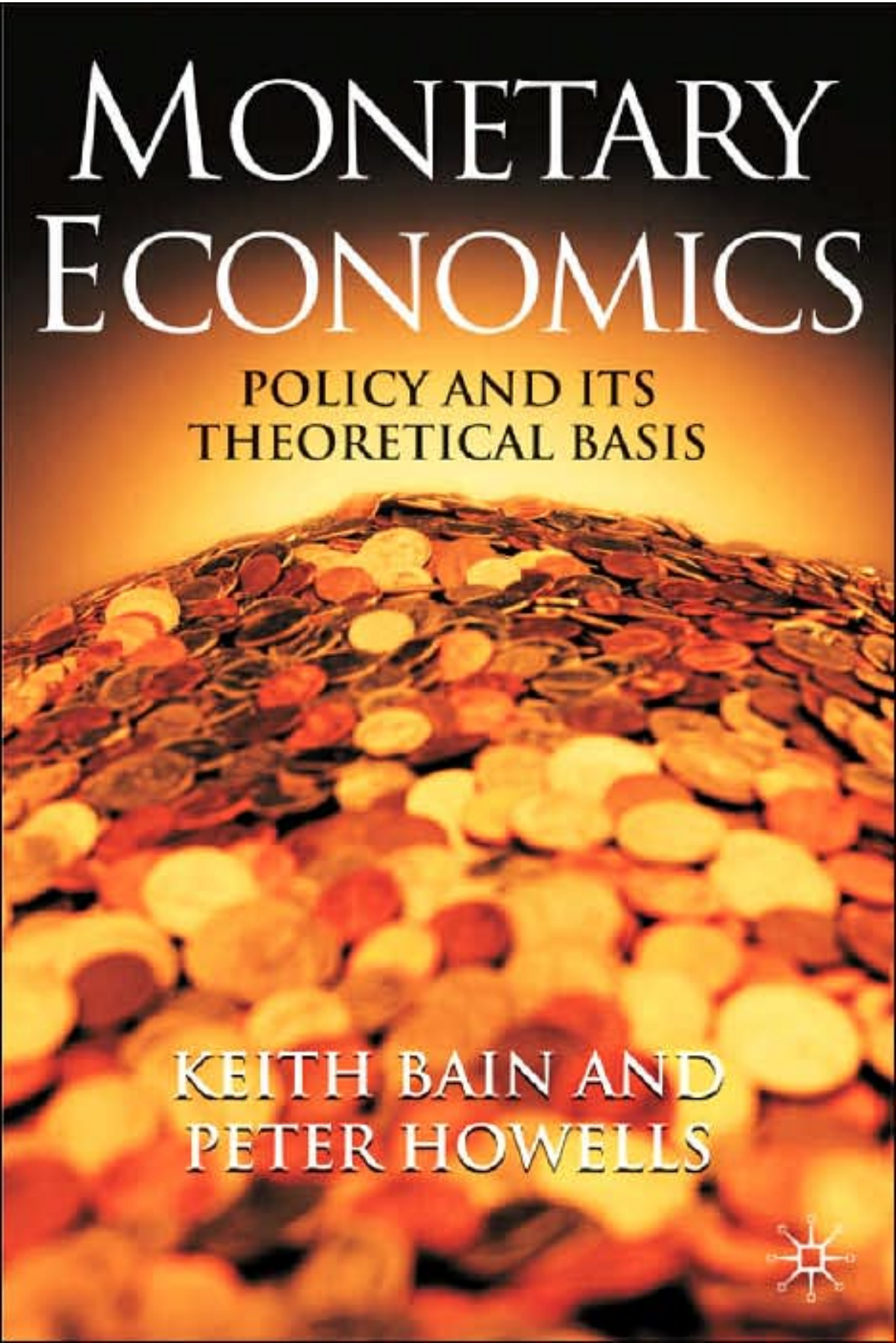
MONETARY ECONOMICS

POLICY AND ITS THEORETICAL BASIS



KEITH BAIN AND PETER HOWELLS

Monetary Economics:
Policy and its Theoretical Basis

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Keith Bain
Principal Lecturer, East London Business School
University of East London

Peter Howells
Professor of Economics, East London Business School
University of East London

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First published 2003 by
PALGRAVE MACMILLAN
Houndmills, Basingstoke, Hampshire, RG21 6XS and
175 Fifth Avenue, New York, N.Y. 10010
Companies and representatives throughout the world

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ISBN 0–333–79255–6 paperpack

This book is printed on paper suitable for recycling and made from fully managed and sustained forest sources.

A catalogue record for this book is available from the British Library.

Copy-edited and typeset by Sarum Editorial Services,
Salisbury, England

Printed and bound in Great Britain by
Creative Print & Design (Wales), Ebbw Vale

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We have taught monetary economics at the University of East London
many years and have now written a book for our students and, we ho
many other students elsewhere. We have also written a book that seeks
redress the imbalance that has existed, it seems forever, in textbooks on
subject. We can only presume that this imbalance has been present, too
many of the monetary economics courses taught. Our particular concern
this regard relates to the dominant assumption almost everywhere that
money supply is exogenous, when clearly it is not — and everyone kno
that it is not, although not everyone seems yet prepared to admit it, mu
less to admit the consequences that follow.

This is not a small thing, since the assumption of endogenous mon
changes many aspects of the subject. It changes entirely one's attitude
the nature of monetary policy and elevates the importance of the supply
money far above that of the demand for money, a reversal of an imbalan
indeed. As we note in a footnote in Chapter 6, in 1999, a three-volume
edited by David Laidler was published under the title *The Foundations*
Monetary Economics, which contains 17 papers on the demand for mon
and none on the supply of money! When you look at the contents of
book you might well, of course, say that we lack the courage of our co
victions since there are two rather long chapters on the demand for mon
Further, much of the two chapters on the transmission mechanism of mo
etary policy assume an exogenous money supply. Our response to this is
say that we appreciate the need for students to understand the attitudes
the past as well as the need to change them.

In most universities, monetary economics has not been a mass subje
Many students have found it esoteric and difficult to understand. We, ho
ever, believe that it is now an extremely important subject and should
studied by most, if not all, students of economics. After all, the regu
decisions of central banks on interest rates are now major news items a
will continue so to be. Our view of the importance of the subject has inf
enced the book in two major ways. Firstly, it accounts for the emphasis
policy. Theoretical aspects of policy and the practice of policy take up f
full chapters as well as entering significantly into several others. This
what we believe students should know about and are likely to find int
esting. Secondly, it has governed our attitude to mathematics and eco

about. On the other hand, we do not believe that large numbers of stude
of economics should feel excluded by an over-concentration on quantitat
material.

We have tried throughout to represent fairly all the ideas we discuss.
shall have failed if we have not done this. None the less, we do hold stro
views about many aspects of the subject and we should equally have fai
if we have not made this clear.

Alas, we do not have secretaries to thank for sterling efforts on
behalf. Perhaps, after many years of working together, we should prin
pally be grateful for each other's forbearance.

KB
PGAH

1

'It is not any scarcity of gold and silver, but the difficulty which suc
people find in borrowing, and which their creditors find in getting
payment, that occasions the general complaint of scarcity of mon
Adam Smith, *Wealth of Nations* (1776) IV. I

What you will learn in this chapter:

- The nature of monetary economics
- The meaning of 'money' in economics
- The importance of money in exchange
- The changing nature of money and its link with social change
- The relationship between money and credit
- The importance of credit
- The meaning of the 'transmission mechanism' of monetary policy

1.1 Introduction

Monetary economics is a branch of economics centred on money and me
etary relationships in the economy. It concentrates on the links betwe
money and prices, output, and employment and so is a development
macroeconomics. Monetary economists have been particularly concern
with the relationship between the rate of growth of the money supply a
the rate of inflation, although monetary economics is a much wider area
study than this implies.

Monetary relationships have been studied for several centuries and
the subject contains a great deal of theory. However, we should alwa
recall that the goal of monetary economics lies in a better understanding
monetary policy: what, if anything, governments and/or central banks c
do to improve the way in which economies perform through the use of
instruments of monetary policy or, at least, to avoid damaging the perfor
ance of the real economy.

Plainly, monetary policy is now regarded as central to the welfare
households and the profitability of firms. The regular decisions of cent
banks on interest rates are major news items. Changes in exchange rates
part of every day journalism. The question of whether the UK should g
up its present currency to join a monetary union is one of the principal po
ical decisions of our day. Monetary policy has become so sensitive that o
the past dozen years many countries have made major constitutional de
sions regarding the operation of monetary policy.

undergraduate economics students. An important reason for this can found in the controversial nature of the material. The subject is full of d agreements and conflict. The standard throw away line, that on any subj two economists will have three opinions, seems to apply to monetary e nomics *par excellence*. There are few topics within monetary economics which a set of ideas can be learnt as 'true'. Thus, students find it diffic to understand, and seek to avoid it.

The reason for this controversy and difficulty can be found in the natu of 'money' itself. Money has been a source of fascination in many fields learning and has been written about by anthropologists, philosophers, a social historians as well as economists. Economists themselves have co sidered various aspects of money such as the reasons for its existen changes in its form, and its role in economic growth and developme However, people writing about 'money' are not always dealing with same thing. Further, the word 'money' is used in everyday speech in a nu ber of ways, generally in different senses from its meaning within moneta economics. The *Oxford Dictionary of Quotations* contains 48 quotatio using the word 'money', ranging from the biblical to the music hall - fr 'the love of money is the root of all evil' (*Epistle of St Paul to Ephesians*, vi. 10) to 'I'll bet my money on de bob-tail nag' (Steph Foster's *Camptown Races*). In many of these quotations, 'money' mea 'income' or 'wealth'. This is not new. Adam Smith noted in 1776 t 'wealth and money … are, in common language, considered as in eve respect synonymous' (Smith, 1776, IV, I).

Nonetheless, this is not at all what modern monetary economists me by 'money'. In modern economics, as in Adam Smith, 'wealth' is produc in the real economy through the production and exchange of goods a services. Money has two clear and separate roles here - in facilitating act of exchange and in expressing in a common unit the value of the ma different goods and services produced. This latter use accounts for the d tinction made in economics between 'real' values and 'money' or 'nomin values. Thus, wealth can be expressed in money terms but 'money' a 'wealth' are certainly not synonymous. However, if 'money' is not same thing as wealth, what precisely is it?

As we shall see in Chapter 2, even within economics 'money' can viewed in a variety of ways and different definitions of money often st from differing ideas concerning the way in which economies function. O of the great historical debates within monetary economics has been over

employment or whether they influence only the general level of pric
There can be little doubt that definitions of 'money' are not neutral in re
tion to economic analysis. Under these circumstances, we must begin
examining carefully the meaning of 'money'.

1.2 The various meanings of 'money'

The *Chambers 20th Century Dictionary* (1983 p. 814) provides the follo
ing definition of 'money':

> *coin: pieces of stamped metal used in commerce: any currency used
> the same way: wealth*

From this, we can make two points. Firstly, as we have suggested abo
'money' in monetary economics is not identified with total 'wealth' as
the final element of the definition here. Rather, when we talk of 'mone
we are discussing one (quite small) part of wealth. An economist's defi
tion concentrates on the earlier elements of the dictionary definition
'money' is defined by its use in commerce or exchange. This gives us
common notion of money as a 'medium of exchange' or 'means of p
ment'. In other words, 'money' is the most liquid part of wealth — that p
which can be most readily exchanged for goods and services.

Secondly, 'money' was once identified with 'coin'. We have this,
course, in 'the king was in his counting-house counting out his money (*S
a Song of Sixpence* in *Tommy Thumb's Pretty Song Book* (c. 1744)'.
shown in Box 1.1, this remains the first definition of 'money' given by
Oxford English Dictionary: 'current coin; metal stamped in pieces
portable form as a medium of exchange and measure of value'. T
bypasses the common notion that 'money', in primitive societies, took
form of 'commodity money': a commodity that had an intrinsic value
came to be used in the process of exchange because it had a number of ch
acteristics that made it acceptable in that process.[1] These characterist
were found most readily in precious metals and it was convenient to t
these into coins of a pre-determined weight.

Since the conversion of metal into coins probably dates back at least
far as the 8th century BC (Galbraith, 1975), it is reasonable to ignore 'co
modity money' in a modern definition. However, we shall return to the c
cept of 'commodity money' in Section 1.4 below since it is important t
consideration of the way in which economists think about money. The id

essentially abstract and that any asset might potentially serve as mon
The abstract nature of money is preserved in the role of money as a 'unit
account'. That is, the use of money allows the value of different goods a
services to be expressed in a common unit, or *numéraire*, whether or n
exchange takes place.

Box 1.1: Dictionary definitions of money

The *Oxford English Dictionary* provides the following definitions of 'money':

1a Current coin; metal stamped in pieces of portable form as a medium
exchange and measure of value. *Piece of money*.

b Applied occasionally by extension to any objects, or any material, servi
the same purposes as coin.

c In modern use commonly applied indifferently to coin and to such prom
sory documents representing coin (esp. government and bank notes)
are currently accepted as a medium of exchange.

2 (With *pl.*) A particular coin or coinage. Also, a denomination of value re
resenting a fraction or a multiple of the value of some coin; in full, mone
of account.

3a Coin considered in reference to its value or purchasing power, hence, pr
erty or possessions of any kind viewed as convertible into money or h
ing value expressible in terms of money.

b with demonstrative or possessive adj., designating a sum applied to a
particular purpose or in the possession of a particular person.

c considered as a commodity in the market (for loan, etc.)

d Wages, salary; one's pay.

4 *pl*. Property = 'sums of money', but often indistinguishable from the sing
(sense 3). Now chiefly in legal and quasi-legal parlance, or as an
archaism.

5 With defining word, forming specific phrases, as big money; chief mone
dirty money; even money; present, real money; single, small money.

The dictionary definition does move on from coin and allows the pos
bility that money consists of 'any currency'. Currency is, in turn, defin
as anything that circulates from person to person in the process of exchan

or cash or what might be called 'ready money' in everyday use. And y
the underlying idea remains that 'money' is anything that is acceptable
payment for goods and services, and payment can occur without the tra
fer of a physical asset. The most obvious example of this is the use
cheques or debit cards to transfer funds from one bank account to anot
This leads to the notion that neither the cheque nor the debit card is mo
but that the bank deposits people can call upon in order to make purcha
are money since the exchange is validated by the circulation of the ba
deposits to which cheques and debit cards refer

We begin to see the difficulty. 'Money', in monetary economics, d
not mean income or wealth. Rather, 'money' is any asset acceptable
exchange for goods and services. We shall see that monetary economi
have spent a great deal of time discussing and testing the 'demand
money'. If we define 'money' as a set of assets generally acceptable
exchange for goods and services, the demand for money is only an indi
demand. What people demand are goods and services but they may ne
money in order to carry out the act of exchange.

The first problem we face, then, arises because a variety of types of as
may allow exchange to take place. This is especially so at an individ
level. Consider a person who has decided to give up stamp collecting
who has a philatelist friend. The ex-stamp collector agrees to exchange
stamp albums for a number of CDs. Plainly, the stamp collection ha
monetary value — it could be sold to a stamp dealer and the money th
obtained could be used to buy other goods and services. However,
stamp collection is not itself 'money' since for an asset to be considered
such it must be generally or widely acceptable directly in exchange
goods and services, not merely be acceptable in an occasional private tra
action. That is, to be classed as 'money', an asset must be exchangeable
goods and services in general.

Thus, 'money' is a sub-set of all those assets that might be acceptable
exchange. Once we acknowledge this, we introduce an element of unc
tainty. To decide which assets are 'money' and which are not, we need
say what precisely we mean by 'generally acceptable'. Further, the ass
that are generally acceptable in exchange might vary from one country
another or from one period to another within the same country.
Goodhart (1989a) notes, money is a social phenomenon that exists in
societies but that is everywhere different.

Our second problem is more important. We need to say something ab

is, the purchaser goes into debt, usually being granted credit by the selle bank, or some other financial intermediary. One way of coping with thi by introducing the idea that 'exchange' only actually occurs when the d incurred by the purchase is settled and for this to happen there has to b transfer of money.

The consequent definition of 'money' as anything that is acceptable final settlement of debt is a common one but this is radically different fr the idea that money allows exchange to occur. Suppose you buy a motor on credit. You drive the car for two years before you settle the debt. these circumstances, it is plausible to say that the act of exchange occur when you obtained the right to drive the car and began to make use of it a that you 'paid' for this right with *credit*. The later settlement of the deb a consequence of the exchange taking place but is not needed to allow it happen.

After all, consider the economic consequences of the exchan Suppose we are talking about a new Ford. Once you have signed the co tract to buy the car, the dealer regards the car as sold. It leaves his sh room and is replaced by another. Ford regard the car as sold and take t into account when they decide how many cars they are going to produce the next period, whether they are going to offer their workers overtime put them on 'short-time' working. These decisions influence Ford's ord for raw materials and the income and hence the expenditure of their wo ers. All of these and other events follow from the physical act of excha — the handing over of the car. In addition, it is at this point that the ca registered in your name with the government and you become lega responsible for it. It is true that if large numbers of people do not repay debt they have taken on there will be an economic impact. It is also true t some people will fail to pay the debt they have entered into and so tech cally a small number of contracts will never be completed. Companies su as Ford allow in their calculations for bad debts of this kind. It remains t the ability to obtain credit permits a high proportion of the exchange i modern economy. Further, the physical act of exchange determines le ownership and produces much of the subsequent economic impact.

The issue becomes clearer when we consider the purchase of goods w a credit card. Over a period of three months, say, a man buys thirty diff ent products using a credit card. He pays a small proportion of the debt has entered into each month but is still in debt a year later. The seller each of the products has been paid by the transfer of a deposit from the ba

does not pay the bank. It is clear that exchange occurs when the credit c
is accepted. In this case, the bank determines the ability to enter i
exchange by the limit that it allows on the credit card. However, this cr
it card limit is not conventionally regarded as 'money' because the p
chaser has gone into debt to buy the goods. 'Money' is, thus, a much n
rower concept than 'credit'.

The credit card case is more complex than that of the purchase of a
from Ford because the purchaser's debt no longer corresponds directly
any particular good he has purchased. Indeed, it is possible for the bank
which he is in debt to sell that debt on to another firm so that it becor
almost totally detached from the act of exchange. Further, the purcha
could repay his credit card debt by borrowing from another bank or finan
company or through re-mortgaging his house. Yet again, debt might
passed on to subsequent generations or be extinguished by bankruptcy
death. The *medium of exchange* is, surely, the credit allowed by the ba
rather than the money the purchaser might eventually hand over. There i
logical distinction between money and credit based on the notion that
exchange remains 'incomplete' until the debt has been settled and that th
by definition, requires money. However, from the point of view of
impact of the exchange on others and on the economy as a whole, the d
tinction between money and credit is of little significance.

We can say that 'money' is likely to be sufficient to enter into an act
exchange (although some companies prefer to be paid by credit card than
personal cheque) but it is certainly not necessary for this. It is true that th
is still a range of transactions in which a purchaser must hand over to
seller bank notes and coin or a cheque or debit card that will bring abou
transfer of bank deposits. Although one can not yet, for example, pay urb
bus fares by credit card, the range of transactions for which this is so l
become much narrower in recent years. There may still be some tempor
embarrassment or inconvenience from not having immediate access to s
ficient money. However, the inconvenience will be very short-term as lo
as one has wealth or reputation against which one can borrow. For son
the cost of borrowing will be very high, but the ultimate constraint rema
the ability to borrow. Exchange is, in general, constrained by the lack
wealth and/or the ability to borrow rather than by the lack of that part
wealth that economists refer to as 'money'.

This understates the importance of money in exchange since it conc
trates on the act of exchange itself and gives no weight to the role of mon

of a lack of 'money' as distinct from a lack of wealth or the ability to b
row.

It follows that the notion of an excess demand for money (the dema
for money being greater than its supply) can only make sense at an agg
gate level. It is true that the great majority of us would like to acquire m
goods and services that we are in practice able to do — but this arises
because of a lack of 'money' in the sense in which the term is used by mo
etary economists but by a lack of wealth. At an aggregate level things m
be different. One of the issues we need to investigate is whether the supp
of money can be lower or higher than the total amount demanded by p
sons and firms to enable them to undertake the exchanges they would o
erwise be able to make and, if so, what the consequences are.

Pause for thought 1.1:

We have suggested:

(a) that current account deposits are 'money' because they can be used to se
debt through the writing of cheques or the use of debit cars; but

(b) that credit is not 'money' because its use creates an outstanding debt.

What, then, should one make of agreed overdraft limits on current accounts? Th
can be used to settle other debts but their use creates a debt to the bank. Are th
'money'?

We shall see in Chapter 6, that part of the problem we face in relation
the demand for money function arises from this discord between the mac
economic and microeconomic significance of money. This shows up p
ticularly as a discord between theory and evidence. Much of the theory
the demand for money is microeconomic in approach but empirical work
concerned with the aggregate demand for money.

Let us recap. At a microeconomic level, we have said, people only ha
a demand for 'money' in the very short term. This contrasts with the us
story that they have a demand for money in order to carry out planned tra
actions. However, a person who makes a high proportion of purchases
credit card might require significant amounts of money for only quite sm
periods of time at the end of each month in order to make the necessa
credit card repayments. Thus, it is more accurate to say that people hav
demand for what we might call 'spending resources'. A person's 'spendi

This requires us to say something briefly about the meaning of 'wealt
The simplest approach is to think of wealth as the total of the real and fin
cial assets owned by people. Clearly, wealth is a major determinant of
ability to borrow. However, it is not the only determinant. For examp
banks are often quite willing to lend to impoverished students - not on
basis of their existing wealth but because they assume that the students
likely to receive good incomes in the future and that this will enable th
to repay their debts. We can allow for this by accepting Milton Friedma
(1957) very broad definition of wealth, which adds 'human wealth' to
total of real and financial assets (non-human wealth). Human wealth co
sists of abilities and skills that enable people to borrow against likely fut
income. The willingness of a financial institution to lend may arise from
existing skills or abilities of the borrower or current enrolment on a cou
of study that will probably develop the necessary skills. Thus, this bro
definition of wealth provides a better indication of the ability to borrow a
hence a measure of 'spending resources'. Of course, even this is not co
plete since banks might lend also because the borrowers' parents are w
off or because he has a satisfactory business plan, is associated with son
one with a reasonable track record in business or much else.

Much is made in many books of the importance of 'liquidity'— gen
ally defined as the ability to convert assets quickly and with little or no r
into money. Assets are often classified in terms of degrees of liquidity, w
money itself being the perfectly liquid asset since it is, by definition, dire
ly exchangeable for goods and services. Thus, a house is not a liquid as
because it is difficult to sell quickly and equities are less liquid than mon
because although they can be sold quickly their prices fluctuate from day
day and one can never be sure of the amount of money one will receive
them when they are eventually sold. However, all assets are effectiv
made liquid to the extent that one can borrow against them.

As we have suggested above, there are occasions when the possession
'spending resources', while necessary, is insufficient for undertaking tra
actions because the resources are not in a form acceptable in exchange (t
is, they are illiquid). However, this is usually important to individuals o
at the level of convenience, not having, for example, enough cash to b
another beer and with the nearest bank cash machine either five miles aw
or not functioning.[2] This lack of liquidity can be overcome by an inco
venient trip to a more distant bank machine or by a loan — from the p
owner or a friend or, perhaps with a short delay, from a financial institut

rowing from a bank takes it for granted that the loan will come in a fo
that allows him or her to spend. Thus, the lack of 'money' does not exc
for very short periods constrain individual demand for goods and servi
and the microeconomic demand for money has little economic significan

1.3 Money in the aggregate

Of course, it might be argued that if I borrow money from someone el
this is part of the total stock of money currently available in the economy
a whole. Then, *as long as we assume that the total supply of money is te*
porarily fixed, we could conceive of a situation in which the supply does
match the current demand for money. But this introduces the import
question of what determines the aggregate supply of money — is it fixed
at least controllable by the monetary authorities, or might 'money' in
aggregate be created by the actions of people in the economy seeking to b
row and to spend? We look at this issue in detail in Chapters 3, 4 and 1

For the moment, let us assume that the aggregate supply of money
temporarily fixed or that it is growing at a predetermined rate. Then,
unanticipated increase in the demand for goods and services, and the co
sequent increase in the demand for money to allow the additional desi
exchanges to take place, might produce a shortage of money in the agg
gate. What does this mean at an individual level? Clearly, those who h
cash or bank deposits will not be immediately affected. Again, there is
physical shortage of notes and coin since these are supplied by the cent
bank and the mint on demand in exchange for deposits. The shortage, th
takes the form of bank deposits not growing sufficiently rapidly. Since,
we shall see in Section 3.2, bank deposits are created when banks ma
loans, the shortage arises through banks being unwilling or unable to m
fully the increased borrowing requirements of consumers at existing int
est rates. In this situation, two broad outcomes are possible.

Firstly, the price of borrowing (the interest rate) might rise. This wo
overcome the shortage if, and only if, the increase in interest rates persua
ed people to borrow less and hence to spend less. That is, we are introdu
ing an additional constraint on aggregate expenditure within the ability
borrow: the willingness to borrow. This willingness is tempered by the c
of borrowing. It would also be possible for the authorities to seek to restr
borrowing (credit) in other ways, such as imposing minimum repaym
amounts. This is clear enough, but the situation is complicated by the st
being told in two, apparently conflicting ways. The first sees the monet

unchanged in the face of an increased demand for it, market forces ca
interest rates to rise. The alternative is to see the monetary authorities
having little or no direct control over the money supply (the money sup
is endogenous) but as having control over interest rates. In this case,
monetary authorities respond to what they see as inflationary press
caused by the initial increase in demand for goods and services by incre
ing the rate of interest. If this does persuade people to borrow and spe
less, the supply of money (or its rate of growth) will fall but, in this ca
the influence of the authorities on the stock of money is only, at best, in
rect, taking place through the rate of interest and then through the dema
for credit.

Expressed in this way, the difference between these channels of inf
ence of the authorities does not seem very important. It remains that
debate over which helps us better understand how the system works
been long and heated and we shall need to consider the issue.

Secondly, as demand for goods and services and the desire to borr
increases, banks might respond by not granting additional loans but
tightening the conditions on which they are willing to lend. Then, so
people who previously could borrow would be unable to do so and oth
would be able to borrow less than previously. That is, people's ability
borrow and hence their spending resources would be restricted — th
would be credit-constrained. Again, the money supply would not grow
this would occur without an increase in interest rate being necessary. T
might happen because, in an uncertain situation and with *asymmetric inf*
mation (discussed in Section 3.5), banks might choose to act in this w
Alternatively, banks might tighten their lending criteria because they are
under pressure to do so by the monetary authorities. That is, the monet
authorities might attempt to influence the ability of people to borrow not
increasing interest rates but by trying to control directly the quantity and
types of loans made by banks. Examples of this in the UK in the 1950s a
1970s are discussed in Section 11.2.

The question arises here of why banks might not meet an increa
demand for loans since these are the source of their profits. The view t
the authorities have direct control over the supply of money sees this
occurring through control over the size of the monetary base (high-powe
money),[3] on the assumption that there is a reliable and predictable relati
ship between the size of the monetary base and the quantity of depo
banks can create. If this were the case, banks would not meet the increa

ever, the authorities could not control the monetary base and/or the re
tionship between the monetary base and the quantity of bank deposits w
unreliable, banks might go on meeting the increased demand for credit
people sought to borrow more in order to increase their spending. The sto
of bank deposits, and hence of money, would increase. In other words,
supply of money might simply increase to meet the increased demand fo
and the shortage in the aggregate supply of money that we assumed at
beginning of this section might never arise. It is clear, then, that a ma
issue in monetary economics concerns the way in which money is crea
and the extent to which the monetary authorities can influence this proce

We assumed above an increase in the demand for goods and servic
We could also assume a fall in the demand for goods and services, prod
ing a fall in the demand for credit. This might lead to a reduction in
stock of money, a fall in interest rates and/or an easing of the conditio
established by financial institutions for the granting of credit.

We could also begin our story with the monetary authorities. We co
assume that the money supply were exogenous and that the authorit
wished to change their existing policy, seeking to persuade people
increase or decrease their demand for goods and services. That is,
assume that the demand for goods and services has not changed but that
monetary authorities for some reason seek to change the money supply (
more accurately, the rate of growth of the money supply) in order to chan
current spending behaviour. We might imagine, for instance, that an ec
omy has operated at much the same rate of inflation for some time but t
now the government seeks to lower that rate. They believe that they can
so by reducing the money supply and forcing up the rate of interest as pe
ple seek to maintain their existing demand for goods and services. T
increase in the rate of interest is then again assumed to deter people fr
borrowing in order to spend. For the monetary authorities to seek to foll
such a policy, they would need to believe that the relationship between
supply of money and the level of spending in the economy was close a
stable. To put it another way, they would need to believe that the dema
for money was stable. This, in turn, would imply a stable technical re
tionship between the amount of money in the economy at any particu
time and the total amount of spending able to be undertaken: the velocity
money would need to be stable.

Whatever our starting point, it is clear that the central policy question
are asking is whether the monetary authorities can hope to control spendi

in exchange.

Pause for thought 1.2:

Can you explain why a stable demand for money implies a stable velocity of mone

The various possibilities considered above are summarized in Table 1 These links between monetary policy and the level of aggregate demand examined in detail in Chapter 6 under the heading of the *transmission me anism of monetary policy*. The transmission mechanism, however, another element. We can see this by continuing to assume an increa demand for goods and services in the economy, leading to an increa demand for money to carry out the desired additional exchanges. But n

Table 1.1: Money transmission effects

Source of change	*Money supply*	*Authorities' response*	*Interest rate change*	*Outcome*
A: Increase in aggregate demand				
1. Money supply increases	Endogenous	—	—	Aggregate demand ris
2. Money supply unchanged	Exogenous	(i) Restrict money supply	Increases	Aggregate demand unchange
	Endogenous	(ii) Raise interest rates directly	Increases	Aggregate demand unchange
3. Money supply unchanged	Endogenous	Restrict credit directly	Unchanged	Aggregate demand unchange
B: Aggregate demand unchanged but authorities seek to reduce it				
1. Money supply reduced	Exogenous	Reduce money supply directly	Increases	Aggregate demand fa
2. Money supply reduced	Endogenous	Increase interest rates directly	Increases	Aggregate demand fa
3. Money supply reduced	Endogenous	Restrict credit directly	Unchanged	Aggregate demand fa

If people are able to borrow freely and interest rates do not rise, demand for goods and services will increase in line with the plans of consumers (the increased demand will become effective). This increas demand for goods and services might be associated with an increase prices, depending on the extent to which the supply of goods and servi could rise to meet the increased demand (either through production imports). Plainly, it is the fear of inflation that leads the monetary autho ties to act. The important monetary policy issues are the effectiveness monetary policy in restraining inflationary pressures within the econo and the extent to which actions to control inflation have an impact on real economy.

We shall see that in dealing with these questions, it is customary to d tinguish between the short-run and long run effects of monetary poli Students are frequently confused, however, over the meaning of the ter 'short run' and 'long run'. This is because much economic analysis is co ducted within an equilibrium framework. The system is assumed to be equilibrium but this is disturbed by a shock, but nothing else is assumed change. Economic agents respond to the shock in such a way that the s tem returns to equilibrium. The impact of the shock can then be analys *ceteris paribus*. Within money markets, equilibrium implies that demand for money is equal to the supply of money (or that the rate growth of the demand for money is equal to the rate of growth of the su ply of money).

Within this framework, the term 'long run' relates to the length of ti needed for the system to return to equilibrium. That is, in the short run system is, by definition, out of equilibrium. There can be no calendar-ti equivalent to this because in the real world:

- economies are subject to frequent shocks and are never in equilibri positions
- shocks are likely to cause other elements within the system to chan
- these changes may well interact with the initial shock to produce f ther changes
- shocks and the subsequent changes generate expectations about fut changes.

It is thus reasonable to say that monetary policy always takes place wi in the short run. However, this conflicts with another usage of the ter For example, according to the economic model used by the Bank England Monetary Policy Committee, a change in UK interest rates has

impact on the economy over six months or a year and the long-run effe
as being the impact over two years or longer. This might sometimes be u
ful but is rather arbitrary and has no relationship with the idea that the lo
run implies equilibrium. As we shall see in Chapter 8, within an equilib
um framework, the long run describes an ideal world in which all expec
tions are fulfilled and economic agents are not subject to money illusion
that is, they do not confuse real and money values.

Pause for thought 1.3:

Keynes is widely quoted as having said: 'In the long run we are all dead'. Is thi
an accurate quotation? In the light of the above discussion, what do you think h
might have meant?

We can sum this section up as follows:

• changes in the relationship between the demand for and supply of l
uid resources ('money' and 'credit') at an aggregate level can hav
variety of important impacts on the economy depending on the extent
which the authorities are able or choose to respond to those changes;

• at an individual level, people are influenced only indirectly, even
strongly — through changes in the interest rate, the rate of inflation,
the ability to obtain credit.

In this section, we have established the following questions to be tak
up in later chapters:

1. What determines the supply of money in the economy and changes
that supply?

2. To what extent, if at all, can the monetary authorities directly cont
this supply?

3. How does the system respond to an increased demand for credit
existing interest rates?

4. Given any limitations on their ability to act, how should the monet
authorities respond to an increased demand for credit?

1.4 The development of money within economies

We have spent a considerable time discussing the meaning of 'money'.
have also looked at the possible links between money, prices, and output
an economy and set down a number of issues to which we must return la

er attention to the role of money in exchange.

Pause for thought 1.4:

What forms of uncertainty can one identify in an act of exchange of goods and services involving delivery at a future date? How does the existence of 'money' help to overcome these?

In analysing this role, Goodhart (1989a) describes money as one of social artefacts (along with the distribution network and organized marke that have evolved to economize on the use of time, which is seen as ultimate scarce resource. This follows the view that the value of money exchange arises because of the existence of incomplete information in m kets. The collection of information needed to allow efficient exchan involves a heavy use of time, which could otherwise be used in the prod tion of additional goods and services. In other words, in the absence money, market exchange involves high transactions costs. These costs ar particularly from the uncertainty that results from inadequate informati The use of money, then, reduces uncertainty for market participants a allows a more efficient use of resources (see, for example, Brunner a Meltzer, 1989).

A common approach to the story of money within monetary econom describes an evolution from primitive economies to modern moneta economies in a number of stages. The process begins with primit economies in which all families were economically self-sufficient and trade occurred. We then pass through:

- the beginning of the process of exchange but solely through barter;
- the development of the use of commodity money;
- the change in the nature of money from commodity money to coi bank notes, and bank deposits and the increasing use of electronic tra fer of deposits.

This approach to the study of money asks what distinguishes moneta exchange from that which takes place through non-monetary mea (barter). The advantages of a monetary economy are then looked at in ter of the costs involved in the process of exchange and the extent to whic movement from barter to the use of money in exchange reduces those cos We shall look at this approach below, but it is worth noting here tha implies far too simple a view of the way in which economies function.

a social process and money a social invention. As such, the role of mo
in exchange differs from one economy to another and changes over time.
any modern economy, monetary exchange and barter both occur and
extent to which each is practised changes constantly. Indeed, both m
occur in a single transaction as in part-payment for a car by trading in an
model. The tendency to think in terms of stereotyped economies can le
to a failure to consider the way in which economic change and the nature
exchange interact. Visions arise of static societies confronted on occasi
by exogenous shocks. An equilibrium model of an economy can be a u
ful analytical device but it is important not to try to impose these models
the much more complex real world. An important recent example was
apparent discovery by monetary economists of 'financial innovation'
explain why their models of the demand for money appeared not to
working. In fact, financial innovation has always been with us and part
the study of monetary economics must be to analyse the interactions amo
real economies, market processes, and institutions within the economy.

Secondly, the barter/monetary exchange distinction is ahistorical a
implies that money came into existence to facilitate exchange. This, in tu
leads to the view that it is possible to analyse a barter economy in wh
money does not exist and then simply add money. This remains a power
idea in modern economics and is at the heart of views that 'money is a ve
over the real economy (Pigou,1949, p.24) and that money is neutral — t
it has no impact on the functioning of the real economy. In reality, there
no evidence that barter preceded money anywhere other than in pre-e
nomic societies in which exchange was only ceremonial. Indeed, W
(1990) argues that money evolved before markets developed and that its
grew much more quickly than the growth of markets.[4] This is not a ma
of pedantry since Wray goes on to show that the different views of the o
gin of money lead to different definitions of money and, in turn, to differ
analyses of the monetary economy.

The idea of money as an addition to a pre-existing barter economy
sometimes acknowledged to be historically inaccurate, only for the story
be justified, in Samuelson's words (Samuelson, 1973), as a 'reconstruct
of history along hypothetical, logical lines'. This raises the question of w
economists have sought to reconstruct history in this way. We shall tell t
story briefly and seek reasons for its attractiveness along the way.

We begin with self-sufficiency. Modern economics often characteri
such an economy as that of Robinson Crusoe — an isolated individual p

vant/slave in Defoe's novel, it also immediately abstracts economic ana
sis from power relationships. Despite this, we establish production as
central measure of progress. Progress from self-sufficiency then requi
the division of labour and specialization. Within a family in a traditio
society, a certain degree of specialization is possible — one member of
family catches fish, a second tends the family's animals, a third weav
cloth and so on. Nonetheless, a more thorough exploitation of speciali
tion requires exchange and this implies the establishment of marke
Markets are seen as a logical construct shorn of institutional and soc
detail and all exchange is thought of as proceeding through markets.

The only available basis for judging welfare in this abstract world
through consumption and the dominant economic question becomes
maximization of individual utility through the most efficient use of sca
resources. Given this starting point, it is only sensible to judge the p
formance of the economic system in 'real terms'. In practice, people of
make judgements in money terms. Indeed, the rich occasionally gain ut
ty by showing the extent of their wealth to others. They may do this
extravagant consumption, but the purpose is often to indicate to others h
successful they have been. Nonetheless, orthodox economists reject
notion that anything can be judged in money terms. As we noted abo
decisions based on money values are disparaged as examples of money il
sion and it is argued that any confusion of money and real values is o
inadvertent and temporary. Once people understand the source of the c
fusion they return, it is assumed, to making judgements in real terms. T
is clearly a very psychologically limited view of human behaviour a
human society but the aim, remember, is to abstract from such compli
tions.

It is a logical development of this approach to believe that economies c
be analysed entirely in real terms. This must follow if we argue that:

- economic behaviour can be separated from social relationships, p
  chological influences and the institutional context in which econo
  decisions are made;
- everyone is concerned with the maximization of individual utility; a
- the source of utility is the consumption of goods and services.

Thus, the notion that 'money' is neutral and has no influence on the r
economy is not a conclusion derived from the analysis of economic beha
iour but an initial assumption of that analysis. It leads to the position t

leads us to the analysis of exchange by barter. If, however, exchange c
occur without money and we assume (incorrectly) that there were societ
in a pre-money world in which all exchange took place by barter, we ne
logical reasons for the invention of money. Wray (1990) argues that 'mon
naturally develops in a capitalist economy in which property is privat
owned and in which production for the market is made possible by prop
ty less workers' (p. xiv). However, in the orthodox story, all econon
activity including exchange could develop without money. It seems natu
then to explain the presence of money in economies simply in terms of
increased efficiency of exchange allowed by money.

Pause for thought 1.5:

To what extent do you make economic judgements in real terms? Can you thin
of occasions when you have been subject to 'money illusion'?

This first requires an explanation of why barter is inefficient. This
done through the notion of the double coincidence of wants — that a pers
who catches fish and wishes to exchange them for pots needs to find
maker of pots who happens to want fish at precisely the same time bef
an exchange can take place. This implies very large search and informat
costs. In other words, people spend a lot of time in the process of exchan
that could be used in a more efficient system for producing more goods a
services. The opportunity cost of a system of exchange by barter is hi
This, of course, is an over-simple vision of exchange even by the us
standards of economics and so it became necessary to acknowledge t
much more efficient systems of barter existed.

Hence, we have the notion that barter passed through stages of incre
ing efficiency. In particular, the literature discusses fairground barter a
trading post barter. Fairground barter occurs when a fair is held for the s
of a particular good in the same place at regular intervals. Then, everyo
who has that good for sale, or wishes to buy it, knows that exchange wo
be much easier if they went to the fair. A common example around Euro
was the horse fair. Trading post barter occurs when someone sets up a tr
ing post at which a specified set of goods are bought and sold and adver
es the location and opening hours. People know that if they were to go
the trading post during its opening hours, they would have a good chance
meeting other people who wished to buy the good they wished to sell or *v*
versa. Thus, both fairs and trading posts considerably reduced search co

trade fairs. This shows that they are methods of organization that have
necessary relation with barter since they allow equally for moneta
exchange.

Nonetheless, our fable of the way in which exchange developed su
ceeds in establishing the inefficiency of barter. A second way in which t
is done is by concentrating on the role of relative prices in the process
exchange. In a barter system, we are talking about price ratios: how ma
fish exchange for one pot; how much maize or fish for one cow, and so
If there are only two goods to be exchanged (fish and pots), there is only
price ratio. With three goods (fish, pots, and maize), however, there
three price ratios (fish/pots; fish/maize; pots/maize). As Visser (1974, pp
and 3) shows, the number of price ratios can be calculated as the number
combinations of two elements from a set of *n* elements. The formula for t
calculation is:

$$\tfrac{1}{2}n(n\text{-}1) \qquad \ldots$$

where *n* is the number of goods and services. Thus, in an economy w
4 goods, there will be 6 price ratios; with 100 goods there will be 4,9
price ratios; and with 1,000 goods 499,500 price ratios. Clearly, bar
is a very inefficient system for this reason. It is, of course, extreme
unlikely that any society proceeded for any length of time witho
attempting to reduce the number of price ratios with which people h
to cope. All that was needed was the adoption of one of the goods a
unit of account in which the price of all other goods could be expresse
This then explains the existence of money. The great reduction
information costs resulting from the use of a unit of account (mone
allows people to spend a greater proportion of their time produci
goods and services, thus improving their standard of living. The noti
of 'information costs' can be considered in more detail. For examp
Clower (1971) speaks of two types of cost associated with bart
These are transactions costs and waiting costs (storage costs, the int
est foregone on the postponed purchase of an asset and the subjecti
costs in doing without a good or service).

We may have an explanation of money as a unit of account but t
is not sufficient to explain why money actually needs to change han
That is, why did money develop as a means of payment? Goodh
(1989a) accounts for this by stressing another informational proble
associated with market exchange. This is lack of information about t

a market could be fully trusted, all exchange could be based on cre
and with multilateral credit and a complete set of markets, mon
would not be needed. An unwillingness of traders to extend credit
to accept other goods as a means of payment means that money
required if some goods are to be purchased. This has become known
a liquidity or cash in advance constraint.

Visser (1974, p.3) points out that the word 'pecuniary' derives from
Latin word pecus which means cattle and that the word 'rupee' comes fr
the Sanskrit roupya, which 'also has something to do with cattle'. T
takes us to the notion that early moneys took many forms as in the colo
ful list in endnote 1, and gives us the idea of money as commodity mon
which we mentioned briefly above. In answer to the question as to w
some commodities were used as money rather than others ooffne can po
to a number of characteristics a commodity should possess before be
used as money. These are that the commodity should be:

- durable
- easily transportable
- easily divisible into small parts
- able to be used in units of a standard value.

In addition, the conditions of supply of the commodity should be stab
If the commodity were subject to sudden increases in supply, people wo
be worried that the value of a unit of the money would fall sharply and th
would not be willing to accept it as a means of payment. Finally, the co
of using the commodity as a means of payment must be small.

We can easily understand from this list why commodity money v
quickly took the form of coins of predetermined weight struck from p
cious metals. The problem with coinage was that people saw very quic
the possibility of reducing the amount of precious metal in coins, for exa
ple by shaving off a small amount of metal and keeping the shavings
their own use. This was known as 'sweating the coinage'. The intent
was to allow the same amount of precious metal to exchange for more goo
than before. The value of the coins in terms of the value of goods th
exchanged for thus became greater than the value of the metal in the coi
In other words, the face value of the coins became greater than the cost
producing the coins. This difference was often put to use by princes a
kings, among other things to finance the fighting of foreign wars. Thus
was called 'seigniorage' from the French word *seigneur*, which mean
feudal lord of lord of the manor. The word is still much used today in m

rency. Thus, the Bank of England produces notes with a face value of £
which exchange for £20 worth of goods but might cost, say, two pence
produce. The extra £19.98 represents a once-and-for-all gain for the mo
etary authorities of the country.[5]

The sweating of the coinage was relatively easily accomplished becau
before the state took over responsibility for the coinage, there were ma
competing mints in existence. For example, Galbraith (1975, pp.24
notes that:

> A manual for moneychangers issued by the Dutch parliament in 1606 listed
> 341 silver and 505 gold coins. Within the Dutch Republic no fewer than
> fourteen mints were then busy turning out money; there was, as ever, a
> marked advantage in substituting plausibility for quality. For each merchant
> to weigh the coins he received was a bother; the scales were also deeply and
> justifiably suspect.

In addition, people saving (or 'hoarding') coins for their future u
would hoard those coins containing the highest weight of metal and wou
seek to use in exchange the coins that had been interfered with such that
amount of metal in the coins was lower than the stated weight. Thus, the
would be the coins most likely to stay in circulation.[6] The 'sweating' of
coinage allowed a given amount of issued coinage to purchase more goo
and services (to increase the velocity of money). The possibility of maki
a profit from reducing the amount of metal in coins led to an import
development in banking. As Galbraith (1975, pp. 25-6) explains, pub
banks were set up in the seventeenth century, initially in the Netherlands,
guarantee the value of coins by weighing them and assessing the true va
of metal in the coins. At the same time, as nation states became mo
important, governments began to take over the responsibility for the mi
ing of coins, reducing considerably the variety of coins in circulation.

Financial intermediaries initially issued notes as receipts for coin a
gold deposited with them. Thus, initially issued notes were backed by
equivalent amount of gold in reserves. However, as banks realized that th
notes were willingly held and accepted in exchange for goods and servic
they were able safely to lend on the gold they held on deposit and the mo
ern fractional reserve banking system developed. The issue of notes, t
ultimately became the preserve of the central bank, which held the offic
reserves of gold. The principal nineteenth century monetary policy deb
then concerned the extent to which the central bank note issue should
backed by gold. The Currency School of economists, worried about

economists, worried by the possibility of aggregate demand being restr
ed by an insufficient issue of notes argued that banks should extend cre
to finance real activity according to their own judgement, using liquid ass
as backing in addition to gold and maintaining a prudent balance betwe
earning assets and gold reserves.

The terms of this debate have changed as the monetary system h
changed, with paper money becoming irredeemable against gold and ba
deposits becoming the principal element in money. Nonetheless, the sp
of the debate has not changed. The modern equivalent of Currency Sch
economists remain concerned about the rate of inflation, the rate of grov
of the money supply and the relationship between them while continuing
distrust governments whom they see as the source of inflation. The mod
equivalent of Banking School economists, on the other hand, place mu
more emphasis on the role of credit in the economy, stress the role of pr
it-seeking commercial banks and are more likely to worry about inter
rates being too high, restricting real economic activity, than about inflati

This story takes us through commodity money to fiat money. In an ec
omy with only commodity money, gold coins and bank notes fully back
by gold, it could be argued that if the supply of commodity money and g
were stable, the money supply would be exogenous, since an increase in
demand for goods and services could not call more commodity money i
existence. However, we have seen that money is a social artefact and,
such, it develops and alters to meet social needs. If the demand for goo
and services is constrained by the inability to obtain 'money' in order
carry out desired transactions, new forms of money develop and/or a hi
er proportion of transactions are carried out on credit. Thus, it is difficul
see that in any longer term sense, the supply of money was ever truly exo
nous. As we shall see, it is extremely difficult to argue that the money s
ply in a modern economy is exogenous in any sense.

1.5 Summary

Monetary economics is very important in modern economies since mo
tary policy decisions have a major impact on everyone. However, it
dogged by widespread disagreements. These partly derive from the di
culty of finding a universally accepted definition of 'money'. This is co
plicated by the variety of meanings the word has in everyday usage. In p
ticular, 'money' is commonly used to mean 'wealth' whereas for monet
economists 'money' refers to only one part of wealth — that part genera

able in the process of exchange. Further, what acts as 'money' is socia
determined, is different from one place to another and changes over time

There is also a problem with the definition of 'exchange'. At an in
vidual level, exchange is constrained by the lack of wealth and/or the ab
ity to borrow rather than by the lack of money. Nonetheless, the quant
of money in the economy may be important at the aggregate level. It is
clear, however, that the monetary authorities are able and/or willing to co
trol the supply of money. Even at an aggregate level, the quantity of mon
in the economy might be no more than an indicator of the level of econo
ic activity.

The story usually told of the development of money in economies see
as arising and changing in order to economize on the information costs a
time needed in the process of exchange. This is historically inaccurate a
biases the debate in favour of the view that money is separate from real ec
nomic activity in the economy — that is, in favour of the view that mon
is neutral.

Key concepts used in this chapter

money
real values
money (nominal) values
the neutrality of money
medium of exchange
credit
wealth
liquidity
exogenous money
endogenous money
transmission mechanism of monetary policy

Questions and exercises

1. The text refers to the 'regular' interest rate announcements of cent
banks. How often and when are interest rate announcements made by:

- the Bank of England Monetary Policy Committee?
- the European Central Bank?
- the Federal Reserve Board of the United States?

3. For a short time, in the early years of the British settlement of Austra (the 1790s), rum was used as a currency. What advantages and disadv tages does rum have as a commodity money?

4. What is the significance of the word 'ready' in the term 'ready mone

5. What limits currently exist on the amount of credit that can be obtai by households? Is there any attempt by the monetary authorities to cont the amount of credit available?

6. The words 'exogenous' and 'endogenous' are used widely in econom — not just referring to money. What precisely do they mean? Provide ot examples of their use.

7. Provide examples of transactions in our modern monetary economy t take place through barter.

8. How would you explain the phrase 'time is money'? In recent yea 'time banks' have been developed to try to help poor people and commu ties to overcome some of the problems they face within the market eco my. Which constraints on people are time banks trying to ease? Try to f some UK examples of time banks.

9. The text refers to the treatment of the market in economics as a theor cal concept devoid of social and institutional features. Clearly there many differences among different types of market. But are these import for economists? For example, the business of financial markets used to conducted face-to-face on the floors of organized exchanges but is now c ducted very largely by telephone and the internet. Is this change likely have had any economic significance? If so, why?

Further reading

Discussions of the meaning of 'money' in economics are often limited definitions or standard roles of money. For more discursive treatment, y are likely to need to consult older books such as Visser (1974) — but th are not now easy to find. By far the most entertaining book on what mo is and how it developed is Galbraith (1975). The early story of money

economists in the first chapter.

2 in Economics

'Only 3l. in each 100l. were cash — that is, coin and bank notes, true money', Bon. Price in *Fraser's Magazine*, May 1880, p. 675.

'In international commerce the form of money most used is a bill exchange, and a good bill is good money', *Westminster Gazette*, June 1903, 2/1.

What you will learn in this chapter:

- How views of the nature of money are influenced by assumptions about the working of economies
- In particular, the impact on definitions of money of assumptions about the leve of information in an economy
- Problems in the expression of the Quantity Theory of Money
- Different approaches to the theoretical definition of money in economics
- Official measures of money and how these have changed over time

2.1 Introduction

In Chapter 1, we discussed the possible meanings of money and dist guished its meaning in monetary economics from its meanings in everyd usage. In this chapter, we look at the various approaches to the formal d inition of 'money' employed by economists. Before this, we look at way in which the preferred definition of money might depend on assumptions made about the nature of the economic system and the role money within that system. We then go on to consider both theoretical a official definitions of money.

2.2 World views and definitions of money

So far, we have said that the only reason for needing a definition of mon is to allow us to measure the money supply and that we might want to this if we believed that we could influence aggregate demand through inf encing the supply of money. This leaves open the nature of the link betwe aggregate demand and inflation, which we shall deal with in Chapters 7 a 8 when we look at the transmission mechanism between money supply a income and prices. We have also suggested that there are difficulties defining the supply of money. One particular problem is that economi tend to think of 'money' in different ways depending on the general vi they hold of how the economy works. To show this, we shall look at t

Money in a world with high levels of information

We begin by assuming an economic system in which all participants a well informed. Markets tend towards equilibrium. When an existing eq librium is disturbed, the return to equilibrium is sufficiently rapid t behaviour may be analysed as if the markets were always in equilibriu That is, we are not saying that the economic system is always in equilib um — merely that an assumption of equilibrium provides the best way analyse the system. Thus, we assume that current real income is always its equilibrium level and that this level is known. Savings decisions, th reflect the long-term choice between the present and future consumption goods and services). This is a real not a monetary decision and is theref a function of the real rate of interest. All savings are invested and the le of investment determines the rate of growth of capital stock, which in tu ensures the desired future level of output. The real rate of interest is det mined by the actions of savers and investors. The plans of economic age are always fulfilled. There is no uncertainty and no scope for purely fina cial transactions.

The money supply is exogenous — the monetary authorities determ its size and rate of growth. We define money as all those assets, and o those assets, that are acceptable in exchange. The price of money is inverse of an index of prices, which we can think of initially as an index the prices of all goods and services in the economy ($1/P_t$). The techni relationship between money and economic activity is then expressed by equation of exchange:

$$MV_t \equiv P_t T \qquad \ldots$$

where M is the stock of money, $P_t T$ is the value of all transactions und taken with money (including exchanges of second-hand goods and fina cial assets as well as of newly-produced goods). V_t, the transactions velo ity of money, is the expression of the technical relationship between stock of money and the flow of transactions and is only likely to chan slowly as the financial system changes. Since it is only likely to chan slowly, we might even think of it as being constant, although this is n essential. Crucially, V_t should be independent of M, P_t, and T. Shocks to would influence $P_t T$, but, in the absence of such shocks, externally en neered changes in M (exogenous money) would produce predicta

We can think of the task of the monetary authorities in measuring a attempting to control the money supply in one of three ways:

- they could attempt to distinguish between those deposits that are h only to allow exchange to take place and deposits held for savings p poses;
- they could attempt to identify a set of assets, changes in the quantity which would, in the absence of shocks to V_t, induce predictable chan in P_tT.
- they could attempt to identify a set of assets, the size of which is unrelated to V_t.

A common approach to distinguishing between deposits held to all exchange to occur and savings deposits was to limit the definition 'money' to non-interest-bearing deposits, on the grounds that people wo only willingly forgo interest on those deposits that they required to carry their planned transactions.

We need to acknowledge at this point a potential problem with the use T (total transactions). When Irving Fisher published his well-known sta ment of the Quantity Theory of Money (Fisher, 1911), he distinguish between those transactions related to national income (Y) and those rela to financial transactions (F). Thus:

$$MV = P_yY + P_fF \quad ...$$

where Y and F are income and financial transactions respectively. Y when economists today refer to velocity, they are almost always referring income velocity, that is to say GDP/M, or PY/M rather than PT Furthermore, income velocity is reported in official statistics. Althoug number of other reasons have been put forward, perhaps the principal exp nation of this is that a measure of total transactions in the economy is readily available.

Pause for thought 2.1:

Why is it so difficult to measure the value of all transactions in an economy, including financial transactions and the exchange of second-hand goods? Can you think of ways in which you might try to obtain such a measure?

chase and sale of newly produced goods and services. Clearly, any as available as a means of payment for this purpose may also be used for tra actions involving second-hand goods and financial assets. We might th write our equation of exchange as:

$$M_Y V_Y + M_F V_F + M_{SV} \equiv P_y Y + P_f F \quad \ldots$$

where M_Y is money held to allow purchases of newly produced goods a services, M_F money held to allow other purchases (of second-hand goo and financial assets) and M_{SV} money held as savings. Thus, to transform $M \equiv PT$ into $MV \equiv PY$, we are implying that:

(i) M_{SV} is zero and

(ii) $P_f F / M_F V_F$ is constant.

We have assumed (i) above. With well-informed market agents, F a Y will also be closely related since financial transactions will only take pla in the pursuit of real ends. That is, as we have noted above, there would no purely financial transactions. Equally, the prices of second-hand goo would be closely related to those of newly produced goods and servic We can therefore feel comfortable with the transformation of V_t into income velocity of money (V_y). The price index we need has also chang We now need an index of the prices of newly produced goods and servi (P_y) rather than of all transactions (P_t). This is another big advantage in co ducting empirical work since the standard published price indices relate Y rather than T.

We would, of course, have great trouble in measuring MY but we co still hope to approach the definition of money empirically by:

- attempting to identify a set of assets, changes in the quantity of wh would, in the absence of shocks to V_y, induce predictable changes in P or
- attempting to identify a set of assets, the size of which is unrelated V_y.

In this case, we would not be attempting to define money directly descriptively but defining it as anything that produces the results we th should be produced by an accurate definition of money.

Can you explain the reasoning behind wishing to identify a set of assets unrela
to the size of income velocity?

In the absence of shocks, we would be looking for a measure of M t
would be associated with a stable or predictable income velocity and, giv
the assumptions made above, we could do so with some confidence.

In an economy such as this, any conversion of non-money assets i
money by individual agents would only produce a redistribution of
existing money balances among people and firms in the economy. It wo
not increase the total.

Starting from a position of just enough money in the economy to all
the purchase of the equilibrium level of Y at the existing price level,
increase in the quantity of money disturbs the equilibrium: people
excess money balances to attempt to buy more goods and services but, si
Y is fixed, the only effect is on P. As P rises, the real value of the mo
stock falls to its original level. Since the only reason for holding mone
to allow the purchase of goods and services, PY goes on rising until
nominal demand for money rises to the new, higher, supply of it. Mone
neutral (having no effect on real variables).

Money in an uncertain world

Let us now assume instead that markets do not function well and that di
quilibrium is the norm. The future levels of employment and output
unknown. People, being in no position to make rational choices betwe
current and future levels of consumption, can only make consumption a
saving plans on the basis of current nominal incomes. Equally, firms do
know the future level of sales and can only base investment plans on
supply cost of capital equipment and the estimated rate of return from va
ous levels of investment. Thus, saving and investment plans are being ma
by different groups of people on different bases and are very unlikely
match. The economy is dominated by uncertainty. Some people plan
save a high proportion of their income; others to dissave through eit
using up past savings or borrowing. The ability to convert savings i
means of payment will be influenced by both their size and their liquid
(the ease, remember, with which an asset can be converted into a means
payment).

Holders of illiquid financial assets may convert them into means of p
ment but there is a cost in doing so since other savers must be persuaded

est in the economy and hence the level of expenditure.

Money thus has value in itself since (in periods without inflation) th is no risk of loss from holding it. Consequently, savers may choose to h part of their savings in the form of money and increases in the quantity money may be held idle as an asset rather than used in the purchase of goo and services. We therefore have a case for widening the definition of mon to include assets that are not means of payment but that can be conver into means of payment with little or no risk of loss. The difficulty is t once we move away from the notion of a 'means of payment', it is hard develop a clear-cut distinction between 'money' and assets that are 'n money'.

Planning to dissave through borrowing introduces another possible li itation on spending plans: the availability of credit. If firms believe tha final payment will ultimately be made, they may extend credit, ma exchanges, and produce on that basis. Attitudes to credit may change ind pendently of changes in the quantity of assets available as a means of fi payment. Financial intermediaries act to weaken further the link betwe the means of final payment and production and employment decisions firms by, in effect, taking over the debt from buyers or sellers.

Consider the implications of this approach to the equations based on the equation of exchange that we considered above:

$$MV_t \equiv P_t T \qquad \ldots$$

Firstly, we are no longer at all sure exactly what M is. Secondly, we likely to have problems in distinguishing between deposits held exchange purposes and those held as savings. That is, we can no long assume M_{SV} to be zero. Thirdly, V_t may change in response to changes in Hence, even if we continue to assume that the authorities are able to cont the level of M, any attempt to restrict $P_t T$ by reducing the quantity of M m be resisted by the easing of restrictions on credit. Thus, any reduction in might be met in part by an increase in V_t, diluting the impact on P Equally, an increase in M might be associated with a fall in V_t. Of cour if the authorities were able to limit the total amount of final payments long enough, and, as a result, debts entered into were not paid, credit wou no longer be offered, or, at least, the terms on which it was granted wou be made tougher. Nonetheless, it is clear that, from the point of view what determines $P_t T$, we should be interested in the volume of credit in economy, rather than the money stock.

ability to do so, the uncertainty surrounding the relationship between M a
P_tT would be so great that it would be very inadvisable for the authorities
attempt to manipulate M. External shocks to P_tT would produce changes
M and money would be endogenous. Our task would be to analyse the ca
es of the external shocks to P_tT.

Finally, there would not be a close link between financial and real tra
actions or between the markets for second-hand and newly produced goo
In a world with low levels of information, market agents would often ma
mistakes. Indeed, in the absence of clear and reliable information about
future values of real variables, it may be wisest for people to base decisio
on current nominal values. Money illusion (the confusion between real a
nominal values), which economists often refer to disparagingly, may b
reflection of rational behaviour in an uncertain world. This would call i
doubt the notion that P_tT and P_yY are closely related. This, in turn, wo
undermine the argument for a stable technical relationship between M a
P_yY, even if there were such a relationship between M and P_tT. It wo
seem highly unlikely that we could find a definition of money that wo
reliably and consistently be associated with a stable income velocity
money.

From this approach to the economy, we might conclude that we do
need a definition of money at all. If we did, out of a general interest, s
to measure the supply of money as distinct from credit, we would opt fo
broad definition that included a range of highly liquid financial assets.

2.3 Economists' definitions of money

We began our discussion in Chapter 1 with a dictionary definition of mo
and noted that money takes a variety of forms — it is anything that cir
lates from person to person in the process of exchange and which provi
a common unit for expressing the price of goods and services exchanged
is obviously important for individuals to know what is acceptable
exchange but this is a matter of national, and sometimes local, practice a
might change over time. We also need to know how to convert illiq
assets into money and how to seek to obtain liquid resources through b
rowing, but, as individuals, we do not need any formal definition
'money'. Nor do we need any appreciation of how much 'money' exists
the economy. Ultimately, if people have sufficient spending resources th
can always obtain money. We have talked above about illiquid assets
all such assets can be converted into money quickly enough if the price

it is not ‘money’ that is scarce. People talk of not having enough ‘mon
but what they lack is ‘spending resources’ as we have defined them abo
real and financial assets together with the ability to borrow.

Pause for thought 2.3:

What does the word ‘money’ mean in the following quotation from Shakespeare
The Merchant of Venice, Act I Scene III?

‘Hath a dog money? Is it possible a cur can lend three thousand ducats?’

Things may be different, however, at an aggregate level. Much depe
on whether we accept the notion that the authorities could and should op
ate on the interest rate by attempting to control the stock of money. In t
case, we would need a clear idea of what constitutes the money supply a
some ability to measure it. If, however, the authorities attempt to cont
spending directly by adjusting the interest rate, we do not need to define
to measure ‘money’ even at an aggregate level. We might still choose
attempt to do so but only perhaps as one of a number of indicators of
desirability of adjusting the interest rate. The fact that we might only ha
a very limited and specific need for a definition of ‘money’ in econom
may well influence the definition we use, although we should bear in mi
that the interest of economists in money is not limited to the macroeconon
relationship between the aggregate money supply and aggregate dema
Let us look, next, at the various approaches to the definition of money
economics.

Descriptive definitions of money

A standard approach is to begin with the three roles attributed to money
the economy. We have mentioned two of these: money as a medium
exchange and money as a unit of account. The third is as a store of value
that the use of money allows for the separation of supply and demand
time. Goods and services can be produced and sold in one time period a
the proceeds held in the form of money until a later period when they c
be used to purchase goods and services. Exchanges in a monetary eco
my are accepted as non-synchronized. This is accepted as a benefit becau
it removes ‘the double coincidence of wants’ associated with barter —
need to find a buyer for your goods who also happens to sell the goods y
desire. In this way, the use of money saves greatly on search and inform

um of exchange. This fits in with the common view of money exemplif by the dictionary definition given in Section 1.2. Further, any asset that p forms the role of a medium of exchange is generally held to be able also act as a store of value and a unit of account. Hicks (1967) denied this, ar ing that money could be a medium of exchange without being a store value as long as, over the course of a day's trading, no individuals have s more than they have bought and vice versa. However, this would be a v special case and the usual view is that all forms of money are stores value, whereas the reverse is not true (see Harris, 1985). Thus, acting a medium of exchange is the only role that clearly sets money apart fr other assets.

Pause for thought 2.4:

What is a cash-in-advance constraint? (If in doubt, see Section 1.4). Would mon be a medium of exchange but not a store of value if there were a cash-in-advan constraint?

Our discussion above, however, alerted us to a problem with the not of 'money' as a medium of exchange since credit acts as a medium exchange but is almost always excluded from definitions of 'money'. C way out is to follow Shackle (1971) and distinguish between the medium exchange (which includes credit) and a means of payment, in the sense o means of final settlement of debt. It is this latter idea that most writers ha in mind. Among the definitions along these lines, we have:

> ...a temporary abode of purchasing power (Friedman, 1963);
>
> ...any asset which gives immediate command over goods and service (Struthers and Speight, 1986);
>
> ...any property right that is generally acceptable in exchange (Fisher, 1911).

These are descriptive or *a priori* definitions of money deriving from notion of money as a means of payment but also admit of the idea of a st of value. However, none of them gives a precise idea of which assets sho be included in a measure of the economy's money stock. Everyth depends on what is acceptable.

Nonetheless, the concentration on the role of money as a means of p ment led to the common acceptance of the 'narrow' view of money as

medium of exchange is money. This, in turn, led to the distinction betwe
narrow money and other financial assets based on whether or not inter
was paid, since it seemed reasonable to argue that people would only ho
in a non-interest-bearing form those funds needed to carry out immin
transactions. Until the middle 1980s, this gave a neat set of assets consi
ing of cash or fiat money (bank notes and coin) plus non-interest bear
deposits with banks ('sight' or chequable deposits). Fiat money is a
known as outside money because it is issued outside the private sector
the monetary authorities, or as 'high-powered' money because it is seen
the monetary base on which the rest of the money supply is construct
Sight deposits with banks are part of 'inside money' because they are b
created by and held within the private sector.

There are two obvious problems with the narrow definition of mon
Firstly, its justification is that all other assets must be converted into no
and coin or sight deposits in order to carry out exchange. However, oth
types of bank deposits and deposits with non-bank financial institutions c
be converted so quickly (and at virtually no cost) into narrow money t
the distinction is hardly worth maintaining. This has been true for ma
years but is all the more true when funds can be moved from one account
another through the internet or by telephone at any time of the day or nig
Indeed, banks now offer 'sweep' facilities that transfer funds automatica
between low interest current accounts and other higher-interest accoun
Equally, other assets do not need to be sold to obtain narrow money but c
be used as collateral for a loan that takes the form of narrow money. Und
these circumstances, many types of asset are as good as narrow money
the purpose of exchange. Certainly, if our interest lies in the notion of a la
of money acting as a constraint on expenditure or as influencing expen
ture plans, the distinction between narrow money and other highly liqu
assets is not worth maintaining.

This justifies the widening of the standard definition to include ba
deposits other than sight deposits. However, once one moves away from t
strict interpretation of means of final settlement of debt and includes l
uidity as a criterion it becomes impossible to draw a line between assets t
are money and those that are nearly money but not quite. The issue w
slightly complicated by the move to the payment of interest on sig
deposits in the 1980s since that raised the question of whether some sig
deposits might be savings rather than being held because of the function
sight deposits as means of payment. In fact, this merely emphasized a pro

acknowledge that people do not know with certainty either the total fut
value of their wealth or the precise value of the transactions they will
undertaking to realize that the distinction is dubious. Some assets prov
convenience because they are acceptable as means of payment or can
easily converted into means of payment. Financial institutions offer a lo
rate of interest on these assets because banks are more limited in their a
ity to make profits from funds deposited with them in this form. Deposit
are prepared to accept a lower rate of interest on these assets because
their convenience. What is important is the interest rate differential betw
assets of differing degrees of liquidity. The attribution in the past of so
special significance to the fact that sight deposits paid no interest sim
gave a false security to the distinction between them and other kinds of ba
deposits.

The second obvious problem with the narrow definition of money is t
it ignores the significance of the idea that to be a means of payment, an as
must be generally acceptable. Since acceptability depends on custom a
the nature of financial institutions, what is and is not 'money' differs fr
economy to economy and changes over time.

This leaves us in the position that the narrow definition of money is
precise and does not reflect the complexity of influences on decisi
regarding the form in which to hold wealth. However, broader definiti
of money are insufficiently precise because there are no clear criteria
deciding what should be included and what left out. Milton Friedman
widely quoted as saying 'money is what money does', implying that a
thing can be counted as 'money' that performs the role of money. This d
not take us very far. There have been attempts to resolve this issue by m
ing use of the 'revealed preferences' of money-holders. This is a mic
economic approach that works on the principle that the best way to find
which assets are 'money' is to discover which assets people treat as mon
We start with a narrow definition including only assets that everyone wo
agree form part of the money stock (notes and coins) and then seek to d
cover by studying household economic behaviour which other assets
treated as sufficiently close substitutes for the original set that they are,
all intents and purposes, equivalent to money. This leaves open what
meant by a 'sufficiently close substitute' and so remains subjective.

An entirely different approach is to decide on the theoretical nature of
relationship of money with other important variables in the economy a
then to define money so as to show that this relationship exists in practi
In other words, one starts with a model of the economy in which 'mon
plays a clear role, with the nature of that role depending on the assumptio
underlying the model. Here we provide two examples of how particu
views of money can be derived from simplified models of the economy
Section 2.2. Once we have the model, we seek a definition of money t
validates the model.

Let us assume that we believe money to be neutral. That is, 'money'
a set of assets changes in the value of which have no impact on real va
ables such as output and employment. We then hope to define money
such a way that empirical tests show this neutrality. Alternatively, we mi
begin with the view that inflation is caused by a too rapid growth of
money supply. A corollary of this is that the demand for money is sta
related to real income. Thus, a demand for money function is construct
using what seems to be the most likely definition of money for the purpo
However, if the function turns out not to be stable, the definition of mon
may be changed until a definition of money is found for which demand do
appear to be stable. This extremely pragmatic approach is strongly su
ported by Milton Friedman and reflects the statement quoted above t
'money is what money does'. The underlying belief is that there must
something, the rate of growth of which is closely linked to the rate of inf
tion, and we may call this something 'money'. The only problem is
practical one of finding an empirical counterpart to the theoretical id
Money is thus defined in the way that yields the most accurate predictio
This is an example of a general approach to economics that sees the pred
tive power of models as all-important. It should not worry us unduly if
assumptions made in the construction of models that predict accurat
appear to be unrealistic.

It remains that this approach to defining money can lead to frequent
hoc adjustments to the definition in an attempt to produce the corr
answer. Given the problems associated with definitions of other variab
in the functions, the dubious quality of many of the statistics be
employed and the complexity of the time lags involved, there is a danger
exercises of this kind becoming more interesting for the range of eco
metric techniques used than for any light shed on important economic re
tionships. It follows naturally that economists who do not start by beli

cism.

In any case, there is a potential practical difficulty. No simple combi tion of assets might produce the desired results. Alternatively, a particu definition may seem to give favourable results when applied to the data one period but the apparent relationships may break down in later perio One reason for difficulties of this kind might be that the different ass included in a definition of money may have different relationships w income. For example, notes and coins, sight bank deposits and other ba deposits may each have a stable relationship with nominal income but relationship may be different in each case. Then, if our definition of mo includes all three of these assets and the proportion each forms of the mo supply changes over time, the relationship between money as a whole a nominal income will change. Thus, a development of the empiri approach has been to weight the various types of deposit to try to ta account of different velocities of circulation. Alternatively, as in the case Divisia indexes, different degrees of liquidity are measured by rates of int est (the lower the interest rate payable on an asset, the more liquid it assumed to be). These are discussed in Section 2.4 below.

2.4 Official measures of money

In the last section we have suggested that the way in which one chooses, would like, to define money is influenced by the way in which one thi that money works: theoretical perceptions predispose us towards particu definitions. In practice, when it comes to defining monetary aggregates policy purposes, the authorities have no such luxury. Debates surround inside and outside money may require, for example, a measure of non-int est bearing money, but if banks make no distinction between interest be ing and non-interest bearing sight deposits, there will be no such da Official measures of money have to reflect the behaviour and practices deposit-taking institutions. This leads us to two rather obvious con quences and an important conclusion. Firstly, pragmatism plays a sign cant role in the compilation of official monetary aggregates with the auth ities having to accept what they can get from the banking system, alb sometimes with pressure applied. Secondly, the aggregates will chan because of changes in banking practice and banking products, as a result other words, of innovation. Both of these characteristics are strongly pr ent in the history of UK aggregates, as we shall see in a moment. Bef that though we might just pause to note that this is our first encounter in t

institutions whose responsibilities to their shareholders, and even to th
clients, come before their responsibilities as agents of monetary policy.
most economies, the official definitions of money as well as the develo
ment of appropriate instruments of monetary control are the outcome o
continuous dialectic between the monetary authorities and the banking s
tem.

Table 2.1 gives a complete listing of all the official monetary aggrega
for which data have been recorded in the UK in recent years. It also gi
their composition and their status at various times. The latter point ne
careful interpretation. The Bank of England has published data for ea
series at some time. The column headed 'first published' gives the date
first appearance in the *Bank of England Quarterly Bulletin*. Quite oft
however, a short back-run of data was also compiled, so date of first pub
cation may not coincide with the beginning of the data seri
'Discontinued' means publication ceased at that date. 'Targeted' is a rat
elastic term. It may mean targeted explicitly or implicitly and it may a
mean targeted by the authorities even though no series was published, as
the early days with DCE, or targeted according to published ranges — in
heyday of monetary targeting. We have also indicated in the final colu
those series that have been subject to 'monitoring' rather than 'targetin
'Monitoring' means that they were closely observed for the informati
they might contain about future developments in the economy and thus
an aid to setting the level of interest rates.

The table is laid out so that aggregates are listed in increasingly 'broa
order, although M4 and M5 are replacements for PSL1 and PSL2 rather th
further extensions of them. DCE, 'domestic credit expansion', and
Divisia indexes are rather different categories and we discuss them se
rately below.

Leaving aside the changes in definitions for a moment, what the ta
shows for the UK is similar to what we would find in any other syste
namely that the authorities record data (published or not) for several seri
At the narrowest end, all central banks are interested in the magnitude of
monetary base or 'high-powered money'. The reason that is usually giv
is that base is an essential input into the money-creation process since ban
must hold a minimum quantity of base in relation to deposits in order
ensure convertibility of their deposits into cash. This ratio lies at the cen
of the deposit-multiplier models of money supply determination. The co
ponents of the base are all liabilities of the central bank and it is therefo

nique known as 'monetary base control'. NIBM1, M1, and M2 are p
gressively wider definitions of what is generally termed 'narrow mone
The first two are narrow in the sense that they focus upon notes and c
plus 'sight' or 'demand' deposits — the media that one would expect to
used primarily for transactions purposes. The appearance of M2 in 19
illustrates the point we made earlier about institutional changes. If one w
interested in money for transactions purposes, it seemed illogical to lea
out many building society deposits since, although they were not at t
time generally chequable, cash for transactions could be drawn on dema
and there was evidence that many such deposits were used by the l
wealthy who did not have bank accounts. The same argument applied
National Savings (a government department) accounts. On the other ha
some large building society deposits were clearly savings (as indeed mi
have been some bank interest-bearing sight deposits) and so M2 was
attempt to cut across both bank and building society deposits to prov
another measure of transactions money.

M3 is a measure of 'broad' money in the sense that it includes sight a
time deposits, including certificates of deposit (CDs). The components
M3 come closest to providing a universal definition of money — import
if one wishes to do comparative empirical work — as the authorities in m
countries publish a series very similar to this (in Germany and the USA
series are actually denoted M3 as well).

PSL1 and PSL2 are even broader definitions. The terms stand for 'p
vate sector liquidity — definitions 1 and 2' and indicate a tendency at
time to think of some components as reaching beyond the limits of 'mone
Bank time deposits with long maturities, treasury bills, and certificates
tax deposit could none of them be used for transactions. On the other ha
they could be turned, quickly, into sight deposits. It is worth noting that
late as 1979, building society deposits were not only thought of as no
money assets; they were included only in PSL2. This explains why wh
in the heyday of monetary targeting, only three years later, it was PSL2 t
was chosen rather than PSL1.

The 1986 Building Society Act permitted societies for the first time
make unsecured loans up to a small maximum proportion of their to
assets. This was enough, however, to allow them to issue their own chec
books and guarantee cards. This made their deposits virtually indist
guishable from bank deposits as a means of payment. The exclusion
building society deposits from mainstream monetary aggregates (symb

Table 2.1: UK official definitions of money

Name	*Components*	*First Published*	*Discontinued*	*Targeted*
DCE (Domestic credit expansion)	Change in £ bank lending to the non-bank public and private sectors	Dec. 1972	March 1986	1967-9 1976-9
M0 (Wide monetary base)	Notes and coin outside the Bank of England + banks' operational deposits at the Bank of England	June 1981		1984-present[1]
NIBM1 (Non-interest bearing M1)	Notes and coin in circulation + NBPS[2] holdings of non-interest bearing £ sight deposits	June 1975	Feb. 1991	
M1	NIBM1 + NBPS holdings of interest-bearing £ sight deposits	Dec. 1970	July 1989	1982-4
M2	NIBM1 + NBPS holdings of interest bearing retail £ deposits with banks and building societies + National Savings ordinary accounts	Sept. 1982[3]		
M3 (£M3 until May 1987)	M1 + NBPS holdings of £ bank time deposits and certificates of deposits (CDs)	March 1977[4]	July 1989	1976-86
M3c (M3 until May 1987)	M3 + NBPS holdings of foreign currency bank deposits	Dec. 1970[4]	July 1989	

PSL1	M3 - NBPS £ bank time deposits with original maturity >2 years + NBPS holdings of bank bills, treasury bills, local authority deposits and certificates of tax deposit	Sept. 1979	May 1987	
PSL2	PSL1 + NBPS building society £ deposits (excl. term shares) + short-term National Savings instruments	Sept. 1979	May 1987	1982-4
M4	M3 + M4PS5 holdings of building society £ shares, deposits and CDs	May 1987		
M4c	M4 + M4PS holdings of bank and building society foreign currency deposits	May 1987	May 1991	
M3H[6]	M4c + public corporations' holdings of £ and foreign currency bank and building society deposits	August 1992		
M5	M4 + M4PS holdings of bank bills, treasury bills, local authority deposits and certificates of tax deposit + short term National Savings instruments	May 1987	May 1991	
'Liquid assets outside M4'	M5 + M4PS holdings of bank and building society foreign currency deposits + further £ liquid assets of M4PS and £ assets of the overseas sector	May 1991		
Divisia	Liquidity-weighted components of M4 (see text)			

Notes: 1 'monitored'; 2 'non-bank private sector'; 3 not to be confused with an earlier version of M2 (Dec. 1970 - Dec. 1971) which was roughly midway betw
M1 and M3; 4 £M3 and M3 included public sector; 5 'M4 private sector' or non-bank, non-building society private sector; 6 a harmonised measure of broad mo

enabled building societies to convert to plc status, in other words to beco
banks. When the Abbey National Building Society did so in June 1989, t
produced a sharp upward break in all those series (excluding NIBM
which contained only bank deposits. From July 1989, therefore, M3 w
discontinued and building society deposits became officially, as many ho
ers had regarded them for years unofficially, 'money'. NIBM1 surviv
until 1991 because it was unaffected, the Abbey National Building Soci
having virtually no non-interest-bearing deposits.

1991 also saw major changes in the recording and classification of l
uid (non-money) assets. Part of the revision involved discontinuing
publication of M4c and transferring the foreign currency component to M
But the assets in M5 itself were dramatically supplemented to inclu
amongst other items, UK-owned off-shore sterling deposits; the overs
sector's holdings of sterling deposits (in the UK and offshore); UK-own
commercial paper, short-dated gilts and, reminiscent of a suggestion fi
made over sixty years ago by J M Keynes, unused sterling credit facilit
such as agreed (but unused) overdraft agreements.

The traditional approach to defining money, as Table 2.1 shows, involv
identifying an appropriate subset of financial assets. Measuring the quan
ty of money then involves the simple aggregation of all those assets in
subset at their nominal value. While this may be an obvious (and straig
forward) approach it suffers from both a theoretical and an empirical wea
ness. At the theoretical level, simple aggregation implies that we are de
ing with homogeneous assets. We seem to be saying, for example, that fr
a monetary point of view, £1bn of CDs is the same as £1bn of notes a
coin. The mere fact that CDs pay interest while notes and coin do not, ho
ever, indicates some degree of differentiation since otherwise no one wou
hold notes and coin. At the empirical level, as we saw in Section 1.3, ec
omists are usually interested in the closeness of the relationship betwee
monetary aggregate and income. This is likely to increase with the ext
to which the aggregate is dominated by assets used for transactions. As
also saw in 1.3, however, it is difficult to know exactly where to draw
line between whole classes of assets for this purpose. Notes and coin a
sight deposits are all perfectly liquid and are obvious transactions media
we know that time deposits can be switched to sight deposits quickly a
cheaply and that other, apparently less liquid, assets have sufficient liqui
ty that they could still be relevant to transactions, albeit to a lesser degre

The Divisia approach involves weighting each of the component ass

tity of money available in the economy for transactions purposes and sho
be more closely linked to expenditure and income.

The weights given to each asset are often said to represent the 'user co
of the asset. To measure the user cost, we must first choose a benchm
asset which provides no transactions services. For example, the Bank
England has published a Divisia index going back to 1977 based upon
components of M4 and using the rate on three-month local author
deposits (the 3mLA rate) as the benchmark. In order to construct the ind
we subtract the rate of interest on the component asset from the rate on
benchmark asset. Notes and coin are given a weight of one representing
difference between the 3mLA rate and zero. Each other asset, a_i, is th
given a lesser weight, w_i, equal to the difference between the benchm
rate and its own rate, i_i, as a fraction of the benchmark-notes and coin d
ferential. In symbols:

$$w_i = (\text{3mLA rate} - i_i)/(\text{3mLA rate} - 0) \quad ...$$

The index, D, is then the sum of the nominal value of each asset adjus
for its appropriate weight:

$$D = \Sigma a_i w_i$$

If it is the transactions services of money in which we are primarily int
ested, then Divisia clearly possesses numerous attractions. There are so
problems though. Firstly, it is still not clear that such an index is measur
transactions services alone since bank accounts give access to other ba
ing services for their holders. Secondly, in using interest rate differenti
to measure user cost we are assuming that interest rates are equilibrium ra
in a perfectly competitive system. A characteristic of the UK monetary s
tor in the 1980s, however, was a marked increase in competition especia
between banks and building societies. For earlier periods, therefore
seems unlikely that this condition holds. Thirdly, unless we assume t
portfolio adjustments are instantaneous, and this is not suggested by e
dence, then the weighted components are unlikely to have equilibrium v
ues. For example, if the rate on an asset increases, the differential with
benchmark asset (and thus the weight) diminishes. But until holdings
that asset have adjusted to its new own rate, the re-calculated weight will
attached to an asset quantity which is too small. Since we are dealing w
an index derived from numerous assets and interest rates and since the

of which index to construct and what interest rates to use in its constructi
We noted above that the bank of England has an index based upon the co
ponents of M4, but such an index could be computed for any of the simp
sum aggregates (excepting M0) and indeed for any other set of assets t
we might think relevant. The choice of interest rate for each asset is unli
ly to be ambiguous but the choice of the benchmark rate is often more d
ficult and will depend upon institutional features of the monetary syste
The benchmark asset has to be capital certain (to be comparable with ot
assets in the index) and yet offer no transactions services (if it did, it sho
be in the index). In most cases, the problem will be one of finding any su
asset (there must not be a secondary market, for example). Where there
more than one, and if differentials between the benchmark assets chan
over time, the logical resolution is to select always the highest benchma
rate.

2.5 Summary

A particular problem in defining money is that economists tend to think
'money' in different ways depending on the general view they hold of h
the economy works. An economist who essentially thinks of the econo
as an equilibrium system is likely to stress the importance of the aggreg
supply of money and to define it narrowly, concentrating on the medium
exchange role of money. On the other hand, an economist who emphasiz
disequilibrium and uncertainty is likely to regard credit as a more import
concept than the money supply.

In seeking to produce a precise definition of 'money' amongst all the
difficulties, economists have attempted to do so both descriptively, usua
starting from the medium of exchange role, and prescriptively, being wi
ing to adjust the definition of money to produce the desired stability in t
demand for money function. There have been many official definitions
money and these have changed frequently over the years.

Quantity Theory of Money	narrow money
store of value	broad money
medium of exchange	divisia indexes
means of payment	benchmark asset
inside money	benchmark rate
outside money	

Questions and exercises

1. What is meant by a 'stable equilibrium'? Draw simple diagrams sho
ing (a) a stable equilibrium; (b) an unstable equilibrium. Is the length
time a system takes to return to an equilibrium position important? If
why?

2. Would it be sensible always to act as if the weather forecast for the f
lowing day were always correct if, on average, weather forecasts were c
rect:

10 per cent of the time?
50 per cent of the time?
90 per cent of the time?

Does this question provide a reasonable analogy with the notion
analysing an economy as if it were always in equilibrium or as if there w
perfect competition? If not, why not?

3. List the advantages and disadvantages of holding savings in the form
money.

4. What do you think is meant in the text by a 'purely financial transactio
Can you provide some examples? Are purely financial transactions nec
sarily speculative?

5. There is a distinction made in the economics literature between 'c
sumption' and 'consumption expenditure'. This distinction implies diff

6. Distinguish between:
   (a) means of payment and medium of exchange;
   (b) inside money and outside money;
   (c) broad money and narrow money.

7. What is the distinction being made in the text between 'descriptive' a 'prescriptive' definitions of money?

8. Distinguish between 'monitoring' and 'targeting' in the context of mon supply measures.

9. List the problems faced by the monetary authorities in preparing mon supply statistics.

Further reading

Monetary economics books generally do not discuss money in the way t we have done here in Section 2.2. Many older monetary economics boo spent time on definitions of money but these are not now likely to be ava able in many libraries. Examples included J Struthers and H Speight (198 and D Fisher (1989).

Equally, official measures of money are less dealt with now than duri the brief period in which the money supply was set as an intermediate t get. However, Handa (2000) provides a brief discussion of the history definitions of money as well as the definitions of the principal official me ures of money in use at the time the book was written.

3 Process

'Central banks almost everywhere usually implement their policies through tight control of money market interest rates. Academic monetary economists almost everywhere discuss monetary policy in terms of the monetary stock. These facts say something about either central bankers or academic monetary economists, or both' W Poole (1991).

What you will learn in this chapter:

- How changes in the quantity of money involve changes in banks' balance she
- How the quantity of broad money can be expressed as a multiple of the monetary base
- How the size of this multiple depends upon underlying portfolio preferences
- How the flow of new money can be analysed as the outcome of bank lending
- How these two approaches can be formally reconciled
- But why each is more appropriate to the analysis of a particular type of monetary regime.

3.1 Introduction

In the last chapter we saw that we encounter many problems when trying define money, especially if we are looking for a definition which actua specifies the assets that should be included rather than simply specify money's functions. However, we also saw that if the authorities wish to co duct any sort of monetary policy they have to decide which assets they going to monitor, even if this involves a degree of arbitrariness and requi the frequent redrawing of boundaries.

In practice, most monetary authorities work with three measures money. These are the *monetary base*, and some measure of *narrow* a *broad* money. For convenience, these are usually identified by numbe Starting from the narrowest measure, M0 is used to denote the monet base and consists only of notes and coin outside the central bank plus ban deposits held with the central bank. Narrow money, M1, consists of no and coin in circulation outside the banking system together with the no bank public's holdings of bank sight deposits. M0 and M1 have pre much the same meaning in all monetary systems. The same cannot be s of the measure of broad money. In the majority of countries this is deno M3, while in the UK it is denoted M4 and, while we can say that the diff ence between broad and narrow money is that the former includes ti

Box 3.1: Official measures of money - end 2001

Name	*Components USA*	*Size $bn*	*Components UK*	*Size £bn*	*Components Eurozone*	*Size €bn*
M0	Currency outside Federal Reserve banks + bank deposits at FR banks	634.5	Currency outside the Bank of England + banks' operational deposits with the Bank of England	37.3	Currency outside national central banks + banks' deposits with NCBs	426.
M1	Currency in circulation + sight deposits + travellers cheques + NOW deposits	1178.8	N/A		Currency in circulation + sight deposits	2138.
M3	M1 + time deposits + money market funds + bank repo liabilities + eurodollar deposits with o/seas US banks	8036.8	N/A		M1 + time deposits + money market funds + bills and bonds with less than 2 years residual maturity	5383.
M4	N/A		Currency in circulation + sterling sight and time deposits of the non-bank private sector at banks and building societies	942.6	N/A	

Sources: www.Bankofengland.co.uk/mfsd; www.federalreserve.gov/releases; ECB, *Monthly Bulletin*, Feb. 2002

1, namely that different monetary systems have different institutional str
tures and these structures change over time. What is accepted as money
one system is not necessarily treated in the same way in another. To ill
trate the point, we show the components of broad and narrow monies in
UK, the eurozone and the USA in Box 3.1. The box also gives an indi
tion of the relative magnitudes of the three measures.

In this chapter, we are going to explore how changes in the quantity
money occur. For this purpose, 'money' consists of notes and coin in c
culation outside the banking system plus a comprehensive range of ba
deposits. It corresponds roughly, therefore, to the national measures
broad money in Box 3.1 and is dominated by bank deposits. The magnitu
of bank deposits is important for two reasons. Firstly, it should alert us
the fact that changes in the quantity of money are the outcomes of an int
action between the preferences of banks, their customers and the monet
authorities: the quantity of deposits will not expand (for example) unl
banks can find a profitable return from marginal additions to loans a
deposits and clients wish to add to loan and deposit portfolios on curr
terms. Secondly, it should alert us to the likely difficulties that monet
authorities will face when they try to constrain the growth of money a
credit. It is not a simple question of modifying their own actions but
modifying the actions of other agents who have no particular interest in
operating to further the authorities' objectives: indeed, these agents m
well feel that the authorities' actions are designed to frustrate their own se
interest.

Before we begin, it is worth noting that what we are describing here i
particular set of institutional arrangements which, while their familiar
may give them a sense of permanence, have not always prevailed. Mon
has not always consisted of bank deposits and its quantity has not alwa
involved the interaction between the income-expenditure decisions a
portfolio preferences of non-bank agents, and the profit-seeking behavi
of banks. Over the years, the importance of a correct understanding of m
etary institutions as an essential prerequisite for the understanding of h
money 'works' has been stressed by a number of writers (Hicks 1967, D
1988, 1996, Niggle 1990, 1991, Goodhart, 2002). The best results fr
consistently applying this principle are revealed in the work of Victo
Chick (for example, Chick 1986, 1993, 1996).

There are broadly speaking two approaches to the analysis of mon
supply changes and both involve the manipulation of a series of (relat

ent at the outset. The fact that two parallel approaches exist, therefore, su
gests that there are rival insights: there are differences of opinion abo
which insights are worth having. And this brings us to another import
issue which is that is that there are different views about how the quant
of money changes, different views, we might say, about the underlying re
ity. The insights generated by one approach are useful if one thinks
underlying system has one set of characteristics, while the insights of
other are useful if the system behaves in a different way. This will beco
clearer as we proceed, but it should be stressed at the outset that eit
approach could be used to analyse changes in the quantity of money in a
regime. The fact that each is identified with a particular state of affairs
simply that the insights it gives are more appropriate to those circumstanc

Since 'money' consists overwhelmingly of bank deposits, in order
make any progress at all, we need to be familiar with the balance sheet
commercial banks and of the central bank and we also need to understa
how flows of funds between commercial banks themselves, and betwe
commercial banks and the central bank, cause changes in the quantity
deposits and in the liquidity of the banking system. Thus, in section 3.2
shall look at stylised versions of commercial banks' and a central ban
balance sheets, look at the effect of flows of funds and introduce some no
tion which will be used throughout the remainder of this book. In sect
3.3 we shall analyse money supply changes through the 'base-multipl
approach', giving a simple summary first and then looking at it more f
mally. In section 3.4 we shall do the same using the 'flow of funds' ide
ty. In section 3.5 we shall show how the two can be formally reconciled a
try to explain why the latter approach has generally been favoured in
UK. Section 3.6 summarises. Throughout the discussion we shall point
the nature of the underlying monetary regime which the insights seem
suggest.

3.2 Bank balance sheets

Box 3.2 shows the stylised balance sheets of commercial banks and a c
tral bank. Notice that the assets of commercial banks are arranged
descending order of liquidity. *Cb* and *Db*, which we shall later c
'reserves' (*R*), are generally non-interest bearing but are essential nonet
less because confidence in the banking system depends upon the inst
convertibility of deposits into notes and coin, and because payme
between clients of different banking companies will require correspond

composition of customer deposits, time deposits requiring a smaller rese ratio than sight deposits. Since these reserves are non-interest bearing can be reasonably sure that banks will hold minimum quantities, either specified by the monetary authorities (a 'mandatory' reserve ratio) or as d tated by their own experience of what provides a safe level of liquidity 'prudential' reserve ratio). This reserve ratio we can denote as *R/Dp*. Th reserves will be supplemented by 'money market loans', that is to say len ing in the interbank market and holdings of money market instrumen much of which can be liquidated on demand or at very short notice. Th is also a ready market for securities (mainly short-dated government bond The most illiquid assets are of course loans and advances (to the public a private sectors). These are generally non-marketable and, in the latter ca can only be called for repayment at the risk of bankrupting the borrower

Box 3.2: Commercial and central bank balance sheets

Commercial bank

Assets		*Liabilities*	
Cb	banks' holdings of notes and coin	*Fs*	capital and shareholders' funds
Db	banks' deposits with the central bank	*Dp*	customer deposits
MLb	banks' holdings of loans to the money market		
Gb	banks' holdings of securities		
Lp	loans (advances) to the general public		
Lg	loans to the government or public sector		

Central bank

Assets		*Liabilities*	
BLcb	central bank loans to the banking system	*Db*	commercial banks' deposits wi central bank
GLcb	central bank loans to government	*Cb*	notes and coin with commercia banks
Fx	central bank holdings of foreign exchange	*Cp*	notes and coin with the non-bank public
Gcb	central bank holdings of government debt	*Dg*	government deposits

Notice that the 'reserve' component of bank *assets* appear as *liabili* of the central bank. This has the effect of interlocking the two sets of b ance sheets. Using the symbols introduced in Box 3.2, Tables 3.1 and show how two different disturbances in commercial bank balance sheets communicate themselves to the central bank and (ii) affect the money s

public (an example of what is often called 'open-market operations').

Table 3.1: An open market sale of government bonds

Commercial bank				*Central bank*			
Assets		*Liabilities*		*Assets*		*Liabilities*	
Cb		*Fs*		*BLcb*		*Cb*	
Db	*(–)*	*Dp*	*(–)*	*GLcb*		*Cp*	
MLb				*Fx*		*Db*	*(–)*
Gb				*Gcb*		*Dg*	*(+)*
Lp							
Lg							

The non-bank public pays for the sale of government bonds by drawi on its deposits at commercial banks (shown by (–)). At the central ba commercial bank deposits are transferred (shown (–)) to the governmer account (shown (+)). Notice that balance sheets must always balance. I commercial banks there is a matching change (–) on opposite sides of t balance sheet; for the central bank there are compensating changes (–,+) the *same* side.

What of the money supply and bank liquidity? Since we define t money stock to include bank deposits of the non-bank private sector, t money stock is reduced (by *Db* (–)). The effect on liquidity is not perha so obvious until we remember that 'reserves' (*Cb* + *Db*) are a small fracti of assets while deposits dominate liabilities. (The reserve ratio, *R/Dp*, very small in other words). Since the reduction on both sides of the balan sheet is equal in absolute size, the effect on *R* is much more pronounc than the effect upon *Dp* and the reserve ratio falls. The reverse can be ea ly demonstrated for the case of an open market purchase of governme bonds.

For the second example, it helps if we remember that a monetary syst is usually a multi-bank system and that what is commercially attractive one bank is likely to be attractive to many. In this case we shall assume t banks wish to increase their lending and to make the illustration more re istic we must introduce a second commercial bank in order to simulate multi-bank system.

We begin with commercial bank *A* which decides that it will increase lending to its clients. This is shown as *Lp* (+). Strictly speaking, the ad

Commercial bank A		Central bank		Commercial bank B	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Cb	*Fs*	*BLcb*	*Cb*	*Cb*	*Fs*
Db (–) [+]	*Dp [+]*	*GLcb*	*Cp*	*Db (+) [–]*	*Dp (+)*
MLb		*Fx*	*Db*	*MLb*	
Gb		*Gcb*	*Dg*	*Gb*	
Lp (+)				*Lp [+]*	
Lg				*Lg*	

tional loans come into existence only when the clients of *A* make payme
Let us suppose that they make payments exclusively to clients of bank
Customer deposits in bank *B* increase by the same amount (shown as
(+))as the increase in lending in bank *A*. These payments are matched b
transfer between the accounts of banks *A* and *B* at the central bank. Thus
A we have *Db* (–) and in *B* we have *Db* (+). What is attractive to bank
however, is also attractive to other banks in the system, including bank
Thus, bank *B* makes additional loans to its customers who (we assu
make payments exclusively to bank *A*. The process repeats itself, in reve
We show the changes this time in square brackets. Loans to customers
bank *B* increase, *Lp* [+]. Customers in bank *A* receive the payments as ad
tional deposits, *Dp* [+]. At the central bank, deposits are transferred fr
bank *B*, *Db* [–] to bank *A*, *Dp* [+]. Notice that at the end of the sequen
changes in the two banks' deposits at the central bank cancel (i.e. th
remain unchanged) while in each bank loans have increased matched b
corresponding increase in deposits.

What can we say about the money supply and bank liquidity in this s
ond case? Remember that we define money as notes and coin (*Cp*) p
bank deposits (*Dp*). In both banks, *A* and *B*, *Dp* have increased and there
thus a corresponding increase in the money stock. As for bank liquid
measured by the reserve ratio *R/Dp*, it is clear that with *Dp* increased and
(= *Cb* + *Db*) unchanged, liquidity is *reduced*.

Equipped with this basic knowledge of bank balance sheets and h
flows of loans and deposits affect the money supply, we can now turn to
two main approaches to aggregate money supply determination.

3.3 The base-multilier approach to money supply determinati

The first characteristic of the base-multiplier (B-M) approach is tha
focuses upon stocks. The stocks in question are the stock of monetary b
(M0) and the stock of money (e.g. M4). It points out that the latter is a m

tary base are liabilities of the central bank, the quantity can be varied at bank's discretion and, given the stable relationship between M0 and M central bank action on M0 will produce a corresponding (multiple) reacti in M4.

Exercise 3.1: Bank loans, deposits and money

Imagine a monetary system with just two commercial banks. Their simplified ba ance sheets are shown below.

Bank A

Assets			*Liabilities*
Cb	=	50	*Dp* = 2000
Db	=	30	
Lp	=	1920	

Bank B

Assets			*Liabilities*
Cb	=	150	*Dp* = 5000
Db	=	50	
Lp	=	4800	

In addition, the non-bank public holds notes and coin (*Cp*) of 400.

1. What is the current stock of broad money?
2. What is the reserve ratio for each individual bank and for the system as a whole?

Suppose now that bank A makes additional loans of 50 to a subset of its customers and that some of these customers use 20 to make payments to other depositors of the same bank and 30 to make payments to clients of bank B.

3. Draw up new balance sheets for each bank.
4. What is the total money stock now?
5. What is the reserve ratio for each individual bank and for the system as a whole?

Suppose now that bank B makes additional loans of 100 to a subset of its customers and that some of these customers use 50 to make payments to other depositors of the same bank and 50 to make payments to clients of bank A.

6. Draw up new balance sheets for each bank.
7. What is the total money stock now?
8. What is the reserve ratio for each individual bank and for the system as a whole?

Suppose that the non-bank public now decides to hold 50 of additional notes an coin.

9. What effect does this have upon the total money stock?
10. What effect has it had upon the aggregate reserve ratio?

ate decision on the part of the central bank, the money stock remains co
stant. It encourages the impression that the monetary authorities are cent
and all-powerful in the determination of the money stock because *ban*
ability to acquire non-reserve assets (e.g. loans and advances) are rese
constrained.

But we can also see from this simple summary that this insight depe
upon some crucial assumptions about the underlying system. Firstly
assumes the stability of two behavioural relationships: indeed, in its si
plest version the B-M approach is sometimes presented as though these re
tionships are fixed. But this is an empirical question which needs to
examined. (Remember what we said in 3.2 about agents' having *pref*
ences). Secondly, while it is true that the monetary base consists of cent
bank liabilities, it does not automatically follow that the central bank eit
can or even desires to control these liabilities. Finally, there is a quest
about whether concentrating on stock equilibrium is very useful when
underlying variables are subject to continuous change. Put briefly, a mo
etary system in which the money supply changes only as the result of
central bank's deliberate adjustment of the monetary base, is a system
which the money supply is *exogenous* — exogenous at least with respect
the preferences of other agents in the economic system. We turn now t
more formal examination of the base multiplier approach.

We begin by defining the two stocks:

$$M \equiv Cp + Dp \qquad \ldots$$

and

$$B \equiv Cp + Cb + Db \qquad \ldots$$

M is (broad) money and consists of notes and coin in circulation with
non-bank public (Cp) plus their holdings of bank deposits (Dp). In practi
M corresponds to one of the broad money measures in Box 3.1. B, the mo
etary base, consists of those same notes and coin plus also now notes a
coin held by banks (Cb) and banks' own deposits at the central bank (D
In practice, B corresponds to M0 in Box 3.1. If we now refer to $Cb + Db$
bank reserves and denote them R, then 3.2 can be rewritten as:

$$B \equiv Cp + R \qquad \ldots$$

At any particular time, there will be a monetary base of given value and si
ilarly a given quantity of broad money and it is a simple task to create a ra

$$\frac{M}{B} \equiv \frac{Cp + R}{} \quad \ldots$$

The first insight comes when we divide through by the non-bank publi holdings of deposits.

$$\frac{M}{B} \equiv \frac{\frac{C_p}{D_p} + \frac{D_p}{D_p}}{\frac{C_p}{D_p} + \frac{R}{D_p}} \quad \ldots$$

For convenience, let $Cp/Dp = \alpha$, and let $R/Dp = \beta$, then we can rewrite as:

$$\frac{M}{B} \equiv \frac{\alpha + 1}{\alpha + \beta} \quad \ldots$$

The insight is that the volume of broad money, in relation to the ba depends upon the two ratios α, which is the public's cash ratio, and β wh is the banks' reserve ratio. Let us suppose for a moment that these ratios stable (not necessarily fixed) then we can *predict* that:

$$M = B.\frac{\alpha + 1}{\alpha + \beta} \quad \ldots$$

and

$$\Delta M = \Delta B.\frac{\alpha + 1}{\alpha + \beta} \quad \ldots$$

Notice that in a fractional reserve system, β will have a value less th one and the term $(\alpha + 1)/(\alpha + \beta)$, let us call it m, will be a multiplier. Rec that the base consists of liabilities of the central bank then, if we assume t the central bank is both willing and able to manipulate these liabilities at discretion, then we get a second, more dramatic, insight, namely that size of the money stock is determined by the central bank's willingness supply assets comprising the monetary base. These assumptions amount a description of a monetary system where the money supply is exogeno ly determined and we can immediately see why the B-M model tends to favoured as a way of describing and analysing changes in the money sto in an exogenous regime: by rearranging two simple definitions we quickly led to this conclusion.

tively are likely to have preferences depending upon relative prices a other constraints. We cannot throw away the standard economic axioms maximising behaviour just because we are dealing with money. That sa we do not promise an exhaustive account of how maximisation might achieved, but we can offer some illustration of relevant factors which w bear upon preferences. If we take α, the public's cash ratio, we can say fi ly that the decision to divide money holdings between notes and c ('cash') and bank deposits must surely depend upon any rate of interest p on deposits, money's 'own rate', which we might denote i_m. The higher rate paid on deposits (and the wider the range of deposits on which i paid), the less willing, *ceteris paribus*, people will be to hold cash.

Furthermore, one of the reasons for holding deposits is to have access the payments mechanism. Just how attractive deposits are as a means payment depends upon current usage — many fewer transactions involv bank deposits a hundred years ago than they do now — and this depends some extent upon technological considerations. The widespread use deposits as means of payment requires the development of an effici cheque clearing system. Since the mid-1960s the big developments in payments system have involved electronic payments — automating th first of all so that customers could set up standing order or direct de instructions and then making electronic transfers possible, most recently the form of debit cards. As the services offered by deposits increase a improve, so they become more attractive relative to cash.

Technology has almost certainly affected the cash/deposit split throu other routes. For a given level of money's own rate and a given level 'services' from deposits, the decision about how much cash to hold m depend to some extent upon the difficulties of switching between cash a deposits, the so-called 'shoe leather costs' based on the idea that repleni ing cash balances involved walking to the bank and standing in a que But one of the many achievements of banking technology has been development of the cash machine or automated teller machine ('ATM') give it its proper name. These machines now allow a wide range of rout banking transactions to be carried out at remote sites like supermarkets, f ing stations, shopping malls and even educational institutions. Given t these facilities make cash replenishment easier, they encourage people hold smaller cash balances. The effect is likely to be more marked in pe ods of rapid inflation and high nominal interest rates when the protection purchasing power offered by interest-bearing deposits will be greatest.

priori. It is conceivable that future technological changes will push in t opposite direction. This means that we cannot give a definite sign to t partial derivative of technology (as we could with money's own rate, example). In practice, however, it is very likely that technological chang have acted over the years towards a reduction in the public's need to ho cash.

Table 3.3: Total transaction volumes in the UK by medium

Millions	*1992*	*1994*	*1996*	*1998*	*1999*	*Annual rate of chan 1992-99*
Paper payments	4,190	3,844	3,621	3,394	3,262	-4%
Automated payments	1,962	2,196	2,613	3,056	3,255	+7%
Plastic cards	2,515	3,095	4,069	5,011	5,562	+12%
Cash (>£1)	15,100	14,200	14,200	14,000	14,000	-1%
Other	1,128	1,117	1,114	1,017	962	-2%
Total	24,900	24,500	25,600	26,500	27,000	+1%

Source: *Yearbook of Payment Statistics, 2000* (London: APACS)

Recent changes in payment preferences are shown in Table 3.3. The f ures are consistent with our remarks about technology in so far as they sh a dramatic increase in automated payments (66 per cent in seven years) a an even more rapid growth in the use of plastic cards (roughly doubled the same period). On the other side of the picture, the clearing of pap based payments has declined by 22 per cent and the use of cash by abou per cent.

As regards influences upon the public's cash ratio, therefore, we can s mise that α will depend to some extent upon at least two factors, mone own rate and technological conditions.

$$\alpha \equiv \frac{Cp}{Dp} = f(\underset{-}{i_m}, \underset{?}{T}) \qquad \ldots$$

Pause for thought 3.1:

In 1999 UK banks caused a stir by suggesting that they would introduce charge for the use of their cash machines which would increase the cost for many customers. In the light of our discussion above, what would have been the likely effect upon the public's cash ratio?

seeking firms, that the cash element of reserves yields no interest and th
in most systems deposits at the central bank are also non-interest beari
This means that holding reserves acts like a tax on banking, an issue
return to in the next chapter.

Banks' decisions to hold reserves will depend firstly upon their co
Where reserves pay no interest then the cost can be proxied by the return
alternative liquid assets, which might be proxied by the bond rate, i_b. Wh
reserves do pay interest, then the cost will be the return on reserves, i_r re
tive to the bond rate. The quantity of reserves held will depend also on
cost of being short, that is upon the rediscount rate charged for lender of l
resort facilities, i_d. This is the rate of interest announced periodically, u
ally monthly, by the central bank. In the UK and the eurozone it is a rate
interest charged by the central bank on short-dated repurchase deals w
banks, using government bonds as the underlying security. Reserve ho
ings will also depend upon any mandatory reserve requirement, RR, a
lastly, upon the variability of inward and outward flows to which banks
subject, σ. This last factor is relevant because the primary purpose
reserves is to enable individual banks to meet demands for cash or, m
importantly, for transfers of deposits as customers make payments to c
tomers of other banks or to the government. The majority of payments
offsetting (payments from bank A to bank B will roughly cancel); reser
are necessary to meet the balance. Provided this balance is predictable,
need for reserves will be limited to the predicted net flow. If it is unp
dictable, then additional funds have to be held. The greater the variance
standard deviation) of the flows, the greater the margin that will be nec
sary.

In summary, then:

$$\beta \equiv \frac{R}{Dp} = f(\underset{+}{i_r}, \underset{-}{i_b}, \underset{+}{i_d}, \underset{+}{RR}, \underset{+}{\sigma}) \qquad ...3$$

Given that we now have some idea of the sorts of influences, and
direction of their effect, upon the ratios α and β, the next obvious quest
is what effect will changes in α and β have upon the size of the multip
expression in 3.7 and 3.8. From there, we can see their effect on the mo
supply.

The answer to the first question lies in the value '1'. Because the val
of α and β are fractions (in practice, very small fractions) it is the '1' wh
gives the expression a multiplier value: the numerator is bound to be lar

nator simultaneously and the outcome may therefore appear indetermin at first glance. But with the numerator already larger than the denomina by virtue of the '1', any change in a must have a bigger effect proportion effect upon the denominator. If we are looking at an increase, therefore given change in α must have a bigger effect upon the denominator than numerator and the value of the multiplier will fall.

With β, the effect is obvious since it appears only in the denominat Any change in β must lead to an inverse change in the value of the mu plier.

Exercise 3.2:

1. Suppose that α = 0.05 while β = 0.01, calculate a value for the multiplier.

2. Suppose that the public's cash preferences change such that α falls to 0.04. Recalculate the multiplier value.

3. Calculate a new value for the multiplier if banks increase their reserve ratio to 0.012 (α remaining at 0.04).

Since the money supply depends upon both the base and the multipl we can write:

$$M = f(\underset{+}{B}, \underset{-}{\alpha}, \underset{-}{\beta}) \qquad ...3$$

and since we know (from 3.9 and 3.10) how α and β are likely to respo to a number of influences, we can substitute into (3.11), to yield a mor supply determined as follows:

$$M = f(\underset{+}{B}, \underset{+}{i_m}, \underset{?}{T}, \underset{-}{i_r}, \underset{+}{i_b}, \underset{-}{i_d}, \underset{-}{RR}, \underset{-}{\sigma}) \qquad ...3.$$

A change in B is a change in the multiplicand; changes in all other va ables cause a change in the size of the multiplier itself.

Pause for thought 3.2:

Making explicit use of the B-M analysis, explain how you would expect the mon supply to be affected by a rise in interest rates announced by the central bank.

We turn now to how this account of money supply determination can presented diagrammatically. The account of money supply determinati which we have just given is more familiar than it may seem since it is wi is assumed, but rarely spelt out, in money market diagrams where a verti money supply curve intersects a downward sloping money demand cur

tion. Before we do that, let us be clear how changes in the variables lis
in 3.12 will be reflected in the diagram.

The horizontal axis depicts the quantity of money as a stock. In t
space, a money supply curve intersects the horizontal (money) axis a
point where $M = m.B$ (where m is the multiplier). A change in B chan
the point of intersection (the supply curve shifts). The same results fro
change in any of RR, i_d i_r, i_m, σ, T since these cause a change in the value
the multiplier.

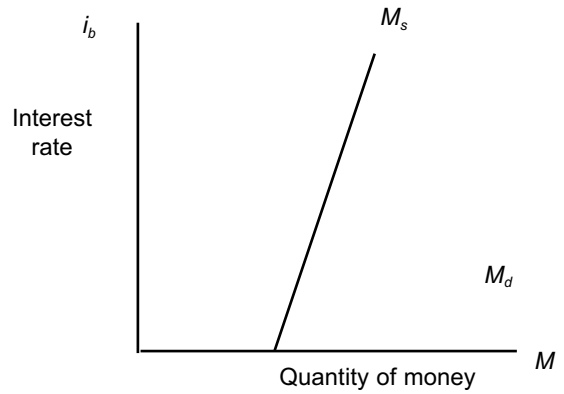
Notice that we have omitted the bond rate, i_b, from this list. This
because the bond rate must appear on the vertical axis. This is because
purpose of drawing the money supply curve in interest-money space at
is ultimately to discuss money market equilibria, the interaction of sup
and demand. With a downward sloping demand curve in the diagram,
rate on the vertical axis must be the opportunity cost of holding mon
Strictly, in a modern monetary system, one might argue that this rate ou
to be a spread term, representing the difference between the bond r
(appearing as a proxy for the return on 'non-money financial assets' wh
agents could hold as an alternative) and money's own rate (effectively
weighted average rate on cash and deposits). This is true but does
change the point we are about to make. If we put a spread term on the v
tical axis it remains the case that a rise in bond rate increases the oppor
nity cost of holding money. As the size of the spread increases the quan
ty of money demanded declines. The crucial point is that it is the bond r
which *must* appear on the vertical axis, either on its own (if money is no
interest bearing) or as part of a spread term.

Now we can see why the money supply curve is drawn with a posit
slope. In our discussion of β, we saw that banks would economise
reserves if returns on other assets increased; this would reduce the value
their reserve ratio (3.10) and this in turn (3.12) increases the money supp
In short, the money supply shows some degree of elasticity with regard
the bond rate and *since the bond rate appears in the diagram* on the ve
cal axis, the effect of changes in the bond rate must be captured by givin
positive slope to the money supply curve.

If as seems reasonable, banks' behaviour towards reserves is depend
upon non-reserve interest rates, the 'vertical' money supply curve m
have some positive slope and one might argue that the money supply
acquired some degree of endogeneity, contrary to what we said at the beg
ning of this section about the B-M approach being associated with exo

geneity is, however, extremely limited. In a fully-endogenous moneta

Figure 3.1: The money supply curve



regime, it is generally accepted that continuous expansion of the mon stock, with little, if any, effect upon interest rates is the norm. Clearly t is not compatible with what we see in Figure 3.1 where a continuous expa sion of the money supply is possible, *ceteris paribus* only if the level interest rates i_b rises without limit. But the more normal case of course that the authorities have some range within which they wish to see i_b rema In circumstances of full-endogeneity continuous expansion requires authorities to change one of the other variables in 3.12 and we shall see the next chapter that this is the monetary base, *B*.

Pause for thought 3.3:

How would you expect the money supply curve in Figure 3.1 to be affected by a increase in the coefficient on the bond rate?

3.4 The Flow of Funds approach

Where the base-multiplier approach focused upon stocks, the flow of fun (FoF) approach concentrates upon changes in stocks, i.e. on *flows*. There a connection with the B-M approach in that one of the flows is the chan in money stock; but the other flow which dominates the FoF approach is flow of bank *lending* to the non-bank public. This is strictly speaking the

money is shown as ΔM, the flow of new loans is shown as ΔLp (for n
lending to the *non-bank private sector*) and ΔLg (for new lending to
public sector).[1] Because it focuses upon flows of new lending and th
ability to create deposits, the FoF approach is sometimes known as
'credit-counterparts' approach.

As with the B-M approach, we begin with the money supply identity

$$M \equiv Cp + Dp \qquad \ldots 3.13/$$

and then rewrite it in flows:

$$\Delta M \equiv \Delta Cp + \Delta Dp \qquad \ldots 3$$

We next concentrate on the deposit element and use the bank balan
sheet identity to remind ourselves that since deposits (liabilities) must
matched by loans (assets) then the same must be true about changes.[2]
the asset side, loans can be decomposed into loans to the private and to
public sector.

$$\Delta Dp \equiv \Delta Lp + \Delta Lg \qquad \ldots 3$$

Concentrate now on bank loans to the public sector. These are just o
way of financing the public sector and, because of its monetary implicatio
and short-term nature, it tends to be a residual source of financing — son
thing to be resorted to after all other forms of finance. So it follows that
can locate the *flow* of new bank lending to the public sector (PSBR) wit
the public sector's total borrowing requirement:

$$\Delta Lg \equiv PSBR - \Delta Gp - \Delta Cp \pm \Delta ext \qquad \ldots 3$$

where ΔGp represents net sales of government bonds to the general pub
Notice that Δext can take a positive or negative value. Δext refers to
monetary implications of external flows. For example, if the public sec
buys foreign currency assets with sterling (as it might if it were trying
hold a fixed exchange rate) this adds to the public sector's borrow
requirement. Selling foreign currency assets for sterling reduces the ne
for sterling borrowing.

We can then substitute 3.16 into 3.15 to show all the sources of chan
in deposits:

$$\Delta Dp \equiv \Delta Lp + PSBR - \Delta Gp - \Delta Cp \pm \Delta ext \qquad \ldots 3$$

because it enters twice, with opposite signs) and reordered the terms to g
3.18, which is often referred to as the 'flow of funds identity'.

$$\Delta M \equiv PSBR - \Delta Gp \pm \Delta ext + \Delta Lp \quad ...3$$

What insights do we gain from the FoF approach? The explicit messa is that changes in the money stock are inextricably linked to lending/b rowing behaviour. But behind this are three implications. The first of th is that changes themselves are what matters — one would not use the F approach to analyse a system where stocks dominate everyone's interest. is an implication of the FoF approach that our interest in money supply an interest in monetary growth. The second implication is that the mon tary base is of little interest. We shall see in the next section that we c rewrite the flow of funds identity so as to include changes in the moneta base, but the fact that the FoF identity is not normally written in that way significant. One does not adopt a method of analysis which deliberat omits variables which one thinks are important. It points to flows as important variables and by omitting references to the monetary base it hi that the authorities might need to find some non-base-orientated way influencing these flows. Equally, one does not normally adopt a mode analysis which gives a key position to variables of little interest. The th implication of the FoF analysis, therefore, is that if/when the authorit become interested in the magnitude of flows, they should pay attention lending/borrowing. While the B-M approach creates the impression t bank lending is reserve (*supply*) constrained, the FoF creates the impressi that it is (*demand*) constrained by the non-bank private sector's desire additional credit.

Pause for thought 3.4:

According to the FoF approach, what is the relevance to monetary growth of go ernment debt sales to the non-bank private sector?

3.5 The two approaches compared

While the B-M and FoF approaches are different ways of analysing quantity of monetary assets, both consist of rearranging identities at le one of which — the money stock and its components — is common to bo

is possible to reconcile the two approaches. Indeed it is perfectly possi
to analyse money supply changes or flows by using an identity which f
tures the monetary base while one could, if one were so inclined, anal
the existing stock of money in terms of the amount of lending. Ea
approach is, strictly speaking, agnostic as regards the underlying beh
ioural characteristics of the monetary system, but each furnishes insig
which are more relevant to a certain type of regime and has thus beco
associated with it. We shall see more of this in a moment, but let us firs
see that the two approaches are formally equivalent.

Pause for thought 3.5:

Using the FoF approach, explain the likely effect on the rate of monetary expans
of a central bank's decision to raise interest rates. (Compare your answer with y
reaction to PfT 3.2).

The B-M approach consists of a statement about the monetary base a
two behavioural relations (see 3.6). We can write the FoF approach
exactly the same terms if we remember that the monetary base consists
cash held by the non-bank public (Cp) together with bank lending to
public sector in the form of reserve assets ($Db + Cb$). (See endnote 2
this treatment of bank reserves). Bank lending to the public sector in
form of reserve assets must be equal to total bank lending to the public s
tor *minus* bank holdings of non-reserve assets (e.g. bank holdings of g
ernment bonds, Gb). So (in changes):

$$\Delta B \equiv \Delta Cp + (\Delta Lg - \Delta Gb) \qquad ...3$$

and, substituting 3.16 and rearranging:

$$\Delta B \equiv \Delta Cp - \Delta Gb + (PSBR - \Delta Gp \pm \Delta ext - \Delta Cp\ ) \qquad ...3$$

From 3.18 and 3.20 we can obtain:

$$\Delta M \equiv \Delta B + \Delta Gb + \Delta BLp \qquad ...3$$

What 3.21 shows is that we can make control of changes in the mo
stock appear to depend upon control of the base together with two beh
ioural relationships, in this case the banks' demand for government d
(ΔGb) and lending to the non-bank private sector (ΔLp), almost as easily

the B-M approach. Some of the reasons for this are historic. These enco
aged the FoF approach years ago and thus ensured a lasting role if o
through inertia. But the FoF also has one overwhelming contempora
advantage that we come to in a moment, but which really forms the the
of the next chapter. We look at four older reasons first.

In the UK, analysis for policy purposes has often focused on the bro
money aggregates — M3 until 1989 and M4 thereafter. This does
require but it does permit the FoF approach which puts the whole of ba
lending on the right hand side. Such an approach cannot be applied t
monetary aggregate containing only a subset of deposits (e.g. M1) since
balance sheet identity requires only that *total* lending is matched by *to*
deposits, and there is no way in which a subset of loans can be linked to a
subset of deposits. In other policy regimes, in the US for example, the p
icy emphasis has often been upon these narrower aggregates and the F
approach does not work.

We noted earlier that the B-M approach emphasises the availability
reserves as a constraint on bank lending while the FoF approach focu
upon the general public's desire for bank credit. The tradition in the UK
for much short-term bank lending to be based upon the overdraft syst
whereby a maximum credit limit is agreed in advance and the borrower th
uses (and is charged for) only that fraction of the loan that is required o
day-to-day basis. Clearly in these circumstances, a proportion of bank le
ing is done at the discretion of the borrower. Furthermore, it cannot
reserve-constrained. A bank that enters into overdraft contracts must gu
antee to meet 100 per cent of the commitment if called upon.

Thirdly, the FoF approach allows all the credit counterparts to moneta
growth to be identified separately. This was particularly important in
days when UK governments frequently ran large budget deficits some
which had to be financed by monetary means. With the independence of
Bank of England and the separation of monetary from fiscal policy (sin
1997) and a policy of fully-funding budget deficits, this is a less compell
argument than it once was.

Another compelling reason for the popularity of the FoF in the U
involves 'credit rationing'. The literature began with Stiglitz and Weiss
1981 who advanced a number of reasons why it might be rational for ban
to ration the volume of their lending in order to screen out some unsafe b
rowers who would be willing and able to pay the going price. The ratio
ality of apparently foregoing profitable opportunities derives from the pr

loans than do the providers of the loans. It is very difficult for banks assess the creditworthiness of borrowers and their projects, this gives rise moral hazard and adverse selection problems. The borrower characterist that banks might use in the screening are discussed in Leland and P (1977) and Diamond (1984) but the important point from the FoF persp tive is that variations in the flow of lending are partly the outcome of ban lending decisions (Stiglitz and Weiss, 1981) and while this is the case th is little point in focusing upon changes in the availability of reserves.

The final and by far the most powerful reason for the widespread ad tion of the FoF framework is that it is easier to apply to the way in wh the UK authorities have, in practice, tried to influence monetary conditio The FoF approach gives a central role to flows of new bank lending an is the flow of bank credit that the UK authorities have focused on, albei differing ways, since 1945. Up until 1971, this control consisted of evolving collection of direct interventions — 'moral suasion' imposed banks to discriminate by type of borrower, then by specifying minim deposits and maximum payback periods for consumer loans. The first these was a supply-side constraint but the latter were intended to work the demand for loans as potential borrowers ruled themselves in or depending upon the severity of the conditions.

In 1971 the *Competition and Credit Control* arrangements swept aw all direct controls and stated the intention of relying upon variations in price of credit, the short term rate of interest, to regulate the demand credit. In the inflationary years of the 1970s, the authorities had occasi al failures of nerve when it was clear that interest rates needed to be hel double figures, and there were occasional outbursts of direct control in form of supplementary special deposits (a reversion to supply-side contr But in 1981, market methods were restored and the last twenty years ha seen a steady convergence in central bank operating procedures towa adjustment of short-term interest rates (Borio, 1997). The short-term r over which central banks have direct control is the lender of last resort rediscount rate which we have already met as i_d in 3.10. But in the B approach the purpose of raising (for example) i_d would be explained as attempt to increase the reserve ratio and reduce the size of the multiplier. practice, raising i_d is assumed to cause banks to raise their lending and b rowing rates and thus to reduce the *demand* for net new bank lending a thus to slow the creation of new deposits. The quantity of reserves and resulting size of reserve ratios has nothing to do with it. In spite of the oc

tral bank. Monetary regulation has always targeted bank lending and ne
the quantity of reserves.

Furthermore, it is the *rate* of money (or credit) expansion that has ex
cised monetary authorities the world over. Nowhere is the stock of any p
ticular interest. A rise in interest rates (today) or a tightening of credit ter
(in the past) was never intended to produce an absolute reduction in
stock of monetary assets or their credit counterparts. This is quite diffic
to deal with in a B-M framework. Recall that we began by saying that
major 'insight' of the approach was that if the authorities did nothing
way of changing the quantity of reserve assets) then the money stock wo
be unchanged. But in practice, the money stock expands continuously at
going rate of interest. If the authorities do nothing (to change the level
interest rates), in the real world the money stock *expands* at its current ra
Thus, the real reason why the FoF approach to money supply determinati
has been so attractive in the UK over the years is that the Bank of Engla
has targeted the flow of new lending and sought to control it through
demand side by changing interest rates. As we shall see in the next chap
years of experience have proved that there is no realistic alternative and
Bank of England has readily acknowledged the fact.

3.6 Summary

In this chapter we have seen that there are two ways of analysing chang
in the quantity of money. One focuses upon *stocks* and looks at the mu
ple relationship between the monetary base and broad measures of mon
the other focuses on *flows* of new loans and new deposits. Although eit
can be used to analyse changes in money in any monetary system and un
any policy regime, each approach carries with it unstated assumptions ab
the nature of the regime it is analysing and each is easier to use and provi
more relevant insights when applied to the type of regime which it is assu
ing. Thus the B-M approach, through its emphasis upon the stock of mo
etary base is most helpful in analysing monetary change in a system wh
the central bank can and does control the quantity of base directly and wh
the cash/deposit preferences of banks and their clients are stable. The fl
of funds or credit-counterparts approach is more helpful in looking at a s
tem where the monetary authorities are more concerned with the rate
monetary expansion and try to influence it through the flow of new ba
loans.

monetary base	prudential reserve ratio
narrow money	mandatory reserve ratio
broad money	open market sales and purchases
reserve ratio	credit counterparts
cash ratio	credit rationing

Questions and exercises

1. In the B-M approach, *explain* the effects of the following and show th
diagrammatically:

a) an introduction of a mandatory reserve ratio in excess of the prud
tial ratio currently in force;
b) the development of new deposit liabilities with zero reserve requi
ments;
c) a dramatic increase in the number and distribution of cash machin

2. Using figure 3.1, show the difference in impact on money market eq
librium of a given reduction in reserve assets when (a) the money sup
curve shows some positive elasticity with respect to the bond rate and
when the money supply curve is completely inelastic with respect to
bond rate.

3. How is the LM curve affected by the introduction of some interest el
ticity in the money supply curve?

4. In the flow of funds analysis, explain the effect of an increase in the g
ernment's budget deficit, *ceteris paribus.*

5. What steps might the authorities take to offset the monetary effects
events in question 4?

6. Why, according to the flow of funds approach, does the choice
exchange rate regime make monetary control more, or less, difficult for
authorities?

The base-multiplier account of money supply determination can be found most intermediate macroeconomic textbooks. To see it presented as definitive account of the money supply process in specialist textbooks need to go to the USA. Mishkin (1995), especially chapters 19 and 20, i good and typical example. Though now rather old, Cuthbertson (198 provides one of the clearest expositions of the approach, together with flow of funds approach and a comparison of the two. Howells and B (2002) ch.12 also compares both approaches.

The Bank of England Quarterly Bulletin (1997b) explains that moneta policy in the UK consists of setting interest rates and letting quantit adjust to demand while the *BEQB* (1999) contains a box explaining h interest rates are set. Borio (1997) does the same for a whole range of cou tries.

4 Control in the UK

'Virtually every monetary economist believes that the CB can cont
the monetary base and…the broader monetary aggregates as we
Almost all of those who have worked in a CB believe that this viev
is totally mistaken…' Goodhart (1994) p.1424.

What you will learn in this chapter:

- Why central banks are in a position to exert considerable influence over short-term interest rates
- Why they have chosen to target short-term interest rates rather than the mone stock
- Why this choice effectively makes the money stock endogenous
- How the endogeneity of money affects our understanding of a range of issues monetary economics

4.1 Introduction

In Chapter 11 we look at the evolution of UK monetary policy over the l
50 years or so. What that survey shows is:

(i) that monetary policy has passed through a number of distinct phas
including an initial phase when its influence upon the rest of the eco
my was regarded as slight;

(ii) that the immediate target of policy instruments has always been
flow of credit and never (not even between 1980 and 1985) the stock
money; and

(iii) that once the Bank of England moved away from direct controls
credit creation (during the 1970s) its chosen monetary policy instrum
was the short-term interest rate at which it was prepared to provide l
uidity to the banking system.

In the terms of the discussion in our last chapter, therefore, the Ban
main focus of attention has always been on the credit counterparts of
money stock and for most of the time its policy instrument has been the r
of interest and not the monetary base. Thus, as we said in the closing pa
graphs, it is hardly surprising that most analysis of the money and cre
supply in the UK has been done using the FoF approach.

In this chapter we look firstly at how a central bank is in a position
impose changes in short-term interest rates upon the rest of the financ

shows, operating procedures are now very similar across most cent
banks. In Section 4.3 we look at *why* central banks have chosen to set int
est rates ('prices') rather than the monetary base ('quantities'). In Sect
4.4 we explain that this behaviour (widespread as it is) effectively makes
money supply endogenous throughout developed monetary systems and
look at the implications of this for the study of monetary economics. T
the circumstances which we analyse are so widely recognised and accep
in central banking and policy circles (see Goodhart, 2002 pp.20-21) rai
the interesting question of why the pedagogy of monetary economics (esp
cially in the USA) remains so attached to the misleading insights of the
M model. Unfortunately, constraints of time and of space prevent us fr
offering any reasons for the scale and persistence of what amounts,
Charles Goodhart's words to misinstruction (Goodhart, 1984, p.188).[1]

4.2 Short-term interest rates as the policy instrument

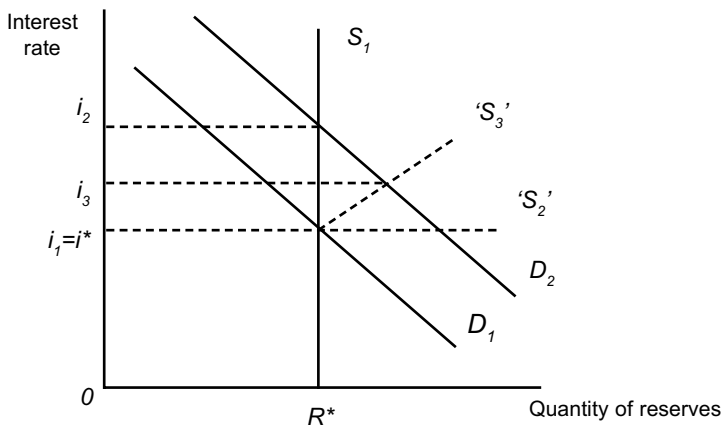
As we explain in Chapter 11, the UK monetary authorities have made u
of a number of policy instruments over the last 50 years, gradually redu
ing the range until they were left only with the central bank's official de
ing rate. Before 1971, they relied upon lending ceilings, qualitative gu
ance (to direct funds to particular uses), hire purchase and other credit ter
and interest rates. In 1971, all the direct controls were to be jettisoned
in practice interest rates had frequently to be supplemented by the supp
mentary special deposit scheme. Since 1981, monetary policy has rel
entirely upon interest rate changes. We look now at how the central ba
can impose a decision about the general level of interest rates, what lim
there might be to this power and what the consequences may be for
determination of the money supply.

Our starting point is that banks must be able to guarantee the conve
ibility into cash of customer deposits.[2] For this purpose they hold 'reserv
of notes and coin and deposits at the central bank. (A glance back at Box
and the surrounding text may be useful here). In the UK these reserves
very small (less than one per cent of deposits) and are supplemented
loans to the money market which are not quite so liquid but have the ben
fit that they pay interest. Other things being equal, the demand for loa
(and the demand for deposits) expands since both are related to nomi
income and this increases as a result of both increases in real income and
the price level. (This is why, when the UK authorities have been concern
about the size of the monetary aggregates — after 1973 and most obvio

the central bank to ensure that the quantity of monetary base (of wh reserves are a part — see equation 3.2) grows slowly enough that at the e of each day the banks involved in the settlement process are short of fu (Bank, 1997a). In addition to this, a large fraction of banks' liquidity c sists of previous short-term borrowing from central banks. When th loans mature ('unwinding of official assistance' in the jargon) they nee be refinanced. Provided that the shortage is system-wide, interbank lend and borrowing cannot resolve the shortage and the central bank is then the position to exploit its monopoly position in the supply of reserves.

Like any monopolist, the central bank can set either the price or quantity of reserves which it supplies. Two contrasting possibilities, and intermediate one, are described in Figure 4.1.

Figure 4.1: The supply of bank reserves



We begin with the situation where the authorities have a fixed target reserves, R*. In the event that demand increases from D_1 to D_2, and there a shortage shown by the distance AB, the central bank can hold to its qu tity target, in which case bidding by banks for the available reserves w push the rate of interest up from i_1 to i_2. Recall what we said above, nam ly that if the shortage is system-wide then interbank bidding cannot chan the quantity which remains at R*. The rise in interest rates must bear all the adjustment.

Alternatively, the central bank may choose to target the rate of intere i*. In this case, the bank must supply whatever quantity of additio

demand curves traces out a horizontal locus. The result *looks like* a ho
zontal supply curve shown by the dashed line which is usually labled
Calling it 'S_2' is a reminder that it is strictly a locus of intersections.

Yet another alternative is that the central bank provides only part
accommodation. The supply curve shifts by just enough to intersect D_2
a position between *A* and *B*, call it *C*. This has the effect of raising the r
of interest to i_3 and if the adjustment is repeated in response to furth
increases in demand the locus will produce an upward-sloping 'supp
curve, shown by 'S_3'.

What precisely is the rate of interest shown on the vertical axis and ho
does it affect any of the money supply components that we saw in Chap
3? The first point to stress is that it is the interest rate at which the cent
bank provides reserves to the banking system. In effect, it is the 'lender
last resort rate'. Analytically, it is, i_d or what we called the rediscount r
in Section 3.3. In different systems it has different names. The ECB lit
ature refers to it as the 'refinancing rate', because as we said the shorta
that we have been imagining can and does often arise from the maturing
loans of reserves that the central bank has made in the recent past as well
from the system's expansion. In the UK it was for some years called 'm
imum lending rate' and was in practice the rate at which the Bank
England was prepared to discount 14-day ('band 1') treasury bills offer
by the discount houses when there was a cash shortage. Several changes
money market operations arrived shortly before the Bank of England's ind
pendence in 1997 (Bank 1997b). One of these was a dramatic widening
the 'counterparties' with which the Bank was willing to deal in smoothi
the supply of reserves. Where previously it had confined its dealings to d
count houses, since then it has been willing to deal with banks, buildi
societies and securities houses (though each must be registered for the p
pose). Furthermore, instead of providing assistance by the outright purcha
of treasury and sometimes commercial bills, since 1997 assistance has be
provided by the use of repurchase agreements ('repos'), in a manner ve
similar to that of the ECB. As Box 4.1 explains, repos are agreements
sell an asset for cash and then to buy it back at a higher price at a specif
time in the future. The difference in the two prices is the 'interest' paid fr
the borrower to lender. Repos are in effect collateralised loans and
money market operations the collateral is government bonds. Thus the r
of interest set by the Bank of England is often referred to as 'repo rate'.

A repurchase agreement (repo) is an agreement to buy a number of specified se rities from a seller on the understanding that they will be repurchased at some sp ified price and time. In the UK, there is an established market for repos in gove ment bonds ('gilts'). Since the repos are usually for very short periods, th months at most, repos are classified as money market instruments (even though maturity of the underlying gilts may be quite long). The difference between the s ing and buying price represents interest paid to the repo buyer by the seller. T formula for finding the interest rate is:

$$i = \frac{(R - P)}{P.n} \quad \ldots$$

where R is the redemption or repurchase price, P is the price at sale and n is length of the repo deal in fractions of a year.

Suppose that the Bank enters into a repo for £1m of government bonds repurchase at £1,001,900 in fourteen days. From Equation 4.1 we can calcul that it will be setting a price for borrowed reserves of:

$$\frac{(1.0019 - 1.0)}{1.0\ (0.038)} = \frac{0.0019}{0.038} = 0.05 \text{ or } 5\%$$

Suppose now that the Bank wishes to raise interest rates by 25 basis poi Rearranging Equation 4.1 we can find the new repurchase price for future deals the same securities.

$$R = (i.P.n) + P = (0.0525 \text{ x } 1\text{m x } 0.038) + 1\text{m} = £1{,}001{,}995$$

Raising the repurchase price of £1m-worth of bonds for fourteen days by £9 equivalent to raising the rate of interest by 25 basis points.

When the central bank changes its official dealing rate, it norma affectsother short-term market rates immediately — pushing them in same direction and by similar amounts. It does not follow that all chan will be identical, however (i.e. that existing differentials will be preserve Depending on the competitive nature of the system, banks may find it p sible to change deposit rates by more than loan rates or *vice versa*. T transmission of these effects occurs mainly by convention but arbitra would bring it about very quickly anyway. Banks price many of their pr ucts by mark-ups on or discounts to their 'base rates' and these base ra are often linked by formula to the Bank of England's official rate. Mo markets are dominated by large institutions who make their profits fr lending and borrowing very large sums for short periods at very small int est differentials (hence the need for the 'basis point', a division of one h dredth of one percentage point, in reckoning money market interest rate

At the moment, the central bank is quoting a repurchase price of £20,050,000 14 day repos based on £20m of UK gilts.

Find:

a) the rate of interest that the central bank is setting

b) the price that it needs to quote if it wishes to change interest rates to 6%

Given that it is market rates (not the official rate itself) which aff agents' behaviour, it is not surprising that the transmission of interest r changes through the money markets and beyond has received quite a lot empirical attention over the years. In the UK, for example, Spencer D examined the link between the Bank of England's 'band 1 stop rate' (treasury bill rate which was for many years the rate which the Bank set) a market interest rates at maturities of 1, 3, 6, and 12-months and 5, 10 a 20-years, for 30 changes in that stop rate between January 1987 and Ju 1991 (Dale 1993). His findings were that:

- The response of market rates was generally positive but often 'ov shot' the change in official rate (i.e. changed in the same direction more than 100 per cent of the official change);
- The effect decayed with term to maturity;
- The effect was greatest at turning points of the interest cycle.
- The examination consisted of estimating the equation:

$$\Delta MR(i)_n = \beta(i)\Delta stop_n + \varepsilon_{in} \quad \ldots$$

where:

$\Delta MR(i)_n$ is the change in the market rate of maturity i on the day of t nth change

$\Delta stop_n$ is the nth change in the Bank's band 1 stop rate

i = 1, 3, 6 months…20 years

n = 1,2,3…30

ε_{in} is an error term.

The first two results were what one would expect. Furthermore, assu ing that short-rates are generally below long-rates, the second result tells something about long-short spreads: they narrow when official rates r and increase when official rates fall.

(set by reference to the Bank's official rate) changes between March 19
and October 1992. Market rates were differentiated by type of asset/liab
ity rather than term, as in Dale 1993. The method used was the event-c
study, familiar in studies of financial markets' response to news but us
also in this context by Cook and Hahn (1989). The findings this time we

- The mean response of all the market rates to a base rate change is p
  itive but significantly less than 100 per cent.

- The responsiveness of market rates is lower, the lower is the degree
  substitutability for the non-bank private sector. Thus, the response to
  official rate change is about 30 per cent for personal loans and credit c
  debt, 38 per cent for corporate loans, above 50 per cent for mortgage a
  deposit rates.

It is worth noting their conclusion that:

> As market rates are sticky, the marginal impact may be less and potentia
> much less, than suggested by a given base rate change. Moreover, this stic
> ness suggests that such spreads may contain useful information about the eff
> tive stance of monetary policy and hence future movements in activity follo
> ing a monetary policy shock. (Dale and Haldane, 1993 p.21).

The stickiness of market rates has also been extensively investigated
Shelagh Heffernan (1993, 1997). Following anecdotal evidence of ba
and building society failure to pass on interest rate cuts to loan custom
Heffernan (1993) showed that the retail banking market was one of comp
imperfect competition with sluggish loan and deposit rate adjustment, w
LIBOR, the London Interbank Offer Rate, proxying the official rate.

More recently (Heffernan, 1997) used an error correction approach
explore the short- and long-run responses of rates on a number of bank
products to changes in official rates. The model was initially estimated
seven different retail bank products using data from four large clear
banks, a number of smaller banks and five large building societies, cov
ing the period (at longest) May 1986-January 1991.

On average, adjustments of chequing accounts and mortgages were
per cent complete within a month, but much slower for personal loans. T
imperfect competition, noted in the 1993 paper was one reason for the sl
response, reinforced by administrative costs. Interestingly, Heffernan ma
a comparison with the pre-1971, pre-*Competition and Credit Control*,
when banks operated an interest rate cartel. In these circumstances,

Changes were mechanical and instantaneous.

Other factors might also influence the speed at which changes in the o cial rate are translated into changes in longer-term interest rates. For exa ple, the administrative costs to the banks in making interest rate chan might cause them not to respond immediately to relatively small changes the official rate, although much again depends on whether they expect a f ther change in the official rate in the near future and on what they exp their competitors to do. Banks are in competition with each other for b assets (for example, in the house mortgage market) and for liabilities (in market for bank deposits). To maintain their spread between borrowing a lending rates (the source of their profits from lending), banks that cut le ing rates must also cut deposit rates. An intensification of the competit for bank deposits might, for example, make banks unwilling to lower rates of interest they were offering on deposits. They might be prepa temporarily to reduce their spread between borrowing and lending rates even so, they might not follow fully a cut in official rates under these cumstances.

This implies that banks have some choice in deciding whether or not respond to the prompting of the central bank. In addition to varying spread between borrowing and lending rates, banks are able to change conditions under which they are prepared to lend (for example, in the c lateral they require for loans). Banks engage as a matter of course in rationing of credit — not everyone is able to borrow the amount they w (or at all) at existing bank interest rates. As we saw in Section 3.5, cre rationing may be justified by the existence in the market for loans of *asy metric information* (we return to this issue in Section 7.7). Thus, to so extent at least banks may choose to respond to tighter monetary conditi by restricting their lending in the hope of reducing the risk associated w their loans.

It should be more difficult for banks to resist attempts by the central ba to push interest rates up since, as we have seen earlier in this section, central bank has the power to induce a genuine shortage of liquidity in economy. If banks hold their assets in a more liquid form than is need all they are doing is forgoing potential profits. If they hold their assets i less liquid form than is needed, they ultimately face the possibility of a l of confidence by the depositors and hence of collapse. Even here, how er, there are some limits to the power of the central bank since it would a very risky policy for central banks to squeeze liquidity to such an ext

lapses. This, in turn, would reduce the confidence of depositors in the ba
ing system — a result that modern governments do not desire.

For all of these possible reasons for stickiness in medium- and long-te
rates, it remains that they are likely to move in response to changes in
central bank's intervention rate at least in the same direction, though
smaller amounts than short rates.

Pause for thought 4.1:

Why might market interest rates not change instantly and exactly in line w
changes in official rates?

So far as *monetary growth* is concerned, what matters most is the resp
siveness of bank loan rates. If an increase, for example, in official rate
quickly communicated to bank loans, then we move up a downward sl
ing demand curve for (the flow of) new loans. Consequently, loans a
through the flow of funds identity, deposits grow more slowly. *If* it is a
the case that the rise in official rates can cause changes in spreads such t
there is a relative cheapening of non-bank sources of credit then better s
This cheapening of the cost of a substitute causes the bank loan dema
curve to move inward. In these favourable circumstances, changes in
official rate have the effect of the proverbial 'double whammy'. A cha
in rates moves us along a curve which simultaneously shifts in a reinforc
direction. This mechanism is quite complicated and we return to it
Section 11.3 where we suggest that various financial innovations in rec
years have dismantled these favourable circumstances, so much so t
changes in official rates are probably very blunt instruments for controll
monetary growth, supposing that the authorities ever wished to do suc
thing.

In spite of all the complications, central banks clearly possess consid
able power to influence short-term interest rates in their role as lenders
last resort. However, this does not mean that they can set even short-te
rates at whatever level they may wish for domestic policy purposes. C
constraint is what is happening to official rates in other major financial c
tres. This constraint is usually imposed by foreign exchange markets wh
will quickly make it clear if they think that a central bank is pursuing
interest rate policy which is inconsistent with the current exchange rate
classic example for the UK is provided by the occasion of the pound's e
from the European Exchange Rate mechanism in September 1992. No c

to raise them sufficiently unless other central banks (notably t Bundesbank) cut their rates to help sterling. Massive sales of sterli occurred until the exchange rate parity was abandoned. We look at mar constraints on central bank policy in more detail in Section 12.3.

In years gone by, a further constraint was imposed by conflicts of pol objectives. From 1945 until the mid-1970s, governments, for whom cent banks acted in effect as monetary policy agents, were inclined to list th policy objectives as stable prices, full employment and economic growth often with a stable exchange rate and balance of payments equilibriu thrown in. The problem, of course, is that four goals are not simultaneo ly consistent with one instrument (in the imperfections of a real world, least). Hence interest rates might be raised to protect the exchange rate was often the case in the UK) but would be reduced at the earliest oppor nity when growth stagnated and unemployment rose. This experience conflicting objectives underlies some of the arguments for giving cent banks independence to set interest rates according to their best judgem *but with only one objective to maximise* — price stability (see Section 8.

Given that the short-term interest rate has become the sole instrument policy for most central banks, attention has turned in recent years to question of how central banks can be helped to make the 'best' decisi regarding the setting of the official rate. This has raised, once again, 'rules versus discretion' debate, though this time over the setting of inter rates rather than the stock of money (broad or base). This debate, which h a long history is discussed in Section 9.3. One of the best known of 'rules' suggested for the setting of interest rates was first proposed by Jo Taylor (1993). The basis of this rule, and its several derivatives, is de with in Section 9.7. What matters here is, as Taylor says, that 'Using interest rate rule…simply makes money endogenous' (Taylor 199 p.661). Central banks do, and have for years, set interest rates and not mo etary aggregates. Given the fundamental nature of this decision, and divergence from so much of what economists write about monetary poli it is time to see why it was taken and why it continues to be reaffirmed.

4.3 The rejection of monetary base control

We have just seen that, given the monopolist's choice between price a quantity, central banks have chosen the rate of interest and not the quant of reserves as their preferred instrument of monetary policy (Goodha

repo agreements (as opposed to outright sales and purchases) as the way making changes in the rates. The alternative, control of the monetary b is, in practice, much more difficult than it sounds when presented as implication of the B-M analysis that we saw in Section 3.3.

The problems, as Goodhart explained in 1994, all stem from the fact t banks must be able to provide *unchallengeable* convertibility between c rency and deposits at par, combined with the fact that reserves pay zero most cases) interest or at least interest rates which are below money mar rates and with fluctuations in flows of funds between the public and priv sectors which cause sharp fluctuations in banks' operational deposits. Fr the first it follows that the demand for reserves is extremely inelastic; fr the second it follows that reserve-holding acts as a tax on banking intern diation and so banks will hold minimum reserves. Putting the two toget means that money market interest rates must be extremely volatile given flows in and out of the banking system. Since any interest is better th none, an end of day excess of bank reserves will be dumped in the mon market until rates are driven down virtually to zero while a shortage w drive rates up to the penal rate at which the central bank does step in or banks are prepared to face the penalty for reserve deficiencies.

Pause for thought 4.2:

Explain why non-interest bearing reserves act as a tax on banking intermediarie

Tinkering with the details can introduce some smoothing. Specifiy the reserve target as an *average* over a period will eliminate day to day fl tuations but will leave rates volatile at the end of the maintenance peri Paying interest on reserves will reduce the distortionary tax efect of rese holding and lead to larger holdings on average. But a new element is int duced into the demand for reserves as money market rates fluctuate relat to the rate on reserves.

Why banks are not reserve constrained in practice is a question that received a number of answers over the years, but they all stem from this f damental dilemma that targeting the quantity of reserves would produce ruptive interest rate fluctuations. We look briefly at the development these arguments and provide a summary in Box 4.2.

One implication of the B-M analysis of money supply determination is that the ce
tral bank can control the size of the monetary base and that this will produce a p
dictable and multiple change in the broad money stock. In each major review of
operation of UK monetary policy (1958, 1971, 1980) however, the authorities ha
rejected such an approach and, indeed, it is difficult to find examples of its use
any developed country. Although policy makers have sometimes stressed
importance of monetary aggregates and the need to control their growth, the ch
sen instrument has almost always been the short term rate of interest. The reaso
for this universal rejection of MBC are many. We give just a brief list below.

If the authorities were able to fix the base, any shock (to the demand for reserv
would have to be accommodated by changes in very short-term interest rat
Because of the convertibility requirement, the demand for reserves is extrem
inelastic and these interest rate fluctuations would be very violent.

- While it is true that the authorities know the size of the base *ex post* it is ve
difficult to control it *ex ante* because it is very difficult to predict the market flo
that cause changes. In its daily money market operations, the Bank of Engla
has frequently to intervene more than once because its morning forecasts tu
out to be wrong.

- Even if it could forecast accurately, it does not follow that the central bank co
undertake the operations necessary to hit the target. If it were necessary to
set a predicted expansion, for example, a sale of bonds or other governm
debt to the non-bank private sector would be necessary and this cannot be c
ried out at short notice without major changes to the debt markets. Continuo
auctions would be required and once again interest rates (on bonds this tim
would become very unstable.

- MBC would probably be inconsistent with other institutional arrangements. F
example, it is difficult to see how banks could make overdraft-type commitme
to clients if they might suddenly find it impossible to obtain the reserves to co
the additional lending.

- Banks' response to the risk that there might be shortages of reserves would
to hold 'excess' reserves. Since these are non-interest bearing this impose
tax on all institutions subject to reserve requirements. Such a tax would ra
the price and reduce the quantity of bank intermediation.

- Experience shows us that any direct control of quantities will stimulate innov
tion designed to evade the constraint. Lending via offshore subsidiaries see
one obvious possibility in a world with free capital movements.

The earliest claim that central banks have little choice but to supp
reserves on demand rests upon the conflict of policy objectives that wou
follow from the behaviour of interest rates under reserve targeting. One v

costs, or in the mark-up on those costs) results in a rise in the demand
active balances. If the level of real output is to be maintained, the supply
money must increase. If it does not, or does not do so sufficiently, inter
rates will rise and this will reduce the level of output and employment.
Weintraub's view, political considerations make this intolerab
Ultimately, the political authorities will instruct the central bank to acco
modate the extra demand for money. Similar views, that central ban
could, if they chose, restrict reserves but choose not to do so for reasons
policy conflicts, appear in Myrdal (1939) and Lavoie (1985). The acco
modating behaviour of central banks, seen from this angle, is essentia
political in origin and the interpretation has a distinctly 'Keynesian' flavo
In the UK, however, the level of interest rates has always been an issue
political sensitivity. In the early-1970s, for example, when broad mon
growth touched 30 per cent p.a. the government of Edward Heath press
the Bank of England to introduce the supplementary special depos
scheme and return to direct controls rather than raise interest rates to
necessary level (see Section 11.2). Goodhart also relates how Marga
Thatcher in the UK, leading a government in the early 1980s which reje
ed any responsibility for output, growth and employment, and stressed
importance of controlling the monetary aggregates, nonetheless baulked
the prospect of raising interest rates to the levels suggested by the Ba
(Goodhart, 2002, p.17).

Given the manifest readiness of governments from the 1970s onwards
sacrifice full employment for low inflation, the accommodating behavio
of central banks needed another explanation. According to Moore (198
chs. 5-8) and Kaldor (1982, 1985) such pressures can be found in the str
ture of modern banking systems. The starting point is that central banks
addition to their role as managers of monetary policy, bear a heavy respo
sibility for ensuring the stability of their domestic financial systems. T
role is commonly referred to as their 'lender of last resort' (LOLR) funct
and reminds us again of a central bank's monopoly position. Since fin
cial intermediation always involves an element of maturity transformati
intermediaries are always subject to the risk that they may have calls
their liabilities which they cannot meet from their relatively illiquid ass
In the case of an individual institution in difficulties, borrowing within
system is a realistic solution but in the event of a system-wide shortage
liquidity the general sale of assets will be self-defeating as regards the ra
ing of liquidity but it could easily cause a collapse of asset prices with

(Moore, 1988a pp.57-65; Kaldor, 1985 pp.20-25). It needs to be empl
sised: this is not a discretionary function. If confidence in the financial s
tem is to be maintained, the public needs to be convinced that this assistan
will always be forthcoming. Such reassurance requires an unquestioni
response, not a response which is hedged around with conditions (Goodha
1984, p.212).

A second structural feature of modern systems explains why such ass
tance might often be required. Most textbook discussion of the lender
last resort tends to focus upon the shortage of liquidity caused by net wi
drawals of cash ('runs on the bank'). However, the same shortage of l
uidity, a fall in the *R/Dp* ratio, will occur when banks increase their lendi
and in many banking systems banks are contractually committed to ma
additional loans on demand. This arises from the 'overdraft' facility wh
banks agree to meet all demand for loans up to a ceiling. Customers th
use that proportion of the facility that they require on a day to day bas
Typically, the proportion of the facility that is in use at any one time is abo
60 per cent of total commitments. Thus it follows that if the state of tra
requires an increase in working capital to bridge the time gap betwe
firms' additional outlays and the receipts from increased sales, requests
loans will always be met. '...if bank loans are largely demand-determin
so that the quantity of bank credit demanded is a non-discretionary varia
from the viewpoint of individual banks, this then implies that the mon
supply is credit driven.' (Moore, 1988b, p.373). If the state of trade[3] mea
customers demand more advances, banks have no choice (unless they are
break contractual agreements) but to expand their lending. Advances (a
deposits) will rise relative to reserves, interest rates will rise and secur
prices fall, reducing the value of bank assets. Faced with a general shorta
of liquidity, the central bank *must*, as we said above, provide assistan
Essentially the same argument is put by Wray (1990, pp.85-90).

There are two further structural features which make it impossible
central banks to resist the demand for reserves. The first is the structure
banks' assets which are overwhelmingly non-marketable loans (rather th
marketable securities). Moore highlights the problem by posing a reducti
in the monetary base brought about by open market operations of the te
book type. Bank reserves are reduced but banks cannot reduce their balan
sheets because calling in loans will bankrupt their customers. This illust
tion is easily modified to reflect a more realistic state of affairs. Recall t
expansion of bank balance sheets is the norm. We must imagine banks ma

bank stance. From this point, Moore's argument follows as before. Ba
cannot unwind this position without causing chaos.[4]

Lastly, it is worth noting that most monetary regimes which pay a
attention to the base/deposits relationship require banks to report on th
holding of base at time *t*, and their holdings of deposits at some earlier pe
od, *t-1*, the system of lagged reserve accounting. The current level
required reserves is thus *predetermined* by the past level of deposits (Moo
1988a; Goodhart, 1984 p.212). In these circumstances, there is plai
nothing that banks can do to accommodate deposits to reserves. A
desired ratio can only be met by the central bank supplying the reserves

For all of these reasons, some a matter of choice, others decidedly n
discretionary, central banks accommodate the demand for reserves and c
fine their policy gestures to setting the price.

Given the ability of banking systems to innovate products and practi
in response to regulation (see Section 11.3 for some examples) it is wo
considering what might be the outcome if central banks *did* take a l
accommodating position.

Suppose, for example, that central banks, under pressure from financ
markets perhaps, were forced to impose quantity constraints on rese
availability. Some have argued that this might still matter little since
structure of modern financial systems enables banks to engage in a num
of activities which enable them to avoid the consequences of reserve sho
ages. In this view it is sometimes said that banks can 'manufactu
reserves though this is a little misleading since most of the practices
aimed at reducing the quantity of reserves that are required. If reserves
defined appropriately as the liabilities solely of the central bank then ba
can do nothing to avoid a system-wide shortage. What, perhaps, they c
do is to economise on reserves so as to avoid the effects of the shortage

Central to this argument is banks' management of their liabilities.
example, in a period where the central bank is consciously seeking
restrain the growth of reserves, and presumably also the money supp
banks will attract funds out of sight deposits which have a high rese
requirement, into time deposits, CDs and other instruments which ha
lower requirements. The result is that a given volume of reserves will s
port a higher volume of lending (and a higher volume of total deposits).
also follows that periods of reserve shortage and consequent liability m
agement will be periods of rising interest rates. Such periods will also
conducive to financial innovation as banks try to find cheaper ways

product enables banks to raise funds for a fixed term more cheaply than th
could through traditional time deposits.[5]

To date, the only attempt to establish empirically which of the t
descriptions (complete accommodation or reserve-economising) is the mo
accurate was carried out by Pollin, looking at the Federal Reserve. The c
teria used were threefold. Firstly, Pollin argued, if 'accommodation' w
the rule, then we would expect stationarity in the ratio of loans (*L*)
reserves (*R*); secondly, if the Federal Reserve were to provide reserv
'willingly' then borrowed (from the Fed) and non-borrowed reserves wou
be very close substitutes and there would be no need to develop circu
ventory products and practices; thirdly, market interest rates would n
move independently of official rates (official rates would 'cause' mar
rates). Formal tests of stationarity in the *L/R* ratio, of elasticities in t
demand for borrowed and non-borrowed reserves and of causality betwe
official and market rates, were all claimed to lend support to the structu
view (Pollin, 1991).

The controversy remains, however, since some of the results are open
alternative interpretation (Palley, 1991). For example, the discovery that
L/R ratio is subject to an upward secular trend is advanced by Pollin as e
dence that reserves are constrained. On the other hand, as Palley points o
the need to hold reserves against deposits has been recognized for years
the standard banking literature as acting as a tax upon banking intermed
tion — limiting the amount of each deposit that can be lent out. The f
that the *L/R* ratio rises over time could merely be evidence that banks a
profit seekers wishing to reduce the burden of reserve requirements ev
when reserves are readily available. Rather similarly, the discovery t
there appears to be two-way Sims (1972) causality between Federal a
market interest rates (where the logic of complete accommodation wou
require uni-directional causality from Fed to market rates) could be accou
ed for by market rates embodying expectations about future Fed rates.

The truth may lie somewhere between the two views, and be heav
dependent on time horizon. It is difficult to see how innovatory behavio
could act quickly enough to alleviate a sudden shortage of reserves but
only because of their tax-like effects, banks have a long-run incentive
minimise reserve requirements. Wherever the truth may lie, whether cent
banks passively accommodate the whole demand for reserves or whet
they do sometimes impose constraints whose effects must be minimised
banking innovation, the Bank of England's view could not be clearer:

banking system (King, 1994 p.264. Our emphasis).[6]

4.4 Endogenous money

Having set the official interest rate, central banks must meet such dema for reserves as is forthcoming. This in turn will depend upon banks' depo liabilities and changes in these will be driven by the demand for loans at current level and structure and interest rates. Given the importance of lo demand in credit and money creation, therefore, it seems mildly curious t empirical work on the demand for bank loans is so sparse while studies the demand for money abound (as the next two chapters show!). Of cour one can argue that credit demands cannot create money unless the result deposits are willingly held and thus the demand for money is the ultim constraint on its creation. But this is an equilibrium argument.[7] But stock models of money demand (see Section 6.4) were developed precis to cope with the possibility that the quantity of money could, at least in short-run, differ from what agents ultimately wish to hold.[8]

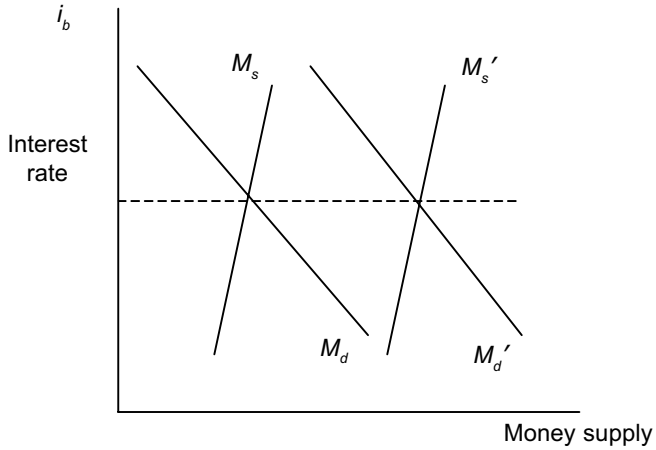
From a present day perspective, where the personal sector's share bank credit outstanding exceeds that of industrial and commercial com nies (ICCs) and other financial institutions (OFIs) combined,[9] it is a curious that such empirical work that exists tends to concentrate upon demand for loans by firms. Cuthbertson (1985b), Cuthbertson and Fos (1982), Moore and Threadgold (1980, 1985; Cuthbertson and Slow, 19 all focused attention upon the demand for loans by ICCs. In this literat it is nominal income, sometimes supplemented by wage costs, import co and taxes, that determine the demand for loans and thus support the vi often quoted in post-Keynesian circles that, given the level of interest rat the demand for loans (and thus the expansion of deposits) depends upon 'state of trade'. Bearing in mind both the dominant position of household in the total demand for bank credit and the more rapid rise in spending up assets relative to GDP in recent years, it is not surprising to find dissent views on credit demand (Howells and Hussein, 1999). Nonetheless, w follows from all of this work is that once the rate of interest has been set a policy instrument, the proximate 'cause' of loans and deposits is a dema which originates with the requirements of the economic system.[10] T demand for loans and the supply of credit money are both endogenous.

Notice the contrast with the quantity theory approach in Section 2.2. T Quantity Theory, we said, was the theoretical basis for being concern about monetary aggregates and maybe even for conducting a monetary p

central bank now operates as though it seriously believes this. A fig l
for the exogeneity of money could be created if it were shown that cent
bank rate were being set so as to produce a given quantity (or rather grov
rate) of the money stock. The Bundesbank certainly published moneta
growth rates and 'reference values' for many years and the practice surviv
in current ECB arrangements. But in both cases, money and credit grov
are being used as *information variables*. They are amongst the many inp
into the decision about when and by how much to change interest rat
They feature also for this purpose in the deliberations of the Bank
England's Monetary Policy Committee (Bank, 1999; Treasury 2002 ch.
But whatever may be said in public, central bank operating procedu
ensure that causality (in Quantity Theory terms) runs from right to left. A
reduction in the growth of money and credit aggregates comes from
ability of interest rates to induce a *prior* reduction in the growth of inco
and output.[11]

The money supply is endogenous and, more importantly for this secti
it is endogenous in the 'base-endogeneity' sense, rather than the more li
ited 'interest-endogeneity' sense that we saw at the end of Section 3.3.
understand this distinction, let us suppose that the money supply *is* det
mined according to the presuppositions of the B-M model, and that we r
resent it as in Figure 4.2 below. The money stock changes with changes
the base. This shifts the curve. It also shifts with changes in the size of
multiplier, with one exception. This is the case where the multiplier chang
as a result of changes in the bond rate. It was this elasticity with respect
the bond rate (recall) that gave the *Ms* curve a positive slope and thus
said it was possible for an exogenously determined money supply to sh
signs of 'interest endogeneity'. However, where the central bank sets sho
term interest rates, we have just seen that reserves must be free to respo
to banks' need for them. The strict analogue of Figure 3.1 in these circu
stances is one in which the *Ms* curve is *shifts* as banks find it commercia
attractive to increase lending (and thus create deposits). If it so happens t
the rate of monetary expansion induced by bank lending happens just
match the growth in the demand for money, then the bond rate (or any ot
representation of the opportunity cost of money) will remain unchanged a
the two continually shifting curves will trace out a horizontal locus as
Figure 4.2 (and the *LM* curve will become horizontal, see Appendix 1).

It should be stressed, however, that there is no reason *a priori* why t
should be the case. The question of how the FoF analysis of the money su



ply relates to the demand for money is a complex one, involving a num of relative interest rates (see the closing paragraphs of Section 4.2 abo and the discussion in Section 11.3). Nonetheless, the regime that we ha just described is often said to produce a horizontal money supply curve, p sumably because the money supply is free to adjust at a *given rate of int est* set by the central bank. But this is erroneous. Anything that may app horizontal in Figure 4.2 is not a money supply curve in the conventio sense. Neither is it the central bank's official rate that appears on the ve cal axis. Thus phrases that describe endogenous money as giving rise t 'supply curve which is horizontal at the going rate of interest' may have merit of brevity but are not helpful.

What does matter is that in the real world, inhabited by central banks a policy makers, the precise analogue of the familiar money supply cu drawn in interest-money space is a money supply curve that is continua shifting to the right, whose rate of shift can be influenced, to some degr by the effect of interest rates on the demand for new loans. In the next f chapters we shall go on to review a lot of work in monetary economics t continues to assume, in the face of the evidence, that this curve shifts o at the discretion of the monetary authorities. Thus, in Chapters 5 and 6, look at theories and empirical tests of the demand for money. Howev with the money supply determined as implied by the FoF approach and described in this chapter, it is not clear that the demand for money has mu policy relevance. In a world where the quantity of money can change in

know how other variables (interest rates, consumption, investment, pric output etc.) will respond to the shock. An analogy is provided by throwi a ball (exogenous money) at a wall (the money demand function) and wi ing to know where the ball will finish up. If the wall is vertical and dire ly in front of us, the ball will come straight back (allowing for diminishi energy, friction etc.). If the wall slopes away from us, in any plane, ho ever, then the ball will come off at an angle. But if we know enough abo the position and shape of the wall we can still predict the trajectory of ball. In these circumstances, knowledge of the demand for money is esse tial if we are to predict and control the effects of monetary shocks.

In the real world there is no ball. Agents have portfolio preferences a these preferences will extend to liquid assets, including money. But th are no monetary shocks independent of these preferences. Changes in quantity of money result from agents' decisions about borrowing fr banks, decisions which themselves are made in the light of existing mon holdings and the interest rate spread between bank loans and deposit Issues such as real balance effects and the neutrality of money simply ha no practical relevance. Neither do discussions about anticipated vers 'surprise' changes in the money stock. Recognising this fundamental irr evance to the real world does not empty such debates of intellectual mer

> There is much of economic theory which is pursued for no better reason than intellectual attraction; it is a good game. We have no reason to be ashamed that, since the same would hold for many branches of mathematics. (Hic 1979).

The ability to make valid deductions from false premises is high regarded in some quarters. But it does suggest that some contributions our understanding of money would fit better in a philosophy than an ec nomics curriculum.

4.5 Summary

No central bank in the developed world targets the money stock or monetary base. In practice, central banks conduct monetary policy by s ting the short-term rate of interest at which they are prepared to ma reserves available. Their ability to set the price of reserves stems from th monopolistic position as lenders of last resort in a system-wide shortage liquidity. The decision to target the price, rather than the quantity, reserves stems from a number of practical considerations but fundament

achieve a level of aggregate demand consistent with some inflation obj
tive. It is not done in order to achieve a particular outcome for the path
monetary aggregates. What happens to monetary aggregates may be re
vant to interest rate setting but only in so far as their growth rates may p
vide advance information about the likely future path of inflation.

In these circumstances, the money supply is fully endogenous, result
from the demand for bank credit. Though widely recognised by economi
actively engaged with the conduct of monetary policy, and of course
central bankers, there has been a reluctance to recognise the implications
some areas of monetary economics in which assumptions are made a
conclusions drawn which amount to misinstruction when presented to s
dents.

Key concepts used in this chapter

lending ceilings
qualitative guidance
direct controls
repurchaseagreements
refinancing rate
counterparties
basis point
convertibility
monetary base control
endogenous money
buffer stocks
interest-endogeneity
base-endogeneity

Questions and exercises

1. Distinguish between ‘interest-endogeneity’ and ‘base-endogeneity’.

2. Why, in practice, are commercial banks unconstrained in their access
reserves?

3. Explain briefly the disadvantages of attempting to regulate monet
growth by non-price methods.

4. Why is the demand for reserves by commercial banks highly intere
inelastic?

and lower short-term interest rates.

6. Go to the statistical section of the Bank of England's webs (www.bankofengland.co.uk/mfsd/) and make a note of (a) the rate of mon growth in each of the last four quarters for which figures are available a (b) any changes in the Bank's repo rate over that same period.

Further reading

The use by central banks of short-term interest rates as the sole moneta policy instrument is documented by all the sources below. The reasons choice of this instrument (as opposed, for example, to the monetary ba and the central bank's ability to impose its choice are explained in Goodh (1994). The procedures by which rates are set are explained in a box *Bank of England Quarterly Bulletin* (1999) 'The Transmission Mechani of Monetary Policy' (May), 161-70, which also explains how the Ba thinks a change in interest rates affects other variables. Borio (1997) co firms the widespread similarity of these procedures across countries. T fact that these operating procedures have the effect of making the mon supply endogenous is documented in Goodhart (*op cit*) and in Howell essay in P Arestis and M C Sawyer (eds) (2001). This also surveys a nu ber of issues arising from the endogeneity of money. H M Treasury (200 provides the background to the conduct of monetary policy in the UK recent years. Chs. 3-6 explain the monetary policy framework, the cho of an inflation target and the conduct of an independent Bank of Englan

5 Demand for Money

'The force of the guinea you have in your pocket depends wholly
the default of a guinea in your neighbour's pocket. If he did not
want it, it would be of no use to you', John Ruskin, *Unto This Las*
(1862).

What you will learn in this chapter

- The implications for economic policy of the Quantity Theory of Money
* The movement from the Quantity Theory to the first theories of the demand for money
- A consideration of Keynes's motives approach to the demand for money and the criticisms of it
- The monetary policy implications of Keynes's theory
- The way in which interest rates were incorporated into the theory of the transactions demand for money
- The development of theories of the precautionary demand for money
- Tobin's development of the portfolio model of the demand for money
- Friedman's approach to the demand for money, its relationship to the Quantity Theory and its implications for monetary policy

5.1 Introduction

Although we have so far talked principally about the money supply, demand for money has made several appearances. For example, in Sect 1.2, we pointed out that if we accept the standard definition of money a set of assets generally acceptable in exchange for goods and servic money is only demanded indirectly — to allow acts of exchange. We a discussed some of the implications of the existence of an excess demand money and spoke of a discord between the microeconomic and macroe nomic approaches to the demand for money. In addition, we pointed ou the end of Chapter 1 that the view that the monetary authorities could ho to control the level of aggregate demand in the economy through adjust the supply of money assumed that the demand for money function was s ble. That is, the demand for money was assumed to be a stable function real income, the price level and interest rates. We returned to this propo tion when discussing prescriptive definitions of money in Section 2.3.

We thus provided some basis for understanding why monetary eco mists have thought the demand for money important, only to suggest

prominence of the testing of the demand for money has been accompan
by a reduction of interest in theories of the demand for money.

There is another problem. The teaching of demand for money theory
still dominated by Keynes's motives for demanding money, which is lar
ly rejected by neoclassical economists because it is said to lack 'mic
foundations'. That is, it does not conform to the choice behaviour of in
vidual, utility-maximizing market agents. However, mainstream neoclas
cal theorizing about the demand for money concludes with the proposit
that the precise form of the demand for money function should be det
mined by empirical testing. Since we need to test the aggregate demand
money, several points that arise from the theory quickly disappear fr
view. The microfoundations of an aggregate demand for money t
appears to do well in empirical testing do not seem to matter. Double st
dards appear to be in operation here.

We attempt to tackle these problems in Chapters 5 and 6. In Chapte
we look at the major contributions to the historical development of the t
ory of the demand for money. We return, in Section 5.2 to the Quant
Theory of Money. Section 5.3 looks at the Cambridge cash balan
approach and its relationship to the Quantity Theory. In 5.4, we consi
the demand for money in Keynes's *General Theory*. Sections 5.5 to
treat theories arising from Keynes's work — later views of the transacti
demand for money (5.5) and of the precautionary demand (5.6) and, th
Tobin's alternative to the speculative demand (5.7). The monetar
approach to the demand for money is the subject of 5.8, while Section
provides a brief introduction only to microeconomic theories of the dema
for money derived from general equilibrium theory. The chapter conclu
with an attempt to tie together a number of the points raised in the chap

5.2 The Quantity Theory of Money

Surveys of theories of the demand for money conventionally start with
Quantity Theory of Money. This may seem odd since the Quantity The
was not a theory of the demand for money at all but dealt with the use
money in transactions rather than with the decision to hold money. Y
there are three compelling reasons for doing so.

- The Quantity Theory stresses the connection between changes in
  economy's money stock and changes in the general price level —
  issue at the heart of the monetary debate.

• The varying views on the demand for money can be easily compa
using the Quantity Theory equation.

The Quantity Theory of money can be traced back at least as far as
eighteenth century and can be seen as a reaction to the mercantilist ident
cation of money with wealth.[1] In its early days the theory was expound
with varying degrees of rigour but it was generally held that an increase
the quantity of money would:

(a) lead to a proportional increase in the price level and

(b) not have a permanent impact on real income.

Some versions of the theory did not require exact proportionality and adm
ted the possibility of a time lag between the increase in the money stock a
the change in the price level.[2]

The Quantity Theory is most familiar to modern readers through Fishe
(1911) version, which we looked at in Section 2.2, when we were co
structing a theory of the relationship between money and income in a wo
in which all participants were well informed. There, we started with
equation of exchange:

$$M V_T \equiv P_T T \qquad \ldots$$

where M is the stock of money, $P_T T$ is the value of all transactions und
taken with money and V_T, is the transactions velocity of money. We n
assume that V_T, T and M are all exogenous and can be taken as constant.
also assume that the monetary authorities can change the size of M at w
Then, causality runs from the supply of money to prices. We now have

$$M\bar{V}_T \equiv P_T\bar{T} \qquad \ldots$$

This expresses the proposition that an exogenous increase in the quan
ty of money leads to a proportional increase in the price level and has
impact on real income (money is neutral). It is common to say that T is co
stant because the economy is making full use of all available resour
(including labour). But we should note that this is not just a simple assum
tion that we can easily relax. The model accepts the classical view of a cl
division between the monetary and real sectors of the economy. T is det
mined in the real sector and cannot be influenced by changes in M. In ot
words, money neutrality does not follow from the analysis of the role t

We noted in 2.2, however, that Irving Fisher's approach was more co
plex than this suggests since he distinguished between transactions rela
to national income and those related to financial transactions:

$$MV = P_Y Y + P_F F \qquad \ldots$$

where Y and F are income and financial transactions respectively. If
accept this, and still require T to be exogenous and entirely unrelated to
we must assume, as we did in the first of our simple models in Section 2
that financial transactions only take place in the pursuit of real ends. T
is, there are no purely financial transactions — a difficult assumption
maintain even in the 18th century and clearly impossible amidst the spec
lative behaviour in modern financial markets. This distinction has larg
been ignored since Fisher's time. Indeed, most textbook versions
Fisher's statement have replaced T with y, excluding the financial sec
from consideration.

A further complexity arises if we pay attention to the precise meaning
M. M was initially limited to currency (in modern terms, the monetary ba
or high-powered money) but was later extended to include bank deposit

$$M_C \bar{V}_C + M_D \bar{V}_D = P\bar{T} \qquad \ldots$$

where the subscripts C and D indicate currency and bank deposits resp
tively. M_C is the monetary base. V_C and V_D are assumed to have differ
values and so variations in M_C/M_D lead to changes in P. As long as M_C
is constant (people hold a constant proportion of their money holdings in
form of currency), the extension to bank deposits does not change the res
Although this formulation allows us to consider the possibility of a char
in M undesired by the authorities, even if they were totally in control of
the Quantity Theory has not been used as a vehicle for the examination
the relationship between the monetary base and the money sto
According to Fisher, an increase in M_C caused prices to rise and hence
real interest rates to fall. This led to an increase in demand for bank loa
and an increase in M_D. Nominal interest rates were pushed up until the r
rate of interest returned to its initial level.

Although V is usually written as a constant, it is affected by changes
the financial system, in particular by changes in the form in which inco
is received and payments are made. Thus, V changes over time (and is c

slowly. We should also be able to predict quite accurately the direction which V is likely to move. A standard list of the factors likely to influe velocity in the Quantity Theory approach is provided in Box 5.1. As stress there the most important assumption is that the nature of the financ system is not influenced by changes in M.

Pause for thought 5.1:

Does it matter, within the Quantity Theory, how rapidly V and T change?

Since T is determined in the real sector, it is influenced by changes in availability of resources, technology and the skills of the labour force, a grows steadily over time.

The Quantity Theory is, in essence, a long-run theory. We can acc that changes in M might cause short-run changes in V and T during the tr sition to a new equilibrium without disturbing the central message of approach. All this requires is that V and T are independent of M in the lo run and that M is fully controlled by the monetary authorities. There is need within the theory to analyse the demand for money since it is clear t the only reason for holding money balances is to undertake transactio There is also no role for interest rates except during the period of transit to the new equilibrium. The interest rate, like T, is determined in the r sector of the economy. What can we say about the meaning of M in the t ory? Plainly, it assumes the existence of a clearly defined set of assets (c rency and bank deposits), which can be used to undertake transactions has no other role in the economy. But we know nothing else except tha is fully controlled by the monetary authorities.

Box 5.1 Velocity in the Quantity Theory of Money (QTM)

We are concerned in the QTM with the transactions velocity of money — the re tionship between the flow of goods and services exchanged in a period and the stock of money.

We can write this as: $V = \frac{P\bar{T}}{M}$

We have said that V changes slowly over time as the financial system changes. But what types of changes in the financial system are relevant to the size of V? standard list of such changes reads:

continue

(a) the frequency with which income is received;
(b) expenditure patterns and the timing of payments;
(c) the degree of vertical integration of industry; and
(d) the extent to which credit is used.

We wish to know how much money people need to hold on average over a peri in order to finance the exchange of a given quantity of goods and services. The more money they need to hold, the lower velocity will be. How does each of the points listed above fit in with this?

(a) We assume people receive income in the form of money — either cash or direct payments into a sight deposit at a bank. Much depends on what alterna-tives are available for the holding of wealth in relatively liquid but income-earnin form. Can people easily and cheaply move part of their income from money ba ances into income-earning assets and be able to convert those assets into mon when they wish to enter into exchange? The frequency with which income is received is only a small part of what is involved here. Still, other things being equal, we might expect that people are more likely to hold lower average balanc of money if they receive their incomes in larger amounts less frequently. Issues this kind are discussed in Section 5.5. Of course, much depends on the definitio we use of *M* (see Section 2.4 on official definitions of money).

(b) Given the possibility of moving from money to income-earning assets and bac the amount of money people need to hold on average is influenced by the frequen cy with which they undertake transactions or have to pay for them — *ceteris paribus*, the less often they spend, the less money they need to hold on average.

(c) Some transactions occur for which money is not needed because they take place within a firm — the firm is vertically integrated. The exchange is recorded the separate books of the various parts of the firm but settlement in money migh never occur or occur only infrequently as a net figure.

(d) This follows on from the second part of (b) — the frequency of payment. Th greater availability of credit allows exchange to occur but payment to be post-poned.

Now answer the following questions. What is likely to happen to the size of *V* if:

(a) people start to make much greater use of credit cards?

(b) there is a wave of mergers among firms leading to greater vertical integratio of industry?

(c) many people who used to pay gas, electricity and telephone bills each quart now do so by monthly direct debit payments?

(d) instead of buying fresh food daily from their local markets, people buy froze food in major shopping expeditions once a month?

(e) people, who used to receive their salaries once a week in cash are now paid monthly directly into their bank accounts?

above, excluded financial transactions from consideration. This und
mined much of the logic of the original Quantity Theory[3] and brought
theory into line with the Cambridge approach and the later portfolio mod
of the demand for money. In these, the central question is why people w
to hold part of their real resources (real income, wealth) in the form
money, a question which we have seen did not arise in Fisher's version
the Quantity Theory.

Endogenous money and the Quantity Theory

From one point of view, it makes little sense to talk of endogenous mon
in conjunction with the Quantity Theory since exogenous money was one
its central assumptions. However, it is worth recalling here the point
made in Section 4.4 that if M is not controlled by the authorities, the cau
direction of the relationship is reversed. Changes occur in the economy t
lead to a change in the demand for bank loans. This, in turn, changes
level of bank deposits and, hence, M. Endogenous money is one, but as
shall see below not the only, way of undermining the conventional conc
sions of the Quantity Theory.

The Quantity Theory and rates of change

We have told the story here in the traditional way in terms of the mon
stock and price levels. As has been clear in earlier chapters, however, i
growing economy, it makes more sense to talk of rates of change. None
the argument is altered thereby. The central message of the Quantity The
is then that changes in the rate of growth of the money supply determine
rate of inflation.

5.3 The Cambridge Cash Balance Approach

The Cambridge cash balance approach, which first appeared in the U
towards the end of the 19th century, attempted to cast the Quantity The
into the form of demand and supply analysis, which was becoming pro
nent in other areas of economics. An assumption of a change in an exo
nous money supply clearly prompted a question about the demand
money. An increase in the money supply, *ceteris paribus*, disturbs the eq
librium in the money market and the consequent change must continue u

still answer this question in terms of the role played by money in exchan
but demand is essentially a subjective concept and the analysis of dema
allows psychological factors as well as institutional arrangements to be co
sidered.

In all of the several versions of the Cambridge approach, people wish
hold a part of their real resources in the form of money (thus the concern
with the real value of money demanded):

$$Md/P = kw \qquad ...$$

where Md is the demand for money; w = real resources (wealth); and k (
Cambridge k) expresses the relationship between them. That is, it is a re
tionship between two stocks (of money and of resources) rather than a re
tionship between a stock and a flow as in the Fisher version of the Quant
Theory.

The definition of real resources varied but was always a long run co
cept, retaining an important element of the Classical model. In long-r
equilibrium, savings, rather than being held as money, are invested leadi
to an increase in the economy's resources. The individual's demand
money depends on:

(a) the convenience and feeling of security obtained from holding money;

(b) the expectations and total resources of the individual; and

(c) the opportunity costs of holding money.

The nature of the financial system, which determines V in the Quant
Theory appears here only as an element in (a) and (c).

Since the convenience obtained from holding money derives from
functions as a medium of exchange and store of value, it was still possi
to think of k as a constant and to draw the same policy message as that co
ing from the Fisher version of the Quantity Theory. This can be seen by f
mally comparing the two. We begin with the Cambridge equation:

$$Md = kPw \qquad ...$$

Firstly, we need to convert the stock of resources into a flow of outp
Since output is produced from the economy's stock of resources and sin
both theories related to long-term equilibrium, we can assume w/T consta

giving us: $Md = kPc\overline{T}$ ...

and: $Md1/ck = P\overline{T}$ ...

With *c* and *k* both constant, we can define Fisher's *V* as the inverse of and write:

$$Md.\overline{V} = P\overline{T} \quad ...5$$

Finally, we assume the money market to be in equilibrium with *Md* = *Ms*. Thus,

$$M\overline{V} = P\overline{T} \quad ...5$$

The two versions of the Quantity Theory appear very similar. In both long as money is exogenous, increases in the price level result from excess supply of money. The demand for money function in the Cambrid version is stably related to *w* and, hence, to *T*.

Nonetheless, there are important differences between the Quant Theory and the Cambridge approach.[4] Firstly, the Cambridge approa makes use of marginal analysis and extends the general neo-classical mo to the money market. It is, thus, a forerunner of the later portfolio mod of Milton Friedman and James Tobin dealt with below.

Secondly, the factors influencing *V* in the Fisher version are only a su set of those influencing *k* in the Cambridge version. The inclusion of opportunity cost in the Cambridge version makes *k* potentially more subj to short-term change than is *V*. The possibility at least exists that peo might choose to hold money for purposes other than engaging in exchange of goods and services. Crucially, it gave a potential role to the r of interest. Keynes, as early as 1923 in *A Tract on Monetary Reform* (JM Vol IV), showed how the incorporation of inflationary expectations co produce changes in the price level, in the absence of changes in the mon stock. In *The Treatise on Money* (1930 and JMK Vols V and VI), he argu that changing expectations regarding security prices might cause changes nominal interest rates. In *The Treatise*, his price equation did not inclu the money stock at all. The opportunity cost of holding money was assu ing greater importance.

5.4 *The General Theory* and the demand for money

Keynes's (1936) theory of the demand for money as treated in *IS/LM* ana sis is widely known. It is a part of his general model, which deals with

endogenous — the real and monetary sectors of the economy are intere
pendent. The assumption that money is neutral is removed.

The analysis of the monetary sector dealt only with financial assets a
was limited to two such assets: money and non-maturing, fixed-interest-r
bonds (consols). This limited choice of assets arises because, in a simp
Keynesian model, savers (households) and investors (firms) are separa
households do not own firms and do not invest. Saving is defined as the d
ference between current disposable income and consumption expenditu
The purchase of real assets by households is part of consumption expen
ture rather than a form of saving. Savings are held in the form of money
other financial assets. The plans of investors, on the other hand, are ty
cally long-term. They seek to raise funds for investment by selling fixe
interest long-term bonds to households. The bond market acts as a vital li
between the money market and the goods market.

Pause for thought 5.2:

Why might Keynes have assumed only two types of financial asset when we all know that there are many others? Does this form of simplification seriously damage a model in the analysis of events in real world economies?

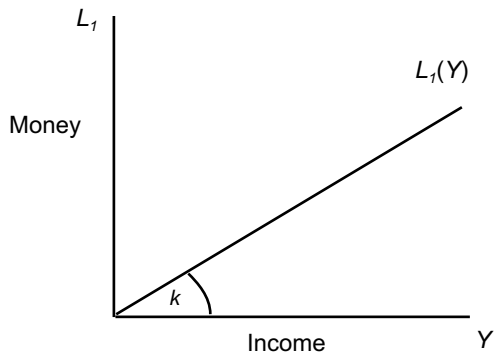
Three motives are distinguished for holding money: the transactio
precautionary and speculative motives. The first two are related to curr
consumption expenditure and, following on from Keynes's theory of
consumption function, their principal determinant is current income.

There is a precautionary demand for money because people do not kn
exactly what their consumption expenditure in the current period will
The transactions demand for money depends on their consumption expe
diture plans, but, in an uncertain world, their plans may not be fulfilled. *E*
post, consumption and saving may differ from their *ex-ante* (planned) v
ues, requiring the quantity of money needed for transactions *ex-post* to d
fer from the planned level. When planned saving is less than planned inve
ment, income rises, causing actual saving and consumption to be high
than planned. The quantity of money needed to undertake consumption
higher than if people's plans had been fulfilled. Equally, when plann
investment is lower than planned saving, actual consumption is less th
planned consumption and money held for transactions purposes will lie id
However, the costs of holding too little money are likely to be greater than the
of holding too much money, causing people to hold precautionary balances.

What are the likely costs of holding lower money balances than those needed fo
transactions purposes?

There are, thus, two effects of lack of certainty about the level of co
sumption on the income velocity of money: (a) more money will be held
average to finance a given value of transactions, causing V to be lower
average than it would otherwise be; and (b) in a recession, V will be lov
still. The precautionary demand for money alone allows us to predict t
the income velocity of money will move pro-cyclically, rising during boo
and falling as income falls in recessions.

Figure 5.1: Demand for active money balances



Despite its importance, the precautionary demand for money is usua
elided with the transactions demand for money as:

$$L_1 = kY \qquad ...5$$

where L_1 stands for the demand for money for transactions and precauti
ary motives (active money balances), Y is nominal income, while k expre
es the relationship between active money balances and nominal income a
is assumed constant. Figure 5.1 shows the demand curve for active b
ances.

There is no particular role for the rate of interest here. It could be one
many parameters underlying the demand for active money balances a
thus, changes in the interest rate might cause shifts in the curve.

tive demand for money (the demand for idle balances) This provides argument for an inverse and unstable relationship between interest rate a the demand for money and hence an inverse and *unstable* relationsl between the money stock and the income velocity of money.

To understand this relationship, we must consider the choice household face in allocating their savings between money and bonds. Money pays interest but is free of risk; the reverse is true for bonds. In deciding whet to hold bonds, market agents must compare the interest rate payable bonds with the risk of capital loss in holding them. This requires a decis regarding the likely future bond price. In the case of bonds that ne mature, this depends entirely on the relationship between the rate of inter payable on bonds currently held and the expected interest rate on bonds be issued in the future.

Pause for thought 5.4

How important is the expected future interest rate in the explanation of the price bonds that mature:
(a) in 2025?
(b) in 2015?
(c) in 2005?
(d) at the end of 2003?
How does your answer to (a) differ from that to (d)?

Keynes assumed that at any time each person held a view of the lik interest rate in the economy; that is, of the interest rate he regarded as 'n mal'. Thus, when a person thought the current interest rate to be below normal rate, he would anticipate a rise in interest rates and a fall in bo prices and would switch from bonds to money.[5] The reverse would ap when the current rate was thought to be above the normal rate. For ea individual, then, the normal rate was the rate at which he was happy w his present holdings of bonds and money and had no incentive to swi from one to the other.

Pause for thought 5.5

What attitude to risk is being assumed in the theory of the speculative motive holding money? Is this consistent with the attitude to risk assumed in the preca tionary motive?

switching from bonds to money, some would be moving in the oppos direction, while others would be content with their existing position. the market as a whole, the average view of the normal rate was import since if the current rate were below this average view, more people wo wish to switch from bonds to money than the reverse. The bond price wo fall and the interest rate rise until equilibrium was restored.

It would also be true that, given an existing set of individually-h views of the normal rate, a fall in the current rate of interest would lead an increase in the proportion of people believing the current interest rate be too low and would increase the number of people wishing to switch i money. That is, falls in interest rate, *ceteris paribus*, cause an increase the demand for money.

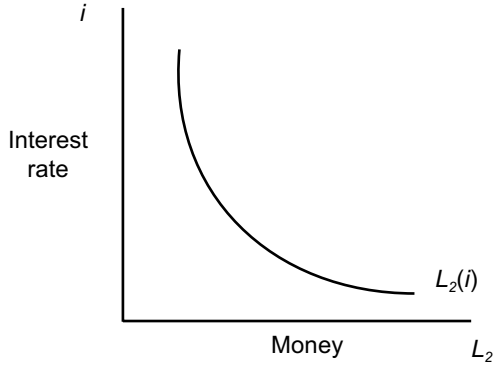
We can now complete the picture. Starting from a position of equilib um in the money and bonds markets, an unanticipated increase in the su ply of money causes interest rates to fall and this increases the demand money to increase. That is, part of the increased supply of money is held the form of increased speculative money balances. Let us consider this terms of a modified form of the Fisher equation:

$$\bar{M}V_Y = Py \qquad ...5$$

where V_Y is the income velocity of money. M is under the control of monetary authorities as before. An increase in the money supply push down the rate of interest and causes an increase in speculative money b ances. Since this is unrelated to current income, V_y falls. This weakens impact of the increase in M on the left-hand side of the equation. How mu does V_y fall? This is difficult to say since we do not have any informat about the views held by people of the normal rate of interest. Howev when interest rates were low, V_y might fall considerably — the interest el ticity of the demand for money would be high — since few people wo think it likely that they would fall further. Many people would, inde anticipate a rise in interest rates and a fall in bond prices. The demand speculative or idle balances (L_2) can be written as:

$$L_2 = f(i) \qquad ...5$$

where i is the rate of interest. This negative relationship between the int est rate and the demand for money is shown in Figure 5.2.



Of even greater importance than the existence of a perhaps power negative relationship between the interest rate and the demand for money the question of the *stability* of the curve. Although each person holds own view of the normal rate of interest, this must be heavily influenced his estimate of the views held by other people in the market. Although might see no objective reason for interest rates to rise, he will know tha sufficient people believe it is going to rise, bond sales will increase a bond prices fall. The most important information to have about a marke what other market participants think and are likely to do. Views of the n mal rate of interest are, thus, highly subjective and open to change.

Consider the impact of a change in the average view of the normal ra We start with the current rate of interest equal to the average view of normal rate and assume that the average view changes in favour of a hig er normal rate. This would cause many people to believe that the curr rate was likely to rise and to seek to switch out of bonds into money. Sin the current rate has not changed, we can only represent this in Figure 5.2 shifting the curve to the right. With an unchanged money supply, demand for idle balances would increase and V_Y would fall, causing a f in Py. If views regarding the normal rate were at all volatile, the specu tive demand for money curve would be unstable.

Even without this possible instability, the theory of the speculative dema suggests that the supply of money and the demand for money are not in pendent of each other. An increase in the supply of money pushes inter rates down and this encourages an increase in the quantity of money dema ed because of the movement of the current rate away from the normal rate

version given here. In the standard version, the demand curve for specu
tive balances was linear, which does not allow for the possibility that
demand for money might be much more interest elastic at low rates of int
est. In addition, the normal rate of interest was assumed constant, reme
ing the possibility of unpredictable shifts in the demand for idle balanc
Thirdly, the role of the bond market in providing investment funds for fir
was ignored. Falls in interest rates were assumed to increase investment
the question of how this investment was to be financed was not tackled.

This accounts for a fourth motive for demanding money (the *finan
motive*), which Keynes did not include in *The General Theory* but propos
later. The finance motive applies to any large, non-routine expenditure
the need to finance investment projects is crucial. The demand for mon
to meet such expenditure is only temporary and may be met by the sale
liquid assets or by borrowing from banks. It is of some importance becau
it provides an additional argument for instability in the demand for mon
since Keynes argued that investment plans were volatile, being much infl
enced by the level of confidence of firms.[6]

In summary, Keynes's writings suggest that the demand for mon
varies inversely with the rate of interest (or, if interest is paid on money b
ances, with the difference between the interest payable on financial ass
and that payable on money balances). In addition, the demand for mon
curve might shift with changes in expectations about future interest ra
and with the need to meet unpredictable expenditure including the finan
ing of investment projects.

Box 5.2 Common criticisms of Keynes's speculative demand for mon

1. The theory of portfolio choice is incorrect - the speculative demand implies th
people hold all money or all bonds, depending on what they believe is likely to
happen to the rate of interest in future. They do not do this in practice.

2. The assumption of regressive expectations is unrealistic.

3. The normal rate of interest is exogenous and no explanation is given of what
determines it.

4. The restriction to only two assets — money and consols — is too limiting.

5. The liquidity trap is a logical impossibility since not everyone can switch from
bonds to money — someone must hold the existing stock of bonds.

6. Savings deposits should not be included in the money stock.

in the works of earlier writers or in his own earlier ideas. Firstly, we
concerned with nominal money balances. Secondly, we have an analysis
short-term *disequilibrium*. Because of this, the demand for money may
highly interest elastic (especially in periods of falling interest rates) and
demand for money function might be unstable.

It is hardly surprising that the theory was much criticized. The m
common criticisms are summarized in Box 5.2.

The first criticism concentrates on portfolio choice. In Keynes's theo
any expectation that the interest rate is about to change causes people
hold either all money or all bonds. A belief that the interest rate is about
rise (and bond prices to fall) causes a switch entirely out of bonds i
money. The reverse case, an expectation of an interest rate fall, causes pe
ple to switch entirely into bonds in order to make the expected capital ga
But rational behaviour dictates portfolio diversification and the holding o
mixture of bonds and money. It is clearly unrealistic, at a microeconom
level, for a fear of a fall in bond prices to cause a switch entirely from bon
to money (and *vice versa*).

This is particularly objectionable to economists who wish to constr
macroeconomic models on microeconomic foundations, a view that impl
that the behaviour of the economy as a whole can be analysed only as
sum of individual activity. However, treating the economy as the sum o
set of microeconomic decisions might cause us to misunderstand import
aspects of the macro economy. It is certainly possible to construct a mac
economic model that has unrealistic microeconomic assumptions but s
produces an accurate analysis of the behaviour of households as a group.
this case, since people hold different views of the normal rate of interest
any time some people will be moving to holding all bonds, others to ho
ing all money. Yet, as we have seen, a fall in the rate of interest causes a
increase in the demand for money. As long as this increased preference
money over bonds as interest rates fall happens in practice, Keynes's mo
produces the correct macroeconomic outcome, even if it fails to descr
accurately what individual agents do. In any case, the criticism can be ha
dled by increasing the number of financial assets in the model, a point
consider below.

Pause for thought 5.6

Why does rational portfolio behaviour lead to the holding of a mixture of bonds and money rather than all bonds or all money?

rate of interest. In practice, many examples can be found in markets extrapolative expectations — where a change in price causes people believe that the price will continue to move in the same direction. Thus, assumption of regressive expectations may seem unreasonable. M importantly, since there is no explanation of how people decide on the n mal rate, there is no way of analysing the factors that might cause it change. Again, since people hold different views of the normal rate, cannot distinguish a clear set of market expectations other than to say, as have above, that the lower the current interest rate is, the more people likely to think that the next move will be up. This provides an explanat of the negative relationship between interest rates and the demand money but gives no indication of the steepness of that slope or of whet the money demand curve is likely to be stable.

However, the assumption of exogenous expectations is important si it explains why market participants can only guess at what other market p ticipants might do in response to a change in interest rates. This unp dictability of the market lies at the heart of the argument for an unsta demand for money. If we knew how market participants formed their vie of the normal rate of interest, we would be able to predict accurately h the market was going to behave and the speculative element in the dema for money would disappear.

Thus, the criticism of the normal rate of interest ignores the world which Keynes's theory applies — one of disequilibrium in which unc tainty is endemic, with knowledge of the future being 'fluctuating, vag and uncertain'. It is not a world in which meaningful probabilities can assigned to all possible outcomes. Since expectations are subject to sudd change from panic fears and rumours, they cannot be modelled formally an endogenous variable. Thus, changes in expectations regarding inter rates cause changes in the demand for money (and the demand for bond and produce shifts in the demand for money curve.

Further, in the complex world of market psychology, in which mu depends on how people think other people will act, many possibilities ari For example, the majority feeling in the market following an interest r fall may temporarily be that the interest rate will continue to fall (extr olative expectations). Nonetheless, everyone will be aware that at so point people will begin to sell bonds in order to realize their capital gai This is more likely the lower the rate of interest currently is. Everyone w wish to sell out before the market turns, although the attempt to do this w

regarding the future rate to change. The idea of regressive expectatio
based on a normal rate of interest provides a shorthand way of expressi
the macroeconomic outcome of a complex set of market interactions.
criticize it as an inadequate theory of microeconomic behaviour is to m
judge its purpose.

Pause for thought 5.7

In football programmes on television, viewers are sometimes asked to choose th
best three goals of the month in order. In fact, to win, a viewer must guess cor-
rectly what the judges think were the best three goals. Does this provide a rea-
sonable analogy with market behaviour — that what people in markets do is to t
to guess what other people think, rather than to attempt to understand underlyin
real forces?

Another common criticism relates to the limitation of choice to t
types of asset leaving us with only one rate of interest. Gowland (199
points to the existence of a large number of capital-certain assets, such
building society deposits, whose value does not vary with interest rates.
argues that people not wishing to hold bonds may hold these assets inste
of money and that Keynes's theory is a theory of the demand for short-te
capital-certain assets in general rather than a theory specifically of
demand for money.

However, Keynes's choice of two assets at the extremes of the spectru
of degrees of liquidity of financial assets was not intended as a realis
description of financial markets but as a means of clarifying import
issues. In particular, we have seen that the two-asset model derives in p
from the separation of households from firms. In relation to these issu
the inclusion of a variety of financial assets lying between money and bon
on the liquidity spectrum does not change the analysis.

UK firms no longer raise a significant proportion of investment fun
through the long-term bond market. Allowing for this merely transf
some of the uncertainty associated with changing interest rates from hou
holds to firms. Assume, for instance, that firms borrow investment fun
short-term from banks at variable interest rates. Now, any fear of futu
interest rate rises increases firms' estimates of the likely costs of investm
funds and reduces their demand for them. As the government increases
monetary base of the economy, banks may be more willing to lend, b
firms become less willing to borrow. Firms accumulating profits for futu
investment are influenced in their decisions regarding the deployment

funds in the form of money or short-term securities than to invest in pl
and equipment.

The final criticism is aimed not at the theory as a whole but at the *l*
uidity trap — the extreme state in which any increase in the money stock
held as speculative (idle) balances. In a liquidity trap, therefore, a
increase in the money supply has no impact on the interest rate and her
no impact on aggregate demand. A liquidity trap, then, implies the ex
tence of a minimum rate of interest for the economy — a rate that is so l
that everyone thinks the next interest rate move must be up. Therefo
everyone believes that bond prices will fall and no one wishes to h
bonds. Everyone switches from bonds to money; but this must involv
fallacy of composition because it is not possible for everyone to hold mon
rather than bonds. Someone must hold the existing stock of bon
Gowland (1991) argues further that the bond market will always be in eq
librium (because of low transactions costs and zero storage costs) and th
in the aggregate, it will not be possible for investors to exchange bonds
money. A general expectation that interest rates will fall causes
increased demand for bonds, a rise in bond prices and a fall in interest ra
but, at the end of the process, the same quantity of bonds is held as befo
Thus, the theory of the speculative demand for money explains who ho
money not the quantity of money held. However, this problem also dis
pears if we assume an uncertain world in which disequilibrium is the n
mal state of affairs. Then, we could imagine a situation in which all bon
holders were *attempting* to sell but could not find buyers. In any case,
liquidity trap represents the extreme theoretical position of the model rat
than being a position likely to be reached by any economy.

5.5 Interest rates and the transactions demand for money

The criticisms of Keynes's theory led economists to find other ways of j
tifying some of Keynes's message, in particular the inverse relations
between interest rates and the demand for money. One approach was
return to the transactions demand for money and to show the way in wh
this could be influenced by changes in interest rates. The best-known mo
of this kind is the Baumol/Tobin *inventory-theoretic model* (Baumol, 19
Tobin, 1956).

In this model, balances set aside for transactions purposes are held te
porarily in the form of securities, which may be converted into money wh

securities and positively by changes in the transactions costs (brokera fees, transport costs, inconvenience) in the conversion of money into bo and back again. All information regarding interest rates and transacti costs is known with certainty.

The model seeks to determine how often it is worthwhile switchi between money and income-earning assets within a single payments peri From this, we can calculate the optimum stock of money to be held on av age over the period. The model assumes that income is received at a stea rate and is all spent during the period.

Let the transactions costs of buying a financial asset be called Switching from money into bonds and back into money costs $2a$. Let i_b the annual yield on the bond. Let income Y = £1000 per month, n is the to number of transactions undertaken. Income is spent evenly through month at £250 per week. Assume firstly that the transactions costs are ze

In week 1, £250 (Y/n) is held as money and the remaining £750 is us to acquire interest-bearing assets. Then, in each of weeks 2, 3 and 4, £2 worth of the securities is cashed to finance expenditure. Thus, four tra actions are involved (n = 4). The formula for the initial holding of the as is:

$$\left(\frac{n-1}{n}\right).Y = \left(\frac{4-1}{4}\right).£1000 = £750 \qquad ...5.$$

To find the return from holding bonds over the month we need to find average holding of bonds over the period. Given our assumption of eq expenditure in each week, this is always half of the initial bond hold $\{[(n-1)/2n].Y\}$. In our simple example here, the holding of bonds is £7 in week 1, £500 in week 2, £250 in week 3 and zero in week 4, an avera of £375. The profit (π) from holding bonds over the period can expressed as:

$$\pi = \left(\frac{n-1}{2n}\right).Yi_b \qquad ...5.$$

Now, allow for transactions costs. If a is a fixed cost, the total costs n transactions = na and the net profit from holding assets becomes:

$$\pi = \left(\frac{n-1}{2n}\right).Yi_b - na \qquad ...5.$$

$$= \left(\frac{Yi_b}{2}\right) - \left(\frac{Yi_b}{2n}\right) - na \qquad ...5.$$

$$\left(\frac{2}{}\right)\left(\frac{}{2}\right)$$

The next problem is to find the number of transactions (n^*) that maximi
the net return. To do this, we differentiate (5.16) with respect to n and
the resultant derivative equal to zero:

$$\frac{\partial \pi}{\partial n} = \frac{(n^{-2}.Yi_b)}{2} - a = 0 \qquad ...5$$

$$Yi_b/2n^2 - a = 0 \qquad ...5$$

and

$$Yi_b/2n^2 = a \qquad ...5$$

$$n^2 = Yi_b/2a \qquad ...5$$

Therefore

$$n^* = \sqrt{(Yi_b/2a)} \qquad ...5$$

This gives the formula for the optimum holding of cash balances (M
On the assumption that expenditure occurs smoothly over each we
the average holding of money is half that held at the beginning of ea
week ($Yi_b/2n$) and:

$$M_T = \frac{Y}{2n^*} = \frac{Y}{2}.\sqrt{\frac{Yi_b}{2a}} = \sqrt{\frac{Ya}{2i_b}} \qquad ...5$$

Thus, the transactions demand for money is inversely related to the int
est rate. Further, the demand for money increases less than proportionat
with increases in Y. That is, there are economies of scale in holding mon
and to return the economy to equilibrium following an increase in
money stock (assuming that there is only a transactions demand for mone
income must increase more than in proportion to the increase in money su
ply. It follows that monetary policy has a greater impact on economic act
ity than would otherwise be the case.

However, the extent of economies of scale depends on the nature of
costs involved. If we assume costs to consist of a fixed and a variable e
ment $(a + bE)$ where E is the amount withdrawn each time, the form
becomes:

$$\sqrt{\left(\frac{2i_b}{\quad}\right)}\left(\frac{\quad}{i_b}\right)\qquad\left(\frac{\quad}{i_b}\right)$$

This considerably reduces the economies of scale involved. With fu
proportional costs, they disappear altogether.

In general, the model predicts:

(a) a (real) income elasticity of demand for money between 0.5 (fix
transactions costs) and 1.0 (proportional costs);

(b) an interest rate elasticity between −0.5 (fixed costs) and −2.0 (p
portional costs); and

(c) nominal money balances increasing proportionately with prices.

The principal ways in which the basic model has been qualified are li
ed in Box 5.3.[7]

Pause for thought 5.8

If the transactions demand for money is interest elastic, how does an increase i
interest rate affect the demand curve for active balances in Figure 5.1?

The empirical relevance of the model has often been questioned. T
earliest attacks were in relation to the demand for money of firms.[8] It h
also been argued that the possible gains for an individual are so small re
tive to the costs (especially if the value of time is taken into account) t
the rational individual would not bother switching into bonds and ba
again.[9] In general, there seems little doubt that the relationship betwe
money, interest rates, and transactions is more complex than in t
Baumol/Tobin model. Nonetheless, it retains theoretical significan
because of its generation of an inverse relationship between interest rate a
the demand for money despite the assumption of perfect certainty.

5.6 Introducing uncertainty into transactions - models of t precautionary motive

Inventory models have been modified to allow for uncertainty in the fo
of a known probability distribution of receipts and payments. These mo
els introduce the possibility of net payments exceeding money holdin
(illiquidity). Results vary a good deal depending on how likely this
assumed to be but, as in transactions models, mean holdings of money
inversely related to interest rates and directly related to the brokerage f

money balances. Milbourne (1986) took the Miller-Orr framework a considered within it the impact of financial innovation on monetary agg gates.

Box 5.3; The principal variations on the inventory-theoretic model the transactions demand for money

(i) With fixed or partly fixed transactions costs, a person does not hold securities at al unless the interest income is greater than the transactions costs of converting money into and out of bonds. Then, a change in interest rate may not cause any change in the demand for money. The inverse relationship between interest rate and the dema for money that the model seeks to demonstrate disappears at low rates of interest.

(ii) The frequency of pay periods and the timing of payments may be influenced by institutional and technical changes (for example, the use of credit cards) and by economic factors such as high and variable interest rates.

(iii) Only the interest rate on bonds is included in the model; but if a firm can use an overdraft facility to obtain money, the relevant rate is the difference between the rate charged on borrowings on overdraft and the rate paid on bonds. Again the demand for money depends on the relative interest rate if the model is exte ed to include an interest rate or an implicit interest rate (in the form of bank serv es provided below cost) on holdings of money.

(iv) The transactions demand for money may be modelled such that money hold ings are only deliberately adjusted when they reach upper or lower thresholds.

(v) Individuals can be allowed to save part of their income, acquiring interest-be ing assets for holding long-term as well as for short-term reasons.

(vi) Once it is accepted that some people but not others make money/bonds/money conversions with transactions balances, aggregation prob lems arise. It can then be shown that almost any elasticity is possible dependin on the propensity to save and the proportion of income earned by those who do not make any conversions.

The formal inclusion of interest rates into the precautionary demand money adds further to the case for an inverse relationship between inter rate and the demand for money, without suggesting that the demand money function might be unstable.

5.7 Tobin's portfolio model of the demand for money

Tobin's model (1958, 1969) can be seen as a response to the common cr cisms of the speculative demand model. It introduces a wider range assets including equities and real assets. Where, in his 1958 article, To

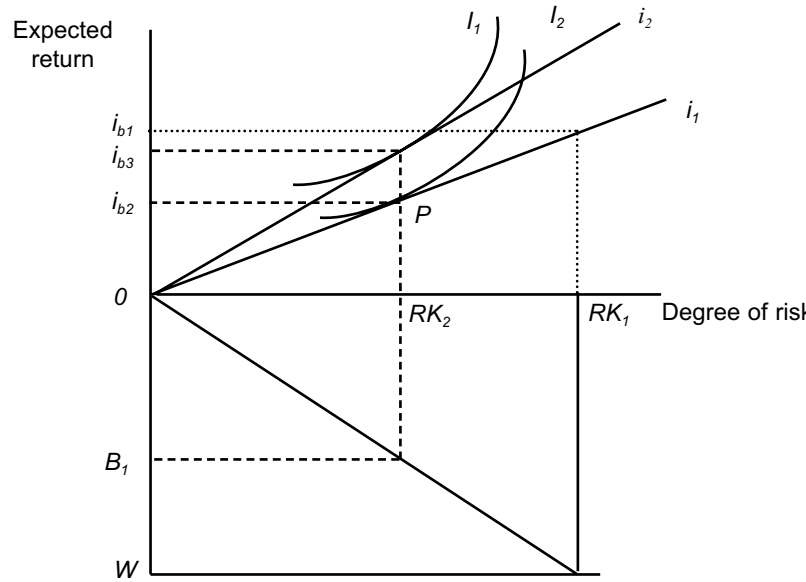
regressive expectations and to have each individual holding a mixture
money and bonds. Thus, the model is very much concerned with mic
economic choice behaviour. It is generally regarded as a Keynesian mo
because the model preserves the possibility of an inverse relationsl
between the rate of interest and the demand for money and because
transmission link between money and nominal income is indirect — mor
only influences nominal income through changes in interest rate, rather th
directly. However, it also produces a demand for money function that
very likely to be stable and so removes the third of the characteristics of
speculative demand model listed above. For this reason, it can be seem
a misrepresentation of Keynes's ideas (Chick, 1977; Dow and Earl, 198

To consider the nature of the demand for money in Tobin's model,
need to concentrate on the choice between money and bonds. This depen
on a trade-off between the net income receivable on bonds and the deg
of risk associated with the total portfolio of bonds and money (which
assumed to be perfectly liquid and non-interest-bearing). The trade-off ar
es because Tobin assumes people in general to be risk-averse, although i
possible to investigate the effect of an assumption that people are ri
lovers. However, because the general uncertainty prevalent in Keyne
model has disappeared, interest rates are thought to be equally likely to r
or fall, irrespective of both the current level of interest rates and what l
happened to them in the recent past: expectations regarding future inter
rates are neutral.

In these circumstances, the risk associated with bond holding is mu
more manageable than in Keynes. Now, for any given level of wealth,
can calculate mathematically the impact of a change in interest rate on b
the interest income and the capital gain or loss associated with the holdi
of different quantities of bonds and money. The capital gain/loss becon
a random variable that is normally distributed around the mean, μ. The to
return from bond holding (interest payments + capital gain/loss) is also n
mally distributed around μ. The standard deviation is used as the measu
of risk. The various assumptions are reflected in Figure 5.3.

In the upper part of the diagram, the vertical axis shows the expec
return on portfolios while the degree of risk associated with the portfolio
on the horizontal axis. The ray from the origin shows the relationsl
between risk and return for a given level of interest rate on portfolios co
posed of different proportions of bonds and money. Thus, a portfolio co
sisting entirely of money is located at the origin, with a zero return and

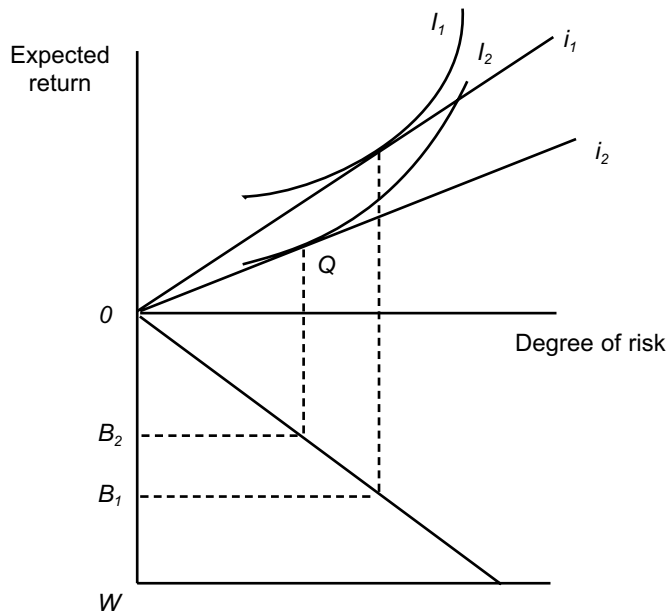
Figure 5.3: Possible composition of portfolios



The possible compositions of the portfolio are shown in the lower p of the diagram where *0W* is the total (fixed) value of the portfolio. The p portion of bonds held in the portfolio is measured down from the ori along the vertical axis. Thus, at the origin, the portfolio contains no bon at *W* no money. The ray from the origin indicates the amount of risk as ciated with each possible composition of the portfolio, with the extre positions of all money and all bonds placing us at *0* and RK_1 respectiv along the horizontal axis. We can then see from the upper part of the d gram that, at an interest rate of i_1, an all bonds portfolio produces an expe ed return of i_{b1} along the vertical axis. A mixed portfolio of, say, $0B_1$ bon and B_1W money involves risk as shown by RK_2 along the horizontal axis a an expected return of i_{b2}. We can see that an increase in the interest rate i_2 leaves the risk associated with this portfolio unchanged but raises expected return to i_{b3}.

trade-off of the market agent between expected return and risk. We do t
through the indifference map in the upper part of the diagram, which sho
the trade-off of a risk-averse agent. Utility increases as we move up to
left from I_2 to I_1 since on I_2 the same degree of risk produces a hig
expected income than on I_1. Utility is maximized where the ray from
origin is tangent to an indifference curve (at P). Since this determines
chosen degree of risk associated with the portfolio, it also determines
division of the portfolio between bonds ($0B_1$) and money (B_1W).

Figure 5.4: The effect of a fall in interest rates



Now we are in a position to consider the impact of an exogen
increase in the money stock. People use excess money balances to b
bonds, causing bond prices to rise and the interest rate to fall: the expec
income from any given quantity of bonds falls. The ray in the upper part
the diagram shifts down to the right and (as shown in Figure 5.4) the po
folio-holder maximizes utility at Q on the lower indifference curve I_2. T
outcome depends on the relative strengths of the income and substitut
effects of the fall in interest rate. Income falls for each degree of risk of
portfolio. To preserve the previous income level, more bonds must be h

ance of a given amount of extra risk now produces a smaller increase
expected income, making it less worthwhile to choose a higher degree
risk. In Figure 5.4, we make the usual assumption that the substitut
effect outweighs the income effect so that a fall in interest rate produce
fall in the holding of bonds and an increase in the demand for money. Th
part of any increase in the money stock is held in the form of idle mon
balances, reducing the possible impact on nominal income and caus
monetary policy to be weaker than it would be otherwise.

Since the outcome for each individual depends on the relative streng

Pause for thought 5.9

When interest rate rises, is it the income or the substitution effect that causes th
demand for money to fall? Why?

of income and substitution effects and since there may be some risk-lov
in the economy, there is no reason to believe that the demand for money w
be highly interest-elastic; nor that the aggregate demand for money cu
will be unstable. The curve will only move if there is a widespread chan
in people's attitude towards the risk associated with holding bon
However, since there is no general uncertainty in the economy and si
risk is defined as the standard deviation of a normal distribution, this
unlikely. Certainly, there is no possibility of the demand for money cu
shifting in response to an increase in the stock of money.[10]

5.8 Monetarism and the demand for money

The term 'monetarism' was first used by Brunner (1968) and has since be
defined in a variety of ways. Mayer (1978) identifies twelve propositio
associated with monetarism, but for our purposes here, we can be cont
with what he identified as the narrow meaning — the view that changes
the money stock are the principal cause of changes in nominal income.
line with this, we continue to assume an exogenous money supply and co
centrate on Milton Friedman's demand for money.

Money is demanded by two groups:

(a) ultimate wealth holders (for whom money is simply one way
which they may hold wealth); and

(b) business enterprises (for whom money is a productive resource).

can consider the demand for money as a whole rather than needing to co
sider separate 'motives' for holding money. Thus, the demand for mon
function contains:

(i) a budget constraint (either permanent income or wealth);

(ii) the prices of the commodity itself (money) and its substitutes a
complements (Friedman sees the counterparts of these as being the ra
of return on money and other assets);

(iii) other variables determining the utility attached to the services re
dered by money relative to those provided by other assets (these m
include the degree of economic stability, the variability of inflation, a
the volume of trading in existing capital assets);

(iv) tastes and preferences.

When Friedman refers to 'wealth' as the budget constraint, he intends to
wealth — the sum of *human* and *non-human* wealth. Since this is impos
ble to measure, Friedman suggests the use of permanent income (
expected future stream of income generated by the stock of human and no
human wealth) as a constraint. There is also a theoretical complication w
the use of total wealth as a budget constraint since there are institutio
restrictions on the conversion of human into non-human wealth and
human wealth is less liquid than non-human wealth. Friedman explains t
by saying that it is only possible to buy or sell the services of human weal
not the wealth itself. Another way of thinking about it is to compare the r
ative ease of obtaining a bank loan using as collateral: (a) non-hum
wealth (a portfolio of government bonds, say); and (b) human wealth (
expected degree, which will allow the holder to earn a higher salary in t
future). This difference in liquidity between the two forms of wealth mea
that the composition of wealth influences the demand for money.
increase in human wealth relative to non-human wealth reduces the over
liquidity of wealth and will cause people to hold the non-human proporti

Pause for thought 5.10:

Why is it possible only to buy or sell the services of human wealth, not human wealth itself?

Friedman's demand for money function

Putting all this together, we arrive at Friedman's 1970 version of his revi
quantity theory:[11]

$$Md/P = f\,[Yp,\ w;\ i_m,\ i_b,\ i_e,\ (1/P).dP^e/dt,\ u] \qquad ...5$$

where:

• P is the price level. It is included because the demand for money i
demand for real balances and a change in P changes the real value of mo
holdings. Thus, P is *positively* related to Md.

• Yp is permanent income, introduced as a proxy for wealth because of
difficulties involved in measuring wealth. As in Friedman's consumpt
theory, permanent income was taken as an exponentially weighted avera
of past and current levels of income. Yp is *positively* related to the dema
for money.

• w is non-human wealth/wealth and is *negatively* related to the demand
money.

• i_m is the rate of return on money itself and is *positively* related to
demand for money.

• i_b is the rate of return on bonds, abstracting from the possibility of cap
gains and losses. It is *negatively* related to the demand for money.

• i_e is the rate of return on equities, abstracting from the effects on equ
prices of changes in interest rates and the rate of inflation. It is *negativ*
related to the demand for money.

• $(1/P).dPe/dt$ is the expected rate of inflation, included as the rate of ret
on real assets. It is also *negatively* related to the demand for money. N
that the demand for money is positively related to the price level, but ne
tively related to the expected rate of inflation.

• u is a portmanteau symbol standing for other variables affecting the ut
ty attached to the services of money and also includes tastes and pref
ences. It may be either negatively or positively related to the demand
money.

The rates of return in the above equation are expected variabl
Although we have indicated the likely signs to be attached to the variab

Although this is a theory of the demand for money and we have seen t the original Quantity Theory (as distinct from the Cambridge version) w not a theory of the demand for money, Friedman regarded his theory a 'restatement' of the Quantity Theory.[12] We can show why with so assumptions and a little manipulation. Let us first multiply both sides (5.27) by $1/Yp$. This gives us:

$$Md/(PYp) = g[i_b, i_e, i_m, (1/P).dPe/dt, w, u] \quad ...5.$$

Next, assume that the demand for real balances is stably related to the sm number of variables we have on the right hand side and replace the wh expression by k. Then we re-arrange to produce:

$$Md = kPYp \quad ...5.$$

As we did with the Cambridge version of the Quantity Theory, we c define k as the inverse of velocity and arrive at:

$$MdV = PYp \quad ...5.$$

With the money market in equilibrium, we have:

$$MV = PYp \quad \ldots 5.$$

This looks very similar to the Fisher version of the Quantity Theory. course, $1/k$ in this model is quite different from Fisher's V. The fact determining Fisher's V appear only as one element in u in Friedma model. Friedman's theory can be defended as a restatement of the Quant Theory if the money supply is exogenous, causality runs from left to rig the demand for money is a stable function of the small number of variab summed up in k, and Yp, as a long-run measure of real income grows stea ly over time. Then, the price level is explained by changes in the stock money. We could easily, as we did with the Quantity Theory itself, expr this in terms of rates of change and say that Friedman's theory supports view that the cause of inflation is a too-rapid growth in the money suppl

Friedman made use of permanent income in the above equation explain apparently conflicting long run and cyclical tendencies. His hist ical studies of money in the US economy suggested that in the long-run income rose, V fell but that over the business cycle, there was a tendency V to rise in booms and fall in recessions. The argument rested on the prop

income. As income rises in the boom of a business cycle, people contin
to base their demand for money on their permanent income, which is n
lower than current income because part of current income is positive tran
tory income. The demand for money falls in relation to current income a
V rises. In the trough of the business cycle, transitory income is negati
the demand for money rises in relation to current income, and *V* falls.

We have not said anything about the demand for money of busin
enterprises. Friedman himself says little except to point out some diff
ences from that of ultimate wealth holders. Thus, he notes that:

> (i) The constraint is different; it is not permanent income or wealth si
> firms can influence the total amount of capital in the form of product
> assets by borrowing through capital markets. Not much work has be
> done on the best scale variable for firms. Friedman suggests three p
> sibilities: total transactions, net value added, and net worth.
>
> (ii) The distinction between human and non-human wealth is not re
> vant for firms.
>
> (iii) The rates of return relevant to firms are different from those for u
> mate wealth holders, for instance, bank loan rates may be more imp
> tant for firms than for households.

Despite these differences, Friedman treats the equation for ultim
wealth holders as the aggregate demand for money function for the eco
my, while observing that the inclusion of firms makes problems of agg
gation more difficult. The problem of aggregation, however, causes li
real difficulty. This is because of Friedman's methodological approa
Having indicated a number of variables likely to be of importance in
aggregate demand function, he argues that the ultimate test of theories
their ability to predict accurately. Since he believes the demand for mon
to be a stable function of a small number of variables, the variables to
included in the equation, the form that they take and the relations
between them may be changed in order to produce the desired res
Testing, in effect, takes over from theory, although the aim of the testing
to demonstrate that the basic theory is correct.

Before the middle of the 1950s, there had only been a small amount
empirical work on the demand for money. Since Friedman's formulation
his demand for money function, however, relatively little attention has be
paid to the theory of the demand for money.

Since Friedman's Revised Quantity Theory, theoretical work on the dema
for money has been far outweighed by the huge number of empirical st
ies. We have already considered the post-Keynesian advocacy of endo
nous money and mentioned the buffer stock approach to the demand
money in Chapter 4. Since the buffer stock approach is best seen as
attempt to find a theoretical justification for empirical results, we return
it in Chapter 6. Apart from these, the only developments have been mic
economic transactions models that have grown from attempts to justify
holding of money for transactions purposes within general equilibri
models. The most prominent models of this kind (McCallum, 19
McCallum and Goodfriend, 1992; Dowd, 1990) analyse the demand
money in terms of the *shopping time* saved in carrying out transacti
through the use of money (as distinct from barter). Shopping time saved
value since it can be used to earn income or to obtain utility from other us

In McCallum and Goodfriend's (1992) version, an agent maximi
present and future utility from the consumption of goods and leisure.
currently holds a stock of bonds and money (the purchasing power of wh
is eroded by expected inflation); and the economy provides a stream
opportunities for the earning of further income by selling labour servi
and for re-arranging consumption over time through a capital market
which bonds may be bought and sold. Consumption goods can be obtai
in exchange for income only by shopping for them.

The amount of time required for shopping increases with the quantity
consumption goods bought, but is negatively related to the size of r
money balances carried on shopping trips. It follows that a decision to h
more money now, *ceteris paribus*, reduces shopping time, leaving m
time for current leisure and/or increased labour supply and future r
income. Equations can be derived from the model for current and fut
demands for consumption, leisure, bond holding, money holding, and
supply of labour.

These are highly theoretical models that were principally intended
overcome criticisms that general equilibrium theory did not provide a r
in the economy for money. The demand for money function that can
derived from them can be compared with Friedman's. In McCallum a
Goodfriend, the demand for money is related to inherited assets; expec
unearned income (non-human wealth); current and expected future wa
rates (human wealth); interest rates and inflation rates. Since decisi

depends on expected future values of interest rates and inflation as well
current values. The model also implies that the current volume of mar
transactions is chosen simultaneously with the demand for money — n
income does not determine the demand for money: both are simultaneou
influenced by deeper underlying forces.

5.10 The theory of the demand for money: a conclusion

The central issue dealt with in this chapter has been the question of the s
bility of the demand for money function. This has long been seen as cruc
in relation to economic policy because it determines whether the authorit
can hope to influence the rate of growth of nominal income by controll
the rate of growth of the money supply. All of the writers we have de
with here, with the exception of Keynes, have proposed theories that su
port the idea of stability. Although there are important differences betwe
the views of, say, Tobin and those of Friedman, strictly from the point
view of the relevance of demand for money theory to economic policy,
important distinction is between Keynes and the others; and a large prop
tion of that debate rests on the dispute over the speculative demand
money.

We have seen that the major criticisms of Keynes's theory arise from
claimed lack of microfoundations. The problem with theories based up
microeconomic reasoning is that they provide us with individual dema
for money functions and leave aside the problem of aggregation, even if c
ficulties involved in it are mentioned from time to time. This become
genuine difficulty when we arrive, as we have done with Friedman, at
proposition that theories can be best judged by their ability to pred
Clearly, if we are to say anything at all meaningful about policy, it is
aggregate demand for money that we need to predict. We shall see
Chapter 6, that this leads to the opening up of a gulf between the theor
discussed here and the empirical work, and casts doubt on both.

There is, of course, an even more serious problem. All of the reason
about the importance of the demand for money is based upon the imp
tance of knowing what factors in the economy will change in order to ca
the demand for money to return to equality with an exogenously determi
money stock. We have seen in Chapter 4 that this is at odds with real
We shall see in Chapter 7 that this can cause serious differences to arise
the approach taken to the transmission mechanism of monetary policy.

The Quantity Theory of Money is not a theory of the demand for money t
has been very influential and can be related to later theories of the dema
for money. The theory contained a number of variations and was far fr
the inflexible idea that is studied today. However, the simplified mo
based upon the equation of exchange and assuming a constant transactio
velocity of income provides the important policy messages that lie at
heart of one of the major approaches to monetary economics — t
changes in an exogenous money supply produce proportional changes in
general level of prices and that money is neutral in relation to real incon
The replacement in the expression of the Quantity Theory of transactions
income undermined the logic of the original theory but brought it m
closely into line with the first major theory of the demand for money,
Cambridge cash balances approach, which was being developed at the sa
time. The Cambridge approach introduced important changes because
demand for money was treated at a microeconomic level and was, like ot
demand functions in economics, subjective. However, most proponents
the Cambridge approach accepted the policy conclusions of the Quant
Theory. This was not true of Keynes who, in 1936, proposed a radically d
ferent theory of the demand for money based upon the motives for holdi
money. This gave interest rates a much more important role in the the
and raised the possibility that the demand for money function might
unstable. This led to the view that monetary policy might be relativ
weak, especially when the economy was in a depression. It also raised
question of whether the authorities could hope to control the rate of inf
tion through changes in the rate of growth of the money supply. In doi
this, it elevated the role of fiscal policy in the management of the econon

Keynes's theory was heavily criticized, particularly because it was s
to be overly concerned with the short run and lacked microfoundatio
There followed a series of attempts to explain the demand for money so
to retain some of Keynes's message (notably that the demand for mon
was interest-elastic) but to do so in a less controversial way. These inclu
ed the incorporation of interest rates into transactions and precautiona
models of the demand for money and the reformulation of the speculat
demand for money as an asset demand. Even the notion of interest-elast
ity was reduced greatly in importance in Friedman's demand for money th
ory. Friedman saw his theory as a return to the spirit of the Quantity The
in the sense that he sought to re-establish the importance of controlling
money supply as the means of controlling inflation. This required a retu

the demand for money function could only be determined by empirical te
ing. Thereafter, apart from some developments that grew out of gene
equilibrium theory, the focus of academic work on the demand for mon
shifted away from theory to econometric testing.

Key concepts in this chapter

- Quantity Theory of Money
- equation of exchange
- transactions velocity of money
- income velocity of money
- stability of the demand for money function
- motives for demanding money:
  - transactions motive
  - precautionary motive
  - speculative motive
  - finance motive
- The Cambridge *k*
- normal rate of interest
- active money balances
- idle money balances
- disequilibrium
- liquidity trap
- inventory-theoretic model
- portfolio models of the demand for money
- human wealth
- non-human wealth
- shopping time

Questions and exercises

1. Economics generally tells us that one must analyse the factors influe
ing both the demand for and supply of important variables. Why, th
might the demand for money not be of great importance from the point
view of economic policy?

2. Why is the Quantity Theory of Money not a theory of the demand
money? What is it a theory of?

3. Given the various points mentioned in Box 5.1 as influencing the veloci
of money, would you expect the long-term velocity of money to ha
increased or decreased over the past fifty years?

5. Why is the Cambridge *k* more likely to change than is *V* in the Quant Theory?

6. Both the precautionary and the speculative motives for holding mor arise from the existence of uncertainty — uncertainty about what in ea case?

7. Why is the speculative demand for money a demand for idle balance What happens to the velocity of money when idle balances increase?

8. Why was the speculative demand for money so controversial?

9. Both the inventory-theoretic model of the transactions demand money and Tobin's portfolio model are commonly called Neo-Keynes models. Why?

10. Why did the testing of the demand for money grow rapidly at expense of theorizing about the demand for money after Friedman pu lished his theory?

11. What are the particular characteristics of monetarist models of demand for money?

12. In Chapter 1, we mentioned the view that the value of money exchange arises because of the existence of incomplete information in m kets. How does this relate to shopping time models of the demand money?

Further reading

A great deal has been written about the theory of the demand for mon For a quite different approach to the historical approach taken here, Howells and Bain (2002). Other good textbook treatments can be found Laidler (1993) and Gowland (1991). For more detailed treatments than found here see Lewis and Mizen (2000) or Handa (2000). For an essay the demand for money that manages to dismiss Keynes in a few lines a victim of money illusion see McCallum and Goodfriend (1992). Po Keynesian explanations of Keynes's finance motive for holding money in Rousseas (1986) and Wray (1990).

for Money

'Money is a Merchandize, whereof there may be a glut, as well as scarcity', Sir D North, *Discourses upon Trade* (1691).

What you will learn in this chapter:

- The weakness of the link between the theory of the demand for money and the testing of it
- The difficulties in carrying out any demand for money test
- The form and results of early demand for money tests
- The problems that arose with the stability of demand functions in the 1970s and 1980s
- The possible link between financial innovation and tests of the demand for money
- Econometric explanations of the instability shown in testing in the 1970s and 1980s
- The buffer stock approach to the demand for money
- Sceptical views regarding the stability of the demand for money function

6.1 Introduction

As we saw at the end of Chapter 5, the focus of academic work on demand for money since the late 1950s has been empirical. There are number of problems associated with testing the demand for money. begin with, the theory we are meant to be testing is based upon theories household demand (or, much less often) of the demand for money by enprises. However, we wish to draw messages for monetary policy about aggregate demand for money. In Section 6.2, we consider the lessons might draw from theory about the form of the aggregate demand functi Unfortunately, we discover that theory is not very helpful in this regard. go on to consider the many difficulties involved in testing demand money functions. In section 6.3, we look at results. Testing seeks to estlish whether the demand for money function is a stable function of a sn number of variables, as Friedman has claimed (see Section 5.8). Early te suggested that this was indeed the case. We look at this work, but then c front the problem that a number of studies carried out in the mid-1970s the USA and the UK seemed to raise doubts about the *stability* of the fution. These tests provide the focus of attention of Section 6.4. Since time, much of the effort put into demand for money studies has gone i

and did not seriously undermine the conventional theory of the demand
money. The principal areas of endeavour have been in improving
econometric techniques used and in studying financial innovation and
effects on the demand for money. As well, the buffer stock theory of
demand for money was developed to show how some of the empirical fi
ings could be explained within the framework of neoclassical theory.
section 6.5, we look at views sceptical about the notion of a stable dema
for money.

6.2 Problems in testing the demand for money

We suggest in Section 4.4 that if money is endogenous, the demand
money might not be very important. However, since much of past mo
tary economics has assumed an exogenous money supply, the demand
money has seemed central to many of the debates on the value of moneta
policy.[1] Consequently, we sufficiently felt the need to conform to p
views to spend Chapter 5 looking in some detail at the theory of the dema
for money, only to find that it raised a number of questions but did not p
vide answers. In particular, the theories differed over two issues that wo
be crucial if the supply of money were exogenous:

1. The extent to which the demand for money is sensitive to changes
the rate of interest; and

2. whether the demand for money function is likely to be stable.

The only possible way of resolving these issues appeared to be through te
ing. A logical starting point for this is to derive from that theory the in
pendent variables we wish to include in the equation to be tested. Based
our discussion in Chapter 5, this might give us a list something like the f
lowing:

- The interest rate on representative non-money assets, possibly including the rate of inflation
- The interest rate on money
- The transfer costs of switching between money and non-money ass
- The level of current income or wealth/permanent income
- The variance of income

• An index of prices.

Unfortunately, we can immediately see several practical difficult associated with testing any equation derived from this list. These are su marized in Box 6.1. We consider each of them below. However, we m first mention a more general problem. Where we are required to ma choices regarding the form of the variables to be included in the test equation (for example, among different definitions of money), we shall that theory provides little or no help. This usually results in the choice be made on pragmatic grounds — which form of the variable 'tests bett But what does this mean? It means that we do not ask whether the dema for money is stable. Rather we ask how we can construct a demand money function that appears to be stable over a particular period. The p sumption of almost all of the thousands of tests that have been conduc over the past half-century has been that the demand for money is stab Equations that don't produce the right result are discarded. The proposit can never be disproved because there are always changes that can be ma to the equation being tested or new tests to be conducted. It is a rigg game. Still, let us do as we promised and look at each of the difficulties s arately.

Box 6.1: Problems in the testing of the demand for money

(a) There is no agreed definition of money for testing purposes;

(b) The demand for money is not directly observable;

(c) The assumption of an endogenous money supply creates an identification problem;

(d) There are problems in the choice between income and wealth as the scale variable and difficulties in the measurement of wealth;

(e) There are problems with the selection of the interest rates;

(f) Variables, all of which should be included as independent variables may be correlated with each other, making it difficult to isolate the specific relationsh between each variable and the demand for money;

(g) Some of the variables in our list may not be easily measured or measurable all;

(h) There are problems in the choice of time period for the testing.

Theories are of little help here. The transactions motive for holding mon suggests a narrow definition (currency + sight deposits), but there are pro lems with theories based on the speculative demand or the proposition t money yields a flow of services. In the latter case, the definition of mon must be an empirical matter. Some Keynesians stress the difficulty of d tinguishing money from 'near-money' and are, thus, likely to prefer bro definitions to include assets that are close substitutes for narrow money terms of liquidity.

When we have settled on a preferred definition of money, we must ma it as closely as we can to an official definition used in the collection money stock statistics. We have seen in Section 2.4, the extent to wh official definitions change over time, and in Box 3.1, the variety of defi tions of money in use in different countries. This has always made choice difficult, but the use of official definitions has been complicated financial innovations that have changed both the roles of financial insti tions (and thus the extent to which their liabilities may act as money) a attitudes towards the various types of financial assets. Consequently, m empirical work settles for the most readily available and consistent defi tions and ignores questions of theoretical justification. Most use currency the sight deposits of banks or add banks' time deposits.

Pause for thought 6.1:

Why might there be a difference between:

(i) the relationship between interest rates and demand deposits; and

(ii) that between interest rates and time deposits?

Attempts to use broader definitions run into additional complicatio Then, explicit interest rates may be payable on some elements of the chos measure but not on others. Some elements may be positively related interest rate changes, others negatively. Further, the demand for non-int est-bearing components of the stock is likely to be more closely related income than that for interest-bearing components since the latter are m likely to be held as part of savings balances. One way of trying to deal w these problems is to replace the conventional aggregates with Divisia inde es, which we discussed in Section 2.4. In these, weights are attached to various types of deposit to take account of different degrees of liquidity measured by rates of interest. Some success has been achieved with the u

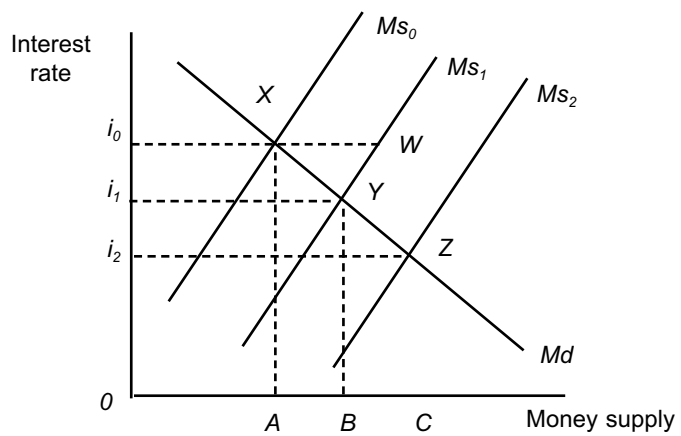
gates and demand for money functions incorporating them appear more s
ble (Chrystal and MacDonald, 1994; Belongia, 1996). This may well
because they are better able to deal with financial innovation than are
conventional aggregates (Mullineux, 1996). None the less, many proble
remain including that of the implicit interest rate on sight deposits (Barn
et al, 1984; Lindsey and Spindt, 1986).

(b) The demand for money is not observable

We can observe the quantity of money currently being held but not whet
it is being *willingly* held. If the money market is in disequilibrium, w
people, on average, attempting to increase or decrease their money ho
ings, measuring the quantity of money does not measure the demand
money.

If we assume the money market is always in equilibrium and the mon
supply exogenous, we can make progress. Consider Figure 6.1. Let
money supply be MS_0, the interest rate i_0 and the money supply equal to
demand for money (Md) = $0A$. Let the money supply increase to Ms_1. T
interest rate falls to i_1, as we move instantaneously to a new equilibrium
Y with $Ms = Md = 0B$. With a further increase in the money supply an
further fall in interest rate to i_2 , we move to Z with $Ms = Md = 0C$. Th
we might assume that the demand for money curve is being traced out as
exogenous money supply schedule shifts along an unchanging demand
money curve.

Figure 6.1: Equilibrium in the money market



demand and supply. Before we can relate observations of the money su
ply to the level of income and the rate of interest and call the resul
demand for money function, we must be sure of two things:

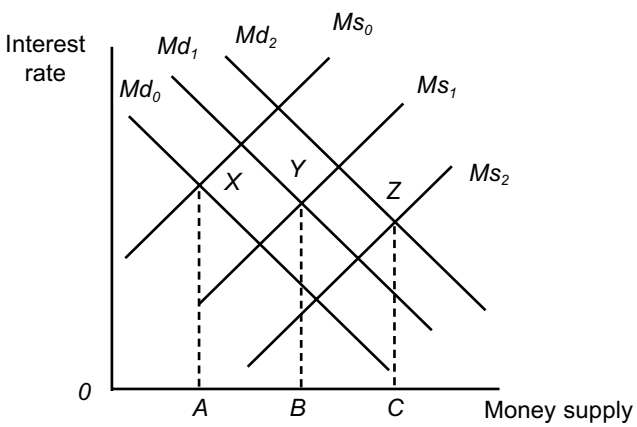
(i) that the supply function of money shifts independently of the dema
function (that is, that the money supply is exogenous, as assumed
Figure 6.1); and

(ii) that such observations lie on the same demand for money functio

(c) Endogenous money supply creates an identification problem

It would be perverse of us to continue to assume (i), given our support
the notion of endogenous money in earlier chapters. Consequently, let
assume the money supply is endogenous, with the same set of variab
influencing both the supply of and the demand for money. Then,
demand and supply curves move together. One possibility is shown
Figure 6.2.

Figure 6.2: The identification problem with endogenous money



We continue to assume equilibrium in the money market, but now the poi
X, Y and *Z* do not identify the demand for money curve. We could draw
same diagram and have the same set of equilibrium points with demand
money curves of quite different slopes.

If we assume an endogenous money supply, can we identify a money supply curve from information about changes in the money stock as interest rates change?

Investigators attempt to overcome this problem by employing techniq that enable supply and demand functions to be fitted simultaneously, there is clearly a serious problem. If we drop the equilibrium assumpti another problem emerges, even if we assume an exogenous money supp In Figure 6.1, following an increase in the money supply from Ms_0 to M the initial movement may be to W rather than directly to Y. We would, th need to consider the speed of the movement to Y and the path taken.

(d) Problems in the choice between income and wealth as the sc variable

We suggest above that choosing a narrow definition of money implie concentration on the role of money as a medium of exchange. This, in tu seems to lead to the use of *GDP* or Total Final Expenditure (*TFE*) as scale variable. Unfortunately, the demand for money is a stock varia while *GDP* and *TFE* are flow variables.[2] This can cause difficulties. addition, in demand for money theories in which the demand for money an asset demand rather than a transactions demand, wealth, a stock variab is the constraint on the holding of money. Early empirical work on dema for money functions was dominated by this controversy over the cho between measured income and wealth as the scale variable.

The first difficulty in trying to resolve this issue is that the desire include wealth always introduces measurement problems. Khusro (19 and Grice and Bennett (1984) constructed a series on financial wealth the UK and used it in their studies. However, this is a much narrow wealth concept than is suggested by the theory. Data permitting the co struction of long time series for various broad measures of the aggreg level of private sector nonhuman wealth, real as well as financial, exist o for the USA. Even there, broad measures have seldom been construc because of aggregation problems, especially the problem of double cou ing in the aggregation of the wealth of households and firms combined.

Because of the absence of reliable statistics for wealth, it was often r resented in studies by data on permanent income. This has the added b efit of incorporating income from human as well as non-human wealth,

exponentially weighted average of current and past values of income, on t
assumption of adaptive expectations. Later, rational expectations w
used. This might still lead to the modelling of expectations formation
some sort of averaging process of current and past values of income, but t
would depend not on exponentially declining weights but on the way
which income moves over time.

In general, wealth seemed to perform better (that is, produce more s
bility) than income (Meltzer, 1963; Chow, 1966; and Laidler, 1971). T
support for wealth was, however, not conclusive. These studies used p
manent income as the wealth variable. When promising results w
obtained in studies using a lagged dependent variable in formulations w
measured income (Feige, 1967; Laidler and Parkin, 1970; Goldfeld, 197
it was suggested that the apparent superiority of permanent income mi
have arisen because it captured important adjustment lags rather th
demonstrating the benefit of including a long-term measure. However, la
studies (Hall, Henry and Wilcox, 1989; Adam, 1991) appeared to confi
that models of broad money in the UK performed better with the inclusi
of an explicit wealth term.

Pause for thought 6.3:

Why is there a problem in including in an equation for testing a variable (such a
human wealth), the measurement of which depends on a separate theory of the
way in which expectations are formed?

A variety of alternatives has been tried. Consumption has been used
a proxy for wealth because it moves more closely with permanent than w
measured income (Mankiw and Summers, 1986; Faig, 1989). Another p
sibility explored was the inclusion of both wealth and income ter
Expenditure has been used as a broader alternative to income (Goldfeld a
Sichel, 1990; Mankiw and Summers, 1986; Hall, Henry and Wilcox, 199
This takes us back to the idea of transactions as the constraint and closer
the spirit of the Quantity Theory. Some studies have, indeed, attempted
employ the value of transactions, but this also produces many measurem
problems. We return to the use of transactions in Section 6.5.

e) Problems with the selection of the interest rate

There would be little point in including the interest rate on more than o
non-money financial asset since interest rates on financial assets tend

est substitute for money since this should best represent the opportunity c
of holding money. However, the closeness of substitutes varies with
definition of money, which itself varies as innovations in very liquid ass
take place. Even with a constant definition of money, the choice of the cl
est substitutes for money changes through time.

Still, short-run commercial debts seem closer substitutes for money th
long rates and, therefore, more relevant. On the other hand, long rates
more representative of the average rate of return on capital in the econo
and incorporate expectations of future inflation rates. On both groun
they may be thought a better guide to the general opportunity cost of ho
ing money than the yield on short-run commercial debts. In any case, wh
theoretical considerations may be of some help, the choice, in practice,
the most appropriate interest rate requires knowledge of institutional det
For example, the rate on long-dated gilts might seem correct in a financ
system in which secondary trading was thin and costly and securities w
generally held to maturity. The growth and development of the second
gilts market, however, and the changes, especially after 1986 in the U
made all gilts extremely liquid. Long gilts like shorts can be sold chea
and easily for cash in 24 hours.

Whether or not absolute changes in the rate(s) on non-money assets r
resent changes in the opportunity cost of money depends on what is h
pening to money's 'own rate'. In a world where bank deposits do not p
interest, money's explicit own rate is zero and absolute changes in rates
non-money assets necessarily indicate changes in opportunity cost.
intermediate situation applies where deposits pay interest but at rates t
are probably low but, above all, are sticky. This was the position in the U
until the changes of *Competition and Credit Control* introduced in 19
Once deposits began to pay market-related rates, changes in money's o
rate meant that changes in the 'spread' or differential between the rate
money and the rate on other assets indicated a change in the opportun
cost of holding money. Furthermore, where some deposits (and notes a
coin) still pay no interest and where banks offer premium rates for differ
terms and conditions, theory suggests that money's own rate should be in
cated by a weighted average of deposit rates.

In theory at least, the spread between money's own rate and the r
charged on bank lending should also influence the demand for money sin
spending in excess of income can be financed either by running down l
uid assets or by borrowing. Sprenkle and Miller (1980) pointed out t

widely recognized in studies of the demand for bank lending. It is less f
quently recognized that there is also an implication for the demand
money since the attraction of overdrafts, when this spread approaches ze
arises from a reluctance to run down liquid assets. Clearly, the growth
interest bearing deposits and the resulting changes in money's own rate
involved here as well. Furthermore, financial innovation may be implic
ed in changes in the other part of the spread, the cost of bank lendi
Competition between banks and building societies to lend for house p
chase in the 1980s, and again 2000-02, led households in the UK to bu
up their holdings of floating rate debt.

This also altered dramatically the composition of their bank debt as
share made up of personal loans and overdrafts diminished while the sh
of mortgage debt rose. Before 1990, mortgage lending was charged at ra
close to base rates with the result that at any given level of interest rates
average cost of bank debt, weighted by its components, was falling. T
attractiveness of borrowing from banks while building up liquid assets w
possibly further reinforced by the increasing ease with which bank cre
became obtainable — a decline in the non-pecuniary costs of borrowing

Pause for thought 6.4:

What are the non-pecuniary costs of borrowing?

In practice, the choice of interest rate may be limited to a small numb
of series by the availability of data over a long period. For this reason, stu
ies in the USA were constrained for a long time to use either the yield
20-year corporate bonds or the yield on 4 to 6 month prime commerc
paper.

Much work has been done on the term structure of interest rates. Laid
suggests that the most satisfactory theory says that (with suitable adjustm
for risk) expected holding period yields on assets of various maturities te
to be equalised by the market. If the planned holding period of money a
bonds is a short one, then the yield on 4- to 6-month commercial paper
more likely to be a good measure of the opportunity cost of holding mon
than the yield to maturity on 20-year bonds. However, it has been argu
that these two series moved very closely together and thus that, for the p
poses of testing for the importance of interest rate on the demand for mon
function, one was probably as good as the other.

When this occurs, the easiest thing to do is to omit one of the variabl
However, this might then become a source of problems. Consider a sim
testing equation. By assuming linear relationships, we may write
demand for money function as:

$$\frac{Md}{P} = \beta_0 + \beta_1 y - \beta_2 i + v \qquad ...$$

with P being an index of prices, y a measure of real income, i a represen
tive interest rate and v a random variable. This is just a straightforw
statement of the demand for money as a function of income and inter
rates. For testing purposes, we could convert this into:

$$m_t = \beta_0 + \beta_1 y_t + \beta_2 i_t + v \qquad ...($$

where m_t equals $(M/P)_t$, a measure of the real value of the money supp
while t indicates the current period. This is usually linearized by tak
logs, which smoothes out the data and converts parameter estimates i
elasticities, making them easier to interpret. The equation becomes:

$$ln\ mt = ln\beta_0 + \beta_1 . lnY_t + \beta_2 . lni_t + v_t \qquad ...$$

A common required addition is the lagged dependent variable (the r
value of the supply of money in the previous time period): $\beta_3\ lnm_{t-1}$. T
simply accepts that there are bound to be time lags in adjustment and th
it is a reflection of the idea that a movement to a new equilibrium follow
a change in one of the independent variables will not be instantaneo
However, in the early days of testing it was assumed that these time la
would be quite short and thus that the role of the lagged dependent varia
would not be very great. It was hoped to establish this by testing. The ot
principal hopes in testing were that:

(i) the signs would be as indicated by the theory (most obviously a n
ative relationship between i_t and m_t;

(ii) that the constants would indeed turn out to be constant;

(iii) that the independent variables (Y_t and i_t) would between them p
dict a high proportion of the demand for money); and

(iv) that v would prove to be random, indicating that it did not incor
rate a missing variable with a systematic relationship with the dema
for money.

Part of the variations is explained by *v*. This might be caused by the om
sion from the equation of an explanatory independent variable. The va
able may, in turn, have been omitted because it was correlated with eithe
or *i*.

An obvious example relates to nominal interest rates and the expec
rate of inflation. An equation containing both of these terms is difficult
estimate because of the high degree of correlation between the two. T
correlation makes it difficult to isolate the specific relationship betwe
each variable and money. For this reason, although Friedman included bo
terms in his theoretical demand for money equation, the usual practice
testing purposes has been to include only the nominal rate of interest. W
expected inflation omitted, however, the equation is likely to perform p
ticularly badly in inflationary periods. Other variables often omitted
similar grounds are a wealth term and the own rate of interest.

(g) Some variables in the list may not be easily measured or mea urable at all

Transfer costs are difficult to measure since they vary from one individ
to another and from one company to another depending on the circu
stances. Since it is usually assumed that transfer costs are likely to chan
slowly over time, they are usually left out of aggregate demand for mon
equations.

There are no objective *ex-post* measures of the expected variab
included in the list. The best we can do is to estimate expected future v
ues of variables based on forecasts using currently available informati
(making a judgement in doing so as to the best available forecasting mode
These estimates can then be entered into the demand for money equation
the assumption of rational expectations — that agents do, indeed, make u
of the best available forecasting models. A more usual approach is
replace the expectational variable with an available proxy or to represen
econometrically in some other way (for example by a dummy variable o
trend term).

(h) There are problems in the choice of time period for the testing

Supporters of the notion of a stable demand for money only claim stabil
in the long run. However, if the demand for money is unstable in the sh
run, we need to be able to explain why, and do it in such a way that t

problems because the definitions of many of the variables change over ti
Some elements omitted from the equation because they are assumed c
stant, such as payment systems, do change over time. In any case, the d
tinction between long run and short-run studies is arbitrary. There is no t
oretical definition of the long run in macroeconomics other than the per
necessary for the economy to return to equilibrium — a definition tha
useless for empirical work.

What can we learn from testing?

One result of these problems is that the standard regression equation used
demand for money testing makes relatively little use of theory beyond t
ing as a starting point the need to include both an income term and an int
est rate term. It is hard, therefore, to argue that it is the theory being test
Rather, we start with a view of the world that leads to a belief in a sta
relationship between the demand for money and real income and we seek
confirm this. Failure to do so does not produce a re-evaluation of the th
ry or a change of world view but a determination to change the equation a
try again. A chapter on the testing of the demand for money in a rec
book (Handa, 2000) contains the sub-heading, 'The desperate search fo
stable money demand function'. This is an accurate description of mu
that has gone on. None the less, let us look at the results of all this ende
our.

6.3 Early demand for money studies

Before Keynes's *General Theory*, estimates were made of the velocity
circulation over long periods, with the aim of relating changes in long-
velocity to institutional changes (fitting in with the classical quantity th
ry of money). After the publication of *The General Theory*, attempts w
made to show a positive relationship between interest rates and veloc
(and thus an inverse relationship between interest rates and the demand
money). The aim was to demonstrate that an increase in the money sto
would produce a fall in velocity, reducing the impact on nominal incon
Other studies (Tobin, 1947; Bronfenbrenner and Mayer, 1960) sought
distinguish between idle and active balances and then to relate idle balan
to interest rates, on the assumption that interest rates only influenced i
balances and had no role to play in the transactions or precaution

ative relationship between interest rates and idle balances. Bronfenbren and Mayer also found a clear negative relationship between the demand idle balances and the rate of interest. The main problem with both stud lay in arbitrary definition of idle balances. This led to the growth of g eral demand for money studies in which no distinction was made betwe the two types of balances. These became by far the most common form study from the early 1950s on.

The form of general demand for money studies

We suggested above that general demand for money studies involve the te ing of equations of the type:

$$m_t = \beta_0 + \beta_1 y_t + \beta_2 i_t + v \qquad \ldots($$

This is a reduced form equation that regresses the demand for a measure money on measures of income and interest rate. No attempt is made derive the parameter estimates of an underlying structural model. This been taken by some writers as a 'monetarist' approach,[4] although Friedm argued that the dispute over the use of large models was almost entir independent of the Keynesian-monetarist controversy. Mayer (1978) poi out that small reduced-form models go well with the view that changes the money stock have effects through a large number of channels, sinc large structural model would not be able to pick all these up and a reduc form approach might be more reliable. He also suggests that the approa suits monetarists because they are concerned only with the supply of a demand for money, not with allocative detail. If one takes the stability the private sector as given, there is no need for large models to exam erratic factors in various sectors.

Pause for thought 6.5:

What is implied if, in equation 6.2, *v* is not a random variable?

The vast majority of reduced-form studies have used highly aggregat time-series data. These studies set out to find:

(a) which variables should be included in the function, for example, income or wealth, long or short interest rates;

(b) whether the demand for money is correctly specified in real terms

(c) the interest elasticity of the demand for money; and

(d) whether the function is stable, with
(i) significant and stable co-efficients; and
(ii) most of the variation in the demand for money accounted for
variations in interest rate and income.

Equations of this type were estimated, using different sample periods a different forms of both the dependent variable and the explanatory va ables. Functions were estimated for both the long-run (using annual d over periods ranging from around 30 to over 100 years) and the short- (mainly with quarterly data, mostly over time periods between 5 and years).

Most short-run studies incorporated time lags, with equilibrium assun to occur only in the long run. In these models, long-run equilibrium w disturbed by a change in income or interest rates but, because of adjustm costs, agents were assumed to adjust only slowly towards the new equil rium level of desired money balances. Thus, a two-stage decision proc was assumed: in the first stage, the long-run optimal amounts of assets to held were determined; in the second stage the optimal speed of adjustm to long-run equilibrium was decided. The adjustment path was assumed have no impact on the optimal long-run demand for the asset.

The second stage decision was modelled according to the partial adju ment hypothesis: that the change in the demand for money in the curr time period is a fraction, θ, of the gap between the desired (long-run or eq librium) demand and the actual demand in the previous period. Thus, $\theta < 1$, and the smaller θ is, the slower is the adjustment to the new equil rium. We have:

$$m_t - m_{t-1} = \theta(m_t^* - \mathrm{m}_{t-1}) \quad \ldots$$

where m_t^* is the long-run equilibrium level of real money balances.

Adding m_{t-1} to both sides gives:

$$m_t = \theta m_t^* + (1 - \theta)m_{t-1} \quad \ldots$$

This shows that the observed demand for money at time t is a weigh average of the desired money demand at that time and the demand money in the previous period with θ and $(1-\theta)$ being the weights. Equat 6.2 could then be taken as a simple long-run relationship for the demand

$$m_t = \theta\beta_0 + \theta\beta_1 y_t + \theta\beta_2 i_t + \theta v + (1-\theta)m_{t-1} \quad \ldots$$

Dynamics were later introduced into the equation by replacing curr income with expected income. This was usually modelled with adapt expectations but, later, rational expectations were incorporated. Other mo els sought to incorporate the learning process of agents (Cuthbertson a Taylor (1987a, 1989). Partial adjustment equations were formulated in bo real and nominal terms. The approaches were different but the results si ilar.

The interdependent asset adjustment model (Brainard and Tobin, 196 provided a variation on simple partial adjustment models. In these, speed of adjustment in money holdings depended on disequilibrium in oth asset markets as well as in the money market. Less formal interpretatio were based on the idea that economic agents altered their behaviour acco ing to 'signals' that they were out of equilibrium (simple feedback model

Pause for thought 6.6:

Explain the role of the lagged dependent variable in testing equations of the demand for money.

The results of early general demand for money studies

Early long-run studies included those of Latané (1954), Meltzer (196 Laidler (1966, 1971) and Chow (1966) all for the USA, and Kavanagh a Walters (1966) and Laidler (1971), for the UK. Short-run studies of no included Heller (1965) and Goldfeld (1973) for the USA, and Laidler a Parkin (1970) and Goodhart and Crockett (1970) for the UK.

Despite considerable variations in detailed results, there was consid able agreement up until the early 1970s in both the USA and the UK. It w broadly accepted that:

(i) the demand for money was interest elastic but elasticities were re tively low. There was a general tendency for UK figures to be high Despite the existence of a small number of extremely high figures short-term studies, long-term elasticities were, on balance, greater th short-term ones, indicating the existence of a time lag. No evidence w found for an infinite elasticity of the demand for money, seeming denying the existence at any time of a liquidity trap. The elasticity fou was generally lower when short interest rates were used.

all proved statistically significant. Widely different income elasticit
were estimated but most studies produced similar results, although ag
results differed between the USA and the UK. Most US studies p
duced estimates close to unity, as against figures comfortably below
in the majority of UK long-run studies. UK results thus appeared to p
vide some support for the existence of economies of scale in the dema
for money.

(iii) The demand for money appeared to be correctly specified in r
terms but with an adjustment lag.

(iv) Time lags between interest rate and income changes and
demand for money seemed from long-run studies to be relatively sh
with three-quarters of the adjustment occurring in the first year and
per cent within two years. However, this was called into doubt in sho
run studies in both the US and the UK, which suggested much lon
lags.

(v) The importance of expected inflation in normal times remain
open to doubt, especially in US studies.

(vi) Demand for money functions appeared to be reasonably stable.

(vii) No clear preference was established between narrow and broad d
initions of money. In general, the interest elasticity of the demand
money was found to be lower, the broader the definition of money us
There was some suggestion that if a narrow definition of money w
used, a long interest rate produced better results, whereas a short inter
rate was preferable with broad money.

Thus, the conclusions of the various tests were relatively favourable to t
monetarist position. The inverse relationship between money and intere
rates seemed clearly to have been established but this posed no problem
so long as the long-run elasticity was small and the function was stable.

The stability of the demand for money appeared to be confirmed
Friedman and Schwartz (1963) in a study of velocity. They found that me
ured income velocity in the USA had fallen on average by one per cent
year over the previous century, from 4.6 to 1.7 but that short-run variatio
in velocity were relatively small compared with changes in the mon
stock. This suggested that the demand for money had been reasonably s
bly related to nominal income around a long-run upward trend. Furth
they claimed that the short-run variations that had occurred had reinfor

6.4 Problems and responses since the 1970s

In the 1970s, problems appeared in both the UK and the USA — wh Goldfeld named the problem 'the case of the missing money' (Goldfe 1976). In the USA between 1973 and 1975, real money balances stead declined, whereas demand for money equations estimated with data for 1950s and 1960s had predicted a mild decline in 1974 followed by a rec ery in 1975. Thus, existing demand for money equations were seriou *over-predicting* the demand for money.[5]

In the UK, too, the demand for money function began to show signs instability. There, however, equations from the 1950s and 1960s *undere mated* the demand for money (Artis and Lewis 1974, 1976; Hacche, 197 Equations also broke down in several other OECD countries (Atkinson a Chouraqui, 1987).

Box 6.2: Explaining the apparent instability of demand for money functio

1. The problem was econometric in nature — demand for money equations had been misspecified or the dynamics of short-run models were inadequate. All tha was needed was to improve the econometrics.

2. There had been changes affecting the arguments of the function, resulting in unpredictable shifts in the demand for money function and/or in the slope of the function. To retain belief in the long-run stability of the function, one then had to argue that such changes were limited to particular periods of time and that once the system had adjusted, long-run relationships would re-emerge. Financial inn vations were thought to have been mainly responsible for upsetting earlier predi tions.

3. Blame was placed upon the assumption of equilibrium and new approaches t disequilibrium were developed, notably the buffer stock approach to the demand for money — a formalization of the importance of the liquidity of money. A distin tion is drawn between 'demanding' money as a means of payment and being wi ing to 'accept' it temporarily because the costs of adjusting stocks of money are less than those associated with adjusting stocks of less liquid assets.

We should add, however, that some Keynesians and post-Keynesians have argued that the demand for money function should be expected to be unstable and that the findings of the 1960s were an aberration; while others have been highly sceptical about the value of any form of econometric testing as an aid to understanding the complex interaction between people and markets.

equations to include the 1970s produced changes in the coefficient on lagged dependent variable (for both narrow and broad money), indicat changes in the length of time lags. The coefficient also tended to be v low, suggesting unreasonably long time lags.

Things began to go wrong again in both the United States and the Uni Kingdom in the early 1980s when income velocity began to fall sharply a demand for money functions estimated on pre-1982 data seriously under timated the demand for narrow money in the mid-1980s (Stone a Thornton, 1987).

Several explanations of these problems have been put forward, most which have sought to preserve belief in the view that the demand for mon is, in the long run at least, stably related to real income and interest rat These explanations are summarized in Box 6.2 and considered individua below.

Improvements in econometric techniques

Many criticisms were made of the early econometric tests. For examp Baba *et al* (1992) criticized the standard demand for money equation o number of grounds, including the omission of the inflation rate and the in equate inclusion of the own rate on money, as well as incorrect dynan specification. Concern about the dynamic specification of equations led the recognition of the inclusion in equations of non-stationary variab (trended variables — such as the money stock and national income — t increase over time and so have no constant mean). Least squares regr sions with non-stationary series can produce spurious regressions, bias coefficients and invalid statistical inferences. Non-stationary variables c be made stationary (detrended) by taking differences but using differenc data does not provide estimates of the long-run relationship betwe dependent and independent variables in the estimating equation. Tests w developed to determine whether variables are stationary or non-station (unit root tests) but the problem remains with those money demand fu tions containing non-stationary variables.

Pause for thought 6.7:

Can you think of non-stationary variables other than money and national income

However, it was discovered that one might be able to combine data ser of non-stationary variables in a linear way to produce a stationary seri

existence of a cointegrating vector among a set of variables implies an eq
librium (long-term) relationship among them. Variables might drift aw
from the equilibrium relationship in the short run but the technique of co
tegration can provide evidence of the long-run relationship.

Unfortunately, several cointegrating vectors might exist among a set
variables. Among *n* variables, there are potentially *n–1* cointegrating v
tors. If two or more cointegrating vectors are found, it is not clear from
econometric estimation which vector relates to which economic relatio
ship. To identify a cointegrating vector with a particular economic re
tionship, such as the demand for money function, judgements must be ma
based on the expected signs and sizes of the coefficients. Sometimes no
of the available vectors possess both the signs and sizes of coefficie
expected from economic theory. This could be caused by the sorts of pro
lems that apply to all testing, which we have outlined above. There
ways of trying to get around the difficulties but it remains that, in relati
to the demand for money function, even if there appears to be a long-te
equilibrium relationship amongst, say, income, the demand for money a
interest rates, it may be difficult to obtain reliable estimates of the intere
rate and income elasticities. In any case, the existence of such a long-te
relationship does not, in itself, tell us anything about causality and so do
not resolve the endogenous versus exogenous money debate.

Further, discovering the existence amongst the data of a long-term eq
librium relationship still leaves the problem of the short-run dynami
These were tackled by the development of error correction models (ECM
These began to be used in the late 1970s to replace partial adjustment
short-term demand for money models. ECMs combine short-run and lon
run elements without imposing restrictions on the lag structure or ty
short-run and long-run effects to a single parameter. They were the outco
of the general to specific modelling strategy (Hendry *et al*, 1984) in wh
a very general equation was used as the beginning point of the search for
best specification of the model. The ECM technique is often combined w
the cointegrating procedure to try to explain short-run deviations from
underlying long-run relationship.

In one particular application of cointegration, researchers tried to ver
the existence of a cointegrating relationship between the current aggreg
price level and the long-run equilibrium price level, labelled *P*-Star. Bas
on the income version of the Quantity Theory of Money, *P*-Star mod
assume a long-run equilibrium velocity (that may be either constant or ha

$$P^* = (M/y^*)V^* \quad \ldots$$

with y^* and V^* representing long-run equilibrium levels of output a velocity. The models are then used to indicate the existence of inflation pressures in the economy by comparing current levels of income and vel ity with their long-run equilibrium levels. If current income is above lo run equilibrium income, ($y > y^*$), then, *ceteris paribus*, current income m fall in the long-run, with the existing monetary pressures in the econo being transferred to the price level. Equally, if current velocity is below long-run level, it must rise in the long-run generating increased expansi ary pressure that must fall on y or P. Plainly, if $y = Y^*$, all additional m etary pressure will fall upon P. Thus, short-run movements in the pr level are modelled as the product of an output gap, ($Y - Y^*$), and a veloc gap, ($V - V^*$). However, the P-Star approach suffers from the same pr lems as other cointegrating studies in that, to obtain definite answers, must impose on the models assumptions drawn from economic theo notably here the assumption of a long-run equilibrium velocity of mon We are also left to explain the short-term deviations of V from V^*.

In general, while cointegration studies have been judged useful, th have not yet been able to establish a stable demand for money function w a specific form and invariant coefficients for out-of-sample data. We ne therefore, to consider the principal explanations of the continuing proble with the function.

Shocks to the demand for money function

Economists have proposed a number of possible causes of sudden shifts in demand for money function in the 1970s and 1980s. These have included

(i) financial innovations associated with institutional change in financial sector;

(ii) uncertainty about the rate of inflation as a result of the large swi in inflation rates in the 1970s and 1980s;

(iii) currency substitution, especially following the movement aw from fixed exchange rates in the early 1970s.

Although we shall say a little about the second and third of these, concentrate here on the impact of financial innovations since this has p duced by far the greatest amount of lucubration.

Institutional change is not new. For example, one of the earliest and m
fundamental innovations, whose consequences foreshadowed those t
would follow from many later ones (Niggle, 1990; Chick, 1986), was
switch from fiat to credit money as banks discovered that they needed
cover only a small proportion of their liabilities with cash. This led
money supply to become the product of private sector institutions wh
principal loyalty was to shareholders.

Many institutional changes affect the trend of velocity. They do
always do so in the same direction, but each change has a predicta
impact. With financial innovation, for example, transactions costs dimin
and, following the Baumol-Tobin inventory model of the transactio
demand for money, the quantity of narrow money demanded is, *cete*
paribus, likely to fall; the income velocity of money should slowly increa
over time. On the other hand, the increasing monetization of the econo
should have produced a downward trend in velocity. The development
near-money substitutes often associated with financial innovation sho
produce a fall in the demand for money relative to *GDP* and, hence,
increase in velocity. However, if the increasingly close money substitu
bear interest, a rise in money's own rate of interest relative to other ra
may follow, increasing its attraction as a liquid asset and tending to redu
velocity. The net result of all such developments is reflected in the incon
elasticity of the demand for money (> 1 with falling velocity; < 1 with
ing velocity).[6]

Pause for thought 6.8:

What meaning can you attach to the idea that money might be a luxury good?

But what specific innovations were thought to relate to the question
the apparent instability of the demand for money function in the 1970s a
1980s? The deregulation of financial markets, the introduction by banks
interest-bearing demand deposits, the impact of technological change
financial services, the liberalization of international capital flows and
imposition or removal of controls on bank lending all came into the deba
Policy measures specific to particular economies also played an import
role in the discussion, notably, for the UK, the relaxation of lending contr
over the period 1971-73.

Technological innovation in the banking and payment systems reduc
brokerage charges (including the cost of changing deposits into cash or n
money assets into deposits). Where extensive (and expensive) specia

works already allowed for payment by credit and debit cards. Electro
communication and ATMs also lowered the cost of entry into some areas
banking activity. Increased competition led to a narrowing of spreads.

These changes had three consequences. Firstly, it gave an opportunity
economize on non-interest bearing cash and an increased desire to h
deposits, giving banks command over a greater proportion of monet
base. Secondly, the virtual automatic access to credit lines provided
plastic cards made it more attractive to hold both debit and credit positi
simultaneously, as well as raising the question of whether the unused cr
it should not be included in a 'truer' measure of money. Thirdly, AT
offering current balance statements and on-screen home banking servi
reduced considerably the need for significant holdings of precautionary b
ances by making it easier for people to manage their money balances w
precision.

It has been argued that there is little to worry about in relation to
demand for money function since there is no long run problem. Perhaps
strongest statement of these views came from economists writing in
Federal Reserve Bank of St Louis Review. For example, they concluded
one occasion that the US demand for money function had shifted down
1974 without affecting the income- or interest-elasticities. Hafer and H
(1979) argued that simply including long-term interest rates in the funct
and redefining money would overcome the apparent difficulties of
1970s. In a similar vein, it was proposed that problems arising from
growth of interest-bearing cheque accounts could be countered and
instability of the income velocity of money reduced by excluding intere
bearing cheque deposits from the definition of money. Further, Ha
(1985) claimed that errors resulting from institutional change and financ
innovation would, in any case, tend to cancel out in the long-run. Howev
when demand for money functions estimated on pre-1982 data seriou
underestimated the demand for narrow money in the mid-1980s, the not
of simple shifts in the function with nothing else changing had begun to
appear. This later failure was put down to a combination of the effects
(a) financial innovations; (b) the sharp increase in the volume of the int
est-bearing components of the money supply; (c) cyclical movements
GNP; and (d) possibly an increased interest-elasticity of the demand
money.

Suggesting that financial innovation causes occasional shifts in an ess
tially stable relationship does not explain why the innovations occur wh

elasticities (the slope of the demand curve will change as well as the cu
shifting). Consider, for example, the impact of monetary policy. A per
of high interest rates may encourage the development of financial inno
tions, allowing money balances held for transactions purposes to
reduced. This introduces the possibility of a ratchet effect — when inter
rates are high, it pays to spend time and effort on the development of fin
cial innovations. In the 1970s and 1980s, for instance, we saw the int
duction of concentration accounts (in which funds deposited in ot
accounts are automatically transferred at the end of each working day), z
balance accounts (that allow firms to do without transactions balances
banks, yet give them the opportunity to write cheques) and automated te
machines. Having been introduced, such innovations are not reversed wh
interest rates fall again because the costs involved are mainly set-up co
such as computing hardware and software. In this case, it was, therefo
likely that financial innovation increased the interest-elasticity of
demand for narrow money (as movements between demand deposits a
high interest-bearing deposits became much easier) as well as causing
downward shift in the function. Thus, monetary policy measures may aff
the demand for money indirectly through inducing financial innovations

Pause for thought 6.9

Do you think the introduction of internet banking has been an important financia
innovation? What effect, if any, do you think it will have on the velocity of mone

Since the principal aim of explanations of the apparent demand
money instability has been to retain belief in a stable long run function, i
not surprising that most explicit attempts to include the effects of insti
tional change on the demand for money, has focused on long-run chang
While Friedman and Schwartz (1982) employed dummy variables to all
for selected institutional changes, the major studies to include institution
ly-related variables have been by Bordo and Jonung (1981, 1987, 199
Siklos (1993), Klovland (1983) and Akhtar (1983). The variables ha
included bank offices per head of population, the proportion of the labo
force employed outside of agriculture, and the ratio of currency to to
money stock and of non-bank to bank financial assets. Other efforts ha
involved the inclusion of past peak levels of interest rates on the groun
that the incentive to innovation comes from changes in costs of which int
est rates are an important part (Judd and Scadding, 1982; Goldfeld, 199

Attempts to incorporate the effects of financial innovation by varying definition or measurement of the independent variables have been co cerned largely with the use of Divisia indexes as measures of the mon supply (discussed above) and interest rates. In particular, the significan of money's own rate in the demand for broad money has been recogniz The own rate can be entered implicitly as an element in the differen between money's own rate and the rate on other assets (Lee, 1967) or expl itly with the rate on other assets appearing independently (Klein, 197 Taylor (1987), for example, used quarterly data (1964-85) and general specific modelling techniques to estimate an equation for changes in U real M3 balances, which contained a spread term. This was the differen between three-month treasury bill rate, representing the rate on non-mon short term assets and the maximum of the seven day deposit rate and h interest cheque account rate, representing money's own rate. The sa spread was also significant in the long-run steady state solution. Taylor a reported results obtained by excluding money's own rate and concluded t money's own rate was a key explanatory variable.

Adam (1991) estimated long and short-run equations from quarterly d for UK real M3 1975-86 using a weighted average own rate on money, w the weights and interest rates reflecting each of the components of M Other, opportunity cost, interest rates were the yield on bonds (includ capital gains) and on eurodollar deposits (adjusted for expected depreciat of sterling), recognising thus the 'innovations' of euromarkets and the ab lition of exchange controls. Both money's own rate and the rate on fore assets were significant in the long-run equation.

We have noted above that empirical work on the demand for money h employed a variety of scale variables in an attempt to capture the effect variously, income, wealth, or transactions. This variety is driven more fr the controversies that still surround the motives for holding money than a recognition that financial innovation had changed the appropriate variab However, it can be argued that the boom in financial activity in the 198 and 1990s caused non-income transactions to rise as a proportion of to transactions. This raises the possibility of using transactions rather th income as the scale variable. In a comparison of the demand for bro money in the UK and Germany, Arestis, *et al*. (1995) found the coefficie on real GNP for Germany was close to unity, while for the UK it was ne ly 1.7. The latter is what one would expect if the demand for money w following a transactions series that was growing more rapidly than GNP

ficulty of capturing in equations the many ways in which institutio change may influence agents' actions. A particular problem is that, to extent that they are induced rather than autonomous, the factors caus financial innovations may be taken into account elsewhere in the equati Yet, however difficult it may be to measure the effects empirically, the sc for financial innovations to modify the demand for money, in various c tradictory ways, is considerable. A summary is provided in Box 6.3.

Box 6.3: Possible effects of financial innovation on the demand money

- liability management affects money's own rate and thus the opportunity cost of holding money
- a change in financial transactions relative to GNP transactions may make GNP an inappropriate scale variable
- a reduction in transactions costs may reduce the demand for precautionary balances but may also lead to more borrowing and larger debit and credit positions
- by creating ever closer money substitutes, innovation may lead to an increase velocity
- cheaper access to cash may reduce the demand for cash and thus reduce the public's cash ratio, with implications also for money supply
- better access to balance sheet information may reduce the demand for precautionary balances
- better access to financial innovation generally may make agents more sensitive to interest rate differentials leading to more frequent switching between components of broad money.

(ii) uncertainty about the rate of inflation

Most work under this heading has related to uncertainty about the rate inflation caused by the large swings in inflation rates in the 1970s and 198 and the changes in exchange rate expectations following the move to flo ing exchange rates in the early 1970s. Associated with this have been fe arising from the loss of the link between the dollar and gold in the Bret Woods exchange rate system and the erratic policies which this allow (Friedman, 1986, 1988). The suggestion is that high rates of inflation in 1970s reduced the willingness of agents to hold money, producing increase in income velocity; while the process of disinflation in the 198 helped to explain the sharp falls.

It has been argued that instability in domestic demand for money functio
may be explained by currency substitution since foreign currency may
as a substitute for domestic currency in economic agents' portfolios eit
directly or indirectly. Direct currency substitution occurs when econor
agents shift into foreign currency when they expect depreciation of
home currency. This may occur because they anticipate expansionary mo
etary action by the authorities. Occasionally, agents may lose faith co
pletely in the domestic currency and seek to hoard foreign currency.

Indirect substitution takes place through the capital market: assume e
nomic agents revise upwards the expected return on foreign bonds. Sell
domestic bonds and buying foreign bonds puts upward pressure on dom
tic interest rates and perhaps downward pressure on foreign interest rat
With a given demand for money function and, in a floating exchange r
system, a given money supply, interest rates cannot move. Thus,
increased demand for foreign bonds causes the exchange rate to rise (that
the home currency depreciates) to a level where the expected future
compensates for the relative fall in the attractiveness in foreign bonds. T
fall in the value of the domestic currency promotes inflation. To the ext
that the domestic authorities validate the inflationary expectations, to
domestic money supply does not fall (the decline in reserves is matched
the increase in the domestic component of the money supply). Meanwh
in the country to which capital is flowing, reserves are rising, increasing
money stock. The net result is an increase in the world money stock.

With fixed exchange rates, the problem does not arise. Capital expo
occur, the domestic money supply falls and the foreign money sup
increases until foreign and domestic interest rates differ by an amo
expressing the relative attractiveness of foreign and domestic bonds
investors.

This argument was most strongly put forward by McKinnon (19
1984a, 1984b) who rejects floating exchange rates on these grounds. It f
lows from this analysis that the breakdown of the Bretton Woods fix
exchange rate system in the early 1970s was a likely cause of instability
the demand for money function. Some influence of changes in exchan
rate expectations have been found. For example, funds were repatriated
France and placed in interest-bearing accounts after France's 1969 deva
ation. Nonetheless, over the period 1960-77, neither the collapse of
Bretton Woods system nor severe exchange rate crises in the UK,
switches between pegging and floating in Canada seem to have had any s
nificant effect on the demand for money.

If currency substitution was important before the beginning of 1999, what effect should the introduction of the euro have had on the stability of the demand for money function in the EU?

The buffer stock response to demand for money problems

We mentioned earlier that demand for money studies allowed for so slowness in adjustment to long run equilibrium positions and sought model this through partial adjustment. This slowness was justified prin pally by the existence of time lags but questions were raised about the ba for the inclusion of such lags in financial markets, especially since trans tion costs in these markets are usually assumed low.

This concern increased in the 1970s when the evidence appeared to su gest that time lags were lengthening. Indeed, it was argued that followi the sharp increase in UK money supply in the mid-1970s, it had remain in excess of the demand for money for several years. It was suggested th if the supply of money were exogenous but the system out of equilibriu the 'independent' variables in the function could not be independent at but must be determined by the interaction of demand and supply. This some to reject single equation estimations and to claim that the demand money could only be estimated as part of a complete model of the econ my. Since this poses many problems, various simplified approaches we tried. For example, the interest rate was treated as the variable that be the main burden of adjustment when the demand for money and the supp of money are in disequilibrium. This was modelled by either:

(i) regressing the rate of interest (the dependent variable) on the mon supply, now treated as the independent variable, inverting the dema for money function (Artis and Lewis, 1976; Laidler, 1980, 198 Goodhart, 1984; Wren Lewis, 1984); or

(ii) relating the inverse of velocity to real income, interest rate, lagg velocity and a variable designed to capture exogenous changes in money stock (for instance, changes in currency holdings, bank reserv and domestic borrowing requirements).

Both of these methods produced improved results and evidence of stabil However, the value of the inversion of short-run demand for money fun tions was called into doubt in relation to narrow money by both Hend

ply the amount of cash people demand. In other words, narrow money (M
is assumed to be demand-determined, although equations that have
money supply as the dependent variable conflict with traditional moneta
analysis. That is, short-run demand determines supply, but takes time
adjust to its long-run equilibrium level. Artis and Lewis (1990) query
partial adjustment of the supply of money to the quantity demanded at
aggregate level. They argue that although individuals can adjust to long-
equilibrium by building up money stocks through asset sales, this is o
possible at an aggregate level under certain circumstances, for instan
when the central bank chooses to stabilize interest rates rather than to c
trol the money stock or when the country is a member of a fixed exchan
rate system.

The best known attempt to explain why adjustment may be subject
long and variable lags was provided by Laidler (1984) in the form of
buffer stock approach to the demand for money. Credit is also giv
amongst others, to Darby (1972) who first used the term. Other writings
money as a buffer stock include those by Goodhart (1989c), Cuthberts
(1985a) and Cuthbertson and Taylor (1987b).

The buffer stock idea derives from the notion that, given risk and unc
tainty, not all events are correctly anticipated and so, following a shock
least one variable won't be equal to its planned value. However, one c
arrange one's affairs so that the shock will fall on a predetermined varia
— the buffer. In the buffer stock approach to the demand for money, p
ple accept deviations in money holdings around their equilibrium leve
Assume, as an example, that a long-run equilibrium is disturbed by
expansion of the money supply, causing money holdings to be temporar
greater than the demand for money. To return portfolios to equilibriu
agents would seek to move out of money into other financial or real ass
However, in the short-run, they might choose instead to absorb the shock
holding excess money balances. There are two clear reasons for behaving
this way:

(a) It requires both time and information to monitor money balances c
tinuously (money, this becomes a substitute for information, and

(b) because the adjustment of portfolios is not costless, agents wait u
they are convinced that the change is not merely transitory.

It is only when money holdings deviate too much from the equilibri

Money is assumed to act as a buffer in this process because it is liq and the costs of adjusting money balances are likely to be less than the c of adjusting holdings of other assets. If it is relatively easy to borrow, cr it might also act as a buffer; but if borrowing is inflexible, money will the ony buffer and money balances can be expected to fluctuate more.

As we have seen above, it can be objected that transaction and inform tion costs in the financial sector are relatively low, and thus that adjustm should be quick. However, adjustment may be slowed due to stickiness both interest rates and goods prices and may be spread over a number months or even quarters. Buffer stocks are then willingly held during t gradual process of adjustment. Economic agents hold money precis because it acts as a buffer rather than having to strive for an exact value their money holdings as presupposed in the deterministic demand money models such as the Baumol/Tobin inventory-theoretic mod Instead they wish to keep their money holdings within a band, monitori them only at intervals.

Pause for thought 6.11:

Provide some other examples of the use of the idea of buffer stocks.

It follows from the buffer stock argument that observed changes in real stock of money may reflect either:

(i) a change in one or more of the determinants of the long-term or 't get' demand for money, or

(ii) a shock to the nominal stock of money not accompanied by chang in the conventional money demand variables sufficient to keep the ec omy on its long-term money demand schedule.

The approach also suggests that instability in the demand for mon found in econometric research need not reflect unstable demand for mon but rather time-consuming adjustment processes. There is a particular pr lem with models that assume equilibrium, which are said to be 'backwa looking'. The demand for money function in a 'backward-looking' mo may be unstable if:

(a) any of the costs of adjustment change, or

(b) there is a change in government behaviour leading to a change income.

forward-looking buffer stock model, in which a change in the money s
ply may lead to a revision of expected income and price levels, a cost fu
tion measuring the cost both of being away from equilibrium and of cha
ing money holdings is added to a conventional money demad function.
order to minimise this cost function, agents form expectations of future v
ues of real income, the interest rate and the price level. The model dist
guishes between expected and unexpected changes. Whereas an expec
future increase in price level or real income or an expected fall in inte
rate will produce an immediate increase in money holdings, unexpec
changes of this type will not initially do so unless they represent news ab
a change in the process generating the variable in question. Again,
exogenous increase in the money stock will be communicated only slo
through the money demand function to the price level, real income and
interest rate.

Laidler (1982) claimed that, in the presence of monetary shocks, only
buffer-stock argument offered a convincing theoretical rationale for
presence of a lagged, dependent variable in relatively successful short-
money demand equations. Cottrell (1986) argued that non-demand-rela
changes in the money stock are common, occurring especially under int
est-rate targeting and other supposedly accommodative monetary regim
Cuthbertson and Taylor (1987b) also suggest that the buffer-stock hypot
sis helps to account for both temporal instability in conventional mo
demand functions and the presence of a long and variable lag in monet
policy. The hypothesis has also been used to explain the finding that
short-term income elasticity of money is low (c.0.2 for the USA) wh
long-term income elasticities are much nearer to unity.

It is clear, then that if buffer-stock money is quantitatively importa
conventional specifications of the short-run money demand function
appropriate and, indeed, that any single-equation estimates of the deter
nants of the demand for money are likely to suffer from serious simulta
ity problems. Although the quantitative significance of buffer-stock mo
has been difficult to establish, Lastarpes and Selgin (1994) suggest that t
might have been due to inadequacies in past tests of the hypothesis. Us
more recently developed econometric techniques to measure the dynam
of real and nominal money in the USA, they conclude that, especially
M1, exogenous nominal supply shocks play an important role in determ
ing real money balances in the short-run.

Although heavily outnumbered by believers in the stability of the dema for money, sceptics can be found. They fall broadly into three groups.

a) Believers in endogenous money.

b) Economists who accept the importance of the demand for mon function and the testing of it but found the problems of the 1970s a 1980s unsurprising. For them, the instability apparent in tests demo strated that the function was indeed unstable and that it was the seemi stability of the 1950s and 1960s that was more apparent than real. Th put forward a variety of possible reasons for instability.

c) Economists who deny the usefulness of econometrics in attempting understand economic relationships.

(a) Endogenous money

We have dealt with this at some length in Section 4.4. There we point that the extreme form of the endogenous money hypothesis holds that th is no demand for money function independent of the supply of mon People are willing to hold whatever money is created through the banki system. We have made it clear in 4.4 that we do not accept this vi because we make a clear distinction between the demand for bank loans a the demand for money. It is the demand for bank loans that drives process and creates money and there remains a question as to why peo are willing to hold the quantity of money created. However, this is clea a secondary question entirely lacking the importance it has when money assumed exogenous. We discuss a role for the demand for money within endogenous money model in Section 7.5.

(b) Unstable demand for money functions

There are several arguments supporting the belief that the demand money function should be unstable even with an exogenous money supp We outline the principal candidates below.

(b1) Institutional changes (financial innovation)

As we suggested earlier in the chapter, financial markets are subject waves of institutional changes. The conventional view is to recognize t

the long run demand for money function is stable. This is because the lo
run stability is assumed to depend solely on the rationality of agents and
assume most institutional changes are exogenous, although we have m
tioned above the possibility of a link between policy changes and insti
tional changes. The only problem according to this view is with the mo
fication of short-term demand for money equations.

An alternative approach (Foster, 1992) sees institutional changes affe
ing the supply of money as the driving force in the market. This may
coupled with the endogenous money approach to the demand for money
construct an explanation of changes in the money stock over time.

(b2) Keynes's speculative demand for money

We have explained Keynes's theory at some length in Section 5.4. T
argument for instability rests on (i) the speculative demand for mon
and/or the finance motive for holding money. We also note that neoclas
cal writers reject the speculative motive on several grounds largely rela
to the liquidity trap, the assumption of a normal rate of interest, and the
or-nothing choice between bonds and money in the model.

We note in 6.3 that some early work attempted to show a positive re
tionship between interest rates and velocity while other studies sought
relate idle balances to interest rates. The latter studies found a relativ
close negative relationship but this could be explained by an asset dema
for money and did not demonstrate instability. Also, there were proble
with the arbitrary definition of idle balances and this approach was ab
doned.

Pause for thought 6.12

Vocabulary test: Is there a difference in meaning between 'to refute' and 'to deny'? If so, what is it?

Later studies contented themselves with looking for a liquidity trap.
Keynesian speculative demand curve indicates that the interest elasticity
the demand for money should increase as interest rate falls (the curve f
tens out at low interest rates), culminating in a liquidity trap when the cu
becomes horizontal. This is explained in the theory by the proposition t
at lower rates of interest more people would believe that the current rate w
below the normal rate and, therefore, that the next rate move would be
producing a fall in bond prices. Thus, it was argued that evidence that

appears to be the case. Studies of the demand for money in the 1930s, wh
interest rates were low, do not show a higher interest elasticity of
demand for money than in other periods. In addition, regressions incorp
rating data from the 1930s predicted the velocity of money in later decad
accurately. The absence of a liquidity trap, however, does not refute
possibility of instability — the possibility that the speculative demand cu
moves unpredictably.

Nonetheless, most economists who see themselves as true adherents
the Keynesian tradition (Post Keynesian rather than New Keynesian or ne
Keynesian) are likely to follow the endogenous money path (desp
Keynes's acceptance of an exogenous money supply) and/or to concentr
on the finance motive for holding money. The finance motive, which
not figure in Keynes's *General Theory*, has been ignored entirely by ma
stream economists. We mention it briefly in Section 5.4. It is defined
Wray (1990 p.120) as 'a propensity to hoard cash in preparation for fundi
an investment project'. Keynes thought investment was highly unstab
because investment decisions depended on the price ratio between capi
assets and current output together with financial market conditions and w
made under conditions of uncertainty. He saw the markets for capital ass
and current output as separate and prices in the two markets as influenc
by different factors. Shocks in financial markets could produce large a
rapid changes in expectations regarding the future. The combination
these elements meant that investment was subject to rapid and unpredicta
change. Clearly then, the finance motive could provide a source of ins
bility in the demand for money function. There have been no attempts
test for the existence or nature of the finance motive.

Minsky (1978, 1986) developed a theory of financial fragility, wh
grew out of Keynes's views regarding investment decisions and theories
endogenous money. According to Minsky, instability derives from waves
credit expansion and deflation. In booms, firms make more use of d
financing; both households and firms reduce their holdings of cash and l
uid assets relative to debt. Banks increase their loans. This credit expansi
increases the money value of assets and this, in turn, justifies further b
rowing. The debt/real assets ratio continues to rise. However, this cann
continue forever. At some point the boom falters. This leads to crisis, cr
it contraction and collapse. In a world like this, there is no room for a s
ble demand for money function or exogenous money. Minsky claimed e
dence for his hypothesis in the 1987 stock market crashes (Minsky, 199

The income term in demand for money functions is most commonly rep
sented by GNP but GNP is a poor measure of the work money has to p
form as a medium of exchange. So too is gross domestic final dema
(GNP - inventory adjustments - net exports). The idea of this is that spe
ing on goods drawn from inventories or on imports calls for transacti
balances without affecting GNP directly, but use of it instead of GNP d
not make much difference in equations. Gross national expenditure (G
+ Imports – Exports) has also been used and in one study produced a be
fit than GNP in 12 out of 16 countries for the two decades ending in 19
(Bomberger and Makinen 1980). However, such concepts do not repres
the total money value of all transactions, even abstracting from the und
ground economy. Variations in the degree of vertical integration in ind
tries or in financial transactions may also change the volume of mo
demanded independent of changes in interest rate or GNP. Thus, paran
ters of the demand for money function may shift.

Total transactions are larger than income transactions by an amount t
reflects, *inter alia*, the volume of intermediate transactions involved in
production process (itself a reflection of the degree of integration in p
duction), the volume of financial transactions and the volume of trans
tions in existing assets or second-hand goods. The latter include a large p
portion of total house sales/purchases. In adopting *Py* rather than *PT*
point is often made that total transactions are likely to be stably related
income transactions and that the distinction between the two is, therefo
unlikely to matter. This is certainly convenient, but not very compelli
Clearly, Irving Fisher did not think it probable and Keynes explicitly den
its likelihood in the first volume of *The Treatise* (1930). Various attem
have been made in recent years to develop a *PT* series and to compare
movements with *Py* or GDP. For the UK, Cramer (1986) worked fr
input-output data to produce a series up to 1980, which showed signific
deviations from *Py* for short periods of four to five years but in the long
followed income fairly closely. The study ended, however, before
deregulation of financial markets and the boom in financial (relative
GDP) activity that occurred in the UK in the 1980s. Following Keynes a
using cheque and electronic payments data, Bain and Howells (1991) c
structed a *PT* series that showed a dramatic upward divergence from G
from a multiple of approximately two to three between 1979 and 19
Interestingly, this study deliberately omitted all transactions through
CHAPS and ‘Town Clearing’ systems. These are ‘same day’ payme
mechanisms used predominantly by financial firms but also in the set

cally the divergence over time. It seems at least worth considering the p
sibility, therefore, that financial innovation could have a fairly direct eff
upon transactions velocity by causing a rise in financial and second-ha
transactions relative to those involving newly produced goods and servic

This distinction between income and transactions velocities and the p
sibility that financial innovation may somehow be implicated, raises ano
er interesting possibility although it is more strictly related to supply a
only indirectly to the demand for money. The endogeneity argument
based upon (deposit-creating) advances being demand-determined. T
demand for bank lending originates ultimately from the expenditure nee
of deficit units. The desire to spend in excess of one's income can reflec
desire for newly produced goods or services or for financial assets or
second-hand goods. There seems no good reason, therefore, why *GI*
rather than *PT* should appear in bank lending equations. Indeed, theory su
gests the reverse. Suppose now that the demand for bank lending w
shown to be sensitive to *PT* rather than to *GDP*. Bank lending follows to
transactions and grows more rapidly than if it were closely linked to *GI*
Bank lending and the money supply grow more rapidly than income a
income velocity must fall. Financial activity thus not only affects trans
tions velocity but also is causally implicated in the fall in income veloc
The study by Howells and Biefang-Frisancho Mariscal (1992) sugge
some support for this line of reasoning. Of course, in equilibrium,
resulting deposits must be held. It would be interesting to see the effect
using a *PT* series as the scale variable in demand for money studies.

When this problem is taken into account, as Visser (1991) notes, para
eter instability in conventional demand for money functions is hardly a s
prise. It is clearly to be expected over longer periods as the underlying re
tionships change continuously. Even if they did not, but the true demand
money function was non-linear, linear estimates would show parame
instability. Visser suggests it is possible that the apparent stability in
demand for money function up to 1973 was unique and unlikely to
repeated. We may note here that the inclusion of bank debits as an additio
transactions variable alongside GNP helped to improve the performance
money demand equations in the early 1980s (Judd and Scadding, 1982).

(c). The rejection of econometric testing

Some Post Keynesian economists deny the value of econometric testi
altogether, although the relationship between Post Keynesian econom

> the neoclassical research programme invokes the axiom of 'ergodicity'. T
> implies that the world is predetermined and immutable. In the case of pro
> bilistic inferences, therefore, as the past is a good guide to the future, objec
> or subjective probabilities will ultimately converge on the true values of
> parameters of the probability distribution.

This explains why they believe inferences can be drawn from stati
cal/econometric analysis. Keynes, on the other hand, saw decision-mak
in financial markets as facing uncertainty rather than risk, implying a mu
more profound ignorance of future events that could not be treated mat
matically nor insured against. An uncertain world, in this sense, is not c
ducive of econometric analysis.

6.6 Summary

Although the demand for money might not be very important, the oppos
has always been assumed within monetary economics. The theory of
demand for money raises a number of questions but does not provide de
nite answers. It seems, therefore, that tests of the theory need to be c
ducted, particularly to discover the interest elasticity of the demand
money and whether the demand for money function is stable. One way
approaching this is to use the theory to draw up a list of the variables t
should be included in an equation to be tested. However, drawing up su
a list reveals a number of specific problems as well as the more gene
problem that when we attempt to choose the form of the variables includ
theory provides little guidance. Consequently, equations to be tested
constructed largely on pragmatic grounds. Further, the tests carried out
not in any genuine sense test the theory. Rather, they seek to confirm
view that the demand for money is stable.

The specific problems relate to the definition of money, the subject
nature of the demand for money, the existence of an identification probl
when money is endogenous, the choice of a scale variable, the choice
interest rate, the existence of correlations between independent variabl
difficulties in measuring some of the variables suggested by theory, and
period over which tests should be conducted. These problems together w
the approach taken towards testing raise serious doubts concerning the va
of the tests. Nonetheless, we looked at the results that have been produce

Some early studies were related to Keynes's theory of the speculat
demand for money, but since the middle 1950s, the great majority of te

tests set out to confirm a number of beliefs derived from conventional th
ories of the demand for money. Early tests were favourable in the sense t
the results appeared to conform to those theories. In particular, the dema
for money appeared to be stably related to real income and not to be high
interest elastic.

However, problems emerged in the 1970s. Tests in both the US and
UK indicated instability in the function together with the lengthening
time lags. A variety of attempts were made to explain how these resu
could be explained without disturbing an underlying belief in the long r
stability of the function.

These included major attempts to improve the dynamic specification
the equations being tested and to take account of shocks that might te
porarily have disturbed the function, notably from financial innovati
Attempts were also made to explain the problems with time lags. These
to the development of buffer stock models, which see adjustment to shoc
occurring through changes in money balances. There have been a numb
of successes in these different approaches but it has not been possible
restore the confidence in the stability of the demand for money that exis
up until the mid-1970s. None the less, most economists still appear
believe that the demand for money function is stable in the long run.

However, sceptics can be found. Notable among these are believers
the endogeneity of money, those who give considerable importance
Keynes's finance motive for holding money and those who doubt the va
of statistical/econometric inference in a world of uncertainty.

Key concepts used in this chapter

stability of the demand for money function

interest elasticity of the demand for money

identification problem

scale variable

own rate of interest on money

omitted variable

lagged dependent variable

partial adjustment equations	error correction models
dynamic specification	buffer stock models
non-stationary variables	ergodicity

Questions and exercises

1. It is widely accepted in science that it is not possible through empiri testing to prove anything. All one can do is to refute hypotheses. How s entific, then, is the testing of the demand for money?

2. Consider the list of variables that the text suggests might be included an equation for the demand for money based on theory. Link each varia to a particular theory discussed in Chapter 5.

3. In what way is it favourable to monetarist views if:

(a) the interest elasticity of the demand for money is low?
(b) the demand for money is correctly specified in real terms?

4. Consider the equation:

$m_t = \theta\beta_0 + \theta\beta_1 y_t + \theta\beta_2 i_t + \theta v + (1 - \theta)m_{t-1}$

Does the assumption that the time lag on the income term should be same as that on the interest rate term cause any problems?

5. Explain the following statement from the text and give some example

'However, the closeness of substitutes varies with the definition of mon which itself varies as innovations in very liquid assets take place. Even w a constant definition of money, the choice of the closest substitutes money changes through time.'

6. Why might it be reasonable to replace an expectational variable in equation with a dummy variable or a trend term? What is being assum when a trend term is used?

8. What is implied about the relationship between money and interest r
when money is made the independent variable and interest rate the depe
ent variable — that is, when the demand for money function is inverted'

9. In the light of Keynes's view about the difference between risk and unc
tainty, explain each of the following ideas from Keynes:

(a) it might be rational (rather than simple money illusion) for workers
make labour supply decisions based on relative money wages rather th
real wages;

(b) households base their consumption and savings decisions on curr
income rather than wealth.

Does the second of these lead you to think differently about the choice
scale variable in the demand for money function?

10. '…the main *prima facie* objection to the application of the method
multiple correlation to complex economic problems lies in the apparent la
of any adequate degree of uniformity in the environment.' (Keynes 19
p567).

Discuss this statement in relation to the question of the value of econom
ric testing.

Further reading

Readers will find much more econometrics and details of the tests in oth
textbooks — for example, Lewis and Mizen (2000), Handa (2000) or
older but still useful Artis and Lewis (1991). Notice too that many of
tests mentioned here date from before 1990. This is true of other books a
as (possibly finally under pressure from endogenous money), interest in
demand for money function appears to have been waning in recent yea
This means that older survey articles are still very helpful. Examples
these include: Artis and Lewis, 'Money Supply and Demand'
Bandyopadhyay and Ghatak (eds) (1990) and Cuthbertson and Barlo
'Money demand analysis: an outline', in M Taylor (ed) (1991)

Sceptical views are harder to come by but readers could start with P
Davidson's 'Reality and Economic Theory' (1996).

7 Mechanism of Monetary Policy - I

'A man who has more money about him than he requires is tempt
to spend it. It is apt to "burn a hole in his pocket".' S. Smiles, *Th*
(1875) viii p.125

What you will learn in this chapter:

- The ways in which interest rate changes affect consumption expenditure
- The ways in which interest rate changes affect investment expenditure
- The factors affecting the size of these changes
- The importance of degrees of confidence and expectations;
- The different views of the transmission mechanism assuming an exogenous increase in the money supply
- The implications of these views for the demand for money
- The importance of the type of exchange rate system for the monetary transmission mechanism
- The possibility of monetary policy changes being transmitted to expenditure through the availability of credit.

7.1 Introduction

We are concerned in this and the following chapter with what happens in economy following a change in monetary policy. We are particularly int ested in the impact that monetary policy has on the nominal income of economy and, through this, on the level of output and the rate of inflati The series of links between the monetary policy change and the changes output, employment, and inflation are known as the *transmission mec nism of monetary policy*. This can be broken up into two elements — impact of monetary policy changes on aggregate demand; and the effect changes in aggregate demand on output, employment, and prices. In t chapter, we consider the first of these. Chapter 8 looks at the second part the transmission mechanism.

We have seen that a monetary policy change may take one of th forms:

liquidity within the monetary system (interest rate control);

• a change in the monetary base in the expectation that this will alter money supply, or its rate of growth (monetary base control);

• changes in the regulations that apply to banks in an attempt to influe the rate of growth of their lending (direct controls).

We saw in Chapters 3 and 4, however, that the Bank of England a other monetary authorities, now use only the first of these. In Chapter and 11, we explain the practical difficulties associated with the other t methods of control in more detail. Here, because of this predominance interest rate control in modern monetary policy, we begin by examining transmission mechanism assuming this form of policy. We do this Section 7.3, concentrating on the effect of an increase in interest rates. T arguments in this section can be reversed for a reduction in interest rat This approach to the transmission mechanism is summarized in Box 7.1

Box 7.1: Interest rate control and the transmission mechanism

The interest rate control (endogenous money) approach to the transmission mechanism in six steps (Goodhart, 2002):

1. The central bank determines the short-term interest rate

2. The private sector determines the volume of borrowing it wishes to undertake from the banking sector at the current set of interest rates.

3. Banks adjust their own relative interest rates, marketable assets, and interba and wholesale borrowing to meet the credit demands upon them

4. These bank actions determine the money stock and its various sub-components (e.g. demand, time and wholesale deposits). This determines the volume bank reserves needed, taking into account any required reserve ratios

5. This determines how much the banks need to borrow from, or pay back to, th central bank in order to meet their demand for reserves

6. In order to sustain the level of interest rates set under Step 1, the central ban uses open market operations to satisfy the banks' demand for reserves established under step 5.

However, much of the theoretical literature has assumed, against the e dence, an exogenous money supply, and the operation of monetary pol through changes in the money supply or in the monetary base. Thus, Section 7.4, we consider the theoretical arguments associated with

anism even within a model constructed on the assumption of interest r
control. This approach involves a distinction between a credit channel
transmission (the impact of the change in interest rates) and a money ch
nel (second and later round effects on nominal income of money sup
changes that follow from the initial interest rate change). We look briefly
this argument in Section 7.5. In Section 7.6, we return to the connect
between monetary policy and exchange rates, which is identified in 7.3
providing a possible transmission link. Section 7.7 discusses the possib
ty of transmission occurring through credit availability.

7.2 The impact of a change in official interest rates on oth rates

In changing short-term interest rates - the interest rate on gilt sale and rep
chase agreements at the two-week maturity in the case of the Bank
England (repo rate), the official refinancing rate (refi) in the case of
European Central Bank — the monetary authorities expect to bring ab
changes in the general level of interest rates in the economy. The l
between the short-term rate on which the central bank chooses to oper
and other interest rates in the economy is discussed in detail in Section 4
There, we conclude that the effect of a change in the Bank's intervention r
is an empirical question and may change over time. In general, short ra
adjust quite quickly and in the same direction as the official change. T
effect on medium and longer-term rates is much less certain. Althou
there are exceptions (examples of which are given in 4.2), they, too, are li
ly to move in the same direction but by smaller amounts than short ra
The next step is to consider the effects on the economy of these changes
interest rates brought about by central banks.

7.3 The impact of interest rate changes on consumption and investment

It is widely accepted that this is influenced by changes in the real rate
interest (the nominal rate of interest less the expected rate of inflatio
Changes in nominal interest rates brought about by central bank changes
its short-term interest (repo) rate will, given the expected rate of inflation
the time, result in changes in the real rate of interest in the economy. Th
we need to look at the ways in which real interest rate changes induced

sumption and investment expenditure.

Pause for thought 7.1:

(a) Why are equity prices likely to fall following an increase in interest rates?
(b) Why might they not fall?

Consumption expenditure derives from current income but consumpti
decisions depend also on expected future income, the level of wealth and
the ability to borrow against existing wealth. Thus, monetary policy is lik
ly to influence household consumption through several channels. F
example, an increase in interest rates:

- makes saving from current income more attractive
- increases repayments on existing floating-rate debt and thus lowers d
  posable income
- increases the cost of borrowing and thus increases the cost of goods a
  services obtained on credit
- lowers the price of financial assets and hence influences estimates
  private sector wealth
- lowers house prices or, at least, slows the rate at which they are incre
  ing and this, too, influences estimates of household wealth and low
  the value of the collateral against which households seek to borrow.

If households believe that the interest rate changes will lower aggreg
demand, they might also become concerned about the impact on output a
employment. Increased worries about future employment will cause hou
holds to lower their estimates of expected future income from employm
and become more cautious about current expenditure. Any fear of
impending recession might, in addition, cause banks to tighten the con
tions they apply to loan applications, making it more difficult for people
obtain credit even if they remain willing to borrow credit.

Of these various influences, changes in repayments on floating-r
mortgages are particularly important in the UK since loans secured on ho
es make up about 80 per cent of personal debt, and most mortgages ca
floating interest rates. *All of these operate in the same direction — we exp
an increase in interest rates to reduce consumption expenditure.*

Yet, not everyone will reduce consumption expenditure as interest ra
rise. The discussion so far has implied that interest rate rises reduce the d

people whose expected future income depends on an annuity to be p
chased in the near future. In both of these cases, higher interest rates im
a higher income. Thus, interest rate changes have redistributional effe
When interest rates increase, net borrowers are made worse off and
savers better off. However, the groups made better off (net savers) are hi
ly likely to be dominated by those made worse off (net borrowers) and
we continue to expect increases in interest rates to reduce household c
sumption expenditure.

The same applies to investment expenditure. An increase in inte
rates:

- raises external borrowing costs for firms that raise funds through ba
  loans or from bills or bonds markets;
- increases the rate at which they discount back expected future retu
  from investment, making investment projects less attractive;
- increases the return from the savings of firms, retained from past pr
  its, raising the opportunity cost of financing investment internally;
- increases the difficulty and cost of raising investment funds through
  issue of new capital on the stock market;
- increases the costs of holding inventories of goods, which are of
  financed by bank loans;
- lowers asset prices, reducing the net worth of firms and making it m
  difficult for them to borrow.

Pause for thought 7.2:

Why might firms take actions leading to reductions in employment when the cen
tral bank *does not* change the rate of interest?

The way in which firms respond to monetary policy changes a
depends on the way in which those changes affect estimates of future agg
gate demand since these are a major influence on their forecast future sa
and hence on estimated future profits. Thus, if a change in the official int
est rate — or, indeed, a failure to change it — reinforces a view that agg
gate demand is likely to fall in the future firms may respond by 'restruct
ing' and cutting back employment by greater amounts than might be expe
ed simply on the basis of the direct effects listed above.

firm and its sources of finance. An increase in interest rates improves
cash flow of firms with funds deposited with banks or placed in the mon
markets, although this does not imply that they will make use of th
improved position to increase investment. It is more likely, indeed,
encourage firms to hold greater quantities of financial assets or to pay hig
er dividends to shareholders. The cash flow of firms whose short-te
assets and liabilities are more or less matched will be little affected
changes in short-term interest rates but are still likely to be influenced
changes in longer-term rates. Further, despite the above list, the impact
changes in the official interest rate on the cost of capital for particular fir
is difficult to predict, especially for large and multinational firms w
access to international capital markets. Nonetheless, it remains true that
firms taken together increases in interest rates are highly likely to lead
reduced investment expenditure.

Open economy influences also need to be taken into account. Oth
things being equal, an increase in domestic interest rates should increase
attractiveness of the currency in foreign exchange markets, raising the va
of the currency. This damages the international competitiveness of dom
tic firms since it raises the prices of their goods when expressed in fore
currencies and, in the short run at least, they have little scope for reduci
costs of production and lowering domestic currency prices. Thus, th
must reduce their profit margins, accept a loss of market share in exp
markets or both. Problems arise in domestic markets also. Import-comp
ing goods face increased competition from foreign products because th
prices are now lower in domestic currency terms. Difficulties are likely
follow also for domestic firms that are not in direct competition with fore
firms because of changes in the composition of household spending t
results from changes in the relative prices of domestic and foreign goo
For example, households may respond to a reduction in the domestic c
rency price of foreign holidays by cutting back on expenditure on books
CDs in order to take a foreign holiday. Of course, it is only those chang
in exchange rate that are brought about by monetary policy changes
expected changes in monetary policy that we are concerned with he
Exchange rates may be affected by many other factors.

Again, different sectors will be affected in different ways by moneta
policy induced exchange rate changes. The manufacturing sector is
most exposed to foreign competition and thus is likely to suffer most fr
increases in the value of the domestic currency. Agriculture, financial a

Pause for thought 7.3:

Can you think of situations in which an increase in domestic interest rates will n cause an increase in the value of the domestic currency?

Expectations and confidence about the future clearly play a major role all of this. It follows that the size of the likely fall in aggregate dema depends crucially on:

(a) whether the present increase in interest rates had been expected; a

(b) whether the present increase leads to expectations of further increases in future or quick reversals of policy;

(c) expectations regarding future inflation rates.

Inflationary expectations are particularly important since much of influence of interest rate changes on the expenditure of households a firms relates to changes in *real* interest rates (the rate of interest adjusted take into account the expected rate of inflation). Monetary policy opera directly on nominal interest rates. Much of the above discussion takes inf tionary expectations as given, in which case a change in nominal inter rates is equivalent to a change in real interest rates. However, monet policy may well have an influence on inflationary expectations. Indeed is commonly the intention of the monetary authorities that it should do Hence, if an increase in interest rates lowers market expectations of future rate of inflation, the real rate of interest will increase by more th the nominal rate. Those areas of expenditure particularly influenced by r rates of interest (e.g. investment expenditure by firms and housing expen ture and expenditure on consumer durables) will be affected more th would have been the case had inflationary expectations remain unchanged.

Pause for thought 7.4:

Are the effects of a reduction in interest rates likely to be the exact reverse of th effects described above for an increase in interest rates?

We can conclude from this section that:

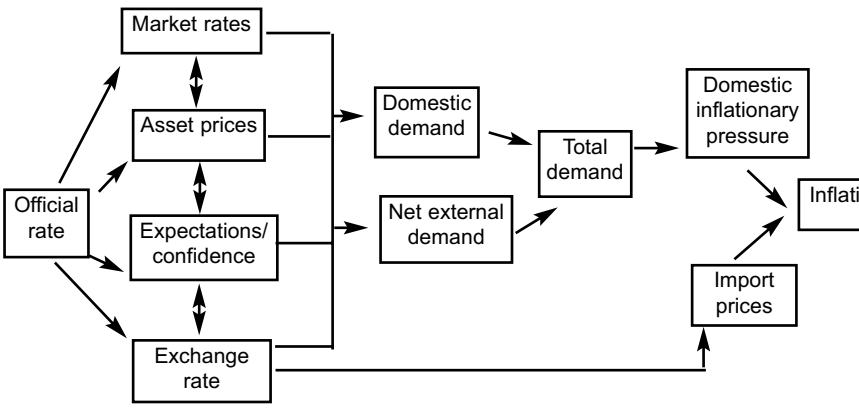
• monetary policy influences aggregate demand in a variety of ways;

• the relationship between interest rates and aggregate demand is inve
— increases in interest rates reduce aggregate expenditure; reductions
interest rates cause aggregate expenditure to increase

• nonetheless, the relationship between interest rates and aggreg
demand is complex

• interest rate changes affect the distribution of income as well as
level of aggregate demand.

Figure 7.1: The transmission mechanism of monetary policy



Source: adapted from *Bank of England Quarterly Bulletin,* May 1999

Knowing the direction in which aggregate demand is likely to chan
when interest rates change is of very limited use. We need to know h
powerful a policy instrument monetary policy is, whether the size of
impact of a given change is predictable and how long it will take for the f
impact of a change in interest rates to be felt in the economy. Clearly,
size of the impact of a monetary policy change and the length of the ti
lags involved in the process may well vary from one economy to anoth
Nonetheless, we can make some general points about time lags.

The approach to the transmission mechanism of monetary policy co
sidered here is summed up in Figure 7.1, which is taken from the Bank
England.

• the length of time it takes for the authorities to observe changes in economy and to decide on a change in the official short-term rate interest (policy decision lag);

• the length of time it takes for the change in the official rate to fe through to other interest rates in the economy (institutional lag);

• the length of time required for interest rate changes to affect the d posable income of households (income lag);

• the length of time required for changes in short-term and long-te interest rates to affect the expenditure of households and firms (exp diture lag);

• the length of time needed for changes in expenditure to be reflected changes in the rate of inflation, output, and employment (real respo lag).

Pause for thought 7.5:

Why does it take so long for interest rate changes to affect the rate of inflation?

Evidence from industrial economies generally suggests that once monetary authorities have changed the official rate it takes about twe months for the full impact of the change to be felt on demand and prod tion. It takes a further twelve months for the full effect on the rate of in tion to be felt. This in itself presents serious problems for the monet authorities since it means that they must be constantly looking forward t ing to assess the likely state of inflationary pressures two years ahead on assumption of unchanged policies and then trying to estimate the impact a policy change. Given that the interest rate is only one influence amo many on expenditure, this is clearly very difficult. However, things even worse because the time lags of twelve months and two years m tioned here are only approximate and are only averages. The time lags as ciated with any particular act of monetary policy may be much shorter much longer — they are highly variable and will depend, among ot things, on the state of business and consumer confidence, how this co dence is influenced by monetary policy changes, events in the world ec omy, and expectations about future inflation.

In Section 3.5, and in Chapter 4, we saw that central banks do not in pr
tice attempt to control the quantity of money directly. In other words,
money supply is not an instrument of policy. Nonetheless, a strong sch
of theoretical monetary economics has always argued that the moneta
authorities could, and should, control the money supply through moneta
base control. Sufficient numbers of economists have in the past believ
strongly enough in the stability of the link between the monetary base a
the money supply that the latter has commonly been treated as a pol
instrument. Thus, most textbook analyses of the transmission mechani
begin with an assumption of a given change in the money supply, as if
authorities could automatically bring this about. For example, moneta
policy is often treated in this way within the *IS-LM* framework.

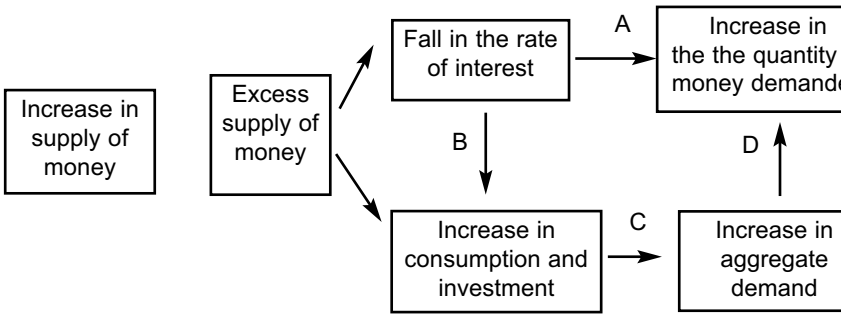
Consequently, we shall look at this approach here, not least because
implies a much more important role for the demand for money and looks
the problems facing monetary policy in a rather different way from the d
cussion above.

We begin with an assumption of equilibrium in the money market, w
the demand for money being equal to the supply of money. We then p
pose an increase in the supply of money. This causes a temporary exc
supply of money (the supply of money is greater than the demand for
Market agents seek to return to equilibrium. Their actions produce chang
in the economy that cause the demand for money to increase to the level
the newly increased supply of money. Thus, we are not asking what eff
a change in monetary policy is likely to have in a particular economy a
particular time. Rather, we are asking what would have to change in
economy to return the money market to equilibrium, if an existing equil
rium were disturbed by a monetary policy change. This assumes crucia
that nothing else changes at the same time. This is an example of comp
ative static equilibrium analysis and is a world away from our approach
the monetary transmission mechanism above. There, for example, we po
out that a change in interest rates might have a variety of impacts depe
ing on the way in which the change affects expectations and consumer c
fidence. Here, we assume such things as confidence and expectations to
unchanging.

It is clear that the nature of the demand for money is crucial in t
approach to the transmission mechanism since we need to know wh
changes must occur in the economy to increase the demand for money

ed in Figure 7.2.

Figure 7.2: Return to money market equilibrium following an increase in the money supply



Assume to begin with that the demand for money is highly interest-el tic (implying the existence of assets that are close substitutes for mone Then, link *A* in Figure 7.2 is strong and only a small fall in interest ra might be required to return the money market to equilibrium following increase in the supply of money. In this case, a significant proportion of increase in the supply of money is held in the form of money balances a there is relatively little impact on aggregate demand. In the terms of Quantity Theory equations in Section 2.2, an increase in *M* produces a in *V* and thus does not have a full impact on *Py* on the right-hand-side of equation. The impact on *Py* would be weaker still if the interest rate effe on consumption and investment expenditure were weak (link *B* in Fig 7.2), although our discussion in Section 7.3 above suggests that this is generally the case.

Pause for thought 7.6:

Which of the theories of the demand for money considered in Chapter 5 sugges the possibility of a highly interest-elastic demand for money?

With these assumptions of a highly interest-elastic demand for mon and interest-inelastic consumption and investment expenditure, monet policy would be a weak instrument of policy.

demand for money, the principal way in which the economy moves back equilibrium following an increase in the money supply is through increa in aggregate demand that require people to hold more money to finan additional purchases of goods and services. This implies a powerful tra mission mechanism linking monetary policy with aggregate demand.

Of course, it would be of relatively little use to the authorities to kn that monetary policy had powerful effects on aggregate demand if they not have a precise idea of how powerful they might be. That is, the auth ities would like the relationship to be a reasonably stable and predicta one. We have seen from our discussion of the theory of the demand money in Chapter 5, that the principal influences on the demand for mon are income and interest rate (links *A* and *D* in Figure 7.2). It is also gen ally accepted that the demand for money is a demand for real money b ances on the grounds that the basic reason for holding money is to carry the desired purchases of goods and services and that utility is related to consumption of goods and services rather than to the amount spent up them. Thus, it is generally accepted that there is a fairly close and posit relationship between the price level and the demand for money. If this is we can write:

$$\frac{Md}{P} = f(y,i) \qquad \ldots$$

where *Md* is the demand for money, *P* is an index of prices, *y* is real incon and *i* is a representative interest rate on non-money assets. Since, in eq librium, the demand for money is equal to the supply of money, it follo that a stable relationship between the supply of money and aggreg demand (*Py*) requires a stable relationship between interest rates and demand for money (link *A* in Figure 7.2). In Chapter 6, we looked at attempts to test the demand for money function for stability. In this cha ter, we shall see that differences in the theory of the transmission mech nism are closely linked to theoretical views of the demand for money.

We can express the argument about the importance of the stability of demand for money also in terms of the income velocity of money. If impact of changes in the supply of money on aggregate demand is p dictable, the income velocity of money (*Py/M*) must also be predictable.

To move towards an answer to these questions, we need to look clos at the way in which an increase in the supply of money affects other va ables within the economy. We begin by assuming that economic agents d tribute their wealth among the various assets to maximize utility and that

positions are disturbed by any changes in the total stock of wealth, expected real rates of return on assets, the perceived degree of risk asso ated with each asset, or the agents' attitude to risk.

The response of agents to a change in the supply of any asset affects r ative asset prices and disturbs the equilibrium positions in other asset m kets. Portfolio effects are concerned with the way in which disequilibri spreads from one asset market to another. At the same time, any change the supply of an asset, *ceteris paribus*, changes the size of the stock wealth and agents take this, too, into account in moving to a new equilib um. In an open economy, portfolio effects may be brought about throu changes in the exchange rate.

Portfolio effects of an increase in the stock of money

For monetarists, how the money supply changes is of little relevance to t argument — we are merely interested in the effects any change will ha This explains Milton Friedman's famous assumption of money be dropped from a helicopter. No matter how the money supply is chang there will be *both* portfolio and wealth effects.

For Keynesians, however, it is possible to separate the wealth and po folio effects of an increase in the supply of money by assuming that the c tral bank increases the stock of money through open market operations buying government securities and issuing money in return. We have increase in the private sector's holdings of money, matched by a reduct in private sector holdings of government debt. We assume for the mom that this leaves total private sector wealth unchanged, although we sh return to this issue later.

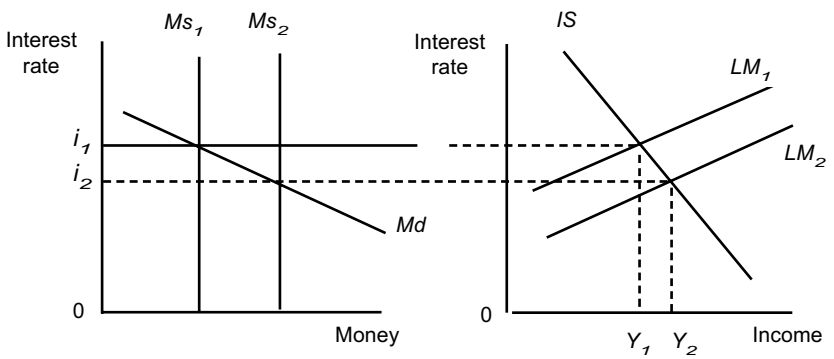
There are three distinct views as to how portfolios will be re-arrang with the differences hinging on the range of assets taken into account a on the extent to which various assets are thought to be good substitutes each other. However, since the monetarist approach combines both port lio and wealth effects, we consider it separately and look first at portfo effects within Keynesian models, starting with the analysis in Keyne *General Theory* (Keynes, 1936).

Keynes and the speculative demand for money

We spent some time looking at Keynes's theory of the speculative dema for money in Section 5.4. We saw there that this theory led to the view t

this encourages an increase in the demand for money because of fears o future interest rate rise. Thus, interest rates may not need to fall much persuade people willingly to hold the now larger supply of money. In oth words, the demand for money is likely to be highly interest elastic and impact of any increase in the money stock on interest rates is bound to small. The increase in investment is small, producing only a small (mu plied) increase in nominal income. From the firms' point of view, the low the interest rate becomes relative to its previous level and, thus, the high is their demand for investment funds, the more difficult it is to raise lon term fixed-interest funds from savers. We can represent the above accou in an *IS/LM* diagram. For details of the derivation of *IS* and *LM* curves, s Appendix I.

Figures 7.3: An increase in money supply



7.3a **7.3b**

Figure 7.3a shows a demand for money curve (*Md*) that is drawn wit shallow slope reflecting the assumption that the demand for money is hig ly interest-elastic. The supply of money curve is here drawn vertical in co trast with the more realistic, positively sloped money supply curve in Figu 3.1. This is simply because here we are continuing to assume, against evidence, that the authorities have complete control over the money supp In Figure 7.3a, an exogenous increase in the supply of money (shown by shift from Ms_1 to Ms_2) produces only a small fall in interest rate, from i_1

by this change in interest rate. Investment increases only slightly, inco
rises slightly producing a small increase in the transactions demand
money. This is shown in Figure 7.3b by the relatively flat *LM* curve m
ing only slightly down to the right (from LM_1 to LM_2), producing onl
small change in *Y*.

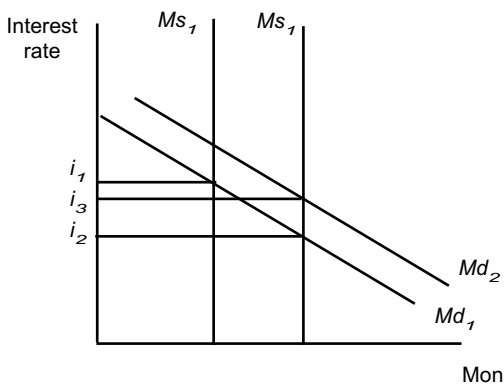
The main messages of this model are:

1. The transmission mechanism between increases in the money st
and the level of nominal income is indirect, operating through the r
of interest.

2. Monetary policy is weak because of the high interest elasticity of
demand for money implied by the impact of interest rate changes
bond prices.

3. The demand for money may well be unstable.

Figure 7.4: Unstable money demand



If this last were true, the link between exogenous changes in the mo
stock and nominal income would be not only weak but also unstable a
unpredictable. For example, in figure 7.4 below, the exogenous increase
the money stock, from Ms_1 to Ms_2, may be associated with an outw
movement (of uncertain extent) of the demand for money curve from M
to Md_2 resulting in an even smaller fall in the rate of interest. The *LM* cu
in Figure 7.3b would, in this case, shift by an even smaller (and uncerta
amount.

In Section 5.7, we dealt with that part of Tobin's theory that deals with choice between money and bonds. However, we pointed out that Tobin a introduced a wider range of assets including equities and real asse Consider the impact of so doing.

Now, an exogenous increase in the money stock is shuffled alo through the assets from more to less liquid. Thus, households use the exc supply of money in the first instance to buy bonds (as in Keynes's mod pushing bond prices up, and interest rates down. As interest rates on bo fall, equities become relatively more attractive than bonds and househo switch to equities, driving up their price and lowering the rate of return them. Firms wishing to expand have the choice of acquiring additio existing capital stock by taking over other firms or investing in new cap stock. As share prices rise, the market valuation of existing firms increa and takeovers become less attractive than the purchase of new capital sto Thus, investment increases. The principal determinant of investment, the fore, is the yield on equities.

Pause for thought 7.7:

Would it change the essence of Keynes's transmission mechanism if, instead of introducing equities into the model, we introduced a range of bills and bonds of different maturities?

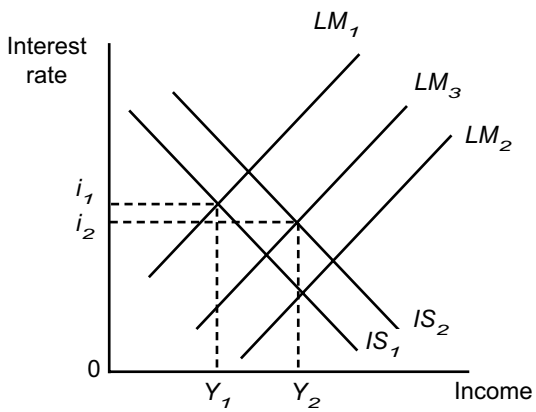
In one sense, this is the same story as in Keynes, but using a differ interest rate. The process remains indirect. Yet, there is a distinction. Tobin, households are able through the purchase of equities to own fir and this eliminates the gulf between financial assets and real assets Keynes's model. We no longer have two separate groups acting fr diverse motives. Tobin's transmission mechanism also suggests differ motives for saving than in Keynes. A bond is a form of lending and pay fixed rate of interest to the holder. The rate, in other words, does not va with the way in which the bond is used, and acquiring the bond does bestow ownership of real assets. Ownership of shares does bestow own ship of real assets and entitles the holder to a share in the future flow of pr its from the use of those assets. This brings us much closer to the classi view of saving as a real decision involving a trade-off between current a future consumption. We might also suggest that if households own firm they control the level of investment and there is no longer any reason fo mis-match of the plans of savers and investors. The uncertainty that p

the direction of a stable demand for money function (see Section 5.7)

Wealth effects of an increase in the stock of money

In Keynesian approaches, monetary policy carried out through open mar operations does not create wealth effects. Everything that follows does through the re-arrangement of portfolios and the interest rate is, therefo central. Governments, supported by the monetary authorities, can a increase the money supply by increasing government expenditure a financing the increase by borrowing from the central bank or the bank sector.[1] This has wealth effects since the increase in the money supply not matched by a reduction in private sector holding of government debt. this case, though, we have a mixture of monetary policy (the increase in money supply) and fiscal policy (the increase in government expenditu and the wealth effects could be attributed to fiscal policy.

Figure 7.5: Money supply and wealth effects



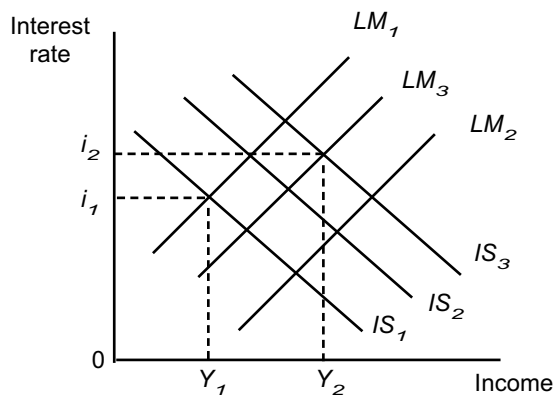
However, it has been argued that even monetary policy carried through open market operations might produce wealth effects. If this w true, an increase in the money stock would produce an increase in priv sector wealth, leading to an increase in the holding of each type of ass including money itself, financial assets of all kinds, and real assets such capital equipment and consumer durables.[2] Then, there would be a dir link between changes in the stock of money and expenditure on goods a services. The interest rate channel of transmission would be much l

This is shown using IS/LM diagrams as in figures 7.5 and 7.6.

Figure 7.5 shows the wealth effect only, without considering how t might arise. An increase in the stock of money shifts the *LM* curve do from LM_1 to LM_2 but the increase in the demand for money resulting fr the increased wealth moves it back to some extent and it finishes at *LM* At the same time, the increased wealth causes consumption to increa shifting the *IS* curve out from IS_1 to IS_2. The strength of the wealth eff resulting from the increase in the supply of money depends on the extent which the *IS* curve moves in comparison with the counteracting backwa movement of the *LM* curve to LM_3.

Figure 7.6 shows an increase in government expenditure financed by increase in the supply of money. In this case, we have two movements the *IS* curve, from IS_1 to IS_2 as a result of the increase in government exp diture and from IS_2 to IS_3 from the wealth effect.

Figure 7.6: Government spending and money supply



If we ignore the money-financed fiscal policy case and concentrate pure monetary policy, we are left with two questions:

- does an increase in the supply of money through open market ope tions produce a wealth effect?
- if it does, how strong is that effect?

Clearly, if there is a strong wealth effect, the argument that monet policy is weak is severely damaged.

Compare the notion of the net wealth of the private sector with Friedman's versi of wealth in Section 5.8. Why does no one include human wealth in the net wea of the private sector?

In considering whether there is a wealth effect, we must first look at notion of wealth being used here. It is usual to refer to the *net wealth of private sector*. We divide the economy into three sectors: the private, public sector, and the foreign. The net wealth of the private sector is defi to include all private sector assets that are not also liabilities of other me bers of the sector—that is, it includes private sector assets for which the c responding liabilities are those of the public sector or the foreign sec Thus, many financial assets are excluded because they create correspond liabilities within the private sector. For example, equities are assets shareholders but are liabilities of firms within the sector. If we rule su assets out, we are left with four categories of asset to investigate:

- real assets;
- assets that are liabilities of the foreign sector;
- inside money; and
- assets that are liabilities of the public sector.

The first two are straightforward. Both real assets held by the priv sector and private sector assets that are liabilities of the foreign sector clearly part of private sector net wealth. However, there are measurem problems. There are severe difficulties in measuring the net value of stocks of private sector housing and consumer durables. Thus, in most st ies, only the capital stock of firms is included as part of private sector wealth. The value of foreign assets can alter rapidly with changes exchange rates.

Inside money, remember, consists of bank deposits, which are assets the holders of the deposits but are liabilities to the banks with which th are held. Since banks are part of the private sector, some attempts have be made to exclude inside money from the definition of private sector wealth. This, however, ignores the fact that the whole monetary system based upon the presumption that banks do not have to repay deposits a need only hold small prudential balances to meet the day-to-day calls up them. If we add central bank willingness to act as lender of last resort ensure that the system does not fail, it seems reasonable to accept ins money as a part of private sector net wealth.

kind: outside (high powered) money and government securities. It has be
argued that the public sector's only source of funds is ultimately from
private sector in the form of taxation and that, therefore, public sector l
bilities are liabilities of the private sector. Remember, however, that
interest is in how the private sector perceives public sector liabilities.

Few people deny that outside money is part of private sector net weal
Technically, fiat money is a liability of the central bank and must be back
by government securities or foreign exchange reserves held by the cent
bank. Despite this, it is argued variously:

(a) that it is not, in practice, a government debt since it never has to
repaid (Pesek and Saving, 1967)

(b) that it is a debt but that the government is not concerned about
level of it (Gurley and Shaw, 1960), or

(c) that the issue of it certainly leads to a change in economic behavio
and that this is more relevant than the formal accounting positi
(Goodhart, 1989b).

However, there has been controversy over whether or not the private s
tor sees its holding of government securities as net wealth. Since inter
payments on bonds and the repayment of principal must come from futu
taxation revenue, one can argue that taxpayers as a group regard public s
tor debt as a liability. In this case, government borrowing imposes a futu
burden on taxpayers.

In the extreme (Ricardian equivalence) view (Barro, 1974), the d
counted present value of this burden exactly equals the value of the bon
to bondholders. Asset and liability cancel out and government bonds
not part of private sector net wealth. It follows that any increase in
economy's stock of outside money (however the increase is brought abo
is an increase in net wealth. Pure monetary policy (open market operatio
has wealth effects.

Opponents of this view object that bondholders and taxpayers are
identical groups and hence any assessment of tax liability will not fu
match the value of bonds to bondholders, especially as at least part of a
tax liability will be met by future generations.[3] Neoclassical economi
have responded with highly formal models of overlapping generations t
assume perfect knowledge of the future and in which the present and
future are, in effect, unified.

pay) and that, therefore, any bond-financed increase in government exp
diture does not create an effective liability for future generations as long
it results in an increase in future real income. This occurs in a Keynes
model if the economy is at less than full employment. The bond-financ
increase in government expenditure increases output and employment a
this, in turn, induces additional private sector investment adding to the ec
omy's capital stock. In this case, the present generation will see governm
bonds as assets and will not offset a perceived future liability against the

On the other hand, as we see in Chapter 8, in a neoclassical mod
unemployment is at its natural level and the increase in government exp
diture merely displaces (crowds out) an equivalent amount of private sec
expenditure. There is no addition to real income to ease the burden
future generations of repaying the increase in government debt.

Seen in this way, the argument about wealth effects of an increase in
money stock resolves itself into an extension of the familiar argument
intermediate macroeconomics concerning the slopes of *IS, LM* and agg
gate supply curves. A typical neoclassical model with a steeply sloped
vertical) *LM* curve and a vertical aggregate supply curve has as a coroll
strong wealth effects following an increase in the money stock. Wea
effects provide an additional support for the view that monetary policy
strong. In a Keynesian model, with a shallow *LM* curve and a positiv
sloped aggregate supply curve, an expansionary monetary policy throu
open market operations does not generate significant wealth effe
Indeed, in the end the effect may even be negative.

We should also note criticisms of the whole idea that only the size of p
vate sector net wealth is important. Chick (1977) argues that the relati
ship between wealth and expenditure is influenced by the composition
wealth: specifically, by its liquidity. She argues that as long as inflat
rates are low, an exogenous increase in the money stock should hav
greater impact on expenditure than an equal increase in other, less liqu
assets. In addition, consumers may increase their liquidity by borrowi
Expenditure plans, in other words, are based on both estimates of the m
ket value of assets and the cost and availability of borrowed funds. Ch
goes further, claiming that it is fallacious to net debt out from wealth sin
while existing debt does have to be paid off and this discourages consum
tion, people go into debt in order to consume. Existing debt is a current
bility but, at the time spending decisions are made, the burden of deb
only potential.

drives down interest rates, there is a capital revaluation effect (windf
gain) in the form of an increase in the market value of capital-uncert
financial assets already held.

Much also depends on government responses to changes in inter
payable on government securities. Thus, the bond-coupon effect describ
the impact of changes in government interest payments on disposa
income: the repurchase of government securities through open market op
ations (combined with any fall in interest payments) lowers governm
interest payments and lowers the current income of bondholders, produci
a possible negative impact on consumption. Yet again, lower interest ra
improve the cash flow of net debtors such as the company sector, possib
encouraging investment. Expenditure decisions may also be influenced
the way in which the economy's stock of wealth is distributed between cr
itor and debtor units of the different sectors in the economy since each s
tor may respond differently to changes in its wealth.

Pause for thought 7.9:

Can you now appreciate how much easier life becomes if we assume that the money supply is increased by dropping money from a helicopter? Is this the ulti mate form of outside money?

These points lead to the view that a much more disaggregated analysis
needed than is provided by the notion of an exogenous increase in
money stock increasing net wealth and producing movements in *IS/L*
curves.

A monetarist transmission mechanism

In monetarist views of the transmission mechanism between changes in
stock of money and the level of nominal income, money is different fr
all other assets. Consequently, no asset is a good substitute for money
money substitutes equally for all other assets. That is, the cross-elasticity
the demand for money with respect to the yield on any one particular as
is low. If we assume that all interest rates move together and talk of a s
gle interest rate, as we saw in Chapter 6 happens very largely in the emp
ical testing of the demand for money, the monetarist stress on the uniq
ness of money explains the belief in a very interest-inelastic demand
money. This helps to explain the difference of view between Keynesia
and monetarists over the 'price of money'. For Keynesians, the interest r

Pause for thought 7.10:

It is sometimes said that, in Keynesian models, increases in the money supply influence investment but not consumption but in monetarist models, both consumption and investment are affected. What explains the difference?

Monetarists argue that the Keynesian concentration on the interest r as the channel through which the monetary transmission mechanism wo derives from the common assumption of fixed prices, which leads to a la of interest in relative prices. For monetarists, on the other hand, transm sion occurs through a number of channels as the result of changes in re tive prices. We begin, as usual, in equilibrium. Demand equals supply all types of asset and an increase in the stock of money disturbs all of th equilibrium positions. Interest rates fall, the prices of financial assets ri the demand for existing real assets rises forcing up the prices of existing r assets leading to increased demand for new assets. The range of relev rates of interest is greater and includes implicit rates of return on real ass (the flow of services from them).

Brunner and Meltzer (1972) developed the best-known monetarist mo of the transmission mechanism. This focuses on stock effects as well as changes in relative prices. According to Mayer (1978), this brings the s tem towards a classical equilibrium. In the Brunner and Meltzer mod there are three types of capital goods:

(a) those for which there are separate prices for existing stock and n output (for instance, plant and machinery);

(b) those for which the prices of existing and new stock of compara quality are the same (including housing and cars);

(c) those for which there is no market for existing stock (certain types consumer durables).

Then an increase in the money stock leads to:

• an increase in equity prices and hence greater demand for new type goods; and

• an increase in prices of type (b) goods, stimulating their production

The rise in prices of real capital assets and the fall in the rate of ret on financial assets act to raise the market value of wealth and hence

effects on the savings/dissavings decision:

(a) a substitution effect — a fall in the opportunity cost of consumpti (and, thus, dissaving) provides a stimulus to current consumpti through an increased incentive to run down accumulated assets and borrow;

(b) an income effect, working in the opposite direction — a fall in int est rate lowers the flow of income and thus potential future consumpti from any given level of saving.

but also:

(c) windfall gains - as asset prices rose, the net wealth of the private s tor increases and, since wealth is a determinant of consumption, so d consumption.

There is much less emphasis on interest rates than in Keynesian mode Nominal interest rates do fall following an increase in the stock of mon but this is reversed as prices increase and the real value of the money sto returns to its initial level. The monetarist transmission mechanism opera more through a real balance (wealth) effect than through substituti because of the weak substitutability of money for other assets. Hence, mo etarist models are characterized by:

1. A wider range of assets than even in Tobin-style Keynesian mode including implicit rates of return on real assets.

2. Direct impact of changes in the money stock on nominal income.

These increases in nominal income cause the demand for money to r to return us to equilibrium in the money market. Income needs to rise co siderably and monetary policy is powerful. A corollary is that interest ra on financial assets are driven down considerably as part of the excess su ply of money is used to purchase financial assets. However, this fall has tle or (in the extreme) no effect on the demand for money since people assumed to know (or to form correct expectations regarding) future rates interest and thus to have no fear of capital loss from holding illiquid fin cial securities. This again makes clear the importance of the assumption uncertainty in Keynesian models.

Much of the debate about the nature of the transmission mechanism h
been concerned with causality and the direction of causality. The assum
tion of endogenous money implies that changes in the money supply ar
consequence of economic activity and should, therefore, follow them. T
money supply does not play a causal role within the economy but is cre
ed by the demand for loans. For monetarists, on the other hand, changes
the money supply should precede changes in output and prices. T
appears to be something we could test empirically. Alas! It is not so ea

Monetarists have always interpreted the empirical evidence to sugg
that changes in the quantity of money have systematically led changes
output and inflation rather than lagging behind them. However, other int
pretations of the evidence are available. For example, Laidler (2002) no
that the cyclical nature of output and inflation might produce mislead
appearances. Alternatively, he suggests, forward-looking agents might
adjusting their money holdings in line with expected output and pri
before these variables actually change. In both cases, the quantity of mon
might only seem to be leading.

A problem also arises from the existence of time lags. Remember t
in Section 7.3, we suggested that a reduction in interest rates would not ha
its full effect on output for around twelve months and two years mi
elapse before the full effect was felt on prices. However, the impact on
money supply occurs as soon as banks meet the increase in demand
loans consequent on the fall in interest rates. Indeed, we shall see
Chapter 9, that one of the arguments for using the money supply as an int
mediate target of monetary policy is precisely that the time lag between
instrument change and a change in the money supply is relatively sho
Thus, timing evidence can tell us little about causality and certainly does
provide the basis for an attack on the endogenous money version of
transmission mechanism.

However, Laidler and others have proposed an addition to that versi
This continues to recognize the importance of the credit channel through
impact of changes in interest rates on borrowing and spending, but sugge
that the quantity of money might still have a role to play in transmission.
doing this, the importance of the demand for money function is re-est
lished. The interest rate change is identified as the first round in the tra
mission mechanism. Consider an interest rate reduction. This causes
increase in borrowing and creates deposits and hence money. However,

of money resulting from an increased demand for loans might be grea
than agents as a group wish to hold. This might arise because the inter
rate change disturbs relationships between indebtedness to the banking s
tem and desired stocks of durable goods.

Consider a simple case with two market agents. Interest rates are lo
ered by the central bank. A increases his borrowing and buys dura
goods. B deposits the funds in a bank and both bank deposits and the mo
supply rise. This is the first round effect. B temporarily has excess mo
balances. Everything depends on what he does next. If he uses his exc
balances to repay existing loans from banks, the money supply falls unti
matches the demand for money. There is no separate 'money channe
Only the credit channel operates. On the other hand, he might use the ne
acquired deposit to buys goods, repay a loan to a non-bank or, indeed, ma
a loan himself. In all of these cases the portfolio disequilibrium is pas
on to someone else, the quantity of money does not fall and the demand
money remains below the increased supply of money.

As output and/or prices change following the first round effects
spending, the demand for money increases and we eventually return to eq
librium in the normal way. Nonetheless, the impact of the initial interest r
change differs depending on the response of agents to the increased quan
ty of money. It is this, which Laidler regards as the second-round effects
the interest rate change or as the money transmission channel. The streng
of this effect clearly depends on the nature of the demand for money.

Pause for thought 7.11

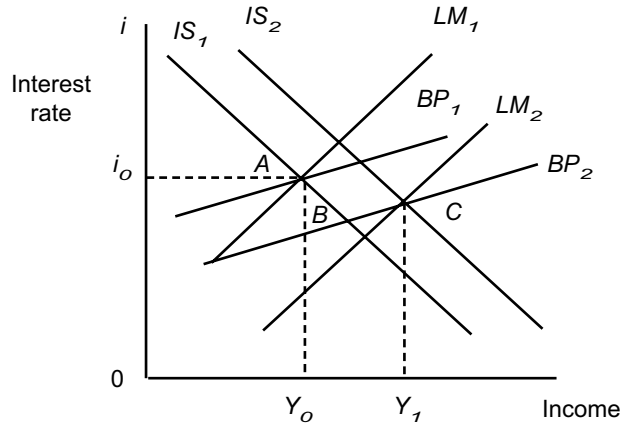
In Section 4.4, we consider the view that the demand for money is a constraint
the demand for credit since credit cannot create money unless the resulting
deposits are willingly held. We dismiss this as only an equilibrium argument.
How does the role for the demand for money envisaged here by Laidler compar
with that argument?

One can regard this approach as adding very little. After all, no
would argue that all interest rate changes have the same effects. We ha
suggested above that much depends, for example, on expectations. It
indeed, largely because the same interest rate change might have sign
cantly different effects on output and inflation and might take varying pe
ods to do so that the conduct of monetary policy is extremely difficult.
remains that the interest rate change is the causal agent and that money
endogenous. However, identifying a secondary money channel might

7.6 Money supply changes in an open economy

We have seen in Section 7.3 that changes in the money stock may also inf
ence the level of nominal income through exchange rate changes. T
analysis of the effectiveness of monetary policy in an open economy
based upon the Mundell-Fleming model — an open economy model, wh
adds a *BP* (Balance of Payments equilibrium) curve to the *IS/LM* mo
(Fleming, 1962; Mundell, 1963).

Figure 7.7: Expansionary monetary policy with flexible exchange rat



This model was developed in the 1960s when most currencies w
linked through the Bretton Woods fixed exchange rate syste
Consequently, the BP curve is drawn on the assumption of fixed excha
rates. The *BP* line shows all combinations of income and the rate of int
est at which the balance of payments is in balance. Exchange rate deval
tions or revaluations cause the *BP* curve to shift. A devaluation of the c
rency improves the current account of the balance of payments and allo
overall balance of payment equilibrium at a lower rate of interest — the
curve shifts down.

As pointed out in Appendix 1, in the normal case for developed co
tries, the *BP* curve is drawn flatter than the *LM* curve because capita
assumed highly mobile internationally. Thus, only small increases in int

mal case.

Here, we have assumed an increase in the money supply, which shifts t
LM curve down from LM_1 to LM_2. Income rises and interest rate falls. T
increase in income causes a deterioration in the current account of the b
ance of payments while the fall in interest rate causes a deterioration in t
capital account. The outflow of currency causes a depreciation of t
exchange rate shifting the *BP* curve down. However, the depreciati
improves the international competitiveness of domestically produced goo
and this is reflected in a rightwards shift of the *IS* curve. The new equil
rium is established at point *C*. At this point, the balance of payments
again in balance and both goods and money markets clear but the expa
sionary monetary policy has produced a higher income and lower inter
rate. Monetary policy under these circumstances is more powerful than
the equivalent closed economy case, in which the new equilibrium positi
would be at point *B*. Although the improvement in competitiveness resu
ing from the exchange rate depreciation is likely to be eroded over time
inflation, it remains that any change in the exchange rate brought about
an increase in the supply of money has a significant short-run impact. T
creates a more direct link between money and nominal income than in eit
a closed economy or an open economy with fixed exchange rates.

Pause for thought 7.12

Remembrance of theories past: How is the competitive advantage gained from a
exchange rate depreciation eroded over time by inflation?

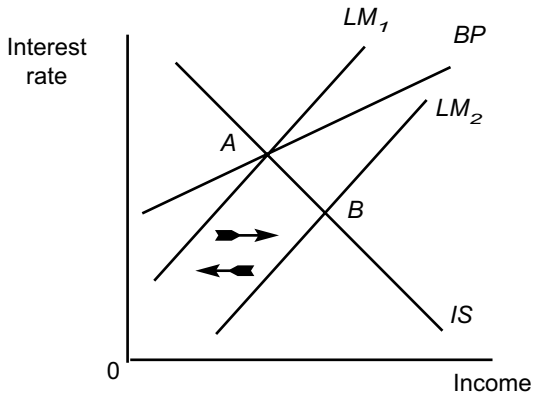
If we assume a system of fixed exchange rates, the position chang
entirely since the *BP* curve does not move. Thus, an expansionary mon
tary policy, which shifts the *LM* curve down and moves the economy
point *B*, generates a capital outflow as domestic interest rates have fal
below world rates. Since the current account also moves into deficit
income rises, we have a deficit in the balance of payments as a whole. Th
together with the developing current account deficit, creates an overall b
ance of payments deficit. This is shown in Figure 7.8, in which point *B* l
below the *BP* curve. Currency flows out of the country and the money su
ply falls.

We can divide an economy's money stock into two elements: a domes
component (*D*), assumed exogenous, and the central bank's holding
international reserves (*IR*):

$$M = D + IR \qquad \ldots$$

setting the initial money supply increase, and pushing the *LM* curve ba
towards its original position. Ultimately, we return to *A*.

Figure 7.8: Expansionary monetary policy with fixed exchange rat



In practice, the balance of payments deficit puts downward pressure
the value of the currency, but the authorities need to intervene, for exam
by using their international reserves to buy their own currency, in order
preserve the agreed fixed rate of exchange.

If the exchange rate is fully fixed, the length of time the economy ta
to return to *A* depends on the degree of capital mobility since this det
mines the speed with which capital flows out of the country as the dom
tic interest rate falls below world levels. With our assumption here of a h
level of capital mobility, the return to *A* occurs rapidly. Increases in inco
are very temporary. The authorities might try to slow down the movem
back to *A* by attempting to reduce capital mobility through the use of ca
tal controls, but this has become increasingly difficult to do with the grov
of offshore financial markets.

Pause for thought 7.13

How would you define 'sterilization', as the word is used here?

Governments might attempt to sterilize the effect on the monetary b
of the balance of payments imbalance by undertaking open market ope
tions. Assume the authorities wish to follow an expansionary monetary p

cy with an open market purchase of government securities, which has
effect of adding monetary base to the economy, reversing the tendency
the *LM* curve to move back to the left.

However, this can only help to prolong the expansionary phase fo
short period. To the extent that sterilization works, it keeps the interest r
below the world level and causes further outflows of capital, again reduci
the monetary base. It remains that as long as the balance of payme
remains in deficit, international reserves continue to fall and the cent
bank will soon run out of these. Thus, with fixed exchange rates and mob
capital, the ability of the authorities to operate a more expansionary or m
contractionary monetary policy than that of other countries is severely co
strained.

Some flexibility exists to the extent that the fixed exchange rate syst
allows the exchange rate of a currency to move within a band around
fixed central rate. This means that the monetary authorities can allow
value of the currency to drift down (pushing down the *BP* curve) to remo
the balance of payments deficit as long as the exchange rate remains wi
in the agreed bands. Normally, however, they must intervene before
lower band is reached in order to avoid damaging speculation against
currency. Nonetheless, the wider the band is, the greater the freedom
authorities have to run a monetary policy different from that of the ot
members of the fixed exchange rate system.

There are several points to note in this analysis. Firstly, in the floati
exchange rate case, the extent of the initial movement of the *LM* cu
remains important. Thus, in a Keynesian model, the *LM* curve does
move much, the balance of payments does not deteriorate much and
impact on the exchange rate is only small. Monetary policy under floati
exchange rates is more powerful in monetarist models than in Keynes
models.

Secondly, we should not, in practice, expect such rapid adjustment
exchange rates and balance of payments positions as is implied here. T
process is slowed down by the presence of a non-tradable goods sector.
any case, the goods market may adjust more slowly to the disturbance th
the asset market. Such rigidities in the system might produce exchange r
overshooting, even with rational expectations (Dornbusch, 1976). We co
sider this in Section 10.5.

Thirdly, the analysis above is simplified to the extent that a change
exchange rate only causes the *BP* curve to shift. In fact, an exchange r

improve the international competitiveness of a country's output and he
lower the marginal propensity to import. Thus, a fall in the value of a co
try's currency should flatten the *BP* curve; an exchange rate appreciat
should make it steeper. However, in the normal case, we are assuming t
the slope of the *BP* curve is influenced to a much greater extent by
degree of mobility of capital than by the size of the propensity to imp
Consequently, allowing for changes in the propensity to import as
exchange rate changes does not make a significant difference to the ana
sis.

Finally, there are a number of problems with the Mundell-Flem
model. Above all, the international competitiveness of a country's goo
and services depends crucially on differences in rates of inflation amo
countries, but the *IS/LM* analysis assumes constant prices. Once we st
talking of inflation, we introduce the distinction between nominal and r
interest rates and the difficulty that the interest rate shown on the verti
axis should be the real rate of interest for analysis of the goods market
the nominal rate of interest for analysis of the money market. We disc
this point further in Appendix I.

In addition, the model is concerned only with flows whereas a full eq
librium requires stocks to be in equilibrium, not just flows. The mo
assumes that a capital outflow continues as long as domestic interest ra
are below world interest rates. It is this that causes monetary policy no
work under fixed exchange rates. This implies that differences in inter
rates provide the only basis for choosing among domestic and fore
bonds. If, however, we allow for the existence of exchange rate or defa
risk, in equilibrium people hold a mixture of foreign and domestic bon
An expansionary monetary policy drives down the domestic interest r
and causes a switch from domestic to foreign bonds, but only until a n
stock equilibrium occurs; and, to the extent that foreign bonds are regard
as more risky than domestic bonds, this happens with the domestic rate
interest below the world rate. Once the new stock equilibrium has be
reached, the flow of capital ceases.

Yet again, the model considers only the overall equilibrium of the b
ance of payments, not its full equilibrium, which occurs only when both c
rent and capital accounts are separately in balance. The problem here is t
a current account surplus matched by a capital account deficit (or v
versa) is not sustainable since, as we have suggested above, the flow of c
ital implied by the lack of balance in the capital account continues only u

Lastly, once we use the model to deal with floating exchange rates, admit the possibility of exchange rate devaluations or revaluations in a fix exchange rate system, we need to take into account expectations regardi exchange rate changes. This is not done in the Mundell-Fleming model

Despite these problems, the model remains useful for considering op economy influences on the transmission mechanism of monetary policy a we return to it in Chapter 10.

7.7 Credit availability and expenditure

Because of the important role played in Keynesian models by the level credit, Keynesian economists have often argued that monetary policy m operate not only through interest rate changes but also through changes credit availability. We discussed the importance of credit availability to FoF approach to the money supply in Section 3.5.

Two types of rationing in credit markets have been distinguished: potential borrowers are not able to obtain a loan irrespective of the inter rate they are willing to pay; (b) a loan of a given amount is offered at a sp ified interest rate with no possibility of obtaining a higher loan at a high interest rate. This implies that money markets are in disequilibrium, w the demand for loans being greater than the supply of them by financ institutions. We have here a sticky price model in which interest rates not (or can not) rise sufficiently to return the market to equilibrium.

Earlier forms of the argument saw either government-imposed contr on interest rates or a failure by financial institutions to follow profit-ma mizing behaviour as the cause of credit rationing. Examples include ‘sticky rate effect’ and the ‘locking-in effect’ both stressed by the Radcli Committee (1959). The sticky rate effect concerned the slowness of bui ing society interest rates to adjust relative to those of banks. Thus, wh interest rates were rising, the building societies lost funds to banks (lead to a rationing of loans). When interest rates were falling, they gained fu from banks. The locking-in effect described the failure of financial insti tions, unwilling to realize capital losses on currently held assets, to adj their portfolios following a sharp fall in asset prices. They were said to f locked in to their existing portfolios.

More recently, writers have argued that loans are not homogeneous fr the lender’s point of view, with different loans carrying differing degrees risk. If we begin in a position of equilibrium and then assume an increa

rowers, increasing collateral requirements, or, in the hire-purchase finan market, raising initial deposits or shortening maximum repayment period

A recent resurgence in interest in credit availability transmission ch nels has been based upon imperfect and asymmetric information. I instance, credit rationing by lenders may be an optimal response in a sit tion in which the potential borrower has greater knowledge than the len of the uses to which the funds will be applied and of the risks associa with them. The problem for lenders is increased to the extent that borro ers have an incentive to conceal the riskiness of their projects from lende These models lead to the proposition that increases in interest rates tend discourage safe borrowers and to increase the average riskiness of lendi Hence, rather than rationing through higher interest rates, lenders meet increased demand for loans by rationing credit. Surveys of this mate may be found in Blinder (1987) and Miles and Wilcox (1991).

Two types of argument follow from the credit availability doctr depending on the monetary policy instrument employed by the authoriti The first (assuming an exogenous money supply) is just a changed form the transmission mechanism that plays down the role of interest rates. government-induced reduction in the money stock may be met by increased demand for loans as agents seek to finance their expenditure pla but interest rates do not rise: the transmission is through credit rationing

Things are more complex for a monetary authority that uses interest ra as its monetary policy instrument. A tight monetary policy based up increases in the rate of interest may bring about an increase in the avera riskiness of lending and in the level of defaults on loans. Thus, the def tionary impact of a tight monetary policy may be very great and may be d ficult to control. This formed part of the explanation by Keynesian eco mists for the depth of the recession in the UK in the early 1990s.

7.8 Summary

This chapter deals with the link between monetary policy and changes nominal income, leaving the link between nominal income and real inco to Chapter 8. Monetary policy may be conducted in one of three ways in recent times has been conducted very largely through central bank c trol of short-term interest rates. These have a strong impact on gene interest rates in the economy, which in turn influence both consumption a investment expenditure. Although a reduction in interest rates does

negative and potentially powerful one. Much depends on the expectatio
of households and firms regarding future changes in interest rates and
likely direction the economy will take.

Although monetary authorities do not use the money supply as an inst
ment of policy, much of the theoretical literature on the monetary transm
sion mechanism assumes an exogenous money supply, manipulated by
authorities. This literature remains important because it raises questio
concerning the likely usefulness and strength of monetary policy. The st
dard approach, through the *IS-LM* model, concentrates on portfolio effe
and sees the transmission of money supply changes as occurring entir
through the interest rate. The Keynesian speculative demand model rai
doubts about both the usefulness and strength of monetary policy - the f
mer because it allows the possibility of an unstable demand for money fu
tion, the latter because it produces an argument for a highly interest-ra
elastic demand for money. This model has been criticized on seve
grounds. One of these has been to argue that even pure monetary policy
wealth effects and that there is a direct transmission of monetary pol
through wealth effects in addition to any transmission through interest ra
In monetarist versions of the transmission mechanism the direct l
between the money supply and expenditure becomes the most important

The chapter concludes with an outline of the theoretical approach to
link between monetary policy, exchange rates and expenditure and with
possibility of transmission occurring through credit availability rather th
through interest rates. Amongst the debate over monetary policy, we c
identify a number of positions, which can be summarized as:

Keynes:
Changes in the money supply are not likely to have a powerful effect
aggregate demand particularly when the economy is in recession; the size
any effect will be unpredictable since the demand for money function mi
be unstable.

Neo-Keynesian (Tobin):
The effect of a change in the money supply on aggregate demand is b
more powerful and more predictable than in Keynes.

Monetarist:
The effect of a change in the money supply on expenditure is both direct a
powerful. However, monetarist economists recognize long and varia
time lags in policy, which lead them to prefer the operation of monetary p

Chapter 8).

Post-Keynesian:
Post-Keynesians accept the propositions listed under Keynes above but a
that the money stock is endogenous and thus cannot be controlled by
Central Bank even if it would like to do so.

Key concepts in this chapter

transmission mechanism of monetary policy
interest rate control
monetary base control
cost of borrowing
inflationary expectations
real money balances
portfolio effects
wealth effects
speculative demand for money
normal rate of interest
liquidity trap
net wealth of the private sector

Questions and exercises

1. How might the impact of a change in UK interest rates be affected by
(a) demand conditions in the USA;
(b) the expected future policy of the Federal Reserve Board?

2 Following a stock exchange crash in 1987, there was a temporary fear
a recession because of an anticipated reduction of consumption expenditu
(a) What was the basis of this fear?
(b) Was the fear justified?
(c) Would things be any different now?

3. What difference would it make to the strength of UK monetary policy
all mortgages were fixed-interest-rate loans:
(a) in the short run; (b) in the long run?

4. How are interest rate changes likely to affect the distribution of inco
between:
(a) rich and poor; (b) borrowers and lenders; (c) old and young?

(a) Why are they 'relatively illiquid'?
(b) Rank them in terms of liquidity among the following range of assets money, houses, jewellery, treasury bills, gold bullion, long-term bon maturing in one year's time, life insurance policies.

6. Provide examples from everyday of life of different forms of expectatio — static, regressive, extrapolative.

7. Draw *IS/LM* diagrams with differently sloped *LM* curves and consider impact in your diagrams of assuming different slopes.

8. If there is a 'normal rate of interest' in money markets, what factors mi cause it to change?

9. How far ahead do people typically look in making market decision Provide examples of different forms of market behaviour in this regard.

10. Provide examples of the three types of capital goods distinguished Brunner and Meltzer in formulating their version of the monetarist tra mission mechanism.

11. How useful is it in a Mundell-Fleming model to assume perfectly mob international capital flows? What happens in the diagram with differen sloped BP curves?

Further reading

The best source of material on the transmission mechanism in the UK is Bank of England (1999) article from which we have borrowed Figure 7 This can also be found at www.bankofengland.co.uk

A discussion of the transmission mechanism with an equivalent diagr can also be found in Chapter 3 of the ECB (2001) and at www.ecb.int.

The material on the transmission mechanism with exogenous money scattered but Gowland (1991) is a reliable source of the principal ideas a covers some aspects in more detail than here, The Mundell-Fleming mo can be found in many books on macroeconomics, international economi and foreign exchange. Two sources are Acocella (1998) and L S Copela (2000).

8 Mechanism of Monetary Policy - II

'But it is pretty to see what money will do.' Samuel Pepys, *Diary*, 21.3.1667

What you will learn in this chapter:

- The empirical basis for the existence of an unemployment/inflation trade-off through the simple Phillips curve
- How the expectations-augmented Phillips curve introduces money illusion into the analysis to deny the existence of a long-run unemployment/inflation trade-off
- The distinction in the Friedman/Phelps model between the short run and the long-run
- Friedman's simple monetary growth rule for monetary policy
- The basis of the New Classical model and of the proposition that aggregate demand policy is completely ineffective
- Criticisms of the New Classical model
- The use of the policy ineffectiveness theorem to develop the ideas of credibility and time consistency
- The case for central bank independence based on the importance of credibility in monetary policy
- More general arguments for and against central bank independence

8.1 Introduction

In Chapter 7, we considered the impact of changes in interest rates and money stock on nominal income. However, our ultimate concern is w their effect on real variables and on the rate of inflation. To complete picture, therefore, we need to consider the links between nominal and r income.

Before Keynes's *General Theory*, this was the preserve of the Quant Theory of Money, which suggested that, in anything other than the sh run, any change in the rate of growth of the money supply would sim lead to inflation. Real income (output) was assumed to be determined the real forces of saving (thrift) and productivity and not by monetary f tors. As we have seen, this required a stable demand for money and he a stable income velocity of money. There was thus, effectively, no tra

Classical theory argued that they were determined by the behaviour savers and investors, as set out in the loanable funds theory of the deter nation of interest rates. Both saving and investment decisions, and he the real rate of interest, depended on long-term considerations. The mo tary authorities could influence nominal interest rates, but these were of long-run significance for the real economy.

This picture was disturbed by Keynes's *General Theory* and by the int pretations made by Keynesians of this theory. In this view, the nomi interest rate was determined by the demand for and supply of money a provided a vital link between the real and monetary sectors of the econo Changes in nominal interest rates could bring about changes in real inter rates and have an effect on the real variables of output and employme Further, the demand for money was held not to be stable and hence cont of the money supply would not have a predictable effect on nomi income. The interest rate became the accepted monetary policy instrum but, as we saw in Chapter 7, monetary policy was thought to have onl weak effect on nominal income, especially when the economy was in rec sion. However, whenever the economy was operating at less than f employment, any impact on nominal income implied also an impact on o put since inadequate demand was argued to be a major cause of unemplo ment.

This approach explained the standard Keynesian models in which general price level was assumed to be constant and hence no distinction w made between nominal income and output. An increase in demand impl an increase in output and employment. It was always acknowledged t excess demand would cause prices to increase when the economy was at f employment as inflationary gaps (the gap between aggregate demand a aggregate supply at the existing price level) developed. In more detai models, prices had to rise before the economy was at full employm because an increase in employment required a reduction in real wages a this could only occur through an increase in the general price level. Th was thus an inherent notion of a trade-off between reductions in unemplo ment and increases in the price level. Despite this, there was little enqu into this trade-off until 1958 when A W Phillips first constructed the Phill curve (Phillips, 1958). Section 8.2 deals with the original Phillips curve a the subsequent attack on the idea of the existence of a long-run trade- between wage inflation and unemployment in the Friedman-Phelps exp tations-augmented Phillips curve. Section 8.3 then discusses the N

Unfortunately for the New Classical model, it is clear from the evide
that there is a short-run trade off between inflation and unemployment.
monetary policy shock does have real effects, at least in the short-r
Further, the impact of such a shock on unemployment precedes the imp
on the rate of inflation. Thus, in Section 8.4, we look at the many criticis
of the New Classical model and at recent attempts to explain the in
tion/unemployment trade-off.

Despite these criticisms, the New Classical model had a powerful eff
on the way in which people looked at economic policy. In particular, it
to the policy irrelevance proposition that the authorities cannot influe
real variables by boosting or squeezing aggregate demand. Section
introduces the notions of credibility and time consistency and spells out
idea that the economy can only reach the optimum (zero) rate of inflatio
the monetary policy of the authorities is held to be credible by mar
agents. Ways of obtaining credibility are listed, including the granting
independence to the central bank. This leads us into Section 8.6, which c
siders the question of the independence of the central bank.

8.2 The simple Phillips curve

After World War II, the UK government accepted for the first time the ob
gation to try to run the economy as close to full employment as possib
although the term 'full employment' was never precisely defined. Keyne
General Theory had suggested that economies in deep recession co
reduce unemployment by expanding aggregate demand and that, in such c
cumstances, fiscal policy was likely to provide a more powerful instrum
than monetary policy. There appeared to be empirical support for th
ideas. Unemployment had been high in the 1930s when demand was lo
it was non-existent during the war years when demand for everything c
stripped supply; and it seemed in the 1950s that expansionary demand m
agement could reverse small increases in unemployment.

Pause for thought 8.1:

What definitions might one use for the term 'full employment'?

After 1958, the idea that governments could effectively choose the level
employment and output up to some critical full employment level, enjoy
what appeared to be overwhelming empirical support from the work of A

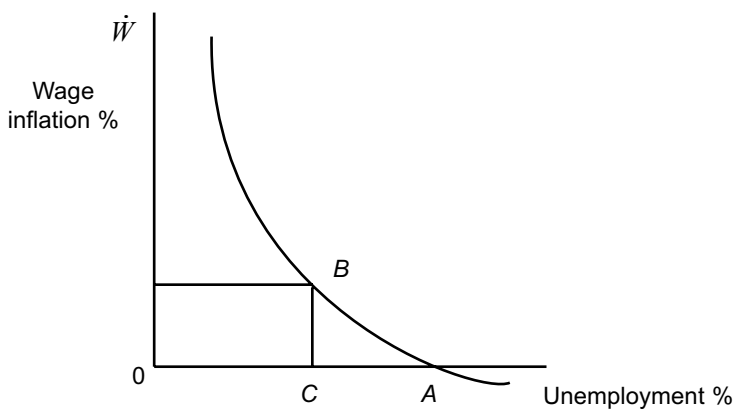
money wages ($\dot{W}$) from 1861 to 1957. The rate of change of money wag was used as a proxy for inflation since price inflation data was not availa for the early years. Figure 8.1 shows a simple Phillips curve with wa inflation on the vertical axis. However, it was easy to move from wa inflation to price inflation by allowing for increases in labour productiv and the Phillips curve is almost always drawn in price inflation/unemplo ment space.

Pause for thought 8.2:

How would one modify Figure 8.1 to convert it into a diagram with price inflation on the vertical axis?

The implication seemed clear. The evidence suggested firstly that economy could be run at various levels of employment and, consequent output. Secondly, it suggested that the level of unemployment could reduced without producing inflation until it fell to the level of unemplo ment at which the curve cut the horizontal axis (5.5 per cent in Phillip original study). Thirdly, the government appeared able to choose to run economy at even lower levels of unemployment if they so wished, but at cost of inflation. They could, for example, choose point *B* in Figure 8 The original study suggested that an unemployment level of 2.5 per c required acceptance of a 2 per cent rate of inflation. Thus was born the id of a stable trade-off between unemployment and inflation.

Figure 8.1: The simple Phillips curve



ical support. Much of standard Keynesian macroeconomics assumed co
stant prices. Where prices were introduced, the analysis was in terms of
price level rather than the rate of inflation. Lipsey (1960) and others p
vided some theoretical support. However, neoclassical economi
remained sceptical because, in conventional microeconomic analys
employment (and hence unemployment) levels depended on the real wa
not the money wage as implied by the Phillips curve. One way of bring
the statistical evidence into line with microeconomic theory was to assu
a zero rate of expected inflation. In other words, workers always took
existing money wage as equivalent to the real wage — a restatement of
existence of money illusion.

When, in the late 1960s, inflation rates began to rise steadily and
points showing the unemployment/money wage inflation combinatio
began to appear well off to the right of the curve plotted by Phillips in 19
Friedman and Phelps were separately able to exploit this approach
explaining the trade-off (Friedman, 1968; Phelps, 1967). The result was
Friedman/Phelps expectations augmented Phillips curve. Of the ma
attempts made to explain the movement away from the original Phill
curve, the Friedman/Phelps model conformed best to the standard theo
that rational labour market decisions were based on real wages. In ot
words, it was an extension of the dominant neoclassical theory of mar
behaviour. This ensured its survival ahead of other theories that depend
on institutional changes and the existence of class conflict to explain
growth of cost inflation.

By incorporating a theory of expectations formation into the model
worker behaviour, the Friedman/Phelps model allowed workers to ta
expected inflation into account. In so doing, it introduced the possibility
the money wage being different from the real wage. If, then, workers' e
mate of the rate of inflation were correct, there would be no money illus
and the labour supply decisions of workers would be based on the true r
wage rate. The Friedman/Phelps model assumed the use of adaptive exp
tations by workers, with workers basing their expectations of inflation o
weighted average of past inflation rates. Their expectations are said to
backward looking. This means that past errors are built in to future fo
casts (the errors are serially correlated). When inflation is increasing, wo
ers systematically underestimate the rate of inflation and *vice versa.* Th
if inflation were to increase steadily over a number of years, workers wo
expect higher and higher inflation rates and would push money wages up

and higher money wage rates to supply the same quantity of labour before. The combinations of unemployment and the rate of inflation experienced by the economy would appear above and to the right of the curve plotted by Phillips. Thus, according to Friedman/Phelps, there was a different short run Phillips curve for every expected rate of inflation.

On each such short run curve, there would be one point at which workers' estimate of the real wage would be correct, and this would be the long run position. Linking these long-run positions together provided the vertical long-run 'Phillips curve' at the level of unemployment that existed when the labour market was in equilibrium. This was called the 'natural rate of unemployment'. It extended the previously existing notion of 'voluntary' unemployment resulting from workers placing too high a value upon their leisure by allowing also for unemployment caused by structural factors (such as the level of economic development and the characteristics of the labour market). Crucially, however, it did not include unemployment caused by lack of aggregate demand — at the natural rate of unemployment unemployment is balanced by job vacancies. Thus, government could only hope to reduce the natural rate of unemployment by microeconomic policies that affected the structural characteristics of markets or the incentives faced by economic agents in making their work/leisure choices, not by increasing aggregate demand.

Pause for thought 8.3:

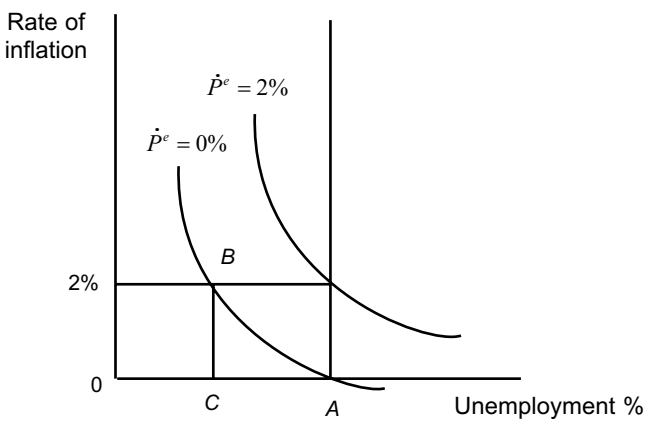
In what sense might an unemployed worker who is seriously looking for work but never receives a job offer be 'voluntarily unemployed'?

The natural rate of unemployment could occur with any rate of inflation and would do so as long as the expected rate of inflation was equal to the actual rate of inflation. The notion of a long run trade-off between unemployment and inflation had been completely removed. The rate of inflation would be explained, as in the Quantity Theory of Money, by the rate of growth of the money supply. The model, thus, supports the simple rule for monetary policy proposed by Milton Friedman — that the rate of growth of the money supply in a stable price environment should be kept equal to the rate of change in real income.

Short-run trade-offs between unemployment and inflation could exist but only because the economy was out of equilibrium. We start at point

authorities increase the rate of growth of the money supply in the hope reducing unemployment. Inflation unexpectedly increases to two per ce The real wage falls but workers continue to offer labour to the market a it had not done so. At the lower real wage rate, employers hire more wo ers and expand production. Output and employment increase and we mo along the short-run Phillips curve from *A* to *B*. However, workers gradu ly adapt their expectations to take into account the true rate of inflation a so long as the rate of inflation remains at 2 per cent, they will eventua forecast it correctly. Money wages are pushed up to restore the initial r wage and the economy returns to equilibrium, again at the natural rate unemployment but at a higher rate of inflation than previously. That is, original short-run Phillips curve applied only as long as expected inflat remained at 0 per cent. When expectations were changed, the curve shif to cut the long-run vertical Phillips curve at the, now expected, actual r of inflation of 2 per cent.

Figure 8.2: The expectations-augmented Phillips curve



Further attempts by the authorities to reduce unemployment by increas the rate of growth of the money supply push inflation higher but, in the lo run, produce no reduction in unemployment. It follows that any level unemployment below the natural rate of unemployment is available o temporarily and is associated with accelerating inflation. For this reas the natural rate of unemployment became widely known as the NAIRU (

ments wishing to control unemployment by managing aggregate demand. implied that increases in aggregate demand could reduce unemployment only in the short run and only at the expense of accelerating inflation. Ea attempt by the government to lower unemployment below the NAI would ratchet up the rate of inflation. In fact, the news was even wo since it was also argued that increasing inflation interfered with the ope tion of the price mechanism and reduced the efficiency of the econor This would cause the NAIRU to rise. This view assumed that higher ra of inflation meant more volatile inflation and hence an increased chance incorrect inflationary expectations.

Pause for thought 8.4:

Is it reasonable to assume that inflation is more volatile at higher average rates inflation? Can the rate of inflation also be volatile if the average rate of inflatio low?

The most prominent explanation of the damage done to the price me anism by volatile inflation came from Lucas (1972, 1973). He assumed t firms know the current price of their own goods but only learn what ha pens to prices in other markets with a time lag. When the current price its output rises, a firm has to decide whether this reflects a real increase demand for its own product or a general increase in prices resulting fr random demand shocks. In the former case, the rational response would to increase its output; in the latter case, it should not do so. That is, fir have to distinguish between absolute and relative prices. The signal t should be provided to producers by changes in relative prices is being co fused by the possibility of inflation, especially by volatile inflation. Fir face a signal extraction problem. The greater the variability of the gene price level, the more difficult it is for a producer to extract the correct s nal, and the smaller the supply response is likely to be for any given char in prices. Far from there being a trade-off between unemployment a inflation, the accepted theory now suggested that inflation caused une ployment to increase. To reduce unemployment in the long-run, gove ments were required to keep inflation low and to attempt to lower NAIRU through supply-side measures.

There was also bad news for those authorities who started with a hi rate of inflation and wished to get it down. Reducing the rate of growth the money supply would push inflation down but workers would contin

would rise, output would fall, and unemployment would increase beyo
the NAIRU. The amount of output lost in order to bring about a fall in inf
tion was called the sacrifice ratio. Of course, in the long run, workers wo
adjust their expectations and unemployment would fall back to the NAIR
However, the short-term costs in terms of lost output and increased une
ployment could be high, especially since the theory did not indicate h
long it would take workers to adjust their expectations.[2] The 'long run' i
logical construct —- the time that it takes for workers to obtain full inf
mation about changing prices. However, in a constantly changing wor
this could be a very long time. Indeed, there is no reason to believe that a
economy ever reaches the long-run. Thus, within the Friedman/Phe
model, monetary policy might have considerable and continuing r
effects.

Pause for thought 8.5:

The argument here implies that workers determine the rate of growth of money
wages — they build the expected rate of inflation into money wages, so that if
their expectations are correct, the real wage remains unchanged. Is this an acc
rate picture of wage bargaining?

There are other objections to the theory. Firstly, the evidence that inf
tion was very costly for economies even at low levels was not strong. T
principal loss for an economy identified by Friedman and others (called
shoe leather cost of inflation) was a welfare cost, which depended on p
ple switching from money to other assets because of inflation. However
one accepts the Keynesian proposition that there are close substitutes
money, this cost might not be very great at low inflation rates. Further, c
could argue that low rates of inflation might be desirable since a zero r
of inflation for the economy as a whole would require prices to be falling
some sectors and falling prices have always been associated with low l
els of confidence. Of course, as we have noted above, the model sugge
that continuing attempts by the authorities to exploit the short-term une
ployment/inflation trade-off produce accelerating inflation and so eventu
ly the costs of inflation must increase, whatever one's view about the clo
ness of substitutes for money. Even so, much time might pass before
costs of inflation become serious for an economy.

Secondly, the view that inflation was caused by the monetary authorit
implied a belief in a stable demand for money function and an exogen

Thirdly, unemployment might also have long-run impacts. It has be argued that increases in unemployment damage confidence leading to low investment and economic growth and might lower the skill levels of wo ers causing reductions in labour productivity. That is, increased unemplo ment in the short-run could cause higher unemployment in the long run a the long-run costs of unemployment might be greater than the long-r costs of low inflation.

The debate over the expectations-augmented Phillips curve thus led many attempts to enumerate and compare the various costs of both inflati and unemployment. If the costs of unemployment were high relative those of low rates of inflation and if economies never reached long-r equilibrium positions, there was still a case for attacking unemployment expanding aggregate demand. Nonetheless, the Friedman/Phelps mod together with the experience of stagflation in many developed economies the 1970s, was influential in the increasing acceptance by governments the limitations of demand management policies. Governments everywh began to pay much greater attention to the supply side of the economy.

Pause for thought 8.6:

Memory test: Define 'stagflation'?

8.3 The new classical model and policy irrelevance

The opposition to demand management policies was soon strengthened w the development of the new classical model in which the rational expec tions hypothesis was applied to a model of continuous market cleari Rational (forward-looking) expectations are informed predictions of futu events and are essentially the same as the predictions of the relevant ec nomic model, which is assumed the correct model for the economy. It f lows that the expected rate of inflation is an unbiased predictor of the ac al rate of inflation. Mistakes may be made because the available inform tion is incomplete but expectations are correct on average. That is,

$$\dot{P}_t^e = \dot{P}_t + \varepsilon_t \qquad \ldots$$

where ε_t is a random error term, which (i) has a mean of zero and (ii) uncorrelated with the information set available when expectations formed. Thus, forecasting errors are not serially correlated. The assum

expectations are not. Adaptive expectations require an additional hypot
sis — how market agents adapt expectations to take account of previ
errors. The assumption of rational expectations, however, means that
expectations of agents are always the values of the variables produced
the model itself.

The rational expectations hypothesis suggests that market agents ma
the best use of all available and relevant information in their forecasts
inflation—rather than simply taking account of past rates of inflation, as
adaptive expectations. Since the rate of growth of the money supply is
evant information in the monetarist model to which new classical econo
ics applied rational expectations, market agents are assumed to consi
government policy in making their forecasts. In other words, governm
is incorporated into the model. In all previous models, government w
exogenous.

The assumption of continuous market clearing implies that prices
free to adjust instantaneously to clear markets. It follows that anyone wi
ing to work can find employment at the market-clearing equilibrium wa
and thus that all unemployment is voluntary. The combination of
rational expectations hypothesis and the assumption of continuous mar
clearing implies that output and employment fluctuate randomly arou
their natural levels. Thus, unemployment fluctuates randomly around
NAIRU. All we are left with of the Phillips curve is the vertical line at
NAIRU. Increases in aggregate demand do not produce systematic red
tions in unemployment, even in the short-run. All they do is increase in
tion. Acceptance of the new classical model denies that there is any adv
tage to be had from demand management.

Pause for thought 8.7:

Is it reasonable to call a vertical line at the natural rate of unemployment 'a verti
cal Phillips curve'?

Another way of making the same point is to say that rational mar
agents fully anticipate the actions of the authorities and incorporate t
information in their expectations of the rate of inflation. That is, if the m
etary authorities seek to increase the rate of growth of the money supply
the hope of reducing unemployment, market agents realize this and corre
ly forecast that the rate of inflation will rise. Workers then push wages
in line with the correctly forecast inflation and real wages; employment a

encing the level of output and employment even in the short run. This known as the policy ineffectiveness or policy irrelevance theorem.

According to this theorem, the only way in which the authorities c influence output and employment through demand policies is to take m ket agents by surprise. For example, an unexpected increase in the mon supply causes workers and firms to see the consequent increase in the ge eral price level as an increase in relative prices. They react by increasi the supply of output and labour and the economy moves to a new short-r aggregate supply curve. Both employment and output temporarily increa As in the expectations-augmented Phillips curve, once agents realize th has been no change in relative prices, output and employment return to th natural levels at the higher price level. However, there are two import differences from the expectations-augmented Phillips curve.

Firstly, market agents include the rate of money supply growth in information they use to forecast inflation and quickly realize that inflati is about to rise. They thus adjust their inflation forecasts much more qui ly than in the expectations-augmented Phillips curve case, where agents not realize what is happening until inflation actually rises.

Secondly, the authorities are unable to exploit the possibility of the te porary trade-off between inflation and unemployment. If they try to redu unemployment through monetary shocks at all frequently, agents learn t this is what the authorities do when unemployment reaches undesirable le els. Workers and firms anticipate the monetary shocks and are no long taken by surprise. In other words, any short-run trade-off between inflati and unemployment disappears if the authorities try to exploit it.

The more often the authorities try to engineer reductions in unemplo ment through monetary shocks, the less easily are workers and firms foo and the more vertical is the short-run Phillips curve. The incorporation government into the model ensures the policy invariance result. If mar agents believe that increases in the rate of growth of the money supply ha no real effects but only cause increases in the rate of inflation, governm cannot have an impact on output and employment by increasing the rate growth of the money supply. When governments do this, market age immediately respond by raising their inflationary expectations, the short-r Phillips curve moves out and the economy remains at the NAIRU. Mon is once again neutral.

As we mentioned in 8.1, a major problem for the new classical model is t
money is not neutral in the short-run. It is widely accepted that a monet
shock does have an impact on output and unemployment and that t
impact occurs before the shock begins to influence the rate of inflati
There have, thus, been many attempts to explore the weaknesses of the n
classical model and to produce new explanations of the non-neutrality
money. We can divide these attempts into five groups:

- modifications to the model that accept continuous market clearing;
- complete rejections of equilibrium models;
- new Keynesian models that reject market clearing in the short run;
- criticisms of the natural rate hypothesis;
- attacks on the use of rational expectations.

Modifications to the continuous market clearing model

Relatively small changes to the model can restore the power of governme
to reduce output fluctuations at the cost of an increase in price fluctuati
and, thus, remove the neutrality of money, without attacking the princi
assumptions of the new classical model. These include:

(a) Progressive income tax structures push workers into higher
brackets as inflation rises, affecting employment and output. T
changes might also affect net-of-tax real rates of interest and, hen
influence borrowing and lending.

(b) Changes in the rate of inflation might influence investment and, th
the long-run rate of growth. For example, higher inflation makes ho
ing real capital more attractive relative to money, and might stimul
investment.

(c) Higher inflation might have a positive impact on consumption as s
ing in the form of financial assets becomes less attractive.

(d) Price movements in a model with asset holdings might produce r
effects:

(i) through changes in the real value of nominally denominated g
ernment assets provided they are considered to be net wealth; and

(ii) through distribution effects that might occur even with ass
issued by the private sector, as creditors and debtors react asymme
cally to changes in the real value of debt.

assumptions of the new classical model.

(e) With fixed exchange rates in an open economy, the relative prices tradable and non-tradable goods change in response even to expec changes in the money supply.

The complete rejection of equilibrium models

At the opposite extreme are criticisms that reject entirely the assumption continuous market clearing, arguing that real world prices are not perfec flexible and markets do not continuously return to equilibrium. The ne classical identification of the long run with equilibrium, which leaves di quilibrium as a short-run phenomenon based on imperfect knowledge, replaced by a view of the world dominated by uncertainty in which di quilibrium is the norm. Equilibrium is a special case, unlikely ever to reached. When markets do clear, it is often not through the process of pr adjustment. Lack of information about the future leads to coordination fa ures among markets.

Pause for thought 8.8:

How can markets clear other than through price changes? Does any other form of market clearing lead to a genuine equilibrium?

This certainly overcomes the policy ineffectiveness problem despite introduction of rational expectations into the analysis, but there remains problem of explaining the transmission mechanism from money to pric and output. A number of general disequilibrium models were produced the 1970s (Benassy, 1975; Barro and Grossman, 1976; Grandmont, 19 Malinvaud, 1977). These were fix-price models, although absolutely fix prices were not required for monetary and fiscal policy changes to produ real effects. However, the models lacked plausible explanations of h prices are determined in an economy not at a market clearing equilibriu Consequently, they had little long-term influence on the debate.

New Keynesian models that reject market clearing in the short-ru

A less strong criticism of continuous market clearing accepts the existen of a long-run equilibrium and the tendency for economies to return to eq librium positions. However, this may take a considerable time, not becau of incorrect expectations but because of institutional features of the mark

wage contracts (Taylor, 1979). When trade unions enter into a contract which wages are fixed for one or two years, even if workers form expec tions rationally and are able to forecast the actions of the policy authoriti they are unable to react to new information. Thus, an inflationary monet shock pushes up aggregate demand and prices rise but, during the life wage contracts, money wages cannot rise. Real wages fall and employm and output increase. It is only as some wage contracts end that mor wages are pushed up and the monetary impulse begins to have a more po erful impact on the rate of inflation. Equally, following a disinflation monetary shock, in the short term real wages are pushed up and output a employment fall. This means that there is a period during which the auth ities might exploit a trade-off between unemployment and inflati Monetary policy is again useful.

To support this model, we need an explanation of why workers and fir enter into long-term wage contracts. New Keynesian economists see th as the product of rational behaviour given the conditions in real wo labour markets. For instance, the theory of implicit contracts assun incomplete labour markets (workers do not have full access to insuran against risk). There is also asymmetric information and workers and fir have different degrees of risk aversion. The outcome is the standard labo contract in which the wage is held constant and the worker's job is guar teed over the period of the contract, no matter how well or badly the firm doing.

Pause for thought 8.9:

What form might asymmetric information take in negotiations between employer and workers over labour contracts? Which side may be better informed about what?

Another possible explanation of the failure of the labour market to cl continuously is provided by the insider-outsider model, in which work already employed by firms have an advantage over unemployed worke In neoclassical models, the real wage is kept at the market clearing le through competition between workers for jobs. Workers with jobs can push their wages above the equilibrium level because there are other wo ers willing to take their places at a lower wage rate. However, in real wo labour markets, there is often no genuine competition between employ and unemployed. Employers know the abilities and attitudes of the wo

tial worker has been unemployed. Firms often assume that a long period unemployment implies something personally unsatisfactory about the wo er, or that the period of unemployment has reduced his potential product ity, or both. Again, the firm has spent time and money training its existi work force and would face costs in both getting rid of existing workers a hiring new workers. For these reasons, firms are willing to pay high wages to existing workers than would be accepted by unemployed worke

Existing workers (insiders) take advantage of their position to push t wage above the market clearing level, causing employers to hire few workers than they would in a competitive market. The unemployed wo ers remain unemployed. In practice, unemployed workers seldom rece job offers and are not in a position to show their willingness to undercut t wage paid to the existing workforce. Equally, employers are seldom in position to discover the wage at which unemployed workers might be p pared to do the job. Unfortunately, the sticky wage theory also confli with reality. If there is no competition from the unemployed, there is no r son for money wages to rise more rapidly in booms than in slumps. Sin prices rise more rapidly in booms, we might expect real wages to move co tra-cyclically — falling in booms and rising in slumps. This does not ha pen.

Pause for thought 8.10:

Why might the insider/outsider model apply better to skilled than to unskilled workers?

Consequently, attention has shifted to new Keynesian models of t price-setting behaviour of firms. These assume monopolistic competition goods markets and incorporate costs of adjusting prices. Firms have m ket power and, thus, are able to set prices above marginal co Consequently, they always wish to sell more at prevailing prices. A mon tary shock influences both aggregate demand and the demand for labour a leads firms to adjust output and employment. That is, it has real effects. a recession, there is excess supply in both the goods and labour marke This theory of the goods market is often combined with a model of t labour market that produces above-equilibrium real wages. Mankiw (200 points out that this approach runs into difficulties when economists atten to develop dynamic models of price setting. The most common approach

Keynesian Phillips curve.

Mankiw sets out an illustrative model in which the current inflation r becomes a function of inflation expected to prevail in the next period a the deviation of unemployment from its natural rate. If expected inflat is held constant, higher unemployment leads to lower inflation, much as the Friedman-Phelps model. Again, however, the model runs into trou when confronted with evidence. Oddly, according to the model, credi monetary disinflations are likely to produce booms (Ball, 1994) whereas practice, monetary disinflations typically lead to recession. Mankiw a argues that the new Keynesian Phillips curve is incapable of produc empirically plausible impulse responses to monetary policy shocks. assumes a plausible response of inflation to a monetary policy shock a then shows that the new Keynesian Phillips curve implies an implausi result for unemployment — a monetary contraction causes unemploym to fall!

Criticisms of the natural rate hypothesis

We have seen that the new Classical model depends on the concept of natural rate of unemployment — the rate of unemployment at which labour market clears and does not exert pressure on the rate of inflati This implies that the natural rate is independent of the actual rate of une ployment in the economy and raises the question of how easy it is to id tify the natural rate. There are problems under both headings. Accord to Mankiw, the natural rate of unemployment 'is impossible to know w much precision' (Mankiw, 2001, p. C47).

Further, there is evidence in support of hysteresis — the notion that current level of unemployment has an impact on future unemployment l els. If this is true, there is no single 'natural rate' for an economy a increases in unemployment resulting from disinflationary monetary pol persist into the long term. Money is not neutral even in the long run. B (1997) provides support for this. His analysis of the growth of Europe unemployment in the 1980s shows that countries with larger decreases inflation and longer disinflationary periods experienced larger increases their natural rates of unemployment. In a 1999 paper, Ball shows that th larger increases in the natural rate of unemployment could be linked back a failure to pursue expansionary monetary policy in the early 1980s. T is, monetary policy influenced both actual unemployment and the natu

Criticisms of the assumption of rational expectations

There have also been several criticisms of the rational expectations hypo esis. It has been argued, for example, that the form of learning applied the rational expectations model is unrealistic. Acocella (1998) also sugge that the new classical model is a model of a stationary society and that ‘rationality’ of human beings in this system ignores ‘creative rationalit which involves the attempt to transform society and the environment rat than just accepting what already exists.

Empirical work on the new classical model

Two statements are made in response to criticisms that the assumptions the new classical model are unrealistic: that markets act as if the assun tions were true; and that the only way of judging a model is through test its predictions — if the model predicts well, the underlying theory must a sufficiently good representation of reality. We, thus, need to say a li more than we have so far done about the empirical work done on the n classical model.

Pause for thought 8.11:

Memory test: Where previously in this book have we come across the propositi that ‘the only way of judging a model is through testing its predictions’.

Much of this empirical work involves testing one of the implications the policy irrelevance hypothesis — that deviations of real variables fr trend result from people being surprised by movements in the general pr level. In other words, only unanticipated monetary policy has real effe Anticipated monetary policy should be neutral. On this basis, early w (Barro, 1977, 1978) appeared to support the policy ineffectiveness propo tion. Using annual data for the US economy from 1941 to 1976, Barr study suggested that, while output and employment are significantly affe ed by unanticipated monetary growth, anticipated monetary growth has real effects. However, subsequent studies (Mishkin, 1982; Gordon, 198 found evidence that output and employment are affected by both anticip ed and unanticipated monetary policy. By 1989, Goodhart (1989a, ch. was able to report 63 tests of the policy irrelevance hypothesis for seven ferent countries. Of these, 17 appeared to confirm the hypothesis that o

not.[3] More recent testing has not altered that balance.

Quite apart from the formal testing, it seems hard to accept that ma booms and recessions can be explained by frequent, large and persist errors in the inflation expectations of market agents, especially given quantity and quality of information that is available about current chan and likely future movements of the price level. It seems far more likely t monetary policy's impact on real variables is the result of one or more of arguments critical of the new classical model. The most likely candidat the failure of real world markets to clear perfectly and instantaneously.

8.5 Credibility and time consistency

Nonetheless, to develop our next set of propositions, we need to ignore criticisms of the new classical model. We must return to the policy irre vance proposition and to the idea that the expectations of market age regarding the rate of inflation depend on their view of the likely behavi of the authorities, specifically the expected rate of growth of the money s ply. In such a world, the monetary authorities could assist market agents the formation of expectations by following a clear monetary rule or, at le announcing targets for the rate of growth of the money supply. There wo be no point in attempting to mislead market agents because, to be effecti they would need to do so in a consistent direction. That is, if the authorit wanted to reduce unemployment they would always need to cause money supply to grow at a faster rate than their announced target. Howev market agents would soon realize that the money supply always grew a faster rate than the authorities' target and would adjust their inflation exp tations accordingly. In other words, agents would make a judgem regarding the credibility of the policy announcements of the authorities.

The credibility of a particular policy statement would depend on:

(a) the performance of the policy authorities in the past (their *reputati*

and

(b) the nature of the policy institutions.

Even if the policy authorities were not to be trusted, institutio arrangements might prevent them from attempting to mislead the pub For example, the authorities might be *pre-committed* to following a par

sistency. Kydland and Prescott introduced these terms in 1977, althou the ideas behind them are not new. A time consistent equilibrium is ano er version of long-run equilibrium. A time inconsistent equilibrium is c that, for one reason or another, cannot be sustained.

Pause for thought 8.12:

Is there any point in the authorities announcing targets for the rate of growth of t money supply, if they cannot guarantee the achievement of those targets?

In Kydland and Prescott's model, the policy maker is engaged in a stra gic dynamic game over a period with sophisticated forward-looking priv sector agents (agents who employ rational expectations). They argue th in such circumstances, '...discretionary policy, namely the selection of t decision which is best, given the current situation, does not result in social objective function being maximized' (Kydland and Prescott, 19 p.463). If a government formulates and announces an optimal policy a private agents believe this, in subsequent periods the policy may not rem optimal. This is because, in the new situation, the government has an inc tive to renege on the previously announced optimal policy. This change the optimal policy over time is known as time inconsistency. More form ly, the optimal policy computed at time *t* is time-inconsistent if reoptimi tion at time t+n produces a different optimal policy. The fact that polic may be time-inconsistent significantly weakens the credibility of pol announcements by the authorities since market agents are always aware t the authorities might not carry out the promises made in the first period.

Kydland and Prescott employ the new classical version of the Phill curve to illustrate this view that discretionary policies are incapable achieving an optimal equilibrium. Assume that the monetary authorit can control the rate of inflation perfectly, that markets clear continuou and that economic agents have rational expectations. Then:

$$U_t = UN + \psi(\dot{P}_t^e - \dot{P}_t) \quad ...$$

where *UN* is the natural rate of unemployment and ψ is a positive consta Kydland and Prescott assume that there is a social welfare function of form:

$$S = S(\dot{P}_t, U_t) \quad ...$$

A consistent policy seeks to maximize (8.3) subject to the Phillips Cu constraint in (8.2).

The form of game proposed by Kydland and Prescott is a dynamic n cooperative Stackelberg game in which the dominant player (the gove ment) acts as leader and the remaining players react to its strategy. B market agents and the government seek to maximize their own object functions subject to their perception of the strategies adopted by the ot player. Thus, the government, as leader, decides on its optimal monet policy taking into account the likely reaction of the followers. The respo of market agents, in turn, depends on their expectations of the future beh iour of the government.

Pause for thought 8.13:

Why should games between market agents and the government be non-cooper tive?

Barro and Gordon (1983) constructed a model to illustrate the ideas Kydland and Prescott. This represents equations 8.2 and 8.3 by an exp tations-augmented Phillips curve and a set of indifference curves show the willingness of the community to trade off inflation against unempl ment. The more concerned the community is about unemployment relat to inflation, the steeper the indifference curves will be. The point of t gency closest to the origin represents the highest welfare point available

If the economy is at the natural rate of unemployment (on the verti Phillips curve) with zero inflation, it is always possible for the governm to expand the economy along the short-run Phillips curve associated with expectation of zero inflation. In doing so, it reaches an indifference cu closer to the origin than the one the economy is currently on. Welfare is te porarily increased. The reduction in unemployment is at the expense higher inflation but the combination is thought preferable to the exist one. If we think of the social welfare function as indicating electoral po larity, democratically elected governments will always opt to expand economy in this way. Hence, the position with zero inflation and the na ral rate of unemployment is time inconsistent in a democracy becaus democratically elected government always seeks to expand the econo The point of tangency between an indifference curve and the short- Phillips curve associated with an expectation of zero inflation yields highest level of popularity the government can achieve by deceiving vot

ral rate of unemployment imply mistaken expectations. The governm
has brought the economy to this point by causing a higher rate of inflat
than that expected by market agents. As soon as market agents realize th
they adjust their inflation expectations. Money wages rise to restore
original real wage and unemployment moves back to the natural rate —
return to a point on the vertical Phillips curve but at a positive rate of inf
tion.

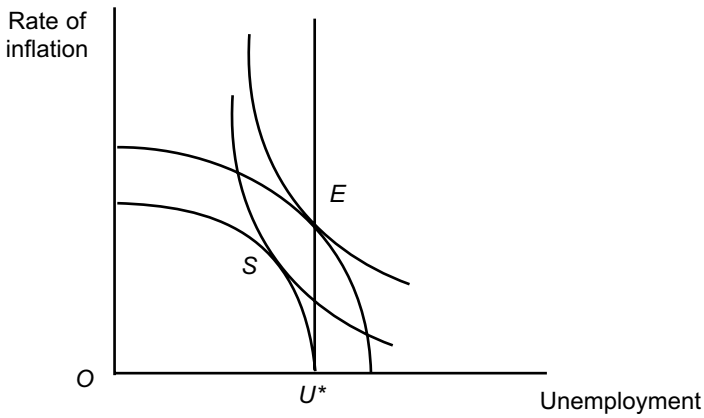
Although we are now worse off than when we started, there appears on
again to be a welfare gain to be had by expanding the economy along
new short-run Phillips curve. The process continues until we reach a po
at which the existing short-run Phillips curve is tangent to an indifferen
curve on the long-run Phillips curve. At that point, there can be no welf
gains from expanding the economy since any move would take us to
indifference curve further away from the origin. Thus, this point is *ti
consistent*. It is on the vertical Phillips curve, with the expected and act
rates of inflation equal (there is no money illusion). The elected gove
ment can obtain no advantage from seeking to move the economy aw
from this position. However, the position is sub-optimal since the econo
could have the same level of unemployment with a zero rate of inflation

This time consistent rate of inflation varies from country to coun
depending on the form of the social welfare function and on the level of
natural rate of unemployment. Countries in which governments c
increase their popularity markedly through short-term reductions in une
ployment have high equilibrium inflation rates. Countries in which peo
are more concerned about inflation have lower equilibrium inflation rate

The addition of rational expectations to the analysis removes all int
mediate steps. Starting from zero inflation and the natural rate of une
ployment, the economy moves up the vertical Phillips curve to the time co
sistent position at the equilibrium rate of inflation. This occurs becau
rational market agents understand that the government is always seeking
expand the economy and they immediately build the expected (equilibriu
inflation rate into their price- and wage-setting behaviour. The Bar
Gordon model is shown in Figure 8.3. A government from a high inflat
country cannot easily lower the equilibrium inflation rate. Any announ
ment of a tighter monetary policy than that followed in the past will not
credible to market agents. We begin at *E*. The monetary authorit
announce a target rate of inflation of zero, to be achieved by reducing
rate of growth of the money supply. If this announcement is credible

are aware that if this occurred, the authorities would renege on their pro
ise and increase the rate of growth of the money supply in order to move
S, with the result that the economy would finish at *E*. Consequently,
announcement of a zero target rate of inflation is not credible. Mar
agents continue to build into their wage-setting behaviour, the old, hig
rate of inflation.

Figure 8.3: The Barro-Gordon model



What then happens if the monetary authorities do follow the announc
policy? The rate of inflation falls and now lies below the expected rate
inflation. Real wages and unemployment rise (we are now to the right
the vertical Phillips curve with unemployment above the natural rate). T
economy could remain in this position for a prolonged period, at a high c
in terms of additional unemployment. If, after some time, market age
begin to believe the government has changed and lower their expectatio
regarding the equilibrium inflation rate, we temporarily reach *U**, only
the process to begin again.

Thus, only unanticipated increases in nominal income have an effect
real variables. All of the transmission channels from money to nomi
income lead to the same result: no impact on real variables either in
long- run or the short-run. One escape route from this position is provid
by the government accepting pre-commitment to a tight monetary poli

to their announcements, the long-term equilibrium could occur at zero inf
tion and the natural rate of unemployment.

In macroeconomic policy terms, governments might pre-commit by
acceptance of fixed or *a priori* rules. This approach is considered
Chapter 9. An alternative to pre-commitment is the transfer of power o
macroeconomic policy from elected governments to non-elected bod
such as independent central banks, which are assumed not to face the ten
tation to re-optimize because they do not face elections. Another possib
ty is to disband the central bank and privatize the supply of money.

The Barro-Gordon model has also been applied to the foreign sector
relation to the choice between fixed and floating exchange rat
Governments whose monetary policy announcements lack credibility w
their own citizens might seek to borrow credibility by tying the domes
currency to a country whose central bank has greater anti-inflationary cr
ibility. Then, as we shall see in Chapter 10, the issue becomes the credib
ity of the fixed exchange rate system. This, in turn, can be used to supp
a move to full monetary union — on the assumption that the central bank
the union is independent and takes over fully the anti-inflationary stance a
credibility of the central bank of the low inflation economy.

The Barro-Gordon model has been subject to various criticisms in ad
tion to those arising from the underlying assumptions of rational expec
tions and market clearing. For example, Driffil (1988) argued that priv
agents do not know what type of government behaviour they face becau
they have incomplete information. They analyse the various policy actio
and announcements and attempt to determine whether the government
strongly anti-inflation ('hard-nosed') or relatively soft on inflation ('we
However, life is made difficult for them because they are aware that 'w
governments have an incentive to masquerade as 'hard-nosed' and m
engage in 'the dissembling actions of an impostor' (Blackburn, 1992). T
might mean that hard-nosed governments face a high sacrifice ratio wh
they follow disinflationary policies because agents mistakenly regard th
as wet. The 1997 decision of the newly elected Labour government to ha
over monetary policy to an independent Bank of England can be interpr
ed in these terms (Milesi-Ferrettti, 1995; Bain, 1998).

Pause for thought 8.14:

Why might 'wet' governments have an incentive to masquerade as 'hard-nosed'

The dynamic time inconsistency theories were widely regarded as prov
ing a strong case for independent central banks as a pre-commitment devi
Rogoff (1985c) suggested that the appointment of conservative inflati
adverse central bankers would prevent the excessive use of discretion
stabilization policies and the inflationary bias that they imply.

This provided support to the anti-discretionary policy view that had be
developed over many years by public choice theorists and others. Pub
choice theory applies the methodology of neoclassical economics to
political process and assumes that governments seek to maximize the ut
ty of individual members of the government by retaining power. Politici
act to maximize votes. Since elections occur frequently, governments
principally interested in the short-run impact of their policies. This impl
that voters are shortsighted and judge the position of the economy only
the time of elections, forgetting what happens between elections. This lea
to a number of different types of argument suggesting that democratica
elected politicians are likely to favour policies that are more inflation
than is desirable for the economy in the long run.

For instance, voters can be divided into smaller groups, each of wh
seeks increased government expenditure in a particular area — health, e
cation, roads, defence etc. Politicians seek to win votes by promising hig
er expenditure in all these areas. Thus, government expenditure rises in
orably. Governments are then faced with the problem of financing th
Beyond a certain level, it becomes politically unpopular to raise taxes.
taxes are not increased, government borrowing must increase. However
governments borrow by selling increasing quantities of bonds to the no
bank sector of the economy, interest rates are pushed up. In a modern ec
omy, with large numbers of voters burdened by mortgages, interest rate ri
are also unpopular. Thus, vote-seeking politicians increase governm
expenditure and finance this by borrowing through the banking sector, th
increasing the money supply and causing inflation.

Another approach has been to consider the government as a unit, wh
seeks to gain advantage for itself at the expense of its citizens. It can do t
by creating inflationary surprises because any expansion of the money su
ply provides seigniorage (see Section 1.4) to the issuer of money.

Pause for thought 8.15:

Memory test: Define 'seigniorage'.

sionary monetary policy acts as a tax on the savings of the citizens. course, the expectations-augmented Phillips curve suggests that each ti the government creates an inflationary surprise, it ratchets up the rate inflation while achieving no long-run increases in employment or output

This, in turn, fits in with the view that governments create political bu ness cycles — unnecessary cycles with real costs for the economy, wh are generated by the need for governments to face elections. Governme expand the economy in order to win elections, only to be forced to defl the economy after the election as the inflationary impact of the expansio ary policy is fully felt. This makes governments unpopular between el tions but puts them again in a position to expand the economy in time to w the next election. This does not, in itself, produce ever-increasing inflati but involves real costs for the economy, as inflation falls following ea election only at the expense of high, albeit short-term, unemployment. T economy faces a regular and unnecessary stop-go cycle, which crea uncertainty and interferes with longer-term growth prospects.

These arguments, too, face problems. Attempts to find evidence for existence of political business cycles have not, on balance, been successf Studies that find no evidence of electoral cycles outnumber those that All theories depend on the shortsightedness or limited vision of the voter contrast with the rational and well-informed market agent. In any case, these arguments have a rather dated feeling since elections in the 1980s a 1990s in most countries were won, in the main, by political parties prom ing low taxation and low inflation rather than high government expenditu and low unemployment as suggested by the anti-discretionary policy the ries.

This reflects an over-simple view of the political process in many pub choice models, in which all citizens are assumed to have similar pref ences. However, since unemployment (especially long-term unemplo ment) is heavily concentrated among unskilled workers and poorer sectio of the economy, the chances of becoming unemployed are much greater some people than for others. Equally, the losses arising from inflation va widely depending on household indebtedness and holdings of financ assets. In general, middle income households with mortgages and sign cant holdings of financial assets, but whose workers have a lower than av age risk of becoming unemployed are likely to be more worried by inflati fluctuations than by output fluctuations. The reverse is likely to be true working class households. In addition, elections are often decided

constituencies have been in the suburbs of cities and in small towns a
have been predominantly middle class. Consequently, in order to be ele
ed, political parties have needed to signal a greater concern with inflat
than with unemployment (Bain, 1998).

Pause for thought 8.16:

Mortgages are a debt. The real value of debts falls with inflation. Yet, the text suggests that holders of mortgages might be particularly worried by fluctuations the rate of inflation. Is this likely to be the case? If so, why?

Because the theoretical arguments in favour of central bank indepe
ence are open to criticism, its supporters have sought to add strength to th
argument through empirical studies. These have looked at the degree
independence of central banks and attempted to find correlations betwe
this and the rates of inflation in the respective countries. These studies ha
largely claimed to find such correlations within developed economies
well as failing to find correlations between the independence of cen
banks and rates of economic growth. The implication is that countries w
politically independent central banks can maintain lower rates of inflat
with no loss in terms of economic growth.

In one of the earlier major studies, Alesina and Summers (1993) exa
ined 17 OECD countries over 35 years. They used a composite index
central bank independence based on a number of indicators of indepe
ence, the chief of which they identified as:[4]

(a) the ability of the central bank to select its policy objectives with
the influence of government and the frequency of contacts between
government and bank officials

(b) the selection procedure for choosing the governor of the cen
bank, including the length of tenure of the governor

(c) the ability to use monetary instruments without restrictions

(d) the requirement of the central bank to finance fiscal deficits.

When they examined the correlation between this index of independe
and some major economic indicators, they found that more independe
was accompanied by lower inflation; but was not associated with lo

pendence promotes price stability, it has no measurable impact on real ec
nomic performance' (p.151). That is, the study appeared to support
view that central bank independence could reduce inflation without cost

Australia and the UK both had more stable rates of growth than Jap
the USA, and Germany, all of which had central banks that were more ind
pendent. Spain, Australia, and Italy all had higher average annual rates
growth over the period 1955-87 than Germany despite having less ind
pendent central banks and higher average inflation rates. The same resu
held for the sub-period between 1973 and 1987. Of course, this is a
undermined to some extent by arguments about the cost to an economy
inflation since there appeared to be no truth in the claim that countries w
below average or stable inflation rates had above average rates of econo
ic growth.

However, the study enabled Issing, then the chief economist of
Bundesbank, to argue that '...as regards the relationship between moneta
stability and employment, the findings are pretty unambiguous, and, exc
in the very short-term, the hypothesis of an alleged conflict in the sense
a trade-off between inflation and unemployment may be considered qu
refuted' (Issing, 1993, p.14).

There were, however, several difficulties with these studies. First
doubts were raised about the index employed. While there was gene
agreement on the characteristics associated with independence, they had
be weighted to produce a composite index of independence. Differ
researchers could use different sets of weights and, hence, rank cent
banks differently in terms of independence. There were also problems
deciding whether central banks fulfilled the various criteria, especia
when there were differences between the constitutions of the banks and th
performance. For example, the average length spent by governors in off
might, in practice, be rather different from the term of office specified in
constitution. Again, Issing (1993), in distinguishing between functio
independence (related to the legal framework) and personal independen
asked how the courage, steadfastness, and skill of the members of the de
sion-making body could be measured. Crawford (1993) suggested t
Alesina and Summers had either overlooked differences in customs and t
ditions among countries or handled them arbitrarily. Overall, although
was accepted that the Bundesbank ranked highly on any index, there w
sufficient doubt about other central banks to query the apparent correlatio
between independence and inflation rates.

from degree of independence to inflation rates. Any correlation could accidental or a third factor might be responsible for both the independe of a central bank and the low rate of inflation. For example, the low ra of inflation in Germany may have been due principally to a strong a inflationary attitude among German people following politically and soc ly damaging episodes of inflation. This meant that there was, for a l period, little or no disagreement among the major political parties over need to keep inflation rates low. This made it easy for the government accept the conduct of monetary policy by an independent central ba German governments may well have followed much the same monet policy as that chosen by the Bundesbank. Even Alesina and Summ acknowledge that the excellent anti-inflationary performance of Germa might have had more to do with the public aversion to inflation than existence of an independent central bank.

Pause for thought 8.17:

Knowledge of history: When did Germany experience politically and socially da aging episodes of inflation?

Further, in the cases of both the USA and Germany, a major reason establishing an independent central bank was to limit the extent to wh regions of the countries were dominated by distant financial and politi centres: both the Federal Reserve and the Bundesbank have strong regio representation on their central governing boards. It can be argued that t kept the central banks in touch with the real economies in the regions led to some tempering of monetary policy. Thus, while control of inflat may have remained the central aim of policy in Germany (reflecting national consensus), there has been little feeling that the interests of financial sector of the economy have dominated the central bank. Any re ing of the reports of the US and German central banks shows them to ha been highly pragmatic institutions. Thus, it seems clear that any relati ship between the nature of a central bank and inflation performance wit its economy is a highly complex one and that simple correlations betwe them do not advance the argument far.

Other writers sought explanations for differences in monetary policy the other functions central banks were required to carry out. For examp Issing (1993) stressed the importance of the German decision to separate

Again, changes during the period in the degree of independence of ce
tral banks and in rates of inflation presented difficulties. Inflation rates h
tended to converge, which might have been due to increased central ba
independence, but might also have been influenced by other factors such
changing government views of the possibility of exploiting a trade-
between inflation and unemployment or changes in labour market organi
tion. Indeed, Campillo and Miron (1997) argued that the empirical corre
tion between inflation and central bank independence disappeared on
other potentially explanatory variables that might account for cross-sectio
al variations in average inflation rates were incorporated into the analys
Such factors included a measure of political instability, the ratio of impo
to GDP, the ratio of debt to GDP, and income.

Despite these doubts, the 1990s saw a widespread acceptance amo
economists and politicians of the desirability of politically independent ce
tral banks. This was translated into action in many countries. In Euro
the Maastricht Treaty on European Union (1992) required that the natio
central banks of all members of the future monetary union should be po
ically independent while the European Central Bank itself would be ind
pendent of all governments and of the European Commission. This w
largely responsible for the increased independence granted to the cent
banks of France, Spain, and Italy. This requirement of economic and mo
etary union was needed to help to persuade financial markets that moneta
policy after monetary union would be as determinedly anti-inflationary
Bundesbank policy had been. Market confidence in the future single c
rency was needed, in turn, to convince the low inflation countries, notab
Germany, to give up their domestic currencies.

This need to persuade financial markets was part of the acceptance, i
world of highly mobile capital, of the dominance of financial markets. I
now taken for granted that a country's long-term interest rates might fal
only, and only if, governments can convince the financial markets of
credibility of their expressed determination to keep inflation low. Handi
control of monetary policy over to the central bank was seen as one way
achieving this, since financial markets have more trust in the anti-inflatio
ary credentials of central banks than in those of elected governments.

We, therefore, have a classic example of self-fulfilling beliefs. We ha
suggested that the theoretical arguments in favour of taking the control
monetary policy out of the hands of elected governments are not strong a
that the empirical evidence is rather weak. It remains that, so long as the

governments are not, in practice, giving up a great deal since the increas
mobility of international capital has made it increasingly difficult to oper
national monetary policies markedly different from those being followed
other countries.

Despite the widespread support for central bank independence, there h
been much concern over the question of accountability. 'Accountabili
has been defined (ECB 2001 p.126) as 'the principle that an institution w
decision-making authority is held responsible for its actions'. Clearly,
bank should ultimately be accountable to the public since it administ
monetary policy on behalf of the economy as a whole. The only way t
can happen is through accountability to parliament and/or the governm
in power. However, the political system in operation in developed countr
is representative democracy. Thus, for accountability to the public to ha
any meaning at all, it must be clear to the public what the bank is trying
achieve and what it is doing in order to meet its objectives. If this is not
members of parliament will not be able to represent the views of their co
stituents over the behaviour of the bank. This introduces the different
related (and often confused) issue of transparency. The European Cent
Bank defines 'transparency' narrowly as requiring the provision of inf
mation about the internal decision-making process and more broadly
'explaining how monetary policy is used to achieve the mandate assign
(ECB, 2001, p.57). We shall return to both issues when we consider in
vidually the Bank of England, the ECB and the Federal Reserve. Here,
are concerned particularly with the issue of accountability.

Concern over accountability has been expressed in a variety of wa
For public choice theorists, members of boards of independent cent
banks, like everyone else, seek to maximize their own utility and it is
clear that this coincides with the maximization of social welfare. For exa
ple, Milton Friedman preferred the idea of a monetary rule to central ba
independence partly because he was worried that central bankers might
strongly influenced by particular interest groups, notably by the bank
sector. Many on the left of the political spectrum have deplored the loss
democracy involved in allowing important economic decisions to be ma
by unelected people. Even Rogoff (1985c), who was strongly in favour
monetary policy being put in the hands of an independent conservative[5] c
tral banker , accepted that there might need to be a clause in the central ba
constitution allowing policy makers to overrule the central banker when
economy was hit by large shocks.

ment (on behalf of the society) as the principal and the central bank as
agent. The difficulty lies in ensuring that the agent acts to achieve the go
of the principal. In terms of the theory earlier in the chapter, any dou
about the behaviour of the agent results in a time consistency problem, ev
in the case of independent central banks. Thus, much has been written
the question of the constitution of central banks, including attempts
design an optimal incentive contract for the central banker, which wou
leave him with full flexibility but avoid the time inconsistency probl
(Walsh, 1995). Blinder (1997), however, rejects this approach because
principal (the government) may not have an incentive to enforce the co
tract on the central banker (the agent). That is, even if an optimal contr
were designed for the central bank, the time inconsistency problem wou
still remain but would be shifted from the central bank back to the gove
ment.

Lohman (1996) takes a rather different line. She suggests that moneta
authorities able to grant independence to a central bank in order to bri
about lower inflation should, logically, also be able to operate directly
monetary policy that would ensure lower inflation. All that is needed is
the public (now regarded as the principal) to be able to punish the moneta
authorities (now the agent) for failing to deliver the low inflation that we
assuming the public ultimately want. This requires policy decisions to
made visible so that the public can easily monitor what the authorities
doing. Thus, visibility and accountability are the best guarantees for mo
etary stability in a democracy. There might still be a case for delegati
monetary policy to an agent with clear responsibilities at arm's length fr
the government to increase the possibility of monitoring by the public a
parliament by distinguishing one public task from others. However, s
sees this as quite different from independence.

We can relate this argument to an earlier point — the idea that cent
bank independence can only be achieved when there is general pub
agreement (as shown by election results) on the overriding importance
controlling inflation. In this case, the independence of the bank might
be the cause of low inflation but simply the institutional arrangement ch
sen to deliver it. It also raises another issue - the distinction between g
independence (freedom to set the goal of monetary policy) and instrume
independence (freedom to set the value of instruments in order to achie
the goal). A central bank (such as the Bank of England) that has instrum
independence but not goal independence could be judged to fall i

sanctions available to the government if the central bank fails to deliver goal set by the government.

8.7 Summary

The Quantity Theory of Money had suggested that, in the long run at lea increases in the money supply led directly to increases in prices. Keyne *General Theory* had analysed the way in which monetary policy could inf ence not only prices but also output and, hence, the level of unemployme The Phillips curve showed the statistical relationship between rates (wage) inflation and levels of unemployment, implying that governme could trade off higher inflation against lower unemployment or vice ver The Phillips curve was criticized because it showed a relationship betwe money wages and unemployment whereas, according to the neoclassi theory of the labour market, labour demand and supply depended on r rather than money wages. Thus, when the Phillips curve relationship bro down in the late 1960s, it was quickly replaced by the expectations-au mented version of the Phillips curve in which there was a separate short-r Phillips curve for each expected rate of inflation. In the long run, the tra off disappeared — the long-run Phillips curve was vertical at the natural r of unemployment. Any attempt by the monetary authorities to redu unemployment by increasing aggregate demand through monetary pol would have no long run impact on unemployment but would cause accel ating inflation. This, in turn, would interfere with the efficiency of the m ket economy and cause the natural rate of unemployment to rise.

Attempts to reduce the rate of inflation by unanticipated reductions the rate of growth of the money supply would cause unemployment to r above the natural rate, where it would stay until workers' expectations inflation adjusted to the lower level of inflation in the economy. This id of the cost (in unemployment) of reducing the rate of inflation was nam the sacrifice ratio. A major objection to this model was that the 'long r had no clear meaning in calendar time, indicating only the period needed the economy to return to equilibrium. Thus, a monetary policy that expan ed aggregate demand might succeed in reducing unemployment for quit long period and might be seen as worthwhile. This would be particularly case if there were hysteresis effects in the labour market, with the short-r reductions in unemployment producing longer-run gains in employment

effect, removed the short run from the analysis by combining ratio expectations with a market-clearing model of the economy. In this mod workers would correctly anticipate expansionary monetary policy a would increase their wages in line with the money supply increases. R wages and employment would be unchanged. Aggregate demand pol could have no real effects even in the short run. This was a full return to neutrality of money. There are, however, a number of problems with be aspects of the new classical model (rational expectations and market cle ing) and a number of ways in which the model can be modified to re-int duce real effects from a monetary change. Recent empirical work a appears to conflict with the existence of money neutrality.

Nonetheless, the new classical model had a very powerful impact, least because it led to the development of the ideas of credibility, reputati and time consistency in economic policy. These played an important role the growing, and ultimately successful, support for the independence central banks. According to the theory, politicians could be expected to f low inflationary policies in the attempt to win elections. Removing the co trol of monetary policy from them and placing it in the hands of indepen ent central banks would lower the expected rate of inflation in the econo and would considerably improve the sacrifice ratio. The rate of inflati should be lower and the rate of economic growth should be higher in cou tries with independent central banks. It is by no means certain, howev that making the central bank politically independent is in itself sufficient lower the rate of inflation. The relationship between the independence central banks and economic growth is even weaker.

Key concepts used in this chapter

Phillips curve	policy ineffectiveness/policy irrelevance
expectations-augmented Phillips curve	credibility
natural rate of unemployment	reputation
non-accelerating-inflation rate of unemployment (NAIRU)	pre-commitment

money illusion

signal extraction problem

sacrifice ratio

forward-looking expectations

central bank independence

accountability

Questions and exercises

1. Where would the combination of inflation and unemployment in the U in 2002 lie on the original Phillips curve diagram?

2. Why is the natural rate of unemployment referred to as 'natural'?

3. Explain the basis of Milton Friedman's simple rule of monetary policy that the rate of growth of the money supply in a stable price environm should be kept equal to the rate of change in real income.

4. Why was the 'shoe leather cost' of inflation so called? What other co are there of anticipated inflation?

5. The model to which new classical economists applied rational expec tions is described in the text as 'market clearing' and 'monetarist'. How these descriptions related? What must have been the principal assumptio of the model?

6. Why does 'the combination of the rational expectations hypothesis a the assumption of continuous market clearing' imply that output a employment fluctuate randomly around their natural levels?

7. How useful do you think equilibrium models are in analysing a world t is never in equilibrium?

8. The *Chambers Twentieth Century Dictionary* defined 'hysteresis' as:

> the retardation or lagging of an effect behind the cause of the effect: influence of earlier treatment of a body on its subsequent reaction.

How then can hysteresis occur in labour markets? How can the existen of hysteresis in labour markets be used to argue against the neutrality money?

10. Is the argument over the independence of central banks being biased
favour of independence by the assumption of forward-looking mar
agents but myopic voters?

11. How are the following arguments discussed in this chapter affected, i
all, by an assumption of endogenous money?

(a) the expectations-augmented Phillips curve

(b) policy irrelevance

(c) central bank independence.

Further reading

The expectations-augmented Phillips curve, new classical models, and
policy irrelevance theorem can be found in any recent intermediate mac
economics text. A good account, together with criticisms, is provided
Acocella (1998). This also discusses public choice views and political bu
ness cycles.

Treatment of the issues relating to central bank independence are sc
tered through countless articles in journals. A good reference, especially
relation to credibility and accountability is H M Treasury (2002) ch.2. T
arguments in favour of central bank independence can be found in ma
places, including Cukierman's (1992) book, and in two publications fr
the early 1990s by the Institute of Economic Affairs: Otmar Issing (19
and Wood, Mills and Capie (1993). For more rounded views see Eijffin
and de Haan (1996). For more scepticism, see Forder (1998, 1999) and
an attempt to defend democracy, see Bain and Howells (1996).

9 Monetary Policy

'The best thing undeniably that a government can do with the Mo
Market is to let it take care of itself.' Walter Bagehot, *Lombard Street*, (1873).

What you will learn in this chapter:

- The nature of monetary policy goals and instruments
- The problems in defining and ordering policy goals
- Theil's social welfare approach to macroeconomic policy.
- Tinbergen's fixed targets approach to macroeconomic policy
- The distinction between targets, intermediate targets and indicators of policy
- The arguments against discretionary policy
- Problems associated with monetary policy rules
- Arguments concerning the choice of monetary instruments
- The issues concerning the decision whether to make use of an intermediate target
- The issues concerning the choice of the final target of monetary policy
- The nature and basis of Taylor rules of monetary policy

9.1 Introduction

The central question for any macroeconomic policy concerns the extent a nature of government intervention. A discretionary or activist monet policy involves frequent government intervention in an attempt to achi relatively precise goals. An alternative to such a policy is to seek only provide a stable medium to long-term monetary framework within wh private economic agents make their own choices. This may be based on acceptance of medium- or long-term rules that remove the ability of monetary authorities to make discretionary changes. Alternatively, as saw in Chapter 7, monetary policy may be taken out of the hands of elected government and trusted to an independent central bank. A m extreme action would be to privatize the issue of money itself, replac monetary policy by a set of institutional arrangements, the sole aim which is to control inflation in order to preserve the value of the monet unit.

The idea that the authorities, whether elected or not, should operat monetary policy, of whatever form, implies the existence of policy go and of instruments that may be utilized to achieve those goals. This ch

tionship between the goals and instruments of economic policy, with
paying particular attention to monetary policy. The choice between a d
cretionary (active) policy and policy rules is considered in 9.3. Section
concentrates on the instruments of monetary policy dealing specifica
with the choice between short-term interest rates and the money supp
although we make clear that the money supply is in practice an interme
ate target of policy rather than an instrument. The second part of the cha
ter investigates the range of targets available to the monetary authoriti
9.5 examines whether the authorities should seek to achieve their go
through an intermediate target or should aim directly at their final target

9.2 Policy goals and instruments

Goals (or target variables) are substantive objectives, the achievement
which increases the material well-being of the population. As we shall
in Chapter 11, the choice made by governments among the goals of mac
economic policy has varied considerably over the past sixty years,
throughout the 1980s and 1990s, primacy was given almost everywhere
the control of inflation on the assumption that a low rate of inflation wa
sine qua non for the achievement of low unemployment and high rates
economic growth.

There are two issues here. Firstly, we have the debate over the Phill
Curve that we considered in Chapter 8 — the question of whether lo
unemployment can be traded off against higher inflation. Secondly, if
conclude that the authorities can indeed succeed in reducing unemploym
through macroeconomic policies,[1] we need to know the economic and soc
costs of both inflation and unemployment. A particular problem arises o
the distinction between the short-run and the long-run. If inflation acts
increase the long-run equilibrium rate of unemployment, but policies aim
at reducing inflation produce an increase in unemployment in the short-r
how do we decide between short-run and long-run costs and benefits? T
answer depends on the extent of the short-run and long-run effects as w
as on the length of time it will take for the long-run to come to pass. B
in mind that the people unemployed in the short-run as a result of anti-inf
tionary policies will be different from those who might obtain jobs in
long-run as a result of these policies. Arguments based on the notion
improving the welfare of the economy as a whole frequently conceal judg
ments about the distribution of income and other benefits both among va
ous social groups and between present and future generations.

ing the economy. Thus, we might accept the proposition that inflation p
duces inefficiencies within the market economy and, in this way, increa
the natural rate of unemployment in the long run, but argue also that a
inflationary policy has hysteresis effects in labour markets, resulting
long-run costs. For example, the skill levels of workers may be seriou
affected by increased spells of unemployment.

Pause for thought 9.1:

What sort of 'inefficiencies' might inflation cause that affect the level of employm
in the long-run? How do these inefficiencies vary with the rate of inflation?

The operation of policy naturally requires rather more than a gene
statement of goals such as 'the control of inflation'. At some point, nu
bers must be attached to goals, converting them into targets.[2] Even if th
is general agreement over the nature of policy goals, there may be disc
over the precise targets that are desirable or practicable, in the light of
available instruments and the associated costs. For instance, attitu
towards inflation may change with its level. At modest rates, inflation m
seem no more than an irritant and, possibly, a constraint on the achievem
of other objectives. Rampant inflation may, on the other hand, seriou
undermine both economic and social relationships and become a ma
source of welfare loss. It follows that, even if we are willing to accept
control of inflation as the dominant macroeconomic objective, we may w
require strong justification for propositions that it should take precede
over all other policy goals, irrespective of the existing rate of inflation a
level of unemployment.

An instrument of policy is a variable that the policy authorities cont
directly, being able to determine its value independently of other variab
in the system. What constitutes an instrument is partly a technical questi
For example, we have seen (in Section 4.2) that the monetary authorit
effectively have direct control over short interest rates but directly cont
neither long interest rates nor the stock of money since these depend also
the actions of private sector financial institutions and the personal secto

The derivation of precise targets from policy goals can be treated f
mally. In the 1950s and 60s, it was believed that there were a number
objectives of policy. It was thought that governments could achieve so
of these objectives or could move part of the way to several of them but t

ing one objective could be compared with success in achieving others.

Theil (1964), sought to answer this question by postulating a social w fare function that expressed the relationships among various goals and constraints implied by the structure of the economy. Such a function wou for example, indicate how much damage to British exports the governm was prepared to accept through increases in the value of sterling in orde bring about particular rates of inflation. If we limited ourselves to t objectives, a social welfare function could be expressed in the form o community indifference map. The most common textbook example tal as the two objectives the reduction of unemployment and the reduction inflation. This map is then imposed on a diagram showing the original fo of the Phillips curve, which represents the constraints on policy. The g ernment, then, simply selects the point at which the Phillips curve is ta gential to a community indifference curve to determine the governme specific targets.

More generally, we can say that the aim was to solve a stochastic op mization problem by maximizing the social welfare function or minimiz a weighted function of deviations of actual values from their socia desired levels.[3] This approach leaves open the question of how the soc welfare function is determined, assuming that it is possible to arrive a social evaluation of objectives through democratic processes.[4]

Other problems associated with this approach are:

(a) it assumes that deviations above or below a target are equally bad

(b) it might lead to undue caution in terms of what is feasible (there too much stress on constraints);

(c) policy makers do not behave in this way.

An alternative view sees governments as satisficers, periodically man ulating instruments all together in discontinuous reactions to crises. Su governments have utility functions with acceptable-level goals rather th specific targets. The satisficing levels of targets are reached by the reso tion of conflict between different parts of the organization e.g. the Pri Minister versus the Chancellor of the Exchequer or the Bank of Engla versus the Treasury. Thus, targets are flexible.

The best known formal approach to macroeconomic policy rema Tinbergen's analysis (1952, 1956) of the relationship between numbers fixed targets and instruments.[5] This takes as given: (a) the structure of

be given to the instrument variables if the policy targets are to be achiev
In algebraic terms, we have to solve a set of equations representing the e
nomic system. These contain: target variables (values known); and inst
ment variables (values unknown). Of crucial importance is the relations
between the number of targets (knowns) and the number of instrume
(unknowns).

This analysis gives rise to Tinbergen's Rule: that to achieve any giv
number of targets, a government must have under its control at least
equal number of independent policy instruments. But there are many di
culties: target variables may be inter-related or inconsistent; instrume
may not be independent of each other and some variables may, depend
on the policy and the policy environment, be either instruments or targe

Further, a government may technically have a policy instrument under
control but be prevented by practical and/or political considerations fr
using its full range of values. The freedom a government has to char
interest rates, for example, may depend on the need to defend a fix
exchange rate or on the proximity of the next election.

Pause for thought 9.2:

Why might the pattern of home ownership be a constraint on the rate of interest
as a monetary instrument?

The existence of uncertainty produces additional problems. There n
be uncertainty over the structure of the economy or over which is the b
model of its operation as well as over the effects of instruments. In t
regard, it can be demonstrated that performance is improved by using m
instruments than targets. Each instrument may be imperfectly used
weaknesses may to some extent be offsetting. If one instrument is given
wrong value, other instruments may also need to be given sub-optimal v
ues in order to produce the best available result.

The relative effectiveness of instruments in achieving particular targ
is also of considerable importance. Even if the authorities have instrume
sufficient in number and in flexibility to achieve their targets, there rema
the question of which policy to apply to which target. One approach to t
problem is to direct each policy instrument at that target over which it
the greatest relative influence. Robert Mundell (1962) referred to this as
principle of effective market classification. He chose as targets exter

etary policy) and the budget balance (fiscal policy). He then showed that a fixed exchange rate system, using fiscal policy to achieve internal balan and monetary policy to achieve external balance would move the syste towards equilibrium, while the reverse would send the economy further a further away from equilibrium.

Another possible approach is to allocate each instrument to a separ authority, giving each authority the responsibility for hitting one we defined target as nearly as possible (Meade, 1978). For such decentrali tion of policy to be successful, we require each instrument to have a stro impact on one policy goal and relatively little impact on all other goals. C obvious example of this is to allocate monetary policy to an independe central bank, which is given the responsibility for controlling inflation (co sidered in Section in 8.5).

A problem of particular relevance to monetary policy stems from the f that the relationship between instruments and final policy goals is far fr direct. Lying between instruments and goals are proximate or intermedi targets: a set of variables that the authorities cannot control directly and t do not have a direct impact on economic welfare but that may be import determinants of final goals and that we may thus wish to target. The m obvious example of a possible intermediate target in monetary policy is rate of growth of the money supply.

Other variables may act as *indicators* — variables that we do not wish control but that tell us what is happening or is likely to happen to intern diate targets or final goals. Indicators that give advance warning of wh effect policies are having on policy variables are called leading indicato Indicators should be variables for which statistics are reliably and read available and that have close and statistically stable relationships with po cy instruments. Thus, ideally, policy-induced and exogenous effects on indicator should be separate and identifiable.

Pause for thought 9.3:

In what ways may the spread between short-term and long-term interest rates b considered as a leading indicator? How is its value as an indicator limited by diff culties in distinguishing policy-induced from exogenous effects? (Hint: see Sectio 12.3).

The best example of an indicator in the recent history of British mo tary policy is M0, a measure of the wide monetary base of the econor Although a target has been set for its rate of growth since 1984, very f

since the government cannot control it directly (see Box 4.2). The princi
defence for it has been as a coincident indicator of consumption and perh
therefore a leading indicator of economic activity.

9.3 Rules versus discretion

Discretionary economic policy has been attacked on several grounds o
the past thirty years. The strongest assault has come from public choice t
orists who argue that granting discretion to politicians and the civil serva
who advise them is bound to lead to excessive government spending and
residual financing of budget deficits with consequent high rates of inflat
that act to transfer resources from the private to the public sector (
'crowding out' debate). This is not an attack on particular groups of pol
cians and bureaucrats but stems from the application of economic princip
of maximization and self-interest to the democratic process. All gove
ments are held to be myopic since rational politicians are concerned o
with obtaining and retaining power. Thus, they choose policies that may
popular in the short-run, even if they have undesirable long-run con
quences for the economy. It follows that governments should be c
strained to follow rules that take into account the longer-term needs of
economy.[6]

A rather different case against discretionary monetary policy has been
terms of its feasibility:[7] that an activist policy is too difficult to operate a
is bound, in practice, to make things worse rather than better. There are s
eral strands to this argument.

Firstly, a beneficial application of discretionary policy requires that
authorities know with some precision how different policies are likely
affect the economy. There are many problems here. To begin with, th
are costs involved in the collection, preparation, presentation and analy
of statistics. Some statistical series are notoriously inaccurate and figu
may be changed retrospectively. Definitions may also change over time,
we have seen in Chapter 2 with definitions of the money stock. Hence, i
arguable that governments do not know what is happening currently
many important variables, let alone what is likely to happen to them in
future.

It is plainly vital for the successful practice of discretionary policy t
forecasters, at the very least, are able to forecast turning points in econo
ic activity: when, for example, an economy is likely to move out of rec

Forecasters failed, for instance, to forecast correctly the size of the 19
boom in the UK and the timing, size and duration of the subsequent rec
sion. Governments also need to know how the economy is likely to respo
to policy changes — but this implies a much greater knowledge of the stru
ture of the economy than currently exists.

These problems are exacerbated by the existence of time lags in the p
icy process. Even if policy makers were able to recognize when acti
should be taken and decide quickly and correctly on the nature of t
action, there would be administrative limitations on the speed with whic
could be taken. Worse, a policy change may not have the desired effect
target variables for a considerable time. Obviously, the longer the time la
are, the more difficult it is to forecast the nature of other changes that w
have been happening in the economy independently of the policy acti
Everything becomes more difficult if the lags are not only long but a
variable.

Pause for thought 9.4:

Make a list of all the lags that may be involved between a development in the re
economy (say a fall in GDP growth below trend) and the earliest appearance of
any evidence of the effect of a change in instrument(s) designed to correct it.
Note that you are being asked to consider the time between actual *occurrence* (
the event) and *recognition* (of the results of policy).

Once a policy action has been taken, there is a clear need to consider h
the outcome relates to the policy targets and whether it is possible to s
why things have gone right or wrong. If things have gone wrong, has
been because of inadequate knowledge of the system, wrong choice
instruments, incorrect information regarding the performance of the eco
my, or exogenous shocks that would have been difficult or impossible
allow for adequately? Again, the achievement of objectives does not n
essarily mean that the policy pursued was the best one available. It m
have been possible to do better (the objectives set were, under the circu
stances, too modest). Again, policy goals may have been achieved for r
sons that had nothing much to do with the policy followed (for examp
there was considerable disagreement about the true causes of the fall
inflation in the UK in the early 1980s and of the rapid rates of growth in
United States in the same period). Yet again, the objectives may have be
achieved at too high a price in terms of the impact of the policy on oth

policy and lead us by a different route to the proposition that all gove ments can do is to set fixed medium-term or long-term policy rules that w provide a stable framework within which the private sector can act.

Such rules are said to reduce both the costs of acquiring information a uncertainty about current and future government policies. This was basis of the Medium Term Financial Strategy (MTFS) introduced by the U government in 1981 (discussed in Section 11.2).

This second form of argument against discretionary policy is not, ho ever, absolute. Models have been developed showing that active monet policy may be stabilizing even in the presence of lags. Empirical estima of the actual effects of policy in the UK have produced conflicting jud ments regarding its success. Defenders of discretionary policy, wh acknowledging the difficulties, are able to claim that knowledge of working of economies has increased over the years and that better foreca will be made in the future.

Different views of the rules versus discretion debate have also be taken under conditions of uncertainty. The treatment of uncertainty in p icy decisions started with Theil (1964), who included additive rand shocks. He showed that if the policy-maker knew the structure of the ec omy, the optimal policy would be the same as the policy under conditi of certainty — that is. it would be 'certainty-equivalent'. Things beca more difficult, however. when uncertainty was introduced in a multipli tive fashion and Brainard (1967) argued that this weakened the case for of monetary policy to stabilize output. Friedman (1960, 1968) argued t a non-activist fixed rule was optimal under uncertainty.

Bertocchi and Spagat (1993) argued against this. They constructe model in which the authorities learn. The policy-maker, in solving a pr lem of intertemporal minimization of output variability optimally takes i account the information revealed by policy actions and updates his kno edge of the economy. At each stage of the process there is a potential tra off between the minimization of output variability and the value of information that can be obtained through a discretionary policy. It follo that monetary policy should be active in two senses:

(a) it should be responsive to new information;

(b) it should seek to generate information even if it is costly to do so

Friedman's fixed money supply rule is not optimal since the learn

order to gain information for the formulation of future monetary poli
Experimentation pays. Even passive learning without experimentation lea
to an activist monetary policy (that is, one that responds to new inform
tion).

In any case, the argument for a rule leaves open the question of
nature of that rule: evidence is needed that there is a rule that will work b
ter than discretionary policy. Most arguments by supporters of a fixed mo
etary rule have been for a money supply rule. The simplest form of mon
tary rule proposed is one that requires the central bank to set the rate
growth of the money supply equal to the rate of growth of real income p
the desired rate of inflation, π. A slightly more complex rule would be:

$$\Delta m = \Delta y^* - \Delta v^* + \pi \qquad \ldots$$

where y^* and v^* are long-run equilibrium values of output and veloc
(Tödter and Reimers, 1994).

Preference for a money-supply rule has been based largely on the vi
that a fixed-interest rate rule would be unworkable. For example, Friedm
argued that it is the nominal interest rate that is observable whereas conc
should be with the real interest rate, which is not observable because
problem of modelling price expectations. Stable nominal rates of inter
only indicate a stabilising monetary policy if real rates of interest are co
stant and inflationary expectations are not changing. Maintaining a sta
nominal interest rate in the face of rising inflationary expectations wo
involve a declining real rate of interest and hence would be expansiona
the reverse would be true if inflationary expectations were falling.

It was further argued that interest rates were very sensitive to exogenc
influences and could only be kept within a target range if that range w
very wide. Any attempt to keep them within a narrow band against the d
tates of the market would be destabilizing. Wicksell (1898) and Sargent a
Wallace (1975) argued that if monetary policy attempted to set the inter
rate and not the money supply then the price level would be indetermina
but this proposition has since been qualified (Sargent and Wallace, 1982

Fixed rules need not be simple but may involve feedback in which ru
depend on what is happening to the goals of policy and the specification
circumstances (contingent rules) under which policy actions will chan
However, once feedback is included in rules, the distinction between fix
rules and active policy becomes blurred. It is for this reason that suppo
ers of rules generally preclude the inclusion of feedback in the rule.

ment. That is, it cannot be controlled directly by the authorities. This ra
es the question of whether or not the government is technically able to co
form to a fixed money supply rule. As we shall see in Section 11.2, in re
tion to the Medium Term Financial Strategy of the British government in
first half of the 1980s, it is one thing to propose a rule, another thing enti
ly to be able to put it into operation.

The argument in favour of rules against discretion in economic pol
has taken an entirely different form over the past twenty years through
application of rational expectations to the question of the effectiveness
government policy. The rational expectations hypothesis sees econon
agents as efficiently applying all relevant knowledge to the best availa
model in order to predict future values of economic variables. Stric
speaking, economic agents need only act as if they know the best model
the economy. That is, it is sufficient if they derive their expectations fr
someone who does know the best model. However it is achieved, the fo
cast of a rational agent is the forecast generated by the model itself. It f
lows that if government policy is relevant, it too will be fully taken i
account. If the best model of the economy were the neo-classical mark
clearing model, government policy would not be able to move the econo
away from those values determined by the operation of markets. Monet
policy would have no effect on real variables in either the short- or the lo
run. This is the strong policy invariance proposition examined in Chap
8. The hypothesis of rational expectations has also been used to critic
forecasting with the aid of large econometric models of the economy (
Lucas critique). The structural parameters in such models are invariant w
respect to policy changes, but if policy changes are fully taken into acco
in private sector decisions, these parameters will change with alterations
the policy regime. Consequently, econometric models produce errors wh
used to forecast beyond the period over which the data was collected
order to estimate the model. If forecast errors are inevitable, the chances
stabilization policy making things worse (rather than just having no effe
increase considerably. Much depends in practice on how different the n
policy is from the old one. A small change in policy may not change
parameters sufficiently to undermine seriously analysis based upon
model.

There are a number of ways of re-introducing the possibility of gove
ment being able to affect real values. This will be so, firstly, if the gove
ment has an informational advantage over the private sector, although in t

may be based on the resource costs involved in collecting and distributi information — it may save resources if the government collects informati and then chooses its policies to produce the same results as would have tra spired had information been costless and fully available to the private s tor.

A second counter-argument depends on the existence of labour contra of more than one period in length. This prevents workers from adjusti immediately to changes in rational inflation-rate expectations and int duces a fixed-price element into the model. Models may thus be par rational, for example with full market clearing in asset markets but w 'sticky prices' in goods and labour markets. Much work has been done recent years in developing models in which price and wage stickiness derived from rational behaviour.[8] Other modifications may be introduced the model that allow government to be able to reduce output fluctuations the expense of higher price fluctuations.

Thirdly, the government may also be able to influence real values in short-run if it succeeds in taking the private sector by surprise by reneg on its policy promises. As we saw in Section 8.5, Kydland and Presc (1977) demonstrated that there may be welfare gains for the governm from such behaviour. The problem for governments is that agents w quickly adjust once they realize the true nature of government policy and the welfare gains will be limited to the short-run. Worse, the credibility future government statements will be damaged.

Assume that the government announces a strong intention to bear do on inflation and a determination to keep the rate of growth of the mon stock at a low level; but the markets do not believe that the government prepared to push interest rates up sufficiently high to achieve its moneta growth targets and thus believe that inflation will be above the governmen aim. Workers will make high wage claims to preserve their real wage in face of the expected high inflation; employers will be prepared to make hi wage settlements and will push up prices to allow for the expected increa es in both wage and other costs. High inflationary expectations will cau the rate of inflation to remain high, for some time at least, irrespective what the government actually does.

These arguments lead to the claim that governments should pre-comm themselves to fixed policy rules rather than engaging in discretionary po cy.

In addition to the general questioning of the rational expectatio

which agents arrive at knowledge of the best model of the economy. T
is a particular problem following major changes in the economy, for exa
ple from fixed to floating exchange rates. The rational expectations hypo
esis does not allow for the possibility that agents will take time to learn w
the best model is under the new circumstances. Secondly, much of
strength of the criticisms of discretionary policy derive not from
assumption of rational expectations, but from its application to the neo-cl
sical market-clearing model (Laidler, 1990, ch.5). Discretionary pol
again becomes feasible when rational expectations are applied to non-m
ket-clearing models.[9]

Pause for thought 9.5:

Why will monetary shocks have real output effects if (only) part of the economy
made up of fix-price markets?

An intermediate notion in the rules versus discretion debate is that th
is a continuum of rules and discretion, not a clear-cut distinction betwe
them. The 'extent' of the discretion left in any monetary arrangement
determined by:

- the nature and precision of the targeted variables;
- the immediacy of the link between policy actions and the attainment
  the targeted variable;
- the transparency of the policy strategy.

The idea of imposing rules on the policymaker's behaviour is to ma
policy actions predictable and to hold the authorities accountable for th
performance. At one end of the continuum, the authorities' objective fu
tion is precisely specified and is directly attainable through policy actio
and the public is fully informed about the policy strategy. The degree of d
cretion then rises with reductions in each of the three areas above.

9.4 The choice of monetary instruments

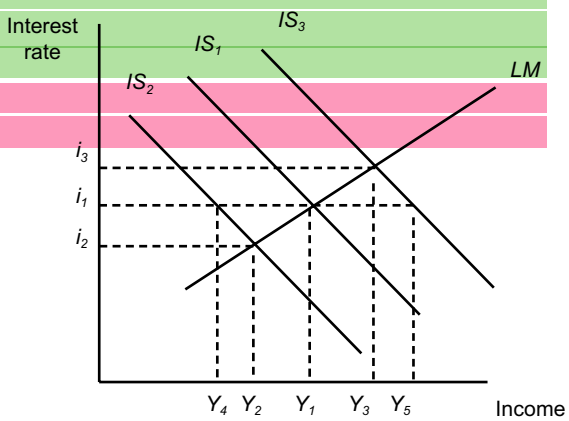
We have dealt with the question of monetary policy instruments in Chap
3 and shall return to it in Chapter 11, where we deal with the choice betwe
interest rate control, monetary base control and direct controls. Howev

it were between the rate of interest and the money supply.

As we have seen, this is not an issue in basic *IS/LM* analysis. The mo assumes full knowledge of the economy and complete control by the auth ities of the money supply. We do not ask how this is achieved: the mon supply is an instrument rather than an intermediate target. The only int mediate target is the nominal income level itself. This is clearly unsatisf tory, because of both the assumed certainty about the economy and the tre ment of the money supply as an instrument.

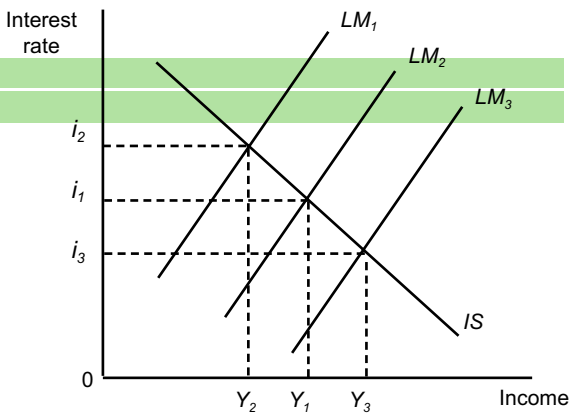
Poole's (1970) analysis of the choice between monetary instrume tackles the first of these problems by introducing uncertainty into one other of the curves in an *IS/LM* model. The curves move, but do not chan their slopes (the disturbances are additive rather than multiplicative). In face of these shifts, the monetary authorities must choose between the int est rate and the money supply as an instrument with the aim of minimizi the instability of income. As is shown in Figure 9.1, with exogenous shi in the IS curve (between IS_2 and IS_3 with IS_1 being the mean or expec position), the policy of keeping the supply of money constant and allowi the interest rate to carry the burden of the shock causes income to vary o within the range Y_2Y_3; whereas the use of the interest rate as an instrume allowing the money supply to vary, produces much greater income chang (from Y_4 to Y_5). Thus, it would appear that if the principal source of unc tainty for the economy lies in the goods market, the money supply is the p ferred monetary instrument.

Figure 9.1: Choice of instrument with instability in the goods mark



money supply is assumed to be under the control of the government, th
shifts must have their origin within the demand for money function. It f
lows that a policy of fixing the interest rate (at i_1 in figure 9.2) and allow
the money supply to vary to offset the random shock to the demand
money keeps the income level at Y_1; whereas, with a constant money su
ply the *LM* curve shifts with the impact of the shock and income var
within the Y_2Y_3 range. Therefore, in the face of instability in the mon
market, the interest rate is preferred as an instrument over the money su
ply.

Figure 9.2 Choice of instrument with instability in the money mark



This has particular significance in the debate between Keynesians a
monetarists, since Keynesians hold that the principal source of instabi
lies in the money market as a result of the instability in the demand
money function. On the other hand, monetarists (as we saw in Chapter
and 6) believe the demand for money function to be stable but see
expenditure multiplier (and hence the *IS* curve) as unstable. On this lin
ed basis, then, Keynesians would be more likely to opt for control of
interest rate; monetarists for control of the money supply, although th
generally argue against short-run discretionary changes in the stock
money, preferring the use of a medium- or long-term rule to govern its r
of growth.

between a monetary target and an exchange rate target, with the answ
depending again on the origin of the shocks to the system. Nonetheless,
model has been subject to many criticisms.[10]

Firstly, despite the introduction of instability in either the goods mar
or the money market, it assumes a great deal of knowledge about the stru
ture of the economy, with the only source of uncertainty being stochas
disturbances. It is this assumption that invalidates discretionary policy a
form of response and requires either a money supply or interest rate rule
be chosen. It has been shown, however, that if the stochastic shocks
serially correlated and the authorities have time to understand what is ha
pening to the economy, Poole's results fall. Again, the conclusions may
invalidated by the introduction of lags into the system or if there is unc
tainty about the slope of the *IS* curve rather than its position (B. Friedm
1975; Goodhart, 1989a).

Secondly, problems arise from the use of the *IS/LM* model in Pool
analysis. *IS/LM* analysis only allows changes in the supply of money
operate indirectly through the interest rate (the Keynes effect) whereas,
we have seen in Chapter 7, monetarists see changes in the money supply
also having a direct impact on consumption and investment. Although
IS/LM model assumes constant prices, equivalent results to Poole's ha
been developed with variable prices and rational expectations, strengthe
ing the case for a money supply target (Blanchard and Fischer, 1989). T
is because, with a constant money stock, aggregate demand changes t
cause prices to vary will tend to be stabilized through the Keynes and Pig
effects; whereas they will be intensified by changes in the money sto
under an interest-rate strategy.

Yet again, the assumption that the money supply may be an instrume
causes difficulties. In practice, the relationship between instrument a
intermediate target (the money supply) may not be stable. As we saw
Chapter 2, there are many possible measures of the money supply, each w
a potentially different relationship to the final goal. We may have a theo
that highlights the rate of growth of the money supply but does not spec
sufficiently closely the meaning of the term. In such circumstances, mon
tary policy may be described more generally, for example, as a desire
'sufficiently tight monetary conditions'. The obvious difficulty, then, is
knowing whether monetary conditions are indeed 'sufficiently tight'.

We have proposed two possible broad approaches to the operation of mo etary policy. The first is the idea that there needs to be an intermediate proximate target for which desirable values should be set. Policy inst ments should then be adjusted to achieve those values. The alternat approach is to use the final target only but to identify indicators or inform tion variables that provide information as to what is likely to happen in future. These should not, however, be treated as targets since this int duces an extra source of error into the system (Waud, 1973).[11]

Intermediate targets should be stably related to both instruments and final target and should, ideally, be observable. Exogenous influences on intermediate target should be separate and identifiable. There are many p sible intermediate monetary policy targets, including the exchange rate, level of credit, various budgetary measures, the money supply, domes credit expansion (DCE)[12] and nominal income. However, most of the ar ment in favour of the use of an intermediate target has taken the money su ply as that target.

We have seen that this was largely based on the belief in a stable ema for money (and hence in the medium-term stability of velocity), wher volatile expectations about future inflation were thought to make it diffic to use interest rates as a guide the stance of monetary policy. Goodh (1989b) pointed out that the case for intermediate monetary targets w even accepted by many moderate Keynesians in the 1970s. There are, ho ever, several difficulties associated with the choice of the money supply an intermediate target.

Firstly, there are a large number of measures of money and thus a pr lem in choosing which measure to target. This has been largely dismis as a second-order problem on the grounds that alternative measures much the same story except in the very short term.

Secondly, the money supply is particularly prone to exogenous inf ences, such as the impact from overseas and financial innovations. One the principal reasons for the rejection of monetary targetry in the UK in 1980s was the view that financial innovation had so changed the nature financial assets and the reasons for holding them that a consistent meas of money had become impossible. However, it has been argued that fin cial innovation has made all assets more liquid and hence all measures money understate its true growth. In the view of Gowland (1990), the o cial response should have simply been a slower growth rate of the mon supply.

a time lag. Thus, the money supply is less observable than, for example, interest rates. Fourthly, there are the doubts over the possible instabilit in short-run relationships between monetary aggregates, economic activ and inflation that we have dealt with in earlier chapters.

Fifthly, since the money stock is not exogenous, there are the proble involved in meeting money supply targets. The attempt to do so mi involve high costs in terms of the required degree of interest rate fluct tions. Sixthly, post-Keynesians have argued that money has such power effects that the attempt to control it might have dramatic and unpredicta effects. This leads to the view that the authorities should let the money su ply adjust to shocks.

9.6 The selection of final targets

Monetary authorities that reject intermediate targets may either target a fi variable or choose to follow a central bank operating rule more comp than the simple monetary rules discussed above. The former involves a f ther choice between inflation targeting, nominal GDP targeting, and tracking of a weighted index of monetary conditions including the exchan rate. We shall deal with each of these in turn before looking at the m commonly proposed policy rules for central banks.

Inflation targeting

The ideas behind inflation targeting are not new but can be traced at least Wicksell (1898) while Sweden operated monetary policy with a price le target in the 1930s. That said, the practice of inflation targetry is largel product of the 1990s. The first country to adopt such a target was N Zealand in 1990 followed by Canada and Israel in 1991, the UK in 1992 a by many more countries since.

An inflation target has the advantage that the central bank has a sin objective for monetary policy. Both a nominal income target and a mo tary conditions target, in contrast, allow for deviations in more than one e nomic variable. On the other hand, the existence of an inflation target mi lead policy makers to seek to bring about a disinflation in the face adverse supply shocks, thus causing greater deviations from equilibri output. However, the most common argument against an inflation targe that it is not transparent because of the long time lag between policy inst ment change and result. Estimates of the time taken vary but recent e

policy measures would have worked themselves through. Yet, inflation t
geting offers much greater accountability than money supply target
because it is relatively easy to judge whether the independent central ba
has been successful in achieving its target and to call it to account for a
misses. The problem remains that the central bank should only be called
account after two years to allow for the transmission period. It is this t
leads to the other attempts at accountability: inflation reports, press sta
ments, minutes of policy review meetings and cross examination by parl
mentary committees (see Section 11.4).

Once a central bank has opted for inflation targeting, there are seve
issues that must be considered in order to define the target. Artis, Miz
and Kontolemis (1998) list the issues as:

(a) Which inflation rate should be targeted and how should it be me
ured?

(b) When an inflation target is specified, how far ahead should the tar
be set? If the target is set consistently with the transmission lag the int
mediate variable for monetary policy becomes an inflation forecast t
get.

(c) Does a central bank need both goal and instrument independence

(d) Has the quite widespread change to an inflation targeting framew
caused a regime change in inflation behaviour.

Which inflation target?

Inflation targeters have, to date, chosen some version of the consumer pr
index, largely on the grounds that, if the central bank is to be accountable
citizens, the price index chosen should not exclude products that make
a large part of the typical consumer's expenditure. This might interfere w
another desirable feature — that the index should not be too volatile sin
the attempt to maintain a volatile index at a fixed level could require
central bank to adjust interest rates frequently and this could create grea
uncertainty in financial markets. Certain items in a consumer price ind
are particularly volatile. These include items with strong seasonal effe
such as food and those that have jumps corresponding to supply shocks su
as energy prices. As a general rule, supply shocks produce a once-and-f
all jump in the price level rather than adding to sustained inflationary pr
sure. Changes in indirect taxes are an obvious example and some countr

est payments and indirect taxes has been published and analysed by
Bank of England for some time. However, excluding the effect of all su
shocks could create considerable differences between the rate of inflation
measured by the central bank and that observed by the citizen. This th
undermines the arguments for inflation targeting which are based upon
simplicity which it brings to the understanding and monitoring of moneta
policy.

The price index should also not respond perversely to changes in
monetary policy instrument. The most obvious example of this occ
when the central bank raises interest rates in order to reduce inflationa
pressures in the economy. This causes mortgage interest payments to r
and pushes up inflation as measured by an index including them. Aga
removing mortgage interest payments from the index conflicts with
notion that the index used for inflation targeting should conform with
public view of the rate of inflation. Nonetheless, these payments
excluded from the index which is actually used by the Bank of Englan
called 'RPIX' (the retail price index *ex*cluding mortgage payments).

Artis, Mizen and Kontolemis (1998) consider the possibility of a who
sale price index target for the ECB on the grounds that these consist larg
ly of traded goods for which the law of one price might be expected to ho
and thus there should be less variation in the rates of inflation across me
ber countries. However, wholesale price index inflation turns out to
more volatile than consumer price index inflation.

One possibility is to surround the central target by a band of some ki
For example, the ECB's target rate of inflation is given as between 0 and
per cent, rather than as a single figure. In the UK, a single figure is giv
(2.5 per cent) but a band of one per cent up and down exists in practice sin
it is only when the inflation rate goes below 1.5 per cent or above 3.5
cent that the Monetary Policy Committee must send an open letter to
Chancellor of the Exchequer explaining their actions and what they inte
to do to move the inflation rate back towards the target. Such a band allo
some volatility in the recorded rate of inflation and reduces the degree
variation needed in short-term interest rates. It also reduces the scope
inflation 'surprises'. It is very unlikely that any monetary policy could co
sistently deliver a point target, as the economy is buffeted by various eve
all of which have some small effect upon inflation. It would therefore
foolish to undermine the credibility of policy makers by debiting eve
small deviation of outturn from target. However, if the bands were set

as trimmed means and medians. The aim is to measure 'core' inflat
without arbitrary omissions by excluding components that are at the tails
the distribution on the basis of information regarding the distribution of r
ative price movements. Other possibilities include the weighted median
a measure based on the common trend of the individual price indic
Artis, Mizen and Kontolemis (1998) make a comparison of different me
ures and decide that, over the period of inflation targeting in the UK up u
that point, there had been very little to separate the various possible ways
attempting to measure core inflation.

Given the width of the band, what should its mid-point be, what is
'optimal inflation target'? If the object of monetary policy is price stabi
then an obvious target appears to a rate of increase in the RPIX of 0 per ce
However, there is both a theoretical and a statistical case for setting the t
get above 0 per cent (Yates, 1995).

One theoretical argument is that most economies are subject to a deg
of price rigidity (especially, but not exclusively) in labour markets.
resource allocation requires relative price changes, then it is easier
achieve these by differential rates of price increase than it would be if so
nominal prices had actually to fall. Another argument is that there may
circumstances (the Japanese recession may be a case in point) where
authorities feel the need to secure negative real interest rates. This is imp
sible without a positive rate of inflation.

The statistical case for a positive target is based upon upward biases
price indexes. Most indexes are based upon a survey of purchasing patte
taken at intervals. Between the intervals, buying habits are assumed to
fixed, though in practice they will adjust with people switching away fr
goods and services whose prices are rising more rapidly. However, si
this substitution will not be picked up until the next survey, the index has
upward bias. Estimates of this, and other biases, suggest an upper bound
around 0.6 per cent. Partly for these reasons, but partly also in order to
a credible target having regard to recent inflation experience, the first tar
was expressed in October 1992 as a range of 1–4 per cent; in June 1995
Chancellor announced that policy would aim at '2½ per cent or less' wh
retaining the range; in 1997 this was modified to 2½ per cent, +/– 100
The arguments for stating an explicit target within a range are (again) tha
simplifies the judging of performance and that it prevents the range fr
becoming a 'range of indifference' where agents come to believe that
authorities are aiming only to come within the upper limit (Haldane 1995

models that include 'off-model' information allowing for inflationary ris
and potential regime shifts.

Pause for thought 9.6:

If the objective of policy is price stability, why are positive rates of inflation alway
chosen as targets?

The inflation forecast as target

Svensson (1997) suggests that, because of the long lags in the moneta
transmission mechanism, inflation targeting is actually inflation forec
targeting. That is, instead of altering the instrument to ensure that a spec
ic target is hit in *m*-quarters time, the monetary authorities might form
optimal sequence for the policy instrument derived from a forward-looki
policy rule based on a forecast horizon for expected inflation. The forec
horizon (*n*) need not necessarily coincide with the target horizon (*
Unless the target horizon is chosen carefully, the use of an optimal forec
horizon that is model-specific may result in a missed target at a time *t* +
If different authorities choose the different horizons, the central bank m
be held responsible for missed targets even though it is optimising using
acceptable loss function to derive *n*. In the UK, the Bank of England is f
to specify the policy horizon and thus to equate *n* and *m*. This gives
Bank of England a degree of goal independence since it is able to choo
the horizon *ex ante* (currently set at around eight quarters) over which it w
be judged on its performance *ex post*. However, the choice of the optim
horizon is not easy.

It is also hard to forecast inflation. Over the period 1971-96, avera
errors in the forecasting of inflation by HM Treasury were 0.71 for fo
quarters ahead and 3.31 for eight quarters ahead. Over the shorter peri
from 1993 to 1996 (during which inflation rates were lower), the erro
were –0.45 and –1.04 respectively, indicating that forecasts had been t
high. Forecasts also understate inflation volatility. Thus, the Bank
England questions the value of setting a target for forecasts in terms of a s
gle measure and stresses the role of judgement. As we shall see in Sectio
11.4 and 12.5, they prefer the use of fan charts and probability distributio
from the Bank's own model, private sector forecasts and cross-sectio
information. This brings into question the transparency of MPC decisio

the question of whether the Bank's forecast should be subject to outs checking — for example, by comparison with private sector foreca However, these are usually unconditional forecasts that incorporate Central Bank's own reaction function as seen by the Bank forecasters. T can lead to problems of multiple equilibria or even non-existence.

In the USA, the Fed has always outperformed the private sector fo casts. This raises the question of what private sector forecasts tell us. If private sector believes that the central bank's target is credible, it will p lish the target as its forecast and no one will learn anything. This impl that the divergence between the forecast and the target is a measure of bank's credibility. That, in turn, gives the bank an incentive to produce target in its own forecast in order to suggest that policy is correctly set. T is, if the central bank regards proximity of inflation forecasts to target a measure of its own credibility, it may seek to create (self-fulfilling) exp tations of falling inflation over the two-year horizon.

Svenson (1997) thus argues for an independent body charged with p ducing strictly conditional forecasts based on present policies given by c stant short rates or market expectations. The central bank would then required to deposit its own forecast models with the independent bo reducing the opportunity for covering tracks. The independent body co assess which mistakes were avoidable and which were likely to be made any good forecaster.

Instrument and/or goal independence

Monetary authorities may fall into one of three categories in terms of th degree of independence. Firstly, they may not be independent at all. As saw in Section 8.5, this now applies to very few monetary authorit because of the strong move towards independence for central banks sine late 1980s. Secondly, they might have only instrument independence. T is, the inflation target might be set by the government while the monet authority is able to choose how to use the available monetary instruments achieve that target. This is the formal case with the Bank of Engla although we have followed Svenson (1997) above in suggesting that ability of the Bank of England to set its own policy horizon gives it so degree of goal independence in practice.

Thirdly, the central bank may be granted both goal and instrument in pendence. That is, it may be allowed to set its own target as well as hav

broad policy goals that should guide the central bank in the setting of t
gets. In this sense, the European Central Bank has both goal and instrume
independence.

A particular problem arises where the authorities have both goal a
instrument independence. This relates to the changing of the inflation t
get. Changing the goal for good reasons must be part of a good contra
The problem is how to provide this flexibility without giving the impressi
that the central bank can always escape blame for a poor performance
shifting the goal posts. One possibility is to provide an escape clau
allowing the government to override the central bank. However, this c
only operate in extreme circumstances or we shall return the position of
market judging that monetary policy is subject to regular political interf
ence. The ECB has a particular problem of credibility because it polices
own contract. One suggestion has been for the use of a nominal income t
get to justify changes in the inflation target. This would allow the inflati
target to be flexible without the credibility of the target being undermin
by political intervention.

Nominal income targets

Nominal income targets also have a number of disadvantages. Firs
national income data is generally quite long delayed, of uncertain accura
and subject to minor revisions. This means that policy makers could o
react to new information about the target variable on a quarterly basis rat
than on the monthly basis possible with price data. Further, nominal GI
figures represent the lagged consequences in the economy of previous p
icy decisions rather than giving a reasonable indication of where the ec
omy may go in the future if no policy action is taken now.

Secondly, moving to nominal income targets involves giving exac
equal weight to a percentage deviation of real output from its desired le
as to a divergence of prices from the price level target. Hall (1986) p
posed placing weights on output and price level deviations so as to refl
more closely some social welfare function weighting of unemployment
the one hand and price level instability and uncertainty on the other. T
would be a considerable improvement on a simple nominal income targe

Thirdly, there would be a possible conflict between an independent c
tral bank and the government over the nominal income target. Fourth
other instruments (for example, fiscal policy) that influence nominal inco

want to react to a shock to prices by encouraging through policy measu
a (partial) offset to output, in pursuit of stability. However, the attainm
of a nominal income target might require the authorities to seek to ra
prices in order to offset a fall in output due, say, to a bad harvest.

Despite these criticisms, a case may be put for placing more emphasis
nominal income targets in establishing and publicly explaining the long
term strategy and framework of policy within which intermediate targ
and shorter-term operating rules are decided. In addition, supporters
nominal GDP targeting have emphasized its operability (since it depe
only on variables known to the policy-makers) and robustness.

Frankel with Chin (1995) makes a theoretical case in favour of a co
mitment to a nominal GNP target on the part of the monetary authorities,
compared with two other popularly proposed targets, the money supply a
the exchange rate. Bean (1984) and West (1986) had shown conditio
under which a nominal income rule would stabilize output more effectiv
than a money rule. However, in their framework, it would not make se
for the monetary authorities to adopt any rule, if the alternative were
ability to use discretion to respond to new disturbances. Frankel with C
adds an exchange rate rule to the list of candidates and adopts a framew
of time consistency for weighing advantages of rules versus discretion.

There has been a good deal of debate in recent years over whether or
nominal GDP targeting leads to instability. It is clear in this debate t
much depends on the precise form of the model and the assumptions ab
how expectations are formed in the Phillips curve. For example, B
(1999) used a small closed economy model to show that nominal GDP t
geting can lead to instability. Ball had inflation expectations simply tak
to be last period's inflation rate. Svensson (1997) suggests that Ba
assumption that policy affects output before inflation lies at the heart of
instability result. McCallum (1997) argues that the Ball-Svensson instab
ity result is a special case and not very interesting. He shows that the s
bility properties of the system come down to how the Phillips curve, or s
ply-side of the economy. is specified in the model. Using a model with f
ward-looking rational expectations, he shows that nominal GDP-target
does not generate instability. Dennis (2001) extends Ball's model to unc
er the role inflation expectations play in generating the instability in t
model. He allows inflation expectations to be a mixture of backward-lo
ing and forward-looking terms and shows that nominal GDP targeting
unlikely to lead to instability. He argues that if inflation expectations in

geting causes instability moving to inexact targeting restores stability.

Targeting an index of monetary conditions

Targeting an index of monetary conditions allows the formal incorporati of a number of variables relevant to the monetary policy decision, rat than leaving various elements to be included subjectively by the pol makers, as in the case of the Bank of England's emphasis on the judgem of the policy makers. Targeting an index is more open and, to the extent t a satisfactory index could be established, would make the monetary auth ities more accountable.

Making monetary policy decisions on the basis of a number of import variables rather than just the rate of inflation or nominal income also mi have specific advantages. For example, one component of any moneta conditions index would be the exchange rate. Taking the exchange rate i account would ensure that the external consequences of a tight moneta policy were taken into account, avoiding the achievement of a low inflati rate through excessive exchange rate appreciation. The incorporation of exchange rate in the index would also address the question of who sho take care of the exchange rate in a world of delegated responsibility monetary policy.

However, there would be severe problems with the choice of the co ponents of a monetary conditions index and the establishment of the weig to be attached to each component. It seems unlikely at present that a re able and broadly acceptable index of monetary conditions could be esta lished.

9.7 Central bank policy rules

The aim of central bank policy rules is to provide a clear and transpar guide to the conduct of monetary policy. They should depend on variab that can be easily measured and for which statistics are available with long time lags. They should be able to be estimated by econometric me ods and should explain the past history of the monetary policy instrume Such rules fall into two categories: simple instrument rules and target rules.

The best known of the former type are Taylor rules (Taylor 1993). Taylor rule is a rule for the setting of short-term interest rates in order achieve a target rate of inflation. The required short-term interest r

the deviation of output from its natural rate and the equilibrium real rate
interest. The rule may be written:

$$i_t = \pi_{t-1} + \theta_1(\pi - \pi^*)_{t-1} + \theta_2\left(\frac{(y-y^*)}{y^*}\right)_{t-1} + (i_t - \pi_t)^* \quad \ldots$$

where i_t is the required short-term interest rate, π_{t-1} is the inflation rate in
previous period, $(\pi-\pi^*)_{t-1}$ is the deviation of inflation in the previous pe
od from the target rate of inflation, $\left(\frac{(y-y^*)}{y^*}\right)_{t-1}$ represents the deviat
of output from its natural rate and $(i_t - \pi_t)^*$ is the target real rate of intere
θ_1 and θ_2 are constants and were set by Taylor at 0.5.

Looking at this equation, one can see a number of potential problems

- it is difficult to determine a desired real rate of interest;
- both the idea and the measurement of the natural rate of growth of o
  put(the NAIRU) are problematic;
- no account is taken of the exchange rate.

One can extract estimates of the desired real rate of interest from fin
cial instruments such as indexed government bonds but such estimates
subject to error and may bias the equation in one or other direction. Desp
a few difficulties, a Taylor rule has the virtue of being simple and relati
ly easy to compute. It simply involves collecting data on inflation and o
put (though calculating the output gap may not be straightforward). I
given these two inputs and an estimate of the real interest rate, instrum
setting is completely mechanical. In particular, there is no room for jud
ment. As McCallum has suggested, policy decisions could be turned over
'a clerk armed with a simple formula and a hand calculator' (McCallu
2000).

The last two decades have seen extensive research carried out on sim
instrument rules (see for example, Clarida, Gali and Gertler, 19
McCallum, 1999 and Taylor, 1999b). One notable finding is that such a r
performs quite well as a description of how interest rates have been se
many economies, even though no central bank has actually adopted
instrument setting rule of the Taylor type. For example, Taylor (1993 a
1999a) showed that his rule could accurately describe US monetary pol
decisions in the past. However, it is not altogether surprising that th
should be some correspondence between monetary policy, however it w

inflation. Targeting the money stock, 'leaning into the wind' and expli
interest rate setting will all produce a positive link between interest rates a
inflation and output. The interesting question is the size of the coefficie
on the output and inflation gaps and Taylor (1999a) shows that these ha
risen steadily in the US, through successive phases of monetary policy, u
they approximate now the coefficients in his rule.

Gerlach and Schnabel (2000) showed that the setting of interest ra
throughout the EMU countries between 1990-98 also followed a path p
scribed by an application of the Taylor rule. At first sight, this may se
surprising for the Bundesbank which for much of the period was wid
regarded as a 'money targeter'. But Bernanke (1996) was the first to arg
that the Bundesbank was really targeting inflation and the claim has sin
been confirmed by Muscatelli *et al* (2000) and Svensson (1999, p.641).

However, the rule has performed less well when applied to explaini
interest rate setting in the UK economy and other small open economi
This may well be due to the omission of such important state variables
the exchange rate, the terms of trade and foreign interest rates (Svensso
2000). Attempts to take account of these variables in an instrument-setti
rule require assumptions about the speed with which such changes aff
domestic prices and makes the rule very much more complex than a
Taylor-type rule. The fact that the Bank of England does take such ad
tional variables into account (and exercises a good deal of judgement, s
Section 11.4) no doubt accounts for the comparative failure of Taylor ru
to describe Bank of England interest rate setting.

Over the years, the basic rule has been modified in a number of wa
These include adding a forward-looking element to take account of lags
the monetary transmission mechanism. Such modified versions ha
approximated monetary policy reasonably well in a range of other countri
Ball (1999) found that Taylor rules are optimal regardless of the preferen
of policy makers and that inflation forecast targeting can always
expressed as a Taylor type rule by substituting forecast output and inflati
gaps for actual deviations. Thus, his model appears to unite Taylor ru
and inflation targeting and shows them to have many desirable properties

Svensson (2001), by contrast, maintains that *targeting* rules are quite d
ferent from *instrument* rules and suggests that we should stop talking abo
monetary policy rules (with the assumption that these are instrument rul
and concentrate instead on developing a 'prescribed guide for moneta
policy conduct' embracing both targeting and instrument rules. If we cann

in practice. He also argues that a specific targeting rule, of the kind ado
ed by the Bank of England, has a number of advantages. For instance
relies on more information than a simple instrument rule, allows the use
judgement and is more robust to model variation that an instrument ru
Consequently, it is likely to lead to better monetary policy outcomes than
instrument rule — which may be why real world monetary policy mak
prefers targeting rules to instrument rules.

9.8 Summary

While economies are subjected to shocks, be they real shocks (to terms
trade, investment, productivity etc) or monetary shocks (exchange rat
demand for money, supply of money etc.) there is a widespread presum
tion that the authorities should take some responsibility for stabilisati
How this is to be done separates commentators into two broad camps: the
who argue for an activist or discretionary policy and those who argue
medium-term, rule-based policy.

Within each of these positions there are further controversies. If
authorities are to make short-run responses to shocks, what is the b
instrument to use in given circumstances? Assuming that the response is
come from monetary policy, should the authorities use interest rates or
money stock? Furthermore, since the connection between instrum
changes and their effect on the objectives of policy is quite long, what int
mediate target should be adopted in order to monitor the progress of poli
While this is a subject of frequent debate in the theoretical literature,
know that in practice central banks are committed solely to the use of sho
term interest rates. If we opt for a rule-based policy is the best rule a mon
supply rule, or an interest rate rule?

In recent years, the debate about rules and discretion has been calmed
shifting the conduct of monetary into the hands of independent cent
banks. These have considerable discretion in their use of the interest r
instrument (and the scale of this discretion was clearly demonstrated dur
2001). Being independent of political pressure, however, removes some
the objections to discretionary policy which were frequently levelled at su
policy when conducted by government. There has also been a substan
move toward focusing solely on a final target, usually the rate of inflat
itself, looking at variables in an intermediate position only as leading in
cators of the future likely path of inflation. There remains an argument o
rules for the setting of the interest rate instrument. 'Taylor-type' ru

Key concepts used in this chapter

- policy goals
- policy instruments
- policy rule
- hysteresis
- satisficing
- Tinbergen's rule
- Keynes effect
- Pigou effect
- intermediate targets
- monetary conditions index (MCI)
- indicators
- discretionary policy
- Medium Term Financial Strategy
- contingent rules
- rational expectations
- Lucas critique
- inflation targets
- nominal income targets
- Taylor rule

Questions and exercises

1. Distinguish between 'goals', 'targets', 'instruments' and 'indicators'.

2. It is often said that 'in the long-run' inflation reduces output and emplo ment. What costs might be incurred in the short-run and why might the fall upon those who may not benefit from a long-run reduction in inflatio

3. 'Tinbergen's rule' says that a government with x policy objectives m have at its disposal at least x independent instruments. Explain the diffic ties that confront the use of this rule in practice.

4. Outline the arguments against discretionary macroeconomic policy.

forecasting.

6. Explain the problems associated with the choice of the money supply an intermediate target.

7. What are the arguments for basing an inflation target on (a) RPIX a (b) RPIY?

8. Compare and contrast the merits of inflation and nominal income monetary policy targets.

9. Why does the ability of the MPC of the Bank of England to set its o policy horizon give it some goal independence?

10. Explain the view that inflation targeting in practice means the target of the central bank's inflation forecast rather than the rate of inflation its

11. Why do you think central banks have not adopted an instrument sett rule of the Taylor type?

Further reading

The best recent coverage of theories of macroeconomic policy is Acocella (1998). Amongst older books, M Peston (1982) is very helpf Acocella also discusses the goals of macroeconomic policy at some leng

A collection of essays which discusses most of the issues raised in inf tion targeting is in Haldane (1995b). Amongst them, Bowen explains thinking behind inflation targets in the UK while Yates discusses issu involved in designing inflation targets. Useful on UK experience also Haldane (1995a) in the *Bank of England Quarterly Bulletin*.

A more recent discussion of targets and rules for the conduct of policy Cecchetti *et al* (2000) while Gerlach and Schnabel (2000) show that the s ting of interest rates in the EMU has in practice approximated what wo have followed from a Taylor rule.

A broader survey of monetary policy rules is provided by Tay (1999b).

Two essential articles for any study of the conduct of monetary pol
are provided bu Goodhart in the *Economic Journal* (1989b and 1994).

10 Monetary Policy

'Money speaks sense in a language all nations understand', Aphr
Behn, *The Rover* (1681).

'The best money to take to the United States, is either guineas or
Spanish milled dollars;Bank of England notes will not do', *Noble'*
Instructions to. Emigrants, U.S. 107, 1860.

What you will learn in this chapter:

- The ineffectiveness of monetary policy with perfect capital mobility and fixed exchange rates
- The transmission of the monetary policy of the leader within a fixed exchange rate system
- The factors slowing down the transmission of monetary influences
- The difficulties involved in attempts to sterilize foreign impacts on the domesti money supply
- The factors influencing leadership within fixed exchange rate systems
- The issues relating to the question of the neutrality of money in a system with floating exchange rates
- The arguments for and against monetary policy coordination amongst countrie
- The nature of the Tobin Tax and arguments for and against its application

10.1 Introduction

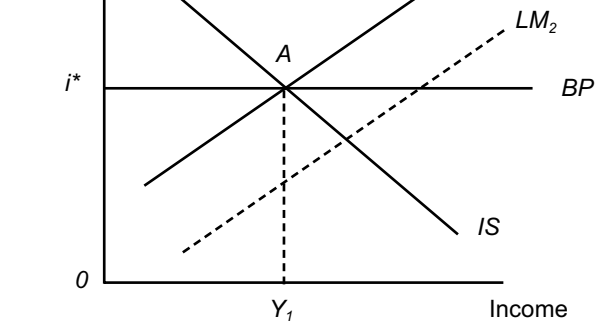
The impact of monetary policy in an open economy depends on the nat of the exchange rate system in operation. In section 7.5, we considered impact of changes in the money stock on nominal income in a fi exchange rate system and showed that, with fixed exchange rates a mobile capital, monetary policy has only a temporary impact on the leve income and, in the longer run, is completely ineffective. On the other ha with freely floating exchange rates and mobile capital, monetary policy more effective than in the closed economy case. In section 10.2, we c sider the case of perfectly mobile capital under fixed exchange rates. 10.3, we go on to consider ways in which countries might hope to prese some monetary independence while retaining membership of a fi exchange rate system. Section 10.4 looks at the question of leadership fixed exchange rate systems. In 10.5, we turn to floating exchange rates a consider the relationship between monetary policy and the exchange ra

for and against the introduction of a Tobin Tax on international capital flo
in the hope of restoring a degree of independence to each country's mo
tary authorities. The question of monetary policy in the euro area is co
sidered in Chapter 13.

10.2 Monetary policy with fixed exchange rates

We return to the Mundell-Fleming model introduced in section 7.5. N
we assume fixed exchange rates and perfect capital mobility. Perfect ca
tal mobility requires foreign and domestic bonds to be perfect substitut
Any small change in interest rates that causes the world interest rate to va
from the domestic rate causes a flow of capital, which reverses the inter
rate change. Domestic interest rates, thus, cannot vary from world rat
Domestic monetary policy is completely ineffective. An expansiona
monetary policy does not cause even a temporary increase in income. T
is illustrated in Figure 10.1, in which the *BP* curve is drawn as a horizon
line at the world interest rate. An expansionary monetary policy in a clos
economy shifts the *LM* curve from LM_1 to LM_2, but in an open econo
with perfect capital mobility, this does not happen. Any tendency for
domestic interest rate to fall below the world rate (i*) causes a capital o
flow and immediately pushes the interest rate back to the world lev
Indeed, any expectation of a fall in the domestic rate of interest has t
effect. The economy stays at point *A* with income at Y_1.

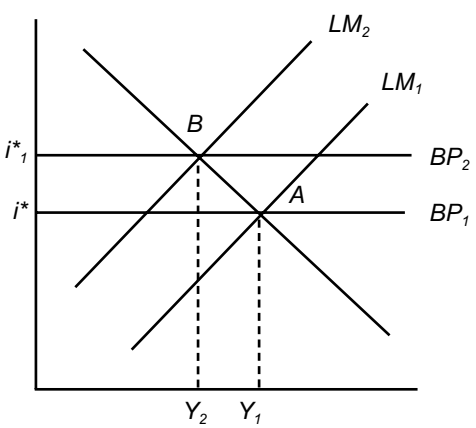
Figure 10.1: Monetary policy with fixed exchange rates and capital mobil



powerful economy within the system. The latter case is known as asy
metric leadership since the leading country is in a different position from
other members. Only it is able to determine its own monetary policy.
discuss the question of the factors influencing leadership in section 1
below. For the moment, we assume that there is such a leader and make
of the Mundell-Fleming model to show how the leader's monetary policy
transmitted to the other member countries of the system. We keep
assumption of perfectly mobile capital.

We begin at *A* in Figure 10.2, with the domestic economy in equilibri
at a full employment income level, Y_1. The strong country tightens its mo
etary policy, forcing the world interest rate up to i^*_1. Capital immediat
flows out of the domestic economy, putting downward pressure on the va
of the domestic currency. The domestic monetary authorities act to prot
the exchange rate, either directly by restrictive domestic open market op
ations (selling domestic bonds, forcing down bond prices and forc
domestic interest rates up to i^*_1) or by buying domestic currency on the c
rency markets, causing international reserves to fall. In both cases,
money stock falls and the domestic interest rate is driven up. The *LM* cu

Figure 10.2 The transmission of monetary policy with fixed exchange rat



moves back to LM_2. We move to point *B*, at a lower level of income th
previously. Domestic monetary policy is being determined by the stro
country within the system. This simple example illustrates a major ar

but find it difficult to do so because, in the light of the past performance the economy, their announced anti-inflationary policy lacks credibility the eyes of market agents. Inflationary expectations continue to be bu into the economy's inflation rate. The fixed exchange rate system provid the possibility of a link with a strong anti-inflationary country, which forc a tight monetary policy on the domestic economy.[1] In effect, the gove ment with the inflation problem borrows a reputation for financial pruden from the strong country in the system.

Pause for thought 10.1:

Why might a country's anti-inflationary statements lack credibility in the eyes of market agents?

Opponents of fixed exchange rates argue, rather, that the monetary po cy forced on the domestic economy through the exchange rate link may r counter to the interests of the domestic economy. This happens when t business cycles of the two countries are not synchronized or when the cou tries have different views of the desirable short-run relationship betwe inflation and unemployment. Let point *A* in Figure 10.2 now represent level of income at which there is high unemployment and low inflati Meanwhile, the strong economy is experiencing boom conditions and hi rates of inflation. It applies a tight monetary policy, forcing up interest ra just at the time when the domestic economy requires an easing of moneta policy.

Clearly, a fixed exchange rate system (or a single currency coverin number of countries) is likely to face fewer problems if the business cyc of the member countries are synchronized and if external shocks to t economies are symmetric — that is, they effect all member economies broadly the same way. Another issue of importance is the extent to wh monetary policy has real effects. If monetary policy does not have r effects in the long run, applying the incorrect monetary policy for a cou try's position on its business cycle causes short-run pain but does not da age the real economy in the long run. However, if there are hystere effects, then the application of a tight monetary policy during a period wh the economy is already experiencing high unemployment increases t unemployment in the short run and results in long term damage.

The strong country might take some account of the needs of the oth members in choosing its policy. However, if it feels that it would, for po

place. In any case, if the strong country does take account of the needs the weaker countries in determining its policy, it may, by lowering the an inflationary credibility of its own monetary policy, damage the anti-inflat credentials of the system as a whole. This, in turn, would reduce the pot tial gains for the small countries from being a member of the system.

The strong country need not adopt an anti-inflationary stan Expansionary policy is transmitted through a fixed exchange rate syst just as is deflationary policy. Much depends on what gives the strong co try its position within the system. The Bretton Woods adjustable p exchange rate system was criticized because the macroeconomic policy the USA in the later years of the system's operation was more inflation than that desired by other major countries and US inflation was be transmitted to other countries through the fixed exchange rates. US in tion made US goods uncompetitive and this, together with the capital o flow resulting from low US interest rates, produced a balance of payme deficit. The principal trading partners of the USA found themselves in b ance of payments surplus, their international reserves increased and so their money stocks.

10.3 Brakes on the transmission of monetary influences

Theoretically, countries wishing to follow a less deflationary or less in tionary policy than the system as a whole, while retaining membership o fixed exchange rate system may do so by:

- devaluing or revaluing the domestic currency, although this needs conform to the rules of the system and/or be approved by partner g ernments; or by
- sterilizing the monetary influences spilling over from the policy f lowed by the strong country.

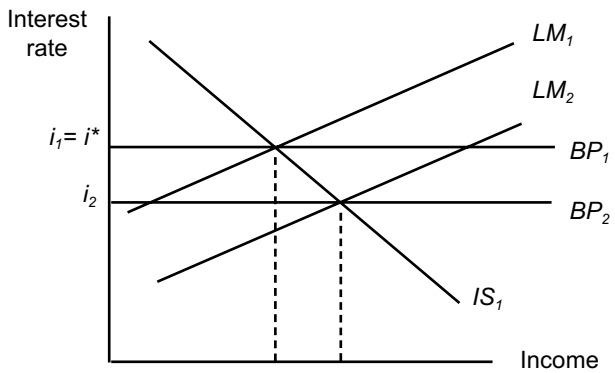
Let us consider these two possibilities. Countries devaluing their curr cies within a fixed exchange rate system obtain a competitive advantage t produces a current account surplus, although there may be long time lags this process.

Pause for thought 10.2

Why are there long time lags between exchange rate devaluations and improve ments in the balance of trade?

down to BP_2, as shown in Figure 10.3. This enables the authorities to ru
more expansionary monetary policy. Interest rates fall (the *LM* curve shi
down to LM_2), capital flows out of the economy and the current account s
plus is offset by a capital account deficit.

Figure 10.3 Short-run freedom for monetary policy after devaluatio



However, the current account gain is likely to be only tempora
Domestic prices are likely to rise, undermining the competitive advanta
obtained from the devaluation. As the current account surplus disappea
the balance of payments moves into deficit and interest rates need to r
again to reverse the capital outflow. If the government wishes its moneta
policy to continue to be different from that of the system as a whole, furth
devaluations become necessary. The possibility that one devaluation will
followed by others reduces the credibility of the existing fixed exchan
rate and damages any reputation for an anti-inflation stance the governm
might have been trying to build up. Workers and firms build higher inf
tionary expectations into wage demands and price-setting formulae a
speculators are likely to put pressure on the currency. Nonetheless,
competitive edge granted by the devaluation may last over a sufficien
long period to be judged useful.

A country wishing to follow less expansionary policies than the stro
country in the system may be forced to revalue at regular intervals. The i
tial revaluation removes (again after a lengthy time lag) the current accou

expectations of further revaluations are likely to reinforce the tendency capital to flow in from the inflating economy. The result may be an over balance of payments balance, this time with a current account deficit be offset by a capital account surplus. The inflationary tendencies emanat from the strong economy are countered temporarily but at the expense lower output and employment.

Although some policy independence may be granted by occasio exchange rate changes, this cannot occur as a matter of course. Regu changes in exchange rate parities in a fixed exchange rate system underm the system's basis. Firstly, exchange rate uncertainty remains and risk p miums will be demanded on currencies thought at all likely to deval Secondly, it opens up the possibility of countries seeking to gain advanta through devaluations. Thus, fixed exchange rate systems must be co structed on the principle that large changes in exchange rate parities sho occur infrequently and should be allowed only if a country can show that balance of payments is in 'fundamental disequilibrium'.[2] The ability to al exchange rate parities within a fixed exchange rate system can provide o an escape route for economies in serious difficulties rather than grant monetary policy independence.

A country can also try to avoid inflationary influences from abroad using domestic monetary policy to sterilize the impact on domestic mon stocks of the inflating economy's balance of payments deficit. This op ates through the open market sale of government securities, soaking excess money balances. Domestic bond prices fall and interest rates ri The increase in reserves is offset by the decline in the domestic compon of the money stock. The high domestic interest rate damages investm and, in time, affects both employment and the rate of economic grow Nonetheless, faced with the threat of imported inflation, governments ha often chosen sterilization. It cannot, however, operate effectively in a wo with high capital mobility since the high interest rates attract further cap inflows from abroad, merely compounding the initial problem.

International capital was sufficiently mobile by the late 1960s to ma sterilization difficult for countries such as Japan, Switzerland, a Germany, which regarded US policy as over-expansionary. To try to ma it work, they had to operate draconian capital controls to limit the inflow capital. Countries wishing to avoid deflationary monetary impulses fr abroad without changing their exchange rate parities also require cap controls, this time to prevent the outflow of capital. In the absence of b

We should not rule out entirely the possibility of operating a fix exchange rate system with capital controls. They played an important r in the EMS up until 1991 and have been resorted to in emergencies sin then. However, they are widely regarded as undesirable and have beco increasingly difficult to enforce with the development of offshore financ markets. In the modern world, they can probably only be enforced for sh periods, at best. The difficulties caused to monetary authorities by the int national mobility of capital has led to a call by some economists for a on international capital movements in the hope of slowing them down. consider this in Section 10.7 and look at related issues in 12.3.

However, even as things are, the chances of some degree of moneta policy independence within a fixed exchange rate system are not quite slim as we have so far suggested. In the real world, even without capi controls, capital is not perfectly mobile. In addition, fixed exchange r systems usually allow some freedom for the exchange rate to move arou the established exchange rate parities. There are normally, also, some li itations on the free international flow of goods and services. Fina changes in central parities do not always generate expectations of furth changes in the same direction. Let us consider each of these points brie

Capital mobility

Capital is not perfectly mobile internationally unless securities issued in d ferent countries are considered perfect substitutes for each other acr international borders. This may not occur because of the existence of po ical or exchange rate risk, different credit ratings of firms and governme or lack of information on the part of market participants. As we showed Section 7.5, any immobility of capital gives the authorities some opportu ty to maintain temporarily an interest rate different from world rates.

Pause for thought 10.3:

Memory test: why is the monetary freedom granted by a small amount of capita immobility only temporary?

(If in doubt, return to section 7.5)

Bands around exchange rate parities

All fixed (but adjustable) exchange rate systems maintain bands around established central parities within which market-determined exchange ra

cent for currencies within the broad band of the exchange rate mechani
of the EMS in operation until July 1993. Following the turmoil in the EI
in that month, an extremely wide band of ± 15 per cent was adopt
although this was intended to be only temporary and was not fully used.[3]
sole purpose was to reduce the scope for profit-making attacks on curr
cies by speculators.

The rules of the system may prevent the full use of the band. In the EI
system, currencies were required to stay within their bands both against
European Currency Unit (Ecu) — a weighted currency basket consisting
the currencies of all members of the European Union (EU) — and agai
each other single currency. This meant in practice that the range of var
tion before July 1993 was limited to 2.25 or 6 per cent against the strong
or weakest currency in the system. Further, governments could not all
their currencies to fall to the bottom of the allowed band since this rai
expectations of a possible devaluation and encouraged speculation agai
the currency.

Nonetheless, the existence of bands around parities can provide gove
ments with a limited amount of monetary policy freedom. This applie
the central exchange rates to which the bands apply are thoroughly credib
Consider Figure 10.4. Here we again assume perfect capital mobility a
show an initial equilibrium with the *IS*, *LM* and *BP* curves intersecting
point *A*. We assume this equilibrium to be at the country's central rate
exchange within a fixed exchange rate system. BP_1 and BP_2 show the
curves that would apply at exchange rates 2.25 per cent above and below
existing central rate. Next we assume that the domestic monetary autho
ties expand the money stock, pushing the *LM* curve down to LM_2, interse
ing the *IS* curve at *B*, which implies an exchange rate still within the allo
able band. In the usual way, however, the fall in interest rate causes cap
to flow out, the money stock falls and the economy moves back to *A*.

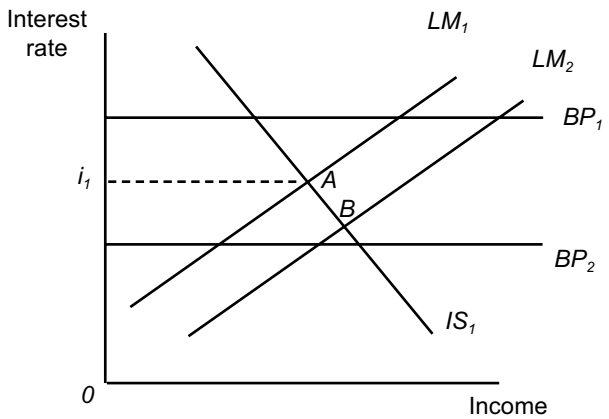
It remains that *B* may be a position of short-run equilibrium if it is fu
believed that the exchange rate will move back to its original position. T
expected increase in the value of the currency causes agents to be willing
hold the currency even at a rate of interest temporarily below the wo
level.

If the value of the domestic currency stays below its central rate for a
length of time, expectations of a movement back to the central rate begin
be undermined and capital again begins to flow out, leading to expectatio
of a future devaluation. Thus, the degree of independence of domestic m

provided and this freedom is greater the wider is the band.

Limitations on free trade

Figure 10.4: Monetary policy in a fixed exchange rate system



Some freedom may be retained also through the ability of a government protect the current account of its balance of payments using commerc policy (tariffs, quotas and other non-tariff barriers). Although the capi account is a much more potent source of instability, expectations of dev uation are often triggered by current account weakness. Extra tension w caused in the EMS in the early 1990s because of the move (under the Sing European Act of 1986) towards a unified market within the EU, severe limiting the ability of member governments to protect their current accou through trade restrictions as well as leading to the removal of restrictions capital movements within the EU.

Expectations of future devaluations following a devaluation

Finally, one devaluation does not always convince the financial markets th others will follow. Consider a case in which a country maintains a fix parity for an extended period but steadily loses competitiveness over th period. Its rate of inflation may be converging on that of the strong cou try within the system, but only slowly. Under these circumstances, ma come to appreciate that the existing parity cannot be maintained and th

change does not engender significant inflationary expectations and/or accompany the devaluation with other policies aimed at preserving the cr ibility of the government's anti-inflationary stance.

To sum up this section, we can refer to the 'inconsistent quartet',[4] wh states that governments cannot at the same time maintain all of the follo ing:

(1) free trade

(2) full capital mobility

(3) fixed exchange rates

(4) national autonomy in the conduct of monetary policy.

This does not apply to the strong country of the system, which is able determine its own monetary policy, as long as it is able to withstand political pressure emanating from other members in cases where intere conflict.

10.4 Leadership of fixed exchange rate systems

We have so far been assuming that any fixed exchange rate system is ch acterized by asymmetric leadership — with a single country occupyin dominant position. This was certainly true of the Bretton Woods system a was widely held to be the case in the EMS, which was often referred to a DM-zone. Yet, the two cases are notably different.

The USA owed its position as leader of the Bretton Woods system to overwhelming strength at the end of the Second World War, which led system to be constructed around the US dollar. Confidence in the syst was provided by the large US gold holdings and the link establish between the US dollar and gold by which the USA agreed to redeem a foreign holdings of dollars at a fixed gold price. This, together with strong demand for US goods in the period after the war, encouraged ot governments to hold dollars in their international reserves, making the d lar the international intervention currency. Later loss of confidence in US dollar destroyed the basis of the system. The nature of the system ga it an inflationary bias since the USA suffered no penalty from operat expansionary policies in both the economic and political fields. In additi up until the late 1950s, other members wanted US expansion (in the e nomic field at any rate) to help post-war reconstruction. Tight US monet

USA from taking actions that would make its currency difficult to obtain the amounts required by other members.

Leadership in the EMS developed differently. German leadership ca from market confidence in the Deutschemark (DM). The strength of the D relative to other currencies meant that agents required a risk premium persuade them to hold other currencies. This confidence in the DM wa reflection of the anti-inflation record of the German government and of co fidence in its future anti-inflationary stance. In theory, changing policies a performances of different governments could cause leadership to pass in other hands — what markets had delivered, markets could take aw Leadership based on a credible anti-inflationary stance has two side effec

Box 10.1: An attempt to reduce deflationary pressure within a fixed exchange rate system - the Basel-Nyborg agreement

The Basle-Nyborg agreement (1987) sought to introduce into the EMS two anti-defla tionary devices. Firstly, when a currency fell to the bottom of its band against anothe currency, both central banks had to intervene, using the strong currency to buy the weak one (before 1987, most intervention in the system had been carried out in dol- lars). The weak currency country borrowed the strong currency through the Very Sh Term Financing Facility of the EMS. Thus, in the short term, the weak currency cour try's reserves did not fall but the act of buying back its own currency reduced the domestic component of its money supply. The strong currency country issued more its domestic currency, both to lend to the weak currency country and to buy the weak currency itself in the market. The net result was an increase in the money stock of t strong currency country.

Secondly, the agreement relaxed the terms of the Very Short Term Financing Facility by:

- extending the loan period, lengthening the period over which a more expansion ary policy was forced on the strong currency country; and
- widening access to borrowing.

Before 1987, borrowing was only allowed for marginal interventions: those requir because a currency had reached a prescribed intervention limit. After 1987, countrie could borrow for intra-marginal interventions before a currency came under threat. Thus, theoretically, a government concerned about the tightness of the monetary pol in the system could apply a limited degree of short-term expansionary pressure on th strong currency country. However, the strong currency country could still sterilize th monetary effects of intervention through selling additional securities in open market operations. If it did this, the full burden of any adjustment was forced back onto the weak country and the deflationary bias of the system was preserved.

Firstly, it introduces a potentially deflationary bias to the system. maintain its position and its apparent independence the leader must cont ue to operate strongly anti-inflationary policies. Then, as we have se

is — it is free to determine its own monetary policy, but only as long as t
policy is what the market expects.

Pause for thought 10.4:

What was the monetary policy significance of the German short-run Phillips cur
becoming more or less steep?

Secondly, political pressures seem bound to ensure that the country a
to deliver the most convincing inflation performance over a run of years
the one with the best short-run unemployment-inflation trade-off. T
means that the pain of convergence on the inflation rate chosen by the lea
for the system is not only unequal across the system but also greater for f
lowers than for the leader. This is likely to intensify the deflationary bia

However, membership of the system itself may have changed
German unemployment-inflation trade-off. Thus,[5] membership may ha
made the German short-term Phillips Curve less steep since part of the in
tionary impact of any German monetary expansion was transmitted abro
through the fixed exchange rate system. Germany could then reduce une
ployment at less cost in terms of domestic inflation than previously. If t
were so, membership would provide an incentive for the German autho
ties to follow more expansionary policies than would be the case with flo
ing rates.

On the other hand, it is equally plausible[6] that membership of the fix
exchange rate system made the German Phillips Curve more steep since
exchange rate could no longer adjust to compensate for any loss of comp
itiveness resulting from domestic inflation. In practice, German policy
the 1990s was influenced much more by the problems it faced in digest
the East German economy than by judgements as to what was happening
the unemployment-inflation trade-off in the West German economy.

Systems can be designed to try to overcome tendencies towards def
tion. In Box 10.1, we set out an example of this taken from the operat
of the exchange rate mechanism of the EMS. However, as is explained
the box, it is difficult to force strong currency countries to follow m
expansionary policies than they wish to do. The only way out appears to
through cooperation among members to establish a monetary policy su
able to all. This requires all countries to make policy concessions and,
we have already noted, there is often little incentive for the strong coun
to do so. Of course, if the alternative is a floating exchange rate syst
characterized by conflict, the strong country may accept cooperation, ev

tem may be weakened.

For the world economy, the asymmetric leader path is no longer ava able. Although the US dollar remains the dominant world currency, the b ance of economic power is more evenly spread across three econon power blocs than it was in the 1940s and 1950s. The issue of cooperati in monetary policy has thus become increasingly important. We say mo about this in Section 10.6.

10.5 Monetary policy with floating exchange rates

Our limited analysis in Section 7.5 concluded that monetary policy w more effective in an open economy with floating exchange rates than in closed economy for two reasons:

- the exchange rate freedom grants the economy monetary independen and allows the authorities to choose the domestic inflation rate;
- the exchange rate movements have an impact on the real economy changing the international competitiveness of the country's output.

Thus, an increase in the money supply causes income to rise and t interest rate to fall. The increase in income causes a deterioration in the c rent account in the balance of payments while the fall in interest rate ca es a deterioration in the capital account. There is a net outflow of curren (the supply of domestic currency increases) and the exchange rate depre ates. The depreciation improves the international competitiveness domestically produced goods and this causes a further increase in incon This analysis implied that the exchange rate changed to restore the goo and money markets and the balance of payments to equilibrium.

Income, then, increases, but the size of any real effects of monetary p icy depends on the extent to which this reflects an increase in the price lev rather than output. This, in turn, depends on the extent of the depreciati that follows the monetary expansion. If the value of the currency falls proportion to the increase in the money supply, the full weight of the expa sion falls on the price level. There are no real effects. Money is neutral. allow us to say more about this, we need to look briefly at theories of t determination of exchange rates in floating exchange rate systems.

The simplest model of exchange rate determination is the flexible pr monetary model. This assumes that capital is perfectly mobile (domes and foreign bonds are perfect substitutes), markets are competitive, tra

expected rate of depreciation of a currency equals the interest rate differ
tial between domestic and foreign bonds. Thus, if the interest rate on U
bonds were two per cent above the interest rate on US bonds, invest
would expect sterling to depreciate by two per cent against the dollar. T
key determinants of exchange rates are the supply of and demand
money.

We assume, also, that all prices are perfectly flexible. Purchasing pow
parity (PPP)[7] holds and money markets clear continuously. The demand
money is stably related to real income and stably and negatively related
the rate of interest.

$$m - p = \eta y - si \qquad \ldots 1$$

where m is the log of the domestic money stock, p is the log of the dom
tic price level, y is the log of domestic real income, and r is the rate of int
est. The same relationship holds abroad and thus:

$$m^* - p^* = \eta y^* - si^* \qquad \ldots 1$$

Since PPP is assumed, we can write:

$$s = p - p^* \qquad \ldots 1$$

where s is the exchange rate. Further, since UIRP holds, we have:

$$Es = i - i^* \qquad \ldots 1$$

(the expected rate of depreciation of the home currency equals the diff
ence between the domestic and foreign interest rates).

Re-arranging and substituting in 10.3 gives:

$$s = (m - m^*) - \eta(y - y^*) + \sigma(i - i^*) \qquad \ldots 1$$

That is, the rate of exchange is determined by the supply of money and
demand for money function at home and abroad.

We can use this model to consider the impact of expansionary and co
tractionary monetary policy changes. *Ceteris paribus*, an increase in
rate of growth of the domestic money supply causing the domestic mon
supply to grow more rapidly than the foreign money supply causes dom
tic prices to rise more rapidly than foreign prices and, to maintain PPP,
domestic currency must depreciate. A ten-percentage point increase in
rate of growth of the domestic money supply causes the domestic curren
to depreciate by ten per cent. Money is neutral in this case.

Consequently, the model has been modified to allow for exchange rate ov shooting in the short run. That is, we continue to assume the existence long-run equilibrium rates of exchange and to incorporate both UIRP a PPP. We also assume rational expectations and so market participants in model make the best use of all relevant information and employ the b model for forecasting future exchange rates. Therefore, they know what long-run equilibrium exchange rate is. Despite this, exchange rates ov shoot their long-run equilibrium positions. That is, if the exchange rate pushed above its equilibrium it will fall well below the equilibrium r before once again rising towards equilibrium. Equally, an exchange r pushed below its equilibrium rate will not move directly back to equilib um but will rise well above it before returning to equilibrium. This resul achieved by assuming the existence of sticky prices. The best-known stic price model was developed by Dornbusch (1976).

In Dornbusch's model, the goods and labour markets are slow to adj whereas the asset market adjusts immediately. Exchange rates are det mined in the asset market and, thus, exchange rate changes are not match in the short run, by price changes. That is, we depart from PPP in the sh run but return to it in the long run.

The model is described by four equations:

(a) uncovered interest rate parity

$$Es = i - i^* \qquad \ldots 1$$

(b) the demand for real money balances

$$m - p = \eta y - \sigma i \qquad \ldots 1$$

(c) purchasing power parity

$$\bar{s} = p - p^* \qquad \ldots 1$$

(d) regressive exchange rate expectations in the short-run:

$$E_s = \theta(\bar{s} - s) \qquad \ldots 1$$

where $\bar{s}$ is the equilibrium or long-run exchange rate and $\theta > 0$.

That is, in each period the expected change in the exchange rate is giv by a fraction (θ) of the difference between its current value and the lo run equilibrium value.

Thus, the model has four endogenous variables:

· the current value of the exchange rate
· the price level.

There are four exogenous variables:

· the foreign interest rate
· the long-run equilibrium exchange rate
· real income and
· the stock of money.

Pause for thought 10.5:

Memory test: where in this book have we commented critically on the assumptio of an exogenous money supply?

The diagrammatic solution of the model gives a relationship between exchange rate and the price level with the asset market always in equilib um as in Figure 10.5, in which equilibrium is at N, with p^e and s^e. Note t the exchange rate is here expressed in direct terms. That is, as we mo along the horizontal axis s increases but this means that the value of home currency falls (one has to pay more home currency for one unit of f eign currency).

In Figure 10.5, AA represents asset market equilibrium. The negat slope of AA reflects the assumptions of an exogenous money supply a UIRP. This latter assumption tells us that if interest rates on domestic bo fall, currency will flow out to buy foreign bonds. This flow will contin until people come to expect a sufficient appreciation of the currency to b ance the interest rate differential between domestic and foreign bonds.

XX represents equilibrium in the goods market. This slopes up since increase in the price level leads to a fall in domestic demand because:

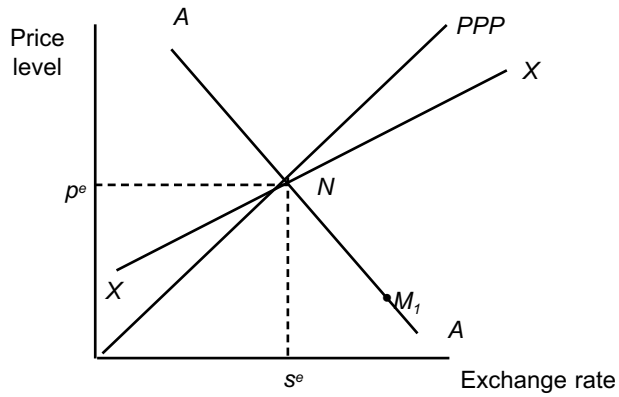
(a) the real exchange rate falls (competitiveness declines) and

(b) the real value of the exogenous money supply falls, pushing dom tic interest rates up.

To return the goods market to equilibrium, the value of the curren must fall (s must rise). Thus, the price level and the exchange rate are p itively related. Below XX, there is excess demand for goods and prices w be rising. Above XX, there is excess supply of goods and prices will falling. We assume that the asset market is always in equilibrium (that we are always on AA). If we are at M_1, there is an excess demand for goo

compensating investors for low domestic interest rates caused by the hi
real money balances.

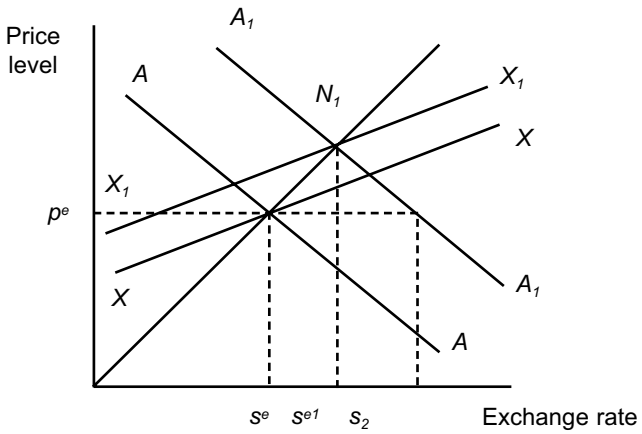
Figure 10.5: Exchange rate overshooting



Assume now a once and for all unanticipated increase in the supply
money. The *AA* curve shifts out to A_1A_1 in Figure 10.6. There is no p
manent effect on the current account of the balance of payments and P
holds at the new equilibrium at N_1 (X_1X_1 shifts up). Investors realize th
The movement to long-run equilibrium takes place in two stages. We st
at *N*. The unexpected increase in the money supply pushes up *XX* and
market knows that the new equilibrium will be at N_1 with an exchange r
of s^{e1}. That is, the market knows the domestic currency will depreciate.

However, because domestic prices are slow to rise, the initial effect is
increase real money balances and lower domestic interest rates, caus
people to sell domestic currency, pushing the exchange rate instantaneo
ly to s_2. At s_2, investors can see the prospect of a sufficient exchange r
appreciation to compensate for the lower interest rate on domestic bon
and the currency depreciation ceases.

There follows a gradual adjustment to the new equilibrium exchan
rate, s^{e1}, as prices increase in the goods market. Therefore, we have ov
shooting of the exchange rate even with rational expectations. If
dropped this assumption and assumed that the market did not know
long-run equilibrium position, they would try to infer the truth from w
others were doing and there would be much wilder movements in *s*.



Another well-known model (Frankel, 1979) combines inflation expectations with the sticky price element of the Dornbusch model. As Dornbusch, the expected rate of depreciation of the domestic currency positively related to the difference between the current exchange rate a the equilibrium exchange rate, but here it is also a function of the expec long-run inflation differential between the domestic and foreign economi

$$E_s = \theta\left(\bar{s} - s\right) + \dot{P}^e - \dot{P}^{e*} \qquad ...10$$

The long-run equilibrium exchange rate in this model is determined the relative supplies of and demands for money in the two countries just in the flexible monetary model. The gap between the current exchange r and its long-run equilibrium value is now proportional to the real inter rate differential between the two countries. If the expected real rate of int est on foreign bonds is greater than the expected real rate of interest domestic bonds, there will be a real depreciation of the domestic curren until the long-run equilibrium exchange rate is reached. When this occu real interest rates will be the same in the two countries and any differen in nominal interest rates must be the result of differences in inflation rat As in the Dornbusch model, an unanticipated monetary expansion in domestic economy causes the exchange rate to overshoot its long-run eq librium level.

Other similar models have been developed, distinguishing for exam between the speeds of adjustment of the prices of tradable and non-trada

models is that they retain most of the assumptions of the standard approa to foreign exchange markets while attempting to produce results closer the reality of volatile exchange rates. They also suggest that the moneta authorities can influence real variables in the short run, although not in long run. The importance of the freedom granted to the monetary autho ties depends on the length of time taken for prices and the nominal exchan rate to move to their long-run equilibrium positions. Expansionary mo tary policy could obtain worthwhile reductions in unemployment for sign icant periods. If a sticky-price model were combined with a labour mar model with hysteresis, these short-run employment gains could beco long-run gains.

Sticky-price models also provide a justification for a gradual approach monetary policy. For example, assume the monetary authorities wish reduce the rate of inflation. If they reduce the rate of growth of the mo supply sharply and interest rates rise, but prices do not change in the sh run, the nominal and real exchange rates fall sharply (overshooting long-run equilibrium level), causing problems for exporters and impo competing industries. Unemployment results. If prices were slow change, these real problems would persist for a considerable time. T position would be worse if the short-run overvaluation of the curren caused bankruptcies of domestic firms and serious loss of market share important industries. The short-run cost of reducing inflation could high. This leads to the view that monetary policy should be applied gra ally to allow the economy to adjust slowly.

Pause for thought 10.6:

Why does a *fall* in the exchange rate of a country's currency cause problems fo exporters?

There remain two problems with sticky price models from the point view of monetary policy. Firstly, although PPP does better in long run th in short run tests, the evidence that it holds in the long run is not convi ing. This increases the strength of the argument that monetary policy in open economy has a long run impact on real variables. Secondly, all mo etary models do not allow a distinction to be made between open market a foreign exchange operations.

Suppose the monetary authorities seek to improve the country's comp itiveness by lowering the value of the currency. They buy foreign bo

falls) and the current account of the balance of payments improv
However, the country's holding of foreign exchange reserves increases a
the money supply rises, creating inflationary pressure. The inflation th
removes the competitive advantage obtained from the higher exchange r
of the domestic currency. The monetary authorities aim to counter this
selling domestic bonds to reduce the domestic component of the mon
stock. Consider this in terms of equation 7.2 in Section 7.5:

$$M = D + R \qquad \text{...7.2/10.11}$$

The authorities attempt to increase R and reduce D so that the mon
supply does not change, but the exchange rate does, but this type of ope
tion is not possible within the framework of a monetary model of excha
rate determination because domestic and foreign bonds are perfect sub
tutes. Changes in D and R have equivalent effects on the exchange ra
This is another way of saying that in a monetary model, the monet
authorities cannot influence the real exchange rate (except in the short-r
in sticky price models).

Portfolio models of the exchange rate overcome this by dropping
assumption that foreign and domestic bonds are perfect substitut
Uncovered interest rate parity does not apply. We assume that residents
the domestic economy think foreign bonds are more risky than equival
domestic bonds and hence require a higher rate of interest on foreign bon
to be persuaded to hold them. This inclusion of differential risk in
analysis allows open market operations and foreign exchange operations
have different effects on interest rates and exchange rates, and introdu
the possibility of monetary authorities making use of sterilized fore
exchange operations. Monetary authorities now have a wider choice of p
icy actions. These are considered in Box 10.2.

We have so far seen that with mobile capital the following applies:

(a) in fixed exchange rate systems, the target of monetary policy is
exchange rate — domestic inflation rates are determined by the mo
tary policy of the whole system;

(b) in floating rate systems, the monetary authorities can target
domestic rate of inflation.

In practice, however, exchange rates in floating exchange rate syste
do not float freely. Central banks intervene to varying degrees to influe

tral banks join together to intervene strongly in the foreign exchange m
ket in the hope of influencing the direction in which exchange rates
moving or to try to keep rates within unspecified target ranges. In this ca
monetary policy may be aimed either at internal or at external objectiv
Problems under these conditions are discussed in Section 12.3.

Box 10.2 Monetary policy with floating exchange rates

If domestic and foreign bonds are not perfect substitutes, the monetary authoriti
may choose among:

(a) an exchange rate operation
(b) an open market operation and
(c) a sterilized exchange rate operation.

(a) They might seek to expand the economy by buying foreign bonds from th
private sector, using newly created monetary base. The private sector's hol
ing of money increases while its holding of foreign bonds falls. The exchang
rate rises and the domestic interest rate falls to maintain equilibrium in the
money market.

(b) They might purchase domestic bonds from the private sector, again caus
ing the exchange rate to rise and the domestic interest rate to fall; or

(c) They might combine an expansionary exchange rate operation with a
deflationary open market operation, leaving the money supply unchanged.
The exchange rate rises but now the domestic rate of interest also rises. T
higher interest rate compensates the private sector for their increased holdin
of domestic bonds relative to foreign bonds while the depreciation of the cur
rency raises the domestic currency value of its now smaller holding of foreig
bonds.

Although the exchange rate and the interest rate move in the same directions in
(a) and (b), the two policies may have different effects. The exchange rate oper
tion has a greater effect on the exchange rate while the open market operation
has a greater effect on the interest rate. Which policy has the greater impact or
output and employment depends on the impact of an interest rate change on
investment relative to the impact of an exchange rate change on the balance of
trade.

10.6 Monetary policy coordination

One of the standard arguments for floating exchange rates is that they i
late an economy from external shocks, allowing the authorities to purs
their own independent monetary policy. However, it has become clear t
all economies are interdependent and are subject to spillovers from

ularly in the early 1970s because of:

(i) increased capital flows after the collapse of the Bretton Woo fixed exchange rate system

(ii) alterations in terms of trade following large changes in world prices

(iii) a greater degree of openness to foreign trade and

(iv) the development of offshore financial markets.

Our particular interest here is in what has been called 'sensitivity in pendence', defined by Cooper (1985) as the amount of adjustment a cou try has to make to foreign events under conditions of normal econon activity. This is determined by factors such as the marginal propensities spend on foreign products or assets, the elasticity of substitution betwe foreign and domestic products or assets, the elasticity of substitution in p duction and the relative size of the economies in question. The theoreti approach to macroeconomic policy coordination calls upon a number areas of macroeconomic theory, as well as making use of games theory incorporate in models the notions of credibility and reputation, and the s tainability and time consistency of policy.

Pause for thought 10.7:

What does 'uncovered' mean in the phrase 'uncovered interest rate parity'?

The first stage in the analysis of macroeconomic interdependence amo economies was the investigation of the channels along which influen flows from one economy to another. The beginnings of a case for so form of policy coordination can be derived from the simple open econo multiplier. For a small economy, it is clear that increased linkages with rest of the world weaken the impact on domestic targets of domestic fis policy. Models can, however, be greatly complicated by dropping the sm country limitation, by making different assumptions about the nature of exchange rate regime, by introducing various forms of price or wage sti iness, or by considering the timing and nature of tax policy changes need to pay for government expenditure increases.

The analysis of monetary linkages builds on the Mundell-Flem model, making varying assumptions about the exchange rate regime,

positive or negative. The importance of spillovers became clearer, howe
er, with the recognition of price spillovers operating through the terms
trade linkage (Hamada, 1976). This plainly meant the end of arguments t
a country could fully insulate itself from events and policies in the rest
the world. Even with perfectly flexible exchange rates, the terms of tra
transmission works.

Pause for thought 10.8:

What do the terms of trade describe?

Cooper (1969) examined the impact of spillovers on domestic pol
using a simple model with fixed exchange rates and constant prices.
argued that the greater is the degree of interdependence (and the stronger
spillovers), the less will be the effectiveness of policies in non-cooperati
economies. Greater interdependence, in other words, leads to either wo
results from domestic policies and longer periods away from equilibrium,
greater costs to restore targets to their desired values.

In Canzoneri and Gray's (1985) model, the governments of two iden
cal countries both attempt to achieve full employment output witho
increasing inflation. Both countries are subject to supply shocks. The pap
is concerned with the monetary transmission mechanism, specifically w
the impact of an expansion of the money supply in each country. Canzon
and Gray consider three possibilities:

(a) beggar-thy-neighbour in which monetary expansion in one econo
has a negative effect on output in the other economy

(b) locomotive in which the spillover effects are positive and

(c) asymmetric in which monetary spillovers have different signs,
result depending on the size of the exchange rate and interest r
changes following the domestic monetary expansion as well as
import content of the foreign price index. The outcome is an empiri
question, depending on the structure of the economies involved.

It has been shown that it is possible both for an instrument's spillov
to change signs over time and for an instrument to have impacts of differ
signs depending on the target at which it is aimed.

Specific conclusions of theoretical models must, however, be treat
with caution since many depend on the sign or relative size of particu

the Lucas critique. In addition, there have not been enough empirical st
ies to produce clear ideas about the likely direction and size of spillover
practice. We are only left, following Hughes-Hallett (1989), with a set
not very surprising theoretical conclusions:

1. Spillovers vary with the policies pursued in other countries

2. There are multiple transmission mechanisms that operate simulta
ously

3. Net spillover effects depend on the particular circumstances of
economies concerned

4. The impacts of spillovers crucially depend on the size of the eco
my, the degree of asset substitutability, relative price and wage flexib
ty and exchange rate flexibility.

Games theory has been used to analyze the desirability of policy coo
nation. This commenced with the development of models incorporat
two simple forms of policy decisions by national governments in an int
national context — Nash non-cooperative games in which either gove
ments act independently taking the decisions of other governments as gi
or one country acts as leader;[8] and cooperative games in which countr
attempt to pursue some common interest, attempting to maximize the s
or product of the utilities of the national governments. The problem is
elucidate and, if possible, to quantify the gains from co-operative decisio

Non-cooperative models suffer from a variety of defects. For examp
they consider only static decisions and thus allowance cannot be made
predictable future effects of current decisions. Further, the restrictions
the assumptions regarding the behaviour of the other country's policy m
ers presupposes that policy makers already know the form of the equilib
um decision rule: but this can only be so in special circumstances. Desp
these difficulties, the sub-optimality of non-cooperative decisions is acce
ed.

The presence of significant policy spillovers forms the basis of a w
known model (Hamada 1976, 1985) illustrating the case for internatio
policy coordination between countries. It is a two-country model, with ea
country targeting its inflation rate and balance of payments position i
fixed exchange rate regime. Each country controls a single policy inst
ment — the level of domestic credit creation. Neither country can att
both objectives by acting alone except by coincidence. In one version

clearly preferable. This fits in with the general conclusion that non-coop
ative decisions are socially inefficient except under special conditions.

However, it is one thing to argue for the inefficiency of non-cooperati
but quite another to accept the need for coordination. To begin with, c
can produce cases where Nash non-cooperative behaviour is superior
cooperation. Perhaps the best-known example of this is Rogoff's inter
tional inflation game in which governments gain from unexpected inflati
(Rogoff, 1985b). In Rogoff's model, governments fix exchange rates a
then agree to raise their domestic money supplies. By cooperating, they
able to exploit the gains to be had from inflation surprises. Their citize
lose out. This assumes that the private sector can be taken by surpri
Most models rule this possibility out by assuming forward-looking exp
tations. Without surprises, the costs to the private sector of anticipa
inflation remain, but an understanding of the nature of government pol
by the private sector leads to a rapid reduction in their willingness to h
government debt except at interest rates that fully take government pol
into account.

Pause for thought 10.9:

Why might governments wish to cause inflation at the expense of their citizens?

One can also show that the degree of sub-optimality of non-cooperat
decisions can be affected by the strength of preferences of national pol
makers, by the economy's policy responses, and by capacity constrain
We can only conclude that the size of net gains (or losses) from cooperati
can only be determined by empirical analysis.

In attempting to bridge the gap, however, between theory and reali
economic theory has paid most attention to a different set of difficulties
if governments succeed in reaching an agreement to coordinate macroe
nomic policies, how can we be sure that such policies will be sustained
each country? There are two separate issues here.

The first deals with the relationship between the state and the private s
tor. As we have seen in Section 8.3, if rational expectations are assum
and thus the private sector cannot be taken by surprise by the governme
the effectiveness of macroeconomic policy depends on that policy bei
credible to the private sector. If this is not the case, macroeconomic pol
is ineffective. One way out for governments is to pre-commit themselves
their stated policy. An obvious example is the pre-commitment of moneta

The second issue relates to the temptation felt by governments to ren on their agreements with other governments. The issue hardly arises in Hamada two-country model since an attempt by one country to improve position by reneging on the agreement will be met by a withdrawal of other country from the agreement — both countries move back to the or inal sub-optimal non-cooperative equilibrium and are worse off. The thr of such action prevents either country from reneging. However, with m than two participants, the question of the credibility of threats becomes r evant. Where the incentive to renege on agreements cannot be removed credible threats to retaliate, policy coordination cannot be sustained.

There are two ways out of this dilemma. The first is to concentrate the notion of reputation. Governments may adopt a longer term view coordination than is implied by the one-off bargains that dominate the wo of policy models. Consequently, they may be willing to forgo poten short-term gains available from reneging on agreements in order to ma future bargains possible. Yet again, the loss of reputation in the field macroeconomic policy coordination might be thought likely to affec country's standing in other international negotiations. This is an example the problems involved in analysing macroeconomic policy in isolation. I clear that the outcomes of G7 economic summits have been influenced much more than narrow macroeconomic considerations.

The second way out is to develop arguments in favour of rule-ba rather than discretionary policy coordination. The acceptance of ru means that all governments are pre-committed to agreed polices, remov the dangers apparent in cases where some parties are effectively pre-co mitted but others are not.

A considerable number of empirical studies have been undertak These have produced mixed results regarding the benefits from macroe nomic policy coordination. On balance, where studies have shown ga from coordination, they have tended to be rather small, although the ga appear to increase with the persistence of disturbances that lead to coor nation. They also appear to increase over time. In the long run, gains fr cooperation in the face of permanent supply or demand shocks may be v considerable. Such studies are of some interest in themselves but the ab ty of researchers to vary the results by making relatively small changes their models means that they can, at best, provide only luke-warm supp for policy coordination.

many meetings on economic issues of the heads of government of G7, su
ported by considerable academic lucubration. Yet very little of substan
has resulted and what has resulted has been subject to much criticis
Perhaps the most substantial outcome has been the development of t
major proposals for international macroeconomic cooperation: Williams
and Miller's target zone proposal[9] and McKinnon's currency substituti
proposal . These have led to a good deal of argument and this has, in itse
underlined the difficulties involved in making serious progress towa
macroeconomic policy coordination at a world level. A brief outline of
two proposals helps to make the point.

Williamson and Miller proposed that interest rate differentials betwe
countries should be varied to keep real exchange rates within a given, w
band around the agreed equilibrium level for the real exchange rate (chos
so as to give medium — to longer-run current account equilibrium). T
target zone would have 'soft buffers' so that authorities would cease defe
ing it in the face of large unexpected shocks. The zone would also be re
ularly adjusted in line with actual changes in exchange rates. Domestic f
cal policy should be used to achieve domestic targets for nominal dema
growth. Although these targets should take account of the need to redu
inflation to zero, countries would be able to give greater or lesser weight
the inflation objective relative to capacity utilization.

Pause for thought 10.10:

What is a soft buffer?

McKinnon, on the other hand, proposed fixing the exchange rates of
currencies of G3 (USA, Japan and the EU) approximately at purchasi
power parity. G3 would then agree on a constant expansion rate for
combined money supply of the three members. If portfolio hold
increased their demand for one of the currencies at the expense of anoth
the authorities would simply accommodate this at the existing exchan
rates. The money stock of the country whose currency was in dema
would expand more rapidly; the rate of growth of the other country's mon
supply would decline. Much academic work followed on target zones
exchange rates.[10]

Although it is worth noting that both Keynesians and monetarists m
support some form of international coordination, the difference between
two proposals outlined above is pronounced. It is clear that there has be
little, if any, convergence in the views of economists. If we add to these d

tainability and time consistency, we cannot be very hopeful about prospects for a rapid movement even to a simple rule-based regi Certainly, there has been no progress in recent years towards a more fi exchange rate system at international level. The prospect of full disc tionary coordination of macroeconomic policies is remote.

Policy coordination in practice

The first significant attempt at discretionary policy coordination was setting up of the annual economic summit of the G7 countries in 1975, s as an important new forum for policy coordination following the breakdo of the Bretton Woods system (an example of rule-based coordinatio Later meetings of some importance in terms of macroeconomic pol included the Bonn Summit of 1978, the Plaza Accord of 1985, and Louvre Accord of 1987. Two problems arise in attempting to deal w these: that of attempting to judge their success or failure; and that of try to account for that success or failure. The crucial question is whether f ure is an indication that any such exercise is bound to fail; or whether th are particular lessons to be learnt that might allow more successful pol coordination to be undertaken in the future.

In 1974, the finance ministers of the industrial countries agreed not have competitive devaluations. However, after 1975, the USA chose a p icy of loose fiscal policy and tight monetary policy; while Europe and Jap used contractionary policies (largely, government expenditure cuts and ti monetary policy). The Bonn Economic Summit in 1978 endorsed the vi that coordination at this time might have considerable benefits; the U called for joint action to expand the major economies as a locomotive the world economy. However, when Germany tried to carry out its part the programme alone, it quickly ran into trouble. From 1980 to 1982, th were further calls for joint expansion but by then the USA were opposed joint action. It has been argued that had the OECD countries other than USA accepted fiscal expansion in return for reduced US budget deficits, inflation would have been lower, while export demand would ha increased via a fall in the value of the dollar. The other OECD countr would have grown faster and had less unemployment. Developing co tries would have increased export earnings and reduced their indebtedne There was a start on this kind of programme with the Plaza Agreement (1985) between G3: it was agreed that monetary policies should be coor nated to manage worldwide reductions in interest rates. 1986 saw the

Japan and Germany to compensate for any contractionary tendencies in
policy. Yet in practice, little happened although interest rates and the dol
did start to fall. In 1987, in the Louvre Accord, finance ministers decid
to try to maintain exchange rates within agreed target zones, but the arran
ment was abandoned after the 1987 stock market crash.

At one end of the spectrum of opinions on recent attempts at policy co
dination, are those who do not see the economic summits as attempts at p
icy coordination at all. In Kindleberger's presidential address to the 9
annual meeting of the American Economic Association in 1985, he asse
ed that '...the commitment to consultative macroeconomic policies in an
al summit meetings of seven heads of state has become a shadow play
dog-and-pony show, a series of photo opportunities ....with ceremony su
stituted for substance'.[11] Portes argues somewhat differently, questioni
not their effectiveness but the motives behind them, seeing the glo
macroeconomic policy attitudes of 1979-85 as '...the very antithesis of p
icy co-ordination'.[12] In his view, the spirit behind policy coordinati
should be a desire to produce more efficient outcomes, but he saw the
summits as attempts to alter the balance of power within the existing e
nomic system by bringing about changes in fellow-members policies
one's own interests.

Pause for thought 10.11:

What do you think a 'dog-and-pony show' might be? To what aspects of such a
show might Kindleberger be referring in the quote above?

At the other end of the spectrum lie the views of those who do, inde
see G7 and G3 meetings as coordination but who believe that all su
attempts are likely to do more harm than good. Such views are based o
central belief in the efficiency of markets, a Public Choice school interp
tation of the aims and ambitions of bureaucrats who attempt to manage m
kets, and a feeling that economists are '...abysmally ignorant about
macro-economic processes and the dynamics of forces that determine
fate of national economies'.[13]

Horne and Masson (1988) provide a good example of the 'lessons to
learnt' approach to the summits. They distinguish between 'procedural' a
'substantive' achievements. At a procedural level, they suggest that
summits were a success, establishing '...an increased awareness of pol
interactions, a recognition of the role of exchange rate factors in macroe

convincing at a substantive level. The 1978 Bonn economic summit, wh
endorsed the view that coordination at this time might have considera
benefits but which led to an apparent over-expansion of the West Gern
economy, is selected particularly as an example of the pitfalls of inter
tional fine-tuning. Currie (1990) suggested, on the other hand, that critici
of the macroeconomic aspects of the Bonn summit may have been unf
and contrasts the '...detailed analysis and negotiation that took place prio
the Bonn summit with the sketchy and hasty preparations for the Plaza a
Louvre Accords'.[15] He reserved his ire principally for the shortcomings
the Louvre Accord, which he saw as an example of stupid coordinat
since its targets for exchange rates were not supported by a willingness
adjust the underlying macroeconomic policies.

The failure of the Louvre Accord set back the development of inter
tional policy coordination. Very little has happened at the level of the wo
economy since 1987. The notion of international macroeconomic pol
coordination seems, temporarily at least, close to expiry. We are left w
attempts by governments to exert pressure on other governments. I
example, in 2001, as the US economy headed into recession and as
Federal Reserve cut interest rates sharply, American economic policy adv
ers on several occasions expressed their unhappiness at the failure of
European Central Bank to follow suit. However, there was no suggest
that there should be an organized exercise in policy coordination to redu
the possibility of world recession.

Exercises in international policy coordination since the collapse
Bretton Woods were not limited to the economic summits. Of equal imp
tance was the operation of macroeconomic policy within EU member co
tries. The EMS was an example of rule-based policy coordination. T
widening membership of the exchange rate mechanism of the EMS, w
most members moving into the narrow band, together with the increas
freedom of capital movements within the EC, ensured a high degree
coordination of monetary policy. This later developed into the movem
to the monetary union of 12 members of the EU. This is dealt with
Chapter 13.

10.7 Capital mobility and the Tobin Tax

We have seen that internationally mobile capital reduces the freedom of p
icy makers to act independently. In a fixed exchange rate system, monet
policy is, at best, effective for only a short period. In a floating excha

problems are discussed further in Section 12.3. Here, however, we wish
consider the application of a small tax to international capital flows. T
was first proposed by the American Nobel Prize-winning economist, Jam
Tobin (1978) and has become universally known as the Tobin Tax. T
original plan was for a uniform tax on capital flows, levied by all countri
to make 'hot money' round trips unprofitable and to remove the dominan
of capital account movements over exchange rates. The tax rate most co
monly suggested is 0.1 per cent, although figures up to 0.5 per cent ha
been put forward by various writers.

There have been many criticisms of the proposal and, until recently
languished in occasional journal articles. Following the Asian financial c
sis of 1998, however, the proposal was taken up particularly by groups ca
paigning against the impact of globalization on developing countries. It h
now attracted support from some governments. It was supported by
Canadian parliament in 1999.

Some criticisms of the Tobin Tax have been practical. For example
has been argued that capital flows for long-term investment are desira
and certainly should not be taxed. The aim should be to reduce, or at le
slow down, speculative capital flows, but it would not be possible to d
criminate accurately between the two types of flows. It has also be
claimed that the proportion of international capital flows that are genuin
speculative in nature has been exaggerated. Another practical difficulty
that many international assets are not controlled by a single authority
group of authorities and this makes it difficult to keep track of all capi
flows. Many already go unrecorded. The application of the Tobin
would provide another incentive for investors to evade official attention a
would lead to a large increase in unrecorded flows. In addition, there is
problem that the tax would need to be imposed by all financial centres b
would provide an incentive for some centres not to charge the tax as a w
of attracting new business.

Quite apart from the practical objections, neo-classical economists arg
that the Tobin Tax is undesirable because it is not a first-best policy a
would have undesirable side effects. It would favour inertia and local as
bias in portfolios and would infringe Pareto-efficiency conditions. Fr
this viewpoint, the underlying problem should be identified and pol
should be aimed directly at that problem. For example, if the problem w
the slow adjustment of goods market prices (as in the Dornbusch ov
shooting model), the first-best policy would be one aimed at the rigidities

The tax has also been criticized by post-Keynesians. Davidson (19
accepts that speculative flows create problems. He stresses the relevance
Keynes's beauty contest analogy to foreign exchange markets. This is
view that market behaviour largely consists of people trying to guess w
other people in markets are likely to do. This can easily lead to wild sp
ulation and panics. However, he argues that the usual magnitude propo
for a Tobin tax would be a negligible deterrent to short-term speculation a
would probably be a greater deterrent to real trade flows and arbitrage act
ities. He makes an alternative proposal for preventing currency speculati
based on Keynes's 1940s writings. He suggests a need for rules and str
tures to prevent crises, pointing out that when Keynes analysed this pr
lem, he saw that a system of outright prohibition of international hot mo
flows would be required.

In recent years, the tax has been supported as a source of funds for s
tainable development. It is argued that if the tax were applied and were
fail in its primary purpose of slowing down flows of hot money, it wo
provide large funds that could be used for the assistance of poorer countri
This assumes that countries could arrive at a decision as to how the fu
would be best used.

10.8 Summary

The impact of monetary policy in an open economy depends on the nat
of the exchange rate system. When a fixed exchange rate system is in fo
and capital is mobile, monetary policy is weak. If capital were perfec
mobile, monetary policy would be completely ineffective. In this case
small country within the system could not determine its own monetary p
icy. The monetary policy of the system could be that of an asymmet
leader or it might be determined by the group of countries acting togeth
In either case, there could be problems for a small country whose busin
cycle was not synchronized with those of the other members of the syste
This would be particularly the case if there were hysteresis effects, wh
caused an incorrect monetary policy to have a damaging long-run impact
the economy.

Countries may retain some freedom in monetary policy if the system
relatively wide bands around the fixed exchange rate parities or if gove
ments are able to devalue or revalue their currencies within the system wi
out damaging either the system or the anti-inflationary reputation of

impact of monetary influences from abroad. However, this cannot be eff
tive for long in a world of highly mobile capital. This also applies to
attempt to preserve monetary independence with capital controls. The lea
ership of a fixed exchange rate system may be determined by the nature
the system or by the attitudes of governments and financial markets. In
latter case, the country most trusted to keep inflation low and to preserve
international value of its currency is likely to become the leader. Th
there is a possibility of the leading country following a tight monetary p
icy that could have a deflationary impact on other members.

Monetary policy is effective if exchange rates are allowed to float. T
precise nature of the impact depends, however, on what determi
exchange rate movements. In simple monetary models of the exchange r
an increase in the rate of growth of the money supply leads to a proporti
al change in the exchange rate, preserving purchasing power parity in b
the short and the long run. That is, monetary policy is neutral. Howev
purchasing power parity certainly does not hold in the short run. Exchan
rates are much more volatile than domestic prices. The overshoot
exchange rate model attempts to explain the volatility of exchange rat
The best-known version of this approach makes use of the idea of stic
prices in goods markets. In this case, monetary policy has real effects in
short run, although it again becomes neutral in the long run. Monetary mo
els suffer from the disadvantage that they preserve the assumption of p
fect capital mobility and do not allow a distinction to be made between op
market operations and foreign exchange operations. This is overcome
portfolio models of the exchange rate.

Floating exchange rate systems are sometimes defended because th
allow countries to preserve independent monetary policies. However, ev
with floating exchange rates, the monetary policy of a country can have
impact on other countries. This possibility has increased as countries ha
become more and more interdependent economically. This raises the qu
tion of the desirability of international monetary policy coordinati
Although a good deal of time has been spent developing policy coordi
tion models, the size of any net benefits from policy coordination rema
unclear. In practice, little progress has been made in discretionary moneta
policy coordination among the major economies.

target ranges

spillovers

perfect capital mobility

synchronized business cycles

devaluations/revaluations of the exchange rate

sterilization of monetary influences

capital controls

exchange rate parities

exchange rate bands

intervention currency

uncovered interest rate parity

purchasing power parity

overshooting exchange rates

macroeconomic policy coordination

rule-based coordination

Questions and exercises

1. How is the deflationary policy of a strong country transmitted throug
fixed exchange rate system?

2.Why might a revaluation of a currency only temporarily reduce a Bala
of Trade surplus?

3. Why does a wide band around fixed exchange rate parities (as with
15 per cent band in use in the EMS between 1993 and the end of 1998) ma
life more difficult for currency speculators?

4. What factors are likely to determine leadership within a fixed excha
rate system?

5. What meaning or meanings might be attached to the notion of the eq
librium exchange rate?

(b) a decision to widen the exchange rate bands within a fixed exchan
rate system.

7. Memory test: What are hysteresis effects? Where are they mentioned
this chapter? What point is made in relation to them?

8. Is the assumption in the Dornbusch model of sticky goods market pri
realistic? What about the other assumptions of the model?

9. What is the relationship between purchasing power parity and the ne
trality of money?

10. Memory test: what is the Lucas critique? Where is it referred to in t
chapter?

11.In what senses is:

(a) the Williamson-Miller target zone model Keynesian?
(b) the McKinnon fixed exchange rate model monetarist?

Further reading

The Mundell-Fleming model is dealt with at length in most second le
macroeconomics texts. It is particularly well used and discussed
Acocella (1998). Textbooks that cover exchange rate economics w
include the third edition of Copeland (2000) and the second edition
Pilbeam (1998). Most of the material on policy coordination dates from
late 1980s and early 1990s, when it was rather more popular as a topic th
it has been recently. Recommended are the essays by Currie in Llewell
and Milner (1990) and by Hughes-Hallet in Greenaway (1989).

11 Monetary Policy in the UK

'In the United Kingdom, money is endogenous - the Bank supplies base money on demand at its prevailing interest rate, and broad money is created by the banking system' Mervyn King (1994) p.2

What you will learn in this chapter:

- The small part played by the explicit targeting of money and credit aggregates in the history of UK, monetary policy
- How financial innovation undermined the experiment in monetary targeting in the 1980s
- Why the short-term rate of interest has emerged as the main instrument of monetary policy
- How the Bank of England sets interest rates through its operations in gilt repo.

11.1 Introduction

In Box 2.1, we saw that for policy purposes, money is defined and measu in similar ways in most economies. Furthermore, we saw that money cons overwhelmingly of bank deposits and that these are the liabilities of priv sector profit making firms and that the monetary authorities can theref have only indirect control over the creation and destruction of money. In t chapter, we are going to look at how monetary policy has evolved over years, at what factors have caused policy to change and thus at what lesso have been learned. In Chapter 4 we saw how changes in the quantity money occur. Here we shall start, in the next section, by looking at the c duct of monetary policy in circumstances where the authorities think t changes in the quantity of money matter. We should stress at the outset t the UK authorities have always been rather half-hearted in their commitm to this view. For most of the period from 1950 to 1985 monetary policy w conducted with at least some vague idea that the quantity of money proba did matter, but that other things — the level of interest rates, the excha rate, the availability of credit, overall 'liquidity' — were also important. was only from 1967 to 1985 that specific targets for monetary growth w set (but not always publicly) and only between 1980 and 1985 that the purs of these targets took clear precedence above all else. Section 11.2 ends in mid-1980s with the final abandoning of monetary targeting.

monetary aggregates less important and also less controllable. We shall s
that there is a certain irony here, since many of the innovations which und
mined monetary targeting sprang from a policy of financial deregulati
introduced by the same government which was at the same time insisting
the importance of hitting its monetary targets. In Section 11.3 we look at
process of financial innovation and how it undermined both the rationale a
the feasibility of monetary targets during the 1980s.

In Section 11.4 we look at how monetary policy has evolved since
demise of monetary targeting. This takes us through a period in which
authorities targeted the exchange rate (against the Deutschemark) and th
targeted the rate of inflation itself. In these circumstances, and in contr
with those outlined in 11.2, money and credit growth rates are demoted, fi
ly to being a subsidiary target and then to at most one of many possible in
cators of the future trend in inflation. In these circumstances, the central ba
sets interest rates with an eye on the likely rate of inflation some eighteen
twenty-four months ahead. Given the level of interest rates, banks are free
meet all creditworthy demand for loans that are forthcoming and the cent
bank ensures that sufficient reserves are available. These 'loans cre
deposits' and the money supply has become endogenous. We close Secti
11.4 by looking at how the central bank sets interest rates and at why, in
present conduct of monetary policy, the money supply is endogenous.

Section 11.5 summarises.

11.2 UK monetary policy before 1985

As we shall see in a moment, UK monetary policy passed through a numb
of very different phases between the end of World War II and the mid-198
Dividing the historical record into precise sub-periods is always controvers
but we can probably say that there were three identifiable phases — 1945
1971, 1971 to 1979 and 1979 to 1985. It was only in the last of these perio
that monetary policy tried to focus explicitly and single-mindedly upon
growth of the money stock, though shifts in this direction can be seen duri
the second period, roughly the 1970s.

Adopting a monetary policy in which control of the monetary aggrega
is the main objective must obviously be based upon some theoretical noti
of how monetary variables affect the rest of the economy and specifica
upon the idea that the aggregates themselves are capable of having an in
pendent, causal effect. The thinking is broadly that which we saw in Secti

$$\dot{M} + \dot{V} \equiv \dot{P} + \dot{y} \qquad \ldots 11$$

As in 5.2, this identity is turned into a theory by placing some restrictio on the following variables:

y : that it grows at a 'natural rate' determined by population and producti ty growth;
V: that it reflects custom and usage of money in the payments system a evolves very slowly;
M: that it is determined independently of other variables in the system.

In its pragmatic version, these restrictions are held to apply only in long-run; short-run deviations are allowed. Notice three important conc sions that follow from these restrictions:

- Causality runs from left to right as a result of money's independence
- The monetary arrangements implied by the B-M approach (see section 3 would do very nicely as an explanation of this independence
- $\dot{P}$, the rate of change in the general price level, is the residual variable wh will adjust to accommodate any tendency for the rate of growth of money vary from the rate of growth of output.

The message, of course, is that the rate of monetary expansion determi the rate of growth of nominal spending ($\dot{M} + \dot{V}$) and if, in the long-run, t differs from $\dot{y}$, the rate of growth of real output, the difference will be refle ed in the rate of inflation.

Pause for thought 11.1

In 2001, the Bank of England was content to observe the M4 money stock grow at an annual rate of about 7 per cent, while being confident that inflation would close to target at 2.5 per cent. If real output was expected to grow at 2 per ce what was the Bank assuming about the likely behaviour of velocity?

As we shall see now, such ideas played little part in the first phase of po war monetary policy. In fact, it took quite a long time for such ideas to g what was a rather fleeting hold over policy.

For these twenty-six years, British monetary policy was effectively det
mined by a theoretical approach, an institutional imperative, and membersh
of the Bretton Woods fixed exchange rate system. The theoretical approa
was Keynesianism, an interpretation of the ideas of Keynes in which
strong views about the ineffectiveness of monetary policy in a depress
were generalized to cover all phases of the business cycle. In terms of
IS/LM model, which was a popular if not always accurate exegetical dev
for Keynes's ideas in this period, the *LM* curve was believed to be flat and
IS curve steep. Thus, monetary policy was believed to be weak and fiscal p
icy strong.

Although Keynesian theory of the day did not reject monetary policy
of hand, it was certainly not thought possible to conduct it through controll
the stock of money. While accepting that planned expenditure was the key
behaviour of nominal income, the ability to carry out these plans was held
depend on the 'liquidity' of the economy, rather than on the narrower conc
of the stock of money. For example, the ease with which people borrow fr
any source (not just banks) would affect their ability to spend. We discuss
this at some length in Section 1.2. Secondly, the existence of many close su
stitutes for money meant that it was difficult to define the supply of money
alone to measure it. The existence of close substitutes (including non-ba
borrowing) meant that spending could vary independently of changes in
money stock which was just another way of saying, in Quantity Theory ter
that velocity was highly variable. All of this was powerfully expressed by
Report of the Radcliffe Committee which deliberated for two years over
working of the UK monetary system.

> It is possible…to demonstrate statistically that during the last few years the v
> ume of spending has greatly increased while the supply of money has har
> changed: the velocity of circulation has increased. We have not made use of t
> concept because we cannot find any reason for supposing, or any experience
> monetary history indicating, *that there is any limit to the velocity of circulati*
> (Radcliffe, 1959, para 391 our emphasis). [1]

This left monetary policy preoccupied with the general level of liquid
Interestingly, Radcliffe opted for changes in the cost of borrowing (the rate
interest) rather than direct controls (lending ceilings) as the best way to inf
ence liquidity. In practice, however, the level of interest rates was larg
determined by the general tenor of macroeconomic policy. The princi
objective of policy throughout the period was full employment, constrain

need to reconstruct the economy following the war, led to a policy of l
interest rates, punctuated by an occasional rise to protect the value of
pound sterling.

The institutional imperative derived from the dual role of the Bank
England as a central bank with responsibility for monetary policy and
country's international reserves, and as banker to the government with
responsibility for marketing government debt issues. The domination of fis
over monetary policy was reflected in the priority given to the debt market
responsibilities among the Bank of England's tasks. The generally accep
view of the UK market for government debt at the time was that it was do
inated by *capital* risk aversion. This led naturally enough to the view that
size of the market could be maximised by keeping bond prices steady and t
in turn meant a combination of stable interest and a policy of 'leaning into
wind' by the Bank, buying and selling debt as the market weakened
strengthened. However one looks at money supply determination, the Ban
position in these circumstances is severely compromised. In the flow of fu
identity for example (see equation 3.18) it has to take any fiscal deficit
given. Its ability to sell debt to the non-bank private sector is inhibited
views about the debt market with the result that residual financing (Δ
broadly follows the deficit. Equation 3.20 puts it in B-M terms. Ignoring
external position, the monetary base expands to the extent that sales of g
ernment debt do not fund the PSBR. Worse even that this, interest rates w
already serving two masters — the needs of the government debt market a
the exchange rate. In these circumstances, giving primary attention to the r
of money and credit expansion would have been a practical impossibility.

Pause for thought 11.2:

Why does the presence of capital risk aversion in the bond market discourage f
quent changes of interest rates?

This lack of access to both the monetary base and interest rates as inst
ments of monetary control meant that when, occasionally, the rate of mon
and credit expansion did reach the policy agenda as in the 'credit squeezes'
1956 and 1964-5, control could only be conducted through the use of dir
controls over bank behaviour . This fitted neatly with the needs and spirit
the immediate post-war period which reflected the very weak position of
economy following the war as well as a general Keynesian suspicion

economy in which rationing of consumer goods also existed for many ye
and in which a number of industries had been nationalized,[3] controls over
behaviour of banks hardly seemed alien.

Controls over banks, however, remained well after they had begun to
dismantled in other areas of the economy. They continued to be used throug
out the 1960s, even though this was against the advice of the Radcli
Committee. Borrowers, with the clearing banks unable to meet their requi
ments, sought other sources of funds. This contributed to the rapid growth
non-bank financial intermediaries, greatly weakening the effectiveness
direct controls. The first response of the authorities was to widen their app
cation, with lending ceilings being extended in the late 1960s to seconda
banks and hire purchase finance companies.

Apart from major devaluations of sterling in 1948 and 1967, balance
payments balance was sustained through macroeconomic policy. This w
largely achieved through stop-go fiscal policies although interest rates had
be raised from time to time to protect sterling from speculative pressures. T
was particularly true in the period before 1967 during which the governm
battled to avoid devaluation.

By the end of the 1960s, all of the elements which had contributed to
formation of monetary policy in the previous 25 years were being called i
question. Inflation rates had risen and the term 'stagflation' had been inve
ed to refer to the periods of 'stop' which combined low rates of econon
growth and rising unemployment with stubborn rates of inflation. Keynes
confidence that the macroeconomy could be managed at or near full emplo
ment had begun to wilt. Furthermore, conditions attached to an IMF loan
1967 included requirements that the government restrict lending to the priv
sector and reduce the budget deficit in order to reduce domestic credit expa
sion (DCE).[4] Although it was expressed in terms of credit rather than mon
stock, this was the first statement that the aggregates must themselves
directly targeted, though the method was unspecified.

In brief, monetarism began to elbow Keynesianism aside and this w
associated with a strengthening of belief in the efficiency of markets. Fr
the point of view of the operation of monetary policy, this was doubly sign
icant. Firstly it stressed the importance of targeting the monetary aggrega
and it also hinted at methods. As we saw a moment ago, direct controls h
always suffered from the ability of market participants to find their w
around them and something of a game of cat and mouse had emerged betwe
the authorities who made a rule, ingenious financial institutions which fou

non-market, controls should play no part.

To reinforce the theoretical shift, there was also a partial change in institutional constraints. As we saw in Equation 3.18, the money supply change when the central bank uses exchanges between domestic currency foreign assets as it is obliged to in a fixed exchange rate regime. This severely hamper any attempt to target the domestic money supply and is widely recognised source of money supply endogeneity. By 1970, howe the Bretton Woods fixed exchange rate system had begun to unravel and p erful claims were being made for floating exchange rates. In future, monet authorities would have more freedom to target the domestic money stock.

1971-79: 'Competition and Credit Control'

By the end of the 1960s the authorities were becoming increasingly concer at the effect of the accumulation of controls on the structure and in particu the competitiveness of the banking system. The objections to the battery 'requests', 'guidelines', 'ceilings' and other forms of direct control were out by the Governor of the Bank of England in 1971 (Bank 1971a). The obj tions were those which routinely apply to all non-price methods of rationi they encourage inefficiency, inequity and evasion.

Inefficiency arose, it was alleged, by diverting funds (priced below market clearing level) into projects (typically in exports and manufacturi which were favoured by government policy but whose return was less t that on other projects (often connected with property development or c sumer goods). Inequities arose at many points. For example, the regulati discriminated against those institutions to which they applied, in favour those to which they did not. Typically the burden of control fell most heav upon the clearing banks to the benefit of existing non-bank financial inter diaries and of newly created secondary banks whose characteristics w designed to keep them just outside the reach of the controls.

The growth of new markets and institutions exempt from the contr yields a wealth of examples of regulation-induced innovation.[5] More imp tantly here it was a demonstration of the classic black market effect of n price regulation. As soon as controls frustrate both sides of the market (ba and their clients) they create a market incentive for evasion. This in t requires new regulation, and expenditure upon the resources required enforcement. Furthermore, it also distorts the meaning of existing indicat and deprives the authorities of valuable information. It was this experience seeing controls imposed at one point countered by circumventory innovati

At the same time, controlling the volume of bank credit was starting emerge as a potential intermediate target of monetary policy partly, as have seen, under pressure from the IMF, but also as the state of monetary ec nomics itself came to link monetary aggregates with nominal income mo directly through a stable demand for money function. In the terms that adopted at the beginning of this section, the discovery of a stable demand money function was tantamount to confirming that, contrary to the Radcli Committee's contention, velocity was subject to very little change. The qua tity of money that people wished to hold (M) was a stable fraction of to spending (Py). Velocity changed only slowly and thus the effect of chang in P would be predictable changes in Py. (Notice that stability in V only c ates a predictable *association* between M and Py. It says nothing abo causality, but this was assumed, with little debate, to run from M). W emerged from a period of extensive discussion and consultation was a set proposals known ever after as *Competition and Credit Control* (*CCC*). The proposals were introduced in September 1971 and the title is significant sin the package was trying to achieve two objectives which did not necessarily easily together. On the one hand, the 'competition' part of the proposals w designed to reduce the discrimination between institutions — banks, secon ary banks and finance houses — and to foster competition between banki firms. The principal targets here were an interest rate cartel operated by banks which kept deposit rates down and made them 'sticky' or unrespons to changes in other short-term rates, and bank charges, which were high than in other countries with developed banking systems. On the other ha the *CCC* proposals were intended to provide a more satisfactory method controlling the expansion of money and credit than the market-distort interventions of the past. The details of *CCC* are reported in many place but briefly:

- all quantitative restrictions on lending by banks and finance houses w to end
- all agreements and conventions on interest rates were to end
- the Bank would no longer support the gilts market by buying bonds w more than one year to maturity
- 8 per cent cash ratio reduced to 1.5 per cent and extended to all bank
- 28 per cent liquid assets ratio replaced with a reserve asset ratio of l per cent for banks and 10 per cent for finance houses with assets over £

The removal of directives and requests naturally raised the question what form control of credit or monetary aggregates should take in futu Given the disillusion with direct controls, it is not perhaps surprising that emphasis was to be on 'market methods', that is to say on price. Changing market price of credit, it was argued, would be indiscriminate between in tutions and would remove the incentives to collusion between borrowers a lenders that inevitably arose when interest rates were held at non-mark clearing levels. The intention was, therefore, to vary short-term interest ra which, it was hoped would cause changes in the demand for loans and demand for the deposits which the loans created. The details of *CCC* ha thus to be seen as a way of giving the authorities the ability to make the changes quickly and predictably, and to make them in a non-discriminat way. The history of the initial failure and the subsequent patching up of *C* reflects the progressive discovery that these demands were not particula responsive to interest changes, especially in periods of rapid inflation.

Pause for thought 11.3:

Why might the demand for bank loans be interest-inelastic?

Given the prevalence of official ratios in the history of UK banking, a the prevalence of bank deposit multipliers in textbook accounts of money s ply determination (see Section 3.3), it is important to emphasise that reserve asset ratio (like all ratios before and since) and the calls for spec deposits were never intended to operate as part of a monetary base cont system where the Bank would seek to change the quantity of deposits changing the supply of reserve assets. The objective was stated by Governor in an often quoted passage:

> It is not to be expected that the mechanism of minimum reserve asset ratio Special Deposits can be used to achieve some precise multiple contraction expansion of bank assets. Rather the intention is to use our control over liquic which these instruments will reinforce, to influence the structure of interest ra The resulting *change in relative rates of return* will then induce shifts in the c rent portfolios of both the public and the banks (Bank, 1971b, p.10, our emp sis).

The key phrase is 'our control over liquidity'. This refers to the Ban position as a monopoly supplier of funds in times of a general shortage (len

these circumstances the role of the reserve asset ratio (and a call for spec deposits for that matter) is solely to speed up the process of interest r adjustment. Essentially, the reserve asset ratio was intended to force ban with a reserve shortage to meet the problem by withdrawing call money fr the discount market where the Bank could immediately put pressure on sho term rates by its response to the discount houses' requests for help. By clas fying a wide range of bank liquid assets as reserves the authorities hoped deter banks from meeting the shortage by disposing of these assets. Of cour a significant disposal — of gilts, for example — would eventually cau interest rates to rise with similar implications for the cost of bank advanc and the flow of lending. But the interest rates affected, and the length of ti required for the effect, would be more diffuse and less certain.

Clearly, and it is worth repeating, the reserve asset ratio was not intend and could not be used as the centrepiece of a fractional reserve-multiplier s tem and was there only to help in the manipulation of interest rates. It is Bank's lender of last resort function and its willingness to vary interest ra which is crucial. Reflecting on the conduct of monetary policy as it was env aged under *CCC*, the Bank later said:

> Importance was now attached to the monetary aggregates; their rate of growth w to be controlled by the market instrument of interest rates. (Bank, 1978).

It is easy to see the FoF approach at work here.

As regards debt management the authorities can adopt one of two a tudes. They can emphasise a support function giving priority to maintain stable debt prices, buying and selling debt so as to smooth market fluct tions, and accepting whatever monetary consequences, via residual financi may follow from that. The alternative is to emphasize the control (of mon supply) function — selling whatever volume of debt is necessary to lim residual financing to whatever is consistent with monetary targets, and acce ing whatever price/yield fluctuations follow from that. Each approach carr a number of detailed implications for the way in which the authorities oper in the market.

As we saw in the last section, in the pre-*CCC* period the authorities s the support function as more important than control. This was consistent w the Keynes-Radcliffe scepticism about monetary aggregates and the con quent emphasis on interest rates. It also reflected some of the Bank's (of unsupported) views about the nature of the government debt market in 1950s and 1960s as we saw in the last section, namely, that the market w

investors away.

The announcement, slightly predating *CCC*, that the Bank would longer be willing to buy stock with more than one year to maturity obviou signalled a major shift in the direction of the control function. This was c sistent with a desire to give more attention to the growth of money and cr it arguments, though it is worth emphasizing again that this priority its emerged only from 1973 onwards. The arguments in the preparation of *C* reflected a wider range of growing doubts about the policy of 'leaning i the wind'. The first questioned the ability of the tactic to deliver its fun mental objective. While stabilising debt prices may maximize present dema it does not follow that long-term demand is similarly affected. It may be t a policy which gave more variable yields and more monetary control n would do more for demand in the long term if the greater degree of monet control produced lower and more predictable inflation rates. Furthermore, ability of the tactic to maximize present demand could be called into quest since there was no real evidence that the market was dominated by scepti Thirdly, the policy was contradictory. 'Leaning into the wind' involved s ing debt and then buying it (or some other debt) back if the market weaken The argument that supporting the market must conflict with the need to v interest rates for monetary control purposes was therefore only one of sev al objections.

Allowing prices/yields to fluctuate more gave the authorities more pot tial control over residual financing of the government deficit, but left th with the problem of how to sell debt on a falling market. In the early years *CCC* when, as we shall see, monetary and fiscal policy were both expansi ary, this was not a problem. Indeed, in 1972 and 1973 the Bank provided s port for the market for short periods. The situation became pressing in 19 however, when large public sector deficits combined with a desire to cont monetary growth required large sales of gilts. The response was twofold. T most dramatic part of the strategy was to raise short-term interest rates shar in order to bring them down later and encourage investors to join the mar to benefit from capital gains. This amounted to treating the demand for g as a function not just of the *level* of interest rates but as a (negative) funct of *changes*, a fall in rates from their peak causing the demand curve to sh outward. The first use of the device, subsequently christened the 'Duke York tactic' for obvious reasons, was in October 1975. Between then a March 1976 over £3bn of central government debt was sold to the non-ba private sector. The tactic was used on a further nine occasions before 197

In March 1977, the Bank invited the first subscriptions for part-paid stock a
followed this with two issues of stocks with variable interest rate payme
linked to treasury bill rate, offering holders some compensation for declin
capital values when interest rates were rising. Although the possibility
moving away from the fixed price/tap system of issue was widely discuss
in 1975 and 1976, the first experiment — with a partial-tender issue — had
wait until 1979.

Finally, amongst the changes often associated with *CCC* was the char
from Bank Rate to Minimum Lending Rate (MLR). The switch was not p
of the provisions but may be argued to have followed necessarily from
change in debt management which allowed greater fluctuations in inter
rates. Bank Rate had functioned both as the 'last resort' rate and as the ba
on which many other rates were set by conventional mark-ups. Its level
the coming week was announced each Thursday though, during years of int
est rate smoothing, the announcement consisted most frequently of '
change'. With many rates linked to it by convention, changes in Bank R
became increasingly momentous events which acquired a correspondi
amount of inertia. When interest rates, including the treasury bill rates
which the Bank was effectively supplying liquidity, were allowed to fluctu
more freely, it became inevitable that market rates sooner or later would mo
out of line with a sticky Bank Rate. Like most things, this was easily p
dictable with hindsight but it took experience to learn. In October 1972, Ba
Rate was replaced by what later became known as Minimum Lending R
(since that is what it was). MLR was determined as treasury bill rate plus
per cent rounded up to the nearest 0.25.

As we said earlier, the dominant theme of monetary policy until 1973 w
expansion. A succession of tax-cutting budgets and, as it turned out, ea
credit led to a rapid rise in the PSBR, a dramatic deterioration in the balan
of payments and unprecedented increases in money supply. In the four qu
ters of 1972 M3 grew by 4¾ per cent, 7½ per cent, 4¼ per cent and 5 per ce
equivalent to 27 per cent at a year-on-year rate. In the 1972 Budget Statem
Chancellor Barber had indicated that not even the sterling exchange r
would hinder recovery. Predictably, the existing exchange rate immediat
became difficult to maintain and sterling was floated on 23rd June. Un
1973, therefore, there was still a recognisable Keynesian flavour to moneta
policy: unemployment still topped the list of potential economic problems a
it was still believed that a combination of monetary and fiscal measures co
deliver (sustained) changes in the level of output and employme

had fallen by over 200,000 on the figures of a year earlier. Furthermore, fr
a small but rapidly declining surplus in 1972, the current account of the b
ance of payments was sent into deficit in the first quarter of 1973 and by su
mer was clearly headed for a very large deficit for the year. Inflation was 9
cent and rising and unfilled vacancies were at a record level. The first ter
tive steps towards restraint came in July with a 1.5 point rise in MLR an
call for Special Deposits equal to 1 per cent of eligible liabilities to be ma
in August. In November, MLR was raised again (to 13 per cent) and a furt
2 per cent call for SDs was made. Between the two calls, further lend
guidelines were issued and the general drift away from *CCC* gathered pa
with an *official* interest ceiling on deposits (for the first time in the UK),
reintroduction of hire purchase term controls in December and the appearan
of a completely new device, the Supplementary Special Deposit scheme
'corset'), for imposing quantitative limits on the growth of deposits.

Under the SSD scheme, the Bank of England would issue target rates
growth of interest bearing liabilities (IBELs) for banks. Growth rates
excess of these targets were taxed in a steeply progressive manner by requ
ing banks to make non-interest bearing SSDs with the Bank of England. T
scheme operated on five occasions between December 1973 and June 19
with variations in the target rates and in the scale of penalties.

Once begun, the most interesting feature of the retreat from *CCC* was
speed and extent. As we have just seen, within the second half of 1973 m
etary policy came once again to be firmly based on direct controls in spite
CCC's high hopes. There are various possible interpretations: the interest r
mechanism was ineffective or too slow. Alternatively, the mechanism w
sound but the authorities declined to use it. 'Willing the end but fearing
means?' is Gowland's interpretation[9] and this is supported by an inside vi
from the Treasury. Browning (1986, p.284) admits that it was Governm
pressure that forced the Bank to find some alternative to further interest r
increases in the second half of 1973, because of the special circumstances
the energy and industrial crises. For the Bank, this is confirmed by Goodha
though he stresses also the unexpected technical problems which confron
interest rate methods as a result of liability management and the consequ
difficulty of.creating the appropriate relative interest rate changes. It is v
significant for Goodhart's case that the two most dramatic innovations in
second half of 1973, interest rate ceilings on deposits and the corset, w
both intended to limit the rise in deposit rates when other interest rates w
increased, thus restoring some of the authorities' ability to influence the l

sharply during 1974 to 6 per cent in 1975. But by then, the annual rate of inf tion, assisted by the first oil crisis, had reached 24 per cent.

The symbolic end of Keynesian monetary policy came in 1976 wh Prime Minister Callaghan, addressing the Labour Party Annual Conferen against a background of a collapsing pound and rumours of forthcoming c in public spending, announced that it was impossible for governments spend their way out of recession, efforts to do so having only a tempora effect before being replaced by higher prices. Within three months the rej tion of fiscal policy was accompanied by the first publication of monetary t gets.

In 1976 inflation had begun to moderate but by then the major focus attention was the PSBR, at £10bn equivalent to almost 10 per cent of GI Repeated speculation about the need for large cuts in public spending a splits in the governing Labour Party, helped by the misinterpretation of go ernment policy toward the exchange rate, led to a thirty per cent depreciati between February 1975 and September 1976. The year ended with the go ernment negotiating a loan from the IMF of $4bn over two years to supp sterling. In exchange, the government agreed to major cuts in public spendi and increases in revenue through to 1978 and agreed also to limit domes credit expansion (DCE), the counterpart of sterling M3 (£M3), to a tar range of 9-13 per cent. Money supply targets were at last out in the open.

The experiment with monetarism

The 1980 Budget speech announced the Medium Term Financial Strate (MTFS) which projected declining target rates of growth for £M3 and fo PSBR forming a declining proportion of GDP. With inflation at 21 per cen was always going to be difficult to hold monetary growth to its target (7- per cent) and interest rates were raised to 17 per cent in November. Even this level, *real* rates were negative but this did not prevent an outcry from personal and corporate sectors. Scepticism about both the ability of inter rates to constrain monetary growth and about the connection between mo tary growth and nominal incomes had already been expressed. The argume in favour of such a hostage to political fortune were essentially to do w information. Published targets, especially if the accompanying rhetoric ma them sound credible, would give the private sector a framework of financ stability within which it could plan more effectively; publicized targets w an indication that negotiators who tried to thwart their implications by rais prices or wages excessively would know they would encounter heavy co

argued that target growth rates, published for some years ahead, wo
impose a discipline on governments which might otherwise be tempted
depart from the counter-inflationary objective for reasons of short-run pol
cal expediency .

The level of interest rates and the UK's new role as a major oil produ
pushed the (nominal and real) exchange rate to very high levels and it was t
which exerted the major deflationary pressure and caused the dramatic rise
unemployment (from 1.3m to 2.2m) during 1980.

By the turn of the year there was some evidence that inflationary pressu
were easing (helped to some degree by external events) and interest rates w
reduced to 14 per cent. The 1981 Budget was sharply deflationary, howev
and inflation continued to fall in spite of rapid monetary growth (14.5
cent) distorted by a Civil Servants' strike. Exchange rate worries reversed
interest rate trend in the autumn but rates declined again through 1982.

The overwhelming commitment to monetary targets in this period, co
bined with a desire to remove the direct controls on credit which had cr
back into use after the failure of *CCC*, provoked an extensive review of m
etary control techniques. The result was a rejection of the arguments for m
etary base control. Instead, the authorities opted for a return to the spirit
CCC but with a number of institutional changes which, they hoped, wo
make interest rates more effective than they had been ten years earlier.

The starting point was the identification of institutions to whom
arrangements should apply. These were described as the 'monetary sector
term later substituted by 'banking sector' after the Banking Act, 1987) a
comprised all banks 'recognized' under the Banking Act, 1979. By includ
also 'licensed deposit takers' it abolished the two-tier structure of recognit
established in *CCC*. It also included the Trustee Savings Banks, the Natio
Girobank, the Banking Department of the Bank of England, and such ba
in the Isle of Man and the Channel Islands as chose to join.

Members of the monetary sector were required to maintain ½ of one
cent of their eligible liabilities as *non-operational* deposits at the Bank
England in order to provide resources and income for the Bank. In additi
banks were required to hold such *operational* balances as they thought p
dent. Notice, this was not mandatory but a matter of judgement for ban
though banks were required to notify the Bank of England of any signific
change which they proposed to make to this prudential ratio.

The most significant provisions concerned banks' relations with the d
count market where the Bank wished to strengthen its leverage over sho

agreement to maintain at least four and an average of six per cent of eligi liabilities as secured call money with discount houses, money brokers a gilt-edged jobbers. This was intended to achieve two things. Firstly, it ensu an adequate supply of bills in which the Bank could conduct the open mar operations by which it intended to provide liquidity and indicate its inter rate preferences; secondly it would ensure that banks would have signific assets subject to the change in interest rates which the Bank could enginee

All other ratios were abolished along with the continuous posting of m imum lending rate although the possibility of announcing a rate in special c cumstances was retained. The Bank instead committed itself to maintain interest rates within an unpublished band. The possibility of calling for sp cial deposits, however, was retained.

The disinclination to publish an official dealing rate was part of the desi observed with *CCC*, to depoliticize interest rate changes — to make th seem more market determined. Without a pre-announced dealing rate, d count houses would have to offer bills to the Bank at a price of their o choosing. This could, at least in theory, be held to reflect the scale of the sho age 'in the market'. Nonetheless the Bank retained the right to reject the off if it was unhappy with the corresponding discount rate. The impression t interest rates were market determined was to be further promoted by Bank's preference for dealing only in 'band 1' bills (those maturing within days), seemingly leaving longer-term rates to be determined by the marke

Faced with the desire to slow the rate of monetary expansion, the mecl nism envisaged the Bank pushing up band 1 rates by buying bills at a lar discount than had hitherto been the case, if necessary rejecting offers of b from discount houses until the shortage of liquidity produced the appropri rate of discount at the houses' initiative. Convention, though ultimately m ket forces if necessary, would ensure that all short-term rates would rise response to reports of the Bank's action (see Section 12.2): amongst th would be bank base rates and thus the rate on advances. Assuming some n ative interest-elasticity, a movement up the curve would slow the flow of n bank lending and therefore the rate of increase of the money stock. If the r in the level of absolute rates meant also a widening of the bank lendi money and non-money-asset - money differentials, then the slowdown wo be reinforced by an inward shift of the curve. We look at this process in m detail when looking at liability management later in this chapter.

By 1982, evidence that £M3 velocity was declining had become i sistible. For this reason, and with their confidence in monetary targets beg

money). From 1982-85 additional evidence on the deflationary stance of p
icy came from employment, output, various measures of inflation, asset pri
and also, by 1983, two additional monetary aggregates — M1, a narrow d
inition and PSL2, a very broad definition (see Table 2.1).

Bank lending, however, continued to grow very rapidly (at around 20
cent p.a.) suggesting, without some drastic action, a similar growth in ba
deposits. Some of the growth came from the banks' aggressive entry into
mortgage market. There was plenty of evidence from earlier periods that
demand for bank lending was interest inelastic but the demand for 'ho
loans' appeared particularly insensitive to high interest rates. Houses h
proved the one successful hedge against inflation in the 1970s and prices w
rising very rapidly again in the early 1980s. Capital gains on dwellings in
UK are generally tax-exempt and there were at the time quite widespread
subsidies on mortgage interest payments.

By the end of 1982, base rates were just above 10 per cent and, with a g
eral election not far away, the authorities were not willing to use interest ra
to tackle this explosion in lending. Instead, they resorted to 'overfunding'
PSBR, introducing a number of novelties in the form of government stock t
they issued but also putting some upward pressure on long-term interest ra
As a means of reconciling the rapid growth of private sector borrowing w
much lower monetary targets, this device was entirely successful but had
inevitable effect that the UK banking system was regularly short of liquid
This was remedied initially by the Bank buying treasury bills from the ba
ing system and, when the stock of these ran out, buying large quantities
commercial bills. In effect, the Bank was lending short to the corporate s
tor, selling gilts in order to do so: a practice which was always open to the c
icism that the corporate sector should have been able to borrow in the bo
market on its own behalf. The practice ceased in 1985 when worries ab
distortions (to relative yields) combined with increasing scepticism about
value of money stock targets.

By the mid-1980s, therefore, it was clear both that the authorities' abi
to target the broad money stock with any degree of accuracy by using inter
rates, had been severely undermined, and that the rationale for monetary t
gets had itself broken down in the face of sharply falling velocity.[12] Both w
recognized by the Bank of England when the Governor announced the end
formal targets from 1986.

We have just seen that the policy of using interest rates to target the rate growth of the money stock has a history going back to 1971, reaching its m explicit form after 1980 before ending suddenly in 1985. Its demise w brought about by a coincidence of circumstance. Firstly, interest rates beca ineffective in controlling the aggregates while falling velocity removed m of the point of targeting the aggregates. Ironically, there was a certain amou of good luck here: the instrument failed just when the policy became poi less. The explanation often given for this state of affairs commonly mak reference to 'financial innovation' and 'liability management', and we ne to look in more detail at just how it is that changes in financial products a processes can have such a major impact on the conduct of monetary polic

Since financial innovation is a continuous process, it is unlikely that eve of the period 1980-85 are unique in having some impact on the monetary s tem. This means that we should be prepared to look rather more broadly the topic and recognise a number of developments which have caused ma monetary changes with at least potential relevance to policy. We want ob ously to look at the falling velocity episode but we will look at three others well. The first is 'regulation Q' and the growth of eurocurrency markets; second is the 'bill-leak' and the Supplementary Special Deposit scheme; third is off-balance sheet activity. We will then look at liability managem and the 1980s. We take them in chronological order.

Regulation Q and the eurocurrency markets

Under the Bretton Woods system the US$ functioned as an intervention c rency, an international means of payment and store of value. The worldw demand for dollars to which these roles gave rise was met by a combinat of US balance of payments deficits and dollar borrowings from US banks, resulting deposits being held until the early 1960s, mainly with US banks. the mid-1960s, however, the US authorities began to impose controls on c rency outflows which limited access to these deposits for overseas holde This combined with two further, long-running, disadvantages. The first w 'regulation Q' which limited interest payments on deposits. The second pro lem, mainly relevant to Eastern bloc countries, was that cold-war tensions c ated the risk that dollar deposits might be impounded for political reaso The result was the growth of dollar deposits placed with European banks a later, with European subsidiaries of US banks.

Since reserve, deposit insurance, capital and other regulatory requireme are usually imposed with respect to banks' holdings of deposits in the dom

Eurobanks to offer their services at more competitive rates than domes institutions.[13]

At the end of 1990, estimates of the growth of the eurocurrency mark put it at over $5,000bn, having increased three-and-a-half-fold during 1980s. 'Eurobanks' (and 'eurocurrencies') are misnomers. Most such ban are departments or subsidiaries of major banks with a clear national ident Most major countries are involved, although the largest shares lie with ban whose headquarters are in Japan or the USA. Equally 'eurocurrency' n refer to currencies with no european connection whatsoever. In this conte the prefix 'euro-' simply means a deposit held in a bank outside the coun in whose currency the deposit is denominated. Hence dollar deposits i Tokyo bank are eurodollars. The use of the term 'euro-' is a reminder that practice of holding deposits outside their country of denomination began w the holding of US$ in 'european' banks.

From an economic point of view, there is nothing fundamentally differ between a bank which specializes in eurocurrency business and a bank wh concentrates on domestic deposits and lending. Both engage in maturity tra formation, and in so far as they create assets and liabilities which are m attractive to end users than would be the case if the latter dealt directly w each other, then they help to mobilize funds which might otherwise have l idle. However, there are two possible consequences of eurobanking activ which have attracted considerable attention.

The first is the effect upon world money supply and liquidity. If, as we s above, eurobanks are able to mobilize funds which would otherwise lie i (through the usual processes of maturity and risk transformation) then priv sector liquidity is increased. Furthermore, if we introduce into the bank system a further layer of institutions whose liabilities are money, as is plai the case with any eurocurrency, then we introduce the possibility of furt multiple deposit creation against a limited quantity of reserves. M eurobanks hold reserves with major US banks or with major banks operat in the domestic monetary system. Imagine, for example, that a US resid moves dollars from a domestic US bank to a eurodollar bank which ho reserves with the domestic bank. In the domestic bank, there is no loss deposits but there is a rearrangement of ownership of deposits (from a n bank to the eurobank). In the eurobank, there is an increase in custo deposits matched, of course, by an increase in reserves. However, the ban liquidity has increased on the assumption that its reserve:deposit ratio is l than one. (The effect is the opposite of the sale of government bonds in Ta

sible. Numerically at least, the significance clearly depends upon two rati
the reserve ratio and the redeposit ratio. Estimates of the size of the eurod
lar multiplier are very uncertain and have a wide range, mainly because i
difficult to identify dollars in a US bank which are being held as reserv
against eurodollars in a eurobank which is a branch of the domestic US ba

A second consequence, or group of consequences, arises from the incre
ing difficulty of operating an independent domestic monetary policy in
absence of exchange control (i.e. post-1979 for the UK). Clearly, any atten
to control domestic monetary expansion can be partially thwarted at least
frustrated UK borrowers taking out eurodollar (for example) loans a
exchanging the proceeds for sterling in the spot market. Such would be a p
dictable response whatever form the domestic monetary restrictions to
Furthermore, high UK interest rates, which would be part of a restrictive mo
etary policy, may attract an inflow of eurocurrencies which could then
exchanged for sterling at a guaranteed price (under fixed exchange rate
increasing both the money supply and UK banks' cash reserves. In princi
such an inflow can be sterilized by sales of securities but there is the obvio
danger that security sales themselves widen the gap between domestic a
Eurocurrency interest rates, leading to an increased inflow. With float
exchange rates the impact falls upon the exchange rate itself rather than on
money supply.

The 'bill-leak'

We saw in section 11.2 that the *CCC* arrangements envisaged the use of int
est rates to limit monetary growth but that this commitment faltered in
period of rapid growth after 1973 when it became clear that interest ra
would have to rise to levels that were considered politically unacceptab
The emergency measure was the Supplementary Special Deposit sche
which allowed the Bank of England to specify growth targets for intere
bearing eligible liabilities (roughly speaking interest-bearing deposits) a
then to impose steeply progressive penalties on banks whose IBEL grow
exceeded the target. The object was to discourage banks from raising depo
rates when the Bank of England raised minimum lending rate. This enab
the Bank to open up a differential between deposit and other market rates a
the thinking behind this was twofold. Firstly, making deposits relatively l
attractive than other assets reduced the tendency for borrowers to hold
proceeds of loans as bank deposits (preferring government securities,

interest rates made borrowing less attractive. By widening the loan-depo spread, using existing liquid assets (i.e. deposits) to finance a deficit, becon marginally more attractive than taking out new loans. (Other relativities also involved in what is quite a complicated story. We return to it under ' bility management' below).

The point about all this is that during the periods when the corset was force, banks were deterred from increasing their lending. Nonetheless, fir still needed credit and banks were fretting at the loss of the interest inco from loans unmade. One partial solution which quickly surfaced was guaranteeing of commercial bills of exchange. Given the most highly dev oped discount market in the world, it had long been possible for firms to ra short-term funds in London by the sale of bills at a given discount for a sp ified period. Indeed, for large corporations this had been a standard meth of short-term finance since the early nineteenth century. The disadvantage smaller firms, or at least for firms with no established reputation in the d count market, was the rate of interest (discount) they would have to offer the bill. This was bound to be greater than the cost of a bank loan, since firm would have an established relationship and a credit record with the ba while in the discount market it was asking buyers to hold the bills of unknown debtor. The cost of bill finance was bound to contain a signific risk premium.

Pause for thought 11.4:

Give some examples of the *relative* interest rates that may influence (a) demand for deposits and (b) the demand for bank loans.

For firms in this position, one solution was to 'buy' reputation from th bank by getting the bank to guarantee the bill. With the bank's guarantee bill would trade at the finest rates of interest since the risk of default was tually eliminated. The bank, of course, would charge for this service, but p vided that the guarantee fee was less than the interest saving, then the fi would gain from a reduction in the cost of bill finance while the bank wo earn fee-income which would provide some compensation for the inter foregone on loans that it was unable to make. By the end of the 1970s 'bill-leak' was very large indeed.

In effect, the corset introduced a form of non-price rationing. Non-pr rationing almost always has two consequences. The first is that it encoura

which allows them to achieve the results the authorities wish to prevent wh
appearing not to do so. The bill-leak was typical of behaviour of this ki
Firms could borrow and spend pretty much as they originally planned; buy
of the bills acquired assets which had almost the same liquidity as ba
deposits; and banks received income from arranging loans. The second, l
obvious consequence of non-price rationing but one which follows direc
from evasion, is that the authorities lose information. In the present case, th
no longer knew what the size of the loan market was or what volume of l
uid assets agents were holding. The statistics which they regularly collect
those for bank loans and deposits. When the corset was in force, these sta
tics suggested that spending should be under control, but the reality was ve
different.

For UK banks, the bill-leak was their first experience of a larger catego
of activity known as 'off-balance sheet operations'. They learned quite qui
ly.

Off-balance sheet operations

It is a curious characteristic of traditional banking business, that the size of
business is directly reflected in the balance sheet. As more loans and depos
are 'produced' the balance sheet expands. Compared with the balance she
of other types of enterprise, a bank's balance sheet is much more informat
about the business. Hence, when the authorities wish to monitor banki
activity it is hardly surprising that they focus upon the structure of bank b
ance sheets and when they wish to impose controls, these controls are spe
fied in terms of balance sheet components (notice the growth rates for IBE
referred to in the last section). Avoiding these constraints, or at least m
imising their impact often, therefore, involves engaging in income-earni
activity which has no direct, corresponding, balance sheet entry.

'Off-balance sheet' operations are activities which generate income
banks without creating assets or liabilities which normal accounting pro
dures would place in their balance sheets. As with most other innovations,
interest in off-balance sheet operations lies not in their novelty but in th
recent rapid expansion and increasing variety. Lewis (1988) listed some
off-balance sheet activities. These were divided roughly equally betwe
'financial services' and those giving rise to 'contingent claims'. The form
included activities such as tax and financial planning, investment advice, po
folio management, insurance broking, credit/debit card services and (m
recently) estate agency. The latter included the issuing of guarantees of ma

of off-balance sheet operations, and much discussed in the financial inno
tion literature, is 'securitization'. This refers both to the increasing use by u
mate lenders and borrowers of capital markets, in preference to bank int
mediation, and to the practice by banks themselves, more especially in
US, of selling off loans from their asset portfolio, turning them into m
ketable securities — shifting them off the balance sheet.

Clearly, at an institutional level, one can view this growth of off-balan
sheet activities as representing a significant change in banking operations.
a more theoretical level, however, one should take seriously the argument t
off-balance sheet activities are essentially the same as the '...traditional
balance sheet lending and borrowing operations of banks [which] can be se
to be packages of information and risk-sharing (or insurance) servic
(Lewis, 1988, p.396). By taking a customer's deposit a bank (traditional
creates a very secure, very liquid asset, repayable at par and turns it int
long-term liability for a borrower. The bank protects both from risk by
superior information and by its size. The interest rate 'spread' is the price t
lenders and borrowers pay for this service. Nothing is fundamentally differ
when a bank accepts a bill or issues a standby letter of credit. The holder
the bill (or letter) enjoys a transfer of risk to the bank for which s/he pays
accepting a lower interest rate on the loan than would have been the case wi
out the bank's guarantee; the borrower pays a fee to the bank for the bene
of the lower interest charge required by the market. Furthermore the bank
willing to accept the risk in the guarantee because it has information wh
enables it to make a reasonable assessment of the individual default risk a
to price it bearing in mind the average default rate on the total pool of gu
antees.

When it comes to identifying the consequences, actual and potential of
expansion of off-balance sheet activity, one can say as with the growth
Euromarkets, that by supplying services which customers want, banks
helping to mobilize funds which might otherwise have lain idle and are g
erally adding to the liquidity of the financial system. However, the con
quences which are of more concern to the authorities are rather different. T
first is the one that we saw in connection with the bill-leak. It opens u
range of opportunities which may well be used in response to regulatio
which are specified in terms of balance sheet size or composition.

The corset was a specifically UK regulation and one which the authorit
applied intermittently during the 1970s to deal with a specific problem.
more widespread and durable significance have been the regulations gove

ple involves the use of 'risk-asset ratios'. Bank assets are divided into five c egories, each of which is given a risk-weighting. For example, 'cash' ha weight of 0 while, at the other extreme, commercial loans have a full wei of 1. The approach is, broadly, to take the market value of assets in each c egory and multiply by the risk-weighting, to give a risk-adjusted value each. These are then aggregated to give an overall value for the bank's ri adjusted assets. This is then compared to the bank's capital base, which its is carefully defined and subject to rules of composition. The Ba Committee set a lower limit of eight per cent for the ratio of capital to ri adjusted assets, though national bank supervisors have discretion to set hig er limits.

The effect of such ratios for a bank operating near the limit is to make further expansion of its loan portfolio very costly and may indeed make unprofitable. Box 11.1 illustrates this and makes the point again that regu tion has the effect of acting like a tax. In the circumstances, some banks ha responded by the practice of securitization. This involves setting up a se rately capitalised 'special vehicle' whose job it is to buy bundles of loans fr the bank. It does this by issuing bonds whose interest payments are guara teed by the income from the loans (after deductions by the originating ba and the special vehicle). The result is that the sale of the loans frees up equivalent amount of capital (assuming that the loans' risk-weighting was lowering the risk-asset ratio, while leaving the bank with some income fr the loans — the fees for setting up the loan and a small fraction of the int est.

Liability management

The last of these illustrations bring us to the circumstances which were wi ly regarded as being responsible for the demise of monetary targets in the U in the mid-1980s.

Given a decision to make monetary targets the centre of monetary poli there exists, in principle, a wide range of techniques which can be used in attempt to control the aggregates. Box 11.2, which draws on Gowland (19 pp.9-10) lists 14.[14] Bewildering as the range may look, however, the chos technique (or techniques) must either restrict banks' ability to lend, restr clients desire to borrow or reduce the community's willingness to hold resulting deposits. In each case the restriction may come in the form of qua tity ('direct') control or price ('market') incentive. Control of the monet base, as implied by the B-M analysis is an example of a quantity restraint

Imagine a bank which has the following, simplified, balance sheet.

Assets £bn		*Risk weights*	*Risk adjusted value*	Liabilities £bn	
Loans	80	1	80	Time deposits	100
Bonds	30	0.4	12	Sight deposits	36
Bills	32	0.25	8	Capital	8
Cash	2	0	0		
Total	*144*		*100*		*144*

Suppose that the prime loan rate = 6%, while deposit rate = 4% and the cost of capital (the required return on the bank's equity) = 15%

Notice that the bank is operating at the limit of its capital adequacy ratio (= 8' In these circumstances, additional lending (e.g. of £1bn) requires a match increase in capital of £0.08bn if the ratio is to be maintained, accompanied £0.92bn of additional deposits. The net income effect of this expansion can be c culated as:

	Expenditure	*Income*
£1bn of additional loans at 6% =		£60.0m
£0.08bn of additional capital at 15% =	£12.0m	
£0.92bn of additional deposits at 4% =	£36.8m	
		-£48.8m
	Profit	£11.2m (=1.12%

Without the capital adequacy constraint, the bank would have been able finance the additional loan solely by additional deposits, which are much chea than new capital. The effect of this can easily be compared with the situation abo

	Expenditure	*Income*
£1bn of additional loans at 6%		£60.0m
£1bn of additional deposits at 4%	£40.0m	-£40.0m
	Profit	£20.0m (= 2%)

The effect of the capital adequacy requirement is to reduce the return on ad tional lending from 2 per cent to 1.12 per cent. The bank may feel that such a ret is inadequate. In these circumstances, it has a number of choices. It can aband its expansion plan. Alternatively, it can charge more for the loans and/or pay lo for deposits. The result will depend upon the elasticities of deposit supply and lo demand but it is likely that the expansion will be smaller than the £1bn envisag Or, it can securitise the loans, avoiding the capital adequacy requirement but h ing to meet the costs of the securitization deal. In all of these cases the outco will be some combination of a lower volume of additional lending and a higher pr — exactly as if a tax had been placed on bank lending.

gets became a serious feature of monetary policy and the plan was to use pr
(interest rates) to deter borrowing and deposit holding. Unfortunately, j
when the techniques were applied in their purest form, institutional chang
undermined the strategy in a fatal manner.

We recall that one aspect of the *CCC* arrangements was the ending of
bank's interest rate cartel and the beginning of competitive bidding
deposits to fund the rapidly growing demand for bank loans after lending c
ings were removed. At this stage the competition involved banks compet
between themselves for wholesale deposits, that is to say large time depos
held mainly by the corporate sector. The effect, however, was to raise
level of interest paid on wholesale deposits relative to other rates and also
make it more sensitive to market movements. Taking the Bank of Englan
treasury bill rate as a benchmark, 7-day deposit rates were approximately h
that rate at end-1971; ten years' later the proportion was 0.87.[15]

The 1980s saw the extension of this competition to retail deposits. On
again, deregulation played its part. The starting point was the entry of ban
into the mortgage market in 1981. From this stemmed the break up of
building societies' interest rate cartel in 1983, the rise in building soci
deposit and advances rates to market clearing levels and the consequ
demise of mortgage rationing. As building societies moved onto the offe
sive, they entered into money transmission services by issuing chequeboo

Box 11.2: Monetary control techniques

Variable	*By price*	*By quantity*
Deposits of the M4PS	Y	Y
Bank lending to public and private sectors	Y	Y
Non-bank lending to the public sector	Y	Y
Variations in the PSBR	N/A	N/A
Variation in the size of the base	N	Y
Variation in the size of the reserve ratio	Y	Y
Tax on banking	Y	N
Licensing	N/A	N/A

Act, 1962, which prevented societies from granting unsecured loans. remove this and other restrictions the societies set about lobbying the gove ment for a change in the legislation.

Pushing on an open door where deregulation was concerned, the societ were quickly rewarded with the Building Societies Act, 1986, which bro ened both the sources and destinations of societies' funds. In particular, la societies were permitted a limited amount of unsecured personal lending. T apparently minor change had momentous results. Since societies could n legally permit customers to be overdrawn, they could, for the first time, is cheque guarantee cards. This made building society cheque accounts inc tinguishable from those of banks except for the considerable advantages t societies paid interest on all positive balances, stayed open longer and w generally seen as more user-friendly by the public. The change in build society regulation, therefore, ensured that banks which had, since 19 grudgingly paid interest on selected cheque accounts with restricted u would have to follow. The first announcement came from Lloyds Bank December 1988. The increasing tendency to pay interest on sight deposits a number of possible consequences. Firstly it raises money's 'own rate' increasing the weighted average return on deposits. This in turn narrows spread between lending and deposit rates, and is one way by which the c of bank intermediation may fall. Borrowing to finance spending becon cheaper relative to using existing liquid assets; at the same time, money's o rate increases relative to other assets. In short, money and bank credit b become more attractive at all levels of income and at any level of *absol* rates. Looking at it in terms of a conventional money demand diagram, demand curve shifts out as money's (interest) services increase.

Nowhere was the effect more obvious than in a comparison between targets and outturns for monetary growth and the rate of inflation. Under Medium Term Financial Strategy (MTFS) starting in 1980, targets for £M were set, for usually the next three years, as a series of declining ranges. Ta 11.1 shows the large, frequent overshoots in broad money growth rates a the steady decline in inflation, the overshoots notwithstanding.

The consequence of increasing the range of deposits on which interes paid (as well as bidding up the rate itself) raises the weighted average ret on money relative to all other assets and liabilities. Broad money becon more attractive as a savings medium. Velocity falls and the link with spe ing is broken.

The rise in money's own rate led to a decline in velocity and undermi

cial rates quite closely made it simultaneously more difficult to hit the targ
The reason for this lies in the way in which a change in official interest ra
affects the flow of new loans and new deposits. Briefly, the flow of new loa
and deposits depends to some degree upon *relative* interest rates and these
increasingly difficult to influence when all rates move in sympathy w
changes in official rates.

Exercise 11.1

Imagine a family with a monthly income of £2000 and annual expenditure of £24,000. It spends the whole of its income each month at a constant rate. In addition it holds a minimum precautionary balance of £800. Deposits do not pa interest.

1) Calculate the household's average money holding over the year;

2) Recall that 'velocity' is the relationship between money holdings and to expenditure, calculate an annual velocity figure for this household;

3) Suppose now that banks begin to pay interest on positive balances of £1,000+ and our household increases its precautionary balance to £1000, al else remaining the same

Recalculate the velocity figure.

Three rates (and thus three relativities) are involved: money's own rate, rate charged on bank loans and the rate on short-dated non-money ass (NMAs). To understand how this works, it is simplest to assume firstly t money's own rate is fixed and that the central bank raises its official deal rates. This increase is followed, through a mixture of convention and ar trage, by an increase in all other rates — closely in the case of short rat more flexibly in the case of medium and long rates — with the notable exc tion of the rate on money. At this point, therefore, bank lending rates and ra on short-dated non-money assets have risen relative to money's own rate a by the same amount. This rise in the opportunity cost of holding money p dictably induces some switch from money to NMAs with the result that price of the latter is bid up and yields fall back from the level to which th initially adjusted in response to the rise in official rates. (This process is be described as taking time and proceeding in steps but this is a logical sequen necessary only for exposition. In practice, adjustment is very rapid). We n have a change in *two* relativities. NMA rates have risen relative to mon while bank lending rates have risen even further (and therefore relative

and inflation, 1980-87 (%p.a.)

£M3 targets announced	outturns 1980/1	1981/2	1982/3	1983/4	1984/5	1985/6	1986/
March 1980	7-11	(6-10)	(5-9)	(4-8)			
March 1981		6-10	(5-9)	(4-8)			
March 1982			8-12	(7-11)	(6-10)		
March 1983				7-11	(6-10)	(5-9)	(4-8)
March 1984					6-10	(5-9)	(4-8)
March 1985						5-9	(4-8)
March 1986							11-15
Outturn	18.5	13	11.5	10	12	15	20
Inflation rate	16.5	11.5	7.1	4.7	5	5.9	3.2

Source: Artis and Lewis (1991) p.136; www.statistics.gov.uk

NMAs as well as relative to money). We can now see that the rise in offic rates affects the demand for bank loans through two channels. Firstly, absolute rise in loan rates pushes us up a downward sloping (flow) dema curve for bank loans. But just as important, in raising the cost of bank lo relative to the return from NMAs, the change has, in effect, cheapened cost of a (partial) substitute for bank credit. Issuing short-dated bonds a even shorter money market instruments is an alternative to borrowing fr banks for firms at least (recall the episode of the bill-leak). In our virtual d gram, not only do we move up the curve, but the curve simultaneously sh inward. In these circumstances, change in official rates have considera influence over the demand for loans, and this influence is to some deg independent of the elasticity of demand for bank loans with respect to lo rates themselves.

Pause for thought 11.5:

The possibility of 'liquidity trap' is usually associated with very low interest rates however, the demand for money depends upon *relative* interest rates, do we ne to revise this view?

While explaining what happens in an ideal world is necessarily compl it is a relatively simple task to see what happens when circumstances mo against the authorities as they did in the 1980s. Suppose now that mone

cost of holding money, no switch to NMAs and no change in the mon
NMA-bank loan relativities. In the diagram again, an increase in rates (
example), pushes us up the loan demand curve, but the position of the dema
curve is unchanged. The elasticity of the bank loan demand curve becon
critical to control of the monetary aggregates.

The importance of being able to influence relative interest rates in or
to achieve control of the monetary aggregates has been stressed by a numb
of commentators (Gowland, 1978, 1984 pp.8 and 67; Goodhart 1984). It w
also part of the rationale behind the corset episodes of the 1970s as we s
towards the end of the last section. By giving banks a disincentive to ac
mulate interest bearing deposits, it was hoped to drive a wedge betwe
deposit and other short-term rates. Regulation Q had a similar effect. W
deposit rates sensitive to market rates, it is very doubtful that the growth
monetary aggregates could again be targeted successfully by the use of int
est rates. With direct controls ruled out because of their distortionary effe
and control of the monetary base ruled out for reasons we come to in the n
section, it is doubtful that monetary targeting will ever be attempted again

It is time now to look at UK monetary policy after the demise of moneta
targets.

11.4 Monetary policy after monetary targets

Ceasing to pursue impossible targets which were anyway becoming irre
vant, was clearly a sensible decision. However, the authorities remained co
vinced that the main objective of monetary policy was to minimise inflati
and achieve an approximately stable price level, the danger in abandoni
money supply targets was that agents would be left without any means
identifying the stance of monetary policy and thus of any way of anticipati
future movements in the price level. Since one of the major objections
inflation is that it makes price signals harder to interpret and increases
chance of agents making allocation errors, 'uncertainty' was clearly un
ceptable.

The initial solution to the problem was to focus attention on the exchan
rate. The argument here was that a 'lax' monetary policy — defined as o
which was likely to produce a future inflation rate above that of the UK
major competitors — would lead to a declining value of the pound agai
other currencies. Conversely, a rising exchange rate indicates a 'tight' mo
etary policy and a lower (than competitors') rate of inflation. The argum

they operated with the 'correct' model of how *current* official interest ra were linked to *future* inflation, a level of modelling sophistication which authorities themselves had failed to achieve in years gone by, and then t this prediction of future inflation would be fully and instantly incorporated exchange rate movements. This amounted to saying that forex markets w both rational (in the choice of model) and efficient (in the use of the result information). These are characteristics of financial markets which many co mentators would be reluctant to credit, but it ushered in a period, continu to the present, in which feedback from financial markets became quite inf ential in monetary policy making.

In the circumstances, the obvious step might have been for the pound join a fixed exchange rate regime which would have *compelled* the autho ties to adjust the policy stance whenever the pound deviated from its specif value. But the only show in town, for this purpose, was the Europe Monetary System and Mrs Thatcher's opposition to Britain's joining the EM (and the more general euro-scepticism of a large section of her party) mad impossible. This left the UK's Chancellor (Lawson) to operate a monet policy in which the pound was linked covertly to the Deutschemark. From autumn of 1985, UK short-term interest rates came to be determined alm entirely by movements in the £:DM exchange rate. The choice of the DM the basis of an exchange rate target made some sense in terms of trade flo but the most compelling reason was that the DM had historically been a stro currency, German inflation had been low (since the reform of the monet system in 1948) and much of the credit for this, rightly or wrongly, was attr uted to the Bundesbank. In effect, the UK authorities were 'buying' credi ity for their monetary policy from an institution which had it to spare.

At the same time, and presumably to mitigate the *volte-face* involved dropping monetary targets entirely, the UK authorities began publish 'guidelines' for the growth of M0. It was emphasized at the time that this w not a precursor to a shift to monetary base control but was rather because relationship with nominal GDP had been subject to less disturbance than t of other aggregates and because it would function as a *leading indicator* future changes in nominal GDP. From the spring of 1987, the exchange r target became more overt, though still unannounced.

The pound was held in a very narrow range against the DM, its upper li was clearly 3.00DM though its lower limit was uncertain. The strength of pound throughout 1987 allowed scope always for a cut in interest rates indeed occurred after the stockmarket crash in October) but not for a rise.

a return of inflationary pressures and the need for a rate rise, even though pound remained strong. So long as markets believed the 3.00 DM exchar rate was secure, the German-UK interest differential caused capital inflo which then required intervention by the authorities which itself caus increases in broad money. The dilemma was resolved by a rise in interest ra in the second quarter of 1988. By the autumn, foreign exchange mark caught up with the deterioration in the UK's position and short-term inter rates rose steadily (to 13 per cent by December) while the pound beca weaker. Base rates reached a peak of 15 per cent in October 1989 a remained there for the following year.

In the hope that formal membership of the European exchange rate me anism would persuade forex markets of the authorities' long-run commitm to reduce inflation and secure the pound sufficiently to allow some easing interest rates, the UK joined the ERM in October 1990 with 2.95DM as central rate of the wider, 6 per cent, band. Interest rates were cut by one p centage point. At the time of joining, doubts were raised both as to the w dom of the move in principle (by Sir Alan Walters, a long-run opponent ERM membership) and of the chosen rate (by opposition political parties). the event, the sceptics received some support as the authorities struggled hold the pound above its lower limit (effectively set at DM2.87 by the streng of the Spanish peseta). Further evidence of the deepening recession and decline in the headline rate of inflation, and a reduction in Spanish inter rates in February 1991, allowed the UK authorities' the tentative step o half-point cut.

The main reason for the UK's entry to the ERM was to increase the cr ibility of its anti-inflationary policy by 'buying' some of Germany's repu tion for financial prudence. To begin with, the policy showed some signs success in so far as interest rates were reduced steadily by a series of ha point cuts through 1991, reaching 10.5 per cent by September, while sterli slipped only slightly from its DM2.95 target to end the year at DM2. Helped by the progressive cuts in interest rates, the lagged response of inf tion to stagnation in the real economy was very sharp when it came. Fr 10.9 per cent in September 1990, the headline rate fell to 4 per cent September 1991. Ironically, this contributed as much as anything else to st ling's difficulties in the ERM in 1992.

By the spring of 1992, credibility was once again the problem. With inf tion running between 3 and 4 per cent and base rates around 10 per cent, *post* real rates fluctuated between 6 and 7 per cent. Even at these levels

1992, non-oil output had fallen for six consecutive quarters — to nearly 5
cent below its peak in 1990(2). Amongst the novelties of this particular slo
down was the sharp fall in output from services as well as manufacturing. T
rise in unemployment (from 5.6 per cent in spring 1990 to 10.1 by autu
1992) was thus spread geographically more evenly so that London and
South East were badly affected. It was in this region that the highest levels
personal sector floating-rate indebtedness had developed during the prope
boom of the mid-1980s and it was here, therefore, that the more drama
cases of personal sector gearing and indebtedness were to be found. By
middle of the year the concern with falling house prices had crystallized in
problem of 'negative equity', preventing people from moving house a
threatening banks and building societies with insolvency if they reposses
property from defaulting borrowers.

By the summer, opinion was widespread that, faced with a choice of ev
higher interest rates or abandoning the exchange rate, the government wo
have to choose the latter. The UK was not alone with this problem. The l
the Irish punt, the peseta and escudo were all subject to speculative press
as their weak economies suggested the need for interest rate reductions. T
only way of avoiding widespread realignments within or defections from
ERM seemed to lie with a cut in German interest rates. The Bundesba
however, was concerned about rapid monetary growth, domestic inflation
pressures and the costs of reunification and used the occasion to enhance ev
further its own credibility, by demonstrating its total independence of the g
eral clamour. The crisis came in September 1992 when doubts about the w
ingness of some countries to ratify the Maastricht treaty called into quest
the durability of the ERM itself. Sterling, which had been very weak throu
out August, came under heavy selling pressure in the middle of the mor
The Bank used its powers to announce an MLR of 12 per cent (in effect ra
ing base rates from 10 per cent) on the 16th September, accompanying it w
a statement of intent to raise it to 15 per cent from the following day. Th
plus large-scale intervention buying, failed to stop the pressure and sterl
was withdrawn from the ERM on the evening of the 16th September. On
18th, interest rates were reduced to 10 per cent, beginning a steady decl
that continued through the first half of 1993.

Leaving the ERM in 1992 left UK monetary policy with the same probl
that it had in 1985: how to find a target which would enable agents to jud
the policy stance. The new monetary policy framework announced
October 1992 contained two features. The first was the adoption of an exp

mate objective itself would be directly targeted. Interest rates were now
with a view to their effects upon inflation some eighteen months ahead. C
way of interpreting inflation targeting is to see it as an encompassing case
monetary targeting or exchange rate targeting. In the latter cases, the auth
ities are setting interest rates with a view to achieving a low inflation ra
using just one source of information (monetary growth, exchange rate et
disregarding all else.[16] In an inflation targeting regime, interest rates are s
set with the same objective but the decision draws upon all relevant variabl
These include money and credit growth, the exchange rate, wage trends, as
prices, employment figures, the 'output-gap', surveys of 'confidence' etc. a
may change over time.[16]

The second feature was a much greater degree of openness and tra
parency in policy making. By the time the Bank of England gained its inst
ment independence in 1997, this contained five elements. Firstly, a quarte
Inflation Report would be published showing the information on which
Bank was making its interest rate decisions. Secondly, the minutes of
meetings between the Governor of the Bank of England and the Chancellor
the Exchequer at which interest rates were set were also published. Af
1997, when the Bank of England was given independence in the setting
interest rates, the latter was replaced by the minutes of the monetary pol
committee (MPC) which again gave commentators some insight into h
decisions were arrived at and also revealed the pattern of voting. Thirdly, r
resentatives of the Bank and the MPC could be called to give evidence
their conduct to the Treasury Select Committee. Fourthly, if inflation w
to deviate by more than one per cent from target, then the MPC would
required to write an 'open letter' to the Chancellor of the Exchequer in or
to explain the horizon over which it intended to bring it back into the tar
range (in effect, making explicit the policy reaction function). Finally,
Bank of England's *Annual Report* would be subject to parliamentary scrut
and debate. The argument behind this openness was that, over time, priv
sector agents would 'learn' how the MPC decided on the appropriate inter
rate and would eventually be able to anticipate the Bank's next decisi
Eventually, changes in interest rates would cease to be 'news' since, by
time they were announced, they would already be incorporated in private s
tor decisions. The economic advantage of this, rather like the advantage
low and stable inflation rates, is that another source of 'shocks' to the eco
my would be eliminated and fewer incorrect decisions would be made by p
vate sector agents. It is worth noting that the lack of comparable openness

inflation targeting (and most of these arrangements) in 1992 and again switch to central bank instrument independence in 1997 had positive effe on credibility and openness (see Section 12.5).

The rate of inflation, which had been running at over nine per cent in 19 fell to two per cent in 1993 and remained in the two-three per cent range u 1997 when the Bank of England was given formal independence. The obs vation that countries with an independent central bank tended to have be inflation records than those without had been made for some years. We exa ined the arguments behind this alleged superiority in Section 8.5. But might note here that one of the reasons advanced was the increase in 'cre bility' that we met earlier when UK monetary policy was linked to the £:D exchange rate. In this case, an unelected and independent central bank is l likely to be subject to political pressure if and when it has to make unpopu interest rate decisions. It should be remembered also that by 1997 it was cl that some form of European monetary union would be inevitable in the n future and plans were already underway for the creation of a European Cen Bank modelled on the Bundesbank. *If* the UK were to join at some point the future, then the Bank of England would need to have the independen from government that other national central banks in the European System Central Banks would have. Changes were also made to the way in which Bank of England imposed interest rate changes through its money mar operations to bring them into line with European practice. This involved greater use of gilt repurchase agreements (strictly *reverse* repos) and l reliance on the outright purchase of treasury and other eligible bills. (Sections 4.2 and 12.2).

At the same time, it was decided to relieve the Bank of England of t functions which it had carried out for centuries, the management of gove ment debt and supervision of the banking system. In both cases, the intent was to increase the Bank's sense of independence and to increase its freed to set interest rates as required by the inflation trend with as few distracti as possible. The responsibility for debt management passed to a newly cre ed 'debt management office' or DMO, an agency of the Treasury, in 19 This was a recognition of the occasions, referred to above, where the Ba had sometimes felt it necessary either to resist changes in interest rates order to stabilise bond prices or to adjust them to counter trends in bond pri (the episodes of 'leaning into the wind'). From now on, the state of the g market would be ultimately a Treasury responsibility. Similar thinking play a small part in the decision to transfer banking supervision to the Financ

monetary policy point of view was that the Bank would no longer be in p session of detailed information about the state of individual bank balan sheets. It would not know, therefore, which, if any, banks might be threaten by poorly performing loans and consequently it would not be deterred fr raising interest rates by the knowledge that such an act might cause a ba failure.

With the coming of independence, the responsibility for setting inter rates passed to the Monetary Policy Committee. This consists of nine me bers. Five of these are Bank staff (the Governor, the two Deputy Govern and two Executive Directors — with responsibility for monetary policy ana sis and for monetary policy operations). Four are appointees of the Chancel of the Exchequer. Voting is by simple majority and the Governor has a ca ing vote in the event of a tie. The Treasury also sends a representative, order to brief on fiscal policy and other issues which the Treasury thinks MPC may like to consider. This provides for some degree of policy coor nation but the representative plays no part in the discussion (except to answ factual questions) and does not vote. The Committee meets according t regular monthly schedule, though the facility exists for additional meetin and one was in fact held on 18 September 2001. Meetings are usually sch uled for the first Wednesday/Thursday after the first Monday of the mon with the policy decision being announced at 12.00 noon on the Thursday. T making of policy thus follows a monthly cycle and contains three element

- Briefings in advance of the policy decision meeting
- A two-day meeting at which decisions are made and implemented imm diately
- Production and publication of the minutes.

We can begin the cycle with the circulation of briefing material to commit members. This is mainly material relating to data releases and market dev opments, prepared by bank staff. On the Friday prior to the decision meeti there is a half-day meeting at which senior Bank staff present reports major features of the economy under a set of standard headings such 'demand and output', 'the labour market', 'monetary and financial con tions' etc. Members of the committee may ask for further information analysis and this is done by the Bank staff on the Monday and Tuesday f lowing. The policy meeting begins on Wednesday afternoon when memb identify the key issues (broadly, the same headings as used in the Friday me

the Thursday morning the Governor summarises the discussion of the pre
ous day and asks members to confirm or amend his summary. Each mem
is then asked to state his or her view of the present situation and the app
priate stance of policy. The Governor then puts a motion which he hopes
command a majority. In all cases, members who are in a minority are as
to confirm their preferred level of interest rates. These will be published in
minutes so that the weight of opinion and sentiment in the MPC can be cle
ly observed by the public. A press statement is prepared for release at 12
noon and where a change in interest rates is decided upon the statement
normally give a brief indication of why the MPC made the change.

The final part of the cycle involves the preparation of the minutes of
meeting. A first draft is circulated for comment in the week after the meet
and a final version is agreed on the following Monday for publication on
Wednesday two weeks after the meeting. Although the minutes show the v
ing decisions of individual members, their comments and arguments are u
tributed. The purpose of this is to encourage the freest discussion in the me
ings.

Alongside its routine of monthly decision meetings the MPC is a
engaged in a detailed inflation forecasting exercise. This follows a quarte
cycle and culminates in the publication of the Bank's *Inflation Report*, n
mally in the week following a policy meeting of the MPC. The work n
mally takes about eight weeks (thus beginning about seven weeks befor
policy meeting). The cycle begins with a review of any research comm
sioned by members at the end of the previous forecast cycle. It then moves
an examination of the latest trends as projected by Bank staff. These
based upon the Bank's suite of econometric models, on information extrac
from current financial market prices and yields (see Section 12.4) and
inputs from independent forecasting bodies like the National Institute
Economic and Social Research (see Bean, 2001). Over the following we
there is a series of meetings in which particular issues are the subject of
cussion between MPC members and Bank staff. A week before publicat
the forecasts are put together, data and trends updated by Bank staff an
final view of risk and plausibility of the forecast is taken and added to
Report. The full text of the *Report* is published in hardcopy and is also av
able on the Bank's website at: www.bankofengland.co.uk/inflationr
index.html

Table 11.2 shows the changes in repo rate made by the MPC since 19
and the annualised rate of inflation measured by RPIX at the time.

Date		Repo %	RPIX % p.a.
1997	6 May	6.25	2.5
	6 Jun	6.50	2.7
	10 Jul	6.75	2.7
	7 Aug	7.00	2.8
	6 Nov	7.25	2.9
1998	4 Jun	7.50	2.8
	8 Oct	7.25	2.5
	5 Nov	6.75	2.5
	10 Dec	6.25	2.6
1999	7 Jan	6.00	2.5
	4 Feb	5.50	2.5
	8 Apr	5.25	2.7
	10 Jun	5.00	2.2
	8 Sep	5.25	2.1
	4 Nov	5.50	2.1
2000	13 Jan	5.75	2.1
	10 Feb	6.00	2.2
2001	8 Feb	5.75	1.9
	5 Apr	5.50	2
	10 May	5.25	2.1
	2 Aug	5.00	2.6
	18 Sep	4.75	2.3
	4 Oct	4.50	2.2
	8 Nov	4.00	2.2

Sources: www.bankofengland.co.uk/mfsd and *Inflation Reports* (various)

11.5 Summary

In this chapter we have seen that monetary policy in the UK since 1945 h
passed through a number of phases. Until 1971, policy followed a broa
Keynesian line. The objective was to minimise unemployment subject t
balance of payments constraint which occasionally caused a weakness in

and short-term interest rates when sterling weakened. From 1967, the c
cern with inflation began to replace unemployment and, after 1971,
authorities tried at least to switch instruments as well by relying entirely u
short-term interest rates. In practice, these had to be supplemented by di
controls in the form of supplementary special deposits. With the end of fi
exchange rates in 1972, the value of sterling was less of a problem. Fr
1979 to 1985, minimising the rate of inflation was the sole objective of m
etary policy and for this brief period there was a firm conviction that
growth of the monetary aggregates should be the sole intermediate targe
policy. Short-term interest rates were reinstated as the instrument of poli
this time with no help from direct controls. By 1985, strict control of the m
etary aggregates looked both unfeasible and unnecessary. Since the m
1980s, therefore, monetary policy has become more pragmatic. Minimis
inflation is still the dominant objective and interest rates are still the ins
ment but the intermediate target, which began as the sterling:Deutschem
exchange rate was abandoned altogether in 1992 when the rate of inflat
became both the target and objective. The pragmatism of policy can be s
most clearly in the eclectic (and flexible) range of indicators which are u
in forming judgements of the likely future trend in inflation and thus of
required level of interest rates.

Viewing the experience of UK monetary policy through the analyti
frameworks of Chapter 3, reveals three things. Firstly, the quantity of mo
has been a matter of relatively little concern. The need to limit the growth
DCE was forced upon the authorities in 1967 and the authorities tried
restrain money and credit growth within unpublished limits between 1973 a
1979. But it was only from 1980 to 1985 that monetary aggregates w
explicitly targeted. Secondly, when the aggregates were important, it
their rate of growth that was targeted. Stocks were of no relevance. Thir
while it is true that the quantity of money can always be expressed as a m
tiple of the monetary base and true that banks must hold a minimum fract
of the base in order to ensure convertibility, the UK authorities have ne
tried to control the base directly. Even during the period of explicit monet
targets, the policy instrument was short-term interest rates whose funct
was to restrain the growth of demand for money and credit; the base requi
to support this growth was available on demand.

liquidity
equation of exchange
Quantity Theory of Money
velocity of circulation
capital risk aversion
domestic credit expansion
leaning into the wind
Duke of York tactic
special deposits
Supplementary Special Deposits
Medium Term Financial Strategy (MTFS)
overfunding
off-balance-sheet operations
risk-asset ratios
securitization
monetary base control
inflation targeting
credibility
openness

Further questions and exercises

1. Explain why policy makers have generally come to the conclusion that only effective instrument of monetary policy is the short-term rate of intere

2. Outline the disadvantages of trying to limit the growth of money and cr it by 'direct' controls.

3. 'It is not that the demand for lending has become less sensitive to chang in relative interest rates. If anything, it has become more so. The problem l in the increasing inability of the authorities to cause changes in relative ra by changing the level of absolute rates.' (Goodhart, 1984). Explain how t situation has come about.

4. Explain how central banks are able to set the level of short-term inter rates.

5. Explain briefly why 'credibility' and 'openness' are desirable properties the conduct of monetary policy.

7. Why might responsibility for the government debt market inhibit a c
tral bank's conduct of monetary policy?

8. Why might giving the central bank responsibility for banking supervis
make it more difficult for the bank to pursue an independent monetary pol
with price stability as the primary target?

9. Explain how capital adequacy requirements impose a tax on banking.

10. Why might the presence of capital risk aversion in the bond market ma
the conduct of monetary policy more difficult?

11. Why does a rise in money's own interest rate, *ceteris paribus*, tend
increase the rate of monetary growth?

Further reading

The history of monetary policy in the UK since about 1971 is dealt with
Artis and Lewis (1991) and in Hall (1983). Goodhart (1989b) brings the st
more nearly up to date. The latest developments can be followed in H
Treasury (2002) and in the regular 'markets and operations' section of
Bank of England Quarterly Bulletin. A critical view of policy in earlier ye
is in Dow and Savile (1988).

Bank of England (1999) 'Monetary Policy in the United Kingdom' *Ba*
of England Fact Sheet, (available at www.Bankofengland.co.uk) gives a s
cinct explanation of the way in which monetary policy is formulated and c
ried out. A detailed explanation of the way in which the MPC works is
Bean (1998 and 2001) and the thinking behind the setting up of the MPC a
the movement towards independence at the Bank of England is in Be
(1998).

A classic work on financial innovation and its relevance to monetary p
icy is Podolski (1985) though this focuses mainly on the implications
money supply. Goodhart (1986) gives a broader account. More recent w
includes Lewis and Mizen (2000) ch.12, though their linking of financ
innovation solely to the demand for money must be read in the light of
remarks about the potential irrelevance of the demand for money in chapt
4 and 5. Chapter 24 in Howells and Bain (2002) takes a broad look at

12 and Financial Markets

'It's official. There is a Greenspan put option'. *Financial Times,* January 4, 2001.

What you will learn in this chapter:

- Why central bank action on official short-term rates has so much leverage over market rates
- How the behaviour of financial markets may place constraints upon central bank policy-making
- How information can be derived from financial markets that can help in making economic forecasts.

12.1 Introduction

In two other sections (4.2 and 9.4) where we refer to central bank inst ments of monetary policy we drew attention to the recently emerged c sensus that the only satisfactory instrument is the short-term rate of inter We have also shown (in Section 4.2 especially) how central banks can repo and similar money market deals to set the price at which reserves made available to the banking system and we looked at how changes in o cial rates are reflected in other, market, short-term rates. In this chapter are concerned with a broader question but one to which the interest rate s ting process nonetheless has some connection. The big question is the re tionship between central bank decision-making and financial markets one way of caricaturing the relationship is one of a struggle for power. central bank wishes to set domestic interest rates at some target level for achievement of its policy objectives but is reluctant to do so for fear t markets (typically the forex or bond markets) will react badly, pushing exchange rate or long-term interest rates to undesirable levels. A variat on this theme, often expressed by critics of 'globalisation', is that the s and instability of international capital flows makes it virtually impossi for any but the very largest monetary authorities to operate an independ monetary policy (Cornford and Kregel, 1996; Mosley , 1997). If there is truth in such a picture, however, one must wonder how it is that individ

Furthermore, in the general consensus that market solutions are best and
subsequent privatisation of monetary policy, policy makers have beco
increasingly willing to use financial markets as sources of information a
prescience, superior to their own. Finally, the reaction of financial mark
to monetary policy actions may offer a way of testing the credibility a
transparency of the policy makers. Given that both are seen as desira
characteristics, financial market responses may be giving us an import
report on progress. To say the least, the relationship between policy ma
ers and financial markets is interesting and complex.

In the next section (12.2) we look at why it is the case that central ba
money market transactions, which are usually quite small in relation to to
money market flows, can have such a powerful effect on domestic inter
rates. In section 12.3 we look at the contrary evidence, namely that mark
can sometimes impose formidable constraints upon policy. In section 1
we examine the slightly different, but very interesting issue: the extent
which markets can provide information which is useful in the forecasting
likely future developments in the economy. In section 12.5 we review
arguments that evidence from market reactions suggests that inflation t
geting (and subsequently instrument independence) have increased
credibility and openness of the Bank of England's monetary policy maki

12.2 Central bank leverage

In Section 4.2, we saw how the Bank of England sets interest ra
through its operations in UK money markets, mainly through deals in g
repos, and that the approach of other central banks was essentially simil

The term 'money markets' refers to a range of markets for short-te
loans. 'Short-term' in this context means an original maturity of less th
one year, though in practice most money market instruments have an ev
shorter initial maturity while the average *residual* maturity is much le
between two and three months. The term 'money market' is usually used
the plural to denote the existence of a number of different instruments a
markets. These range from what is sometimes called the 'traditional'
'discount' market wherein bills are issued at a discount to their matur
value and have their yields quoted as a rate of discount rather than a co
ventional interest yield, to the interbank market which is a 'market'
which banks lend and borrow between themselves, the resulting depos
being non-negotiable. Other money markets include the CD market

effect collateralised loans, the collateral being government bonds. Note t
government bonds are normally thought of as capital market instrumen
having much longer initial (and in most cases residual) maturities th
money market instruments. The fact that repos are classified as money m
ket instruments reflects the fact that the repo is for a short period, while
residual maturity of the underlying bonds can be anything, provided o
that it exceeds the maturity of the repo deal. The pricing of repos, with
illustration of how a change in price causes a simultaneous change in yi
is given in Box 4.1.

The participants in money markets are banks, other financial institutio
large corporations and the central bank. Money markets are, in other wor
wholesale markets dominated by professional institutional traders. The m
imum denomination of the instruments is large and the personal sector
little if any direct access. Some banks offer money market accounts, off
ing money market interest rates but restricted as to the number of wi
drawals/transfers of deposits per period of time and subject also to a h
minimum threshold for each transaction. Some mutual fund managers a
offer unitised investment facilities for individuals wanting to get access
money market instruments indirectly. Given that the markets are domina
by professional, well-informed traders and that the instruments are v
close substitutes for each other (short-term, minimal risk), it is not surpr
ing that spreads across the market are small and that rates move clos
together. Changes in yields and in spreads are often reckoned in 'ba
points' (1bp = 0.01 per cent) because they are so small. Table 12.1 sho
the yields on a range of UK money market instruments in September 20

Table 12.1: UK money market rates

	Overnight	*7-days*	*1-month*	*3-months*
Interbank sterling	3.86 - 3.38	3.75 - 3.5	3.97 - 3.84	4 - 3.88
Sterling CDs			3.91 - 3.88	3.94 - 3.9
Bank bills			3.88 - 3.84	3.88 - 3.8
Discount market deposits	3.75 - 3.5	3.94 - 3.69		

Source: Adapted from the *Financial Times, 21/22 September 2002, p.18*

How would you explain the interest differentials shown in table 12.1?

Money markets are also large. Table 12.2 shows the total amount o
standing for a range of UK money market instruments at the end of Ju
2001 and the average daily turnover in these instruments during the pre
ous three months. Set against these magnitudes central bank operations
usually very small. Table 12.2 shows the average daily money market sho
age with respect to which the Bank of England had to take a position in
same period. The table shows the shortage averaged about two per cent
the total daily turnover and less than half of one per cent of the amount o
standing.

Table 12.2: Sterling money market volumes, £bn 2001(Q2)

	Amounts outstanding	*Daily turnover (av*
Gilt repo	128	17.9
Interbank (overnight)	177	11.1
CDs, bank bills and eligible bills	143	12.4
Other	95	66.0
Total	*543*	*107.4*
Money market shortage (daily ave.) = 2.3		
Money market shortage as %	0.4	2.1

Source: *Bank of England Quarterly Bulletin*, Winter 2001, tables F, G and I

As we saw in Chapter 4, changes in central bank rates certainly do co
municate themselves instantly to the money markets and we even kn
something about how the official changes are reflected in market rat
albeit with lags and spread impacts in some cases. But the big question
not 'how?', it is 'why?'. Why should decisions by central banks to char
their official lending rate have so much leverage in these markets that ma
of the market adjustments are instantaneous, when the volume of funds
which they deal directly is a minute fraction of the total funds flowi
through these markets? To the extent that there is an analogy between ce
tral bank intervention to set interest rates and central bank intervention
deliver a desired rate of exchange rate the analogy is not encouragi

The beginnings of an answer can be found in Section 4.2. In a syst wide shortage of liquidity, the central bank is the monopoly supplier wh the demand for central bank money is extremely inelastic (Goodhart, 19 p.1424). The next step involves recognising that while the central bank m act only on a small fraction of money market flows, relying a great deal convention to do the rest of the work, it could if it wished *impose* its will the sheer scale of its operation if it so chose — and markets know th Potentially, central banks are much bigger players in domestic money m kets than they could ever be in foreign exchange. The creation of cent bank money is virtually costless and the central bank can create as much it needs to buy whatever quantity of securities (repo deals) is necessary force or keep down market rates. Conversely, when it comes to imposin rise, its power is limited only by the quantity of securities it is prepared sell. Provided that markets know this, there is no need for an everyd demonstration.

An alternative (but not exclusive) explanation was offered by Dow a Saville (1988). This is that without central bank stabilisation, it would very difficult for money market participants to know what the 'correct' d to day risk-free rate should be. In many monetary systems, governm banks with the central bank and thus transactions between government a private sector could have big daily effects upon money market rates a they would be very hard to predict (since their timing — critical if the ban ing system requires end of day settlement — arises as much from admin trative decision as from any economic 'fundamentals'). In these circu stances, where relevant information is very scarce, market participants easily swayed by official statements. Provided that there is *some* action back up the official announcement, the announcement itself is the k Viewed like this, the setting of short-term interest rates relies less on op market operations and more on what has become known as 'open mo operations'.

12.3 Market constraints

There are, we have just seen, several ways in which we may try to expl the influence that central banks have over domestic, short-term, inter rates. Recall now, some of the things that we saw in Section 8.6, when discussed the trend towards central bank independence. The precise nat of this independence varies across regimes but minimally it includes fr

This obligation actually adds to central bank powers. This is because removes any dilemma that might arise from trying to pursue several inco patible objectives at once. Such 'conflict of objectives' was commonpla for policy makers (governments and/or central banks) for 30 years af 1945 as they tried simultaneously to achieve 'full employment', 'hig growth, a balance of payments equilibrium and low inflation. In the UK, oscillation between these objectives was christened 'stop-go' policy. It a spawned the 'Theil-Tinbergen' literature on matching the number of inst ments to targets that we discussed in Section 9.2.

Given that central bank interest decisions have a major effect on mar interest rates, given that they are free to set interest rates without politi interference and given that they have a single objective, one could draw conclusion that central banks have unlimited powers to set interest rates whatever level they choose. This would be a major exaggeration and in t section we consider some of the constraints under which central ban work. One such constraint arises where monetary policy involves *interm diate* targets. Even with a single (inflation) *objective* conflicts can be re troduced if policy is guided by more than one intermediate target. Such t gets might be some combination of exchange rate, money growth, cre expansion and so forth. Finding an interest rate which enables a central ba to hit simultaneous intermediate targets could be as difficult as finding o which achieves multiple final objectives. But we are more interested here constraints which arise from financial market behaviour. Many of these c be seen to be related to the credibility of central bank behaviour: they appe as the result of partial or incomplete credibility (Treasury, 2002, ch.2). O simple, but recent, example is provided by market reactions to the succ sion of cuts in repo rates that the Bank of England instigated during 200 The main purpose, in a low inflation environment, was to limit the effect the UK economy of what looked like a developing world recessi However, as we stressed in Section 4.2, the central bank only has direct co trol over a current and very short-term nominal interest rate while it may other rates which matter to spending decisions. These may be longer-te rates, and/or *real* rates or even expectations of future short-rates. These ra were much less influenced by the Bank's relaxation of monetary policy. February 2002, the price of short-term interbank interest rate futures (s Section 12.4 below) suggested a strong belief on the part of market parti pants that short-term rates were about to rise again and such expectatio naturally worked against the efforts of the Bank to loosen monetary poli

Why do you think that the interest rates futures market would react 'fast and f
ously' to comments by the Governor of the Bank? Might the reaction have been
ferent ten years ago? If so, why?

On February 19th, the Governor felt forced to make an announcem
that this was not likely and markets 'reacted fast and furiously' to price
lower interest rate expectations (*Financial Times*, 20.2.02). This was ano
er triumph, at least temporarily, for 'open mouth operations', and it
arguable that it would not have had the effect that it did in the early 19
when Bank of England policy statements lacked the credibility that th
have now (see Section 12.5 below). Even so, it still shows how the effe
of central bank policy can be modified by market reactions.

We are used to defining an open economy as one in which exports p
imports exceed a certain fraction of its GDP. For open economies th
defined, developments in the real economies of its trading partners w
always be important. Typically, these developments involve divergent p
ductivity trends which eventually have their effect upon competitiven
and show up in balance of trade trends and maybe eventually the excha
rate. This familiar concept of openness and its implications we might c
'real economy openness'.

Since the 1970s, under pressure from the World Trade Organisation a
national governments (especially in developed economies) this openn
has been promoted as policy. Alongside it, however, has been the growth
'financial openness' with the progressive liberalising of capital mark
The result, predictably, has been a rapid growth in international cap
flows, in relation to real GDP, and in relation to international trade flo
Much of this capital, therefore, is mobile in pursuit of the best returns a
will respond to quite small differences in perceived risk/return combi
tions. In the absence of a fixed exchange rate regime, such flows inevita
cause fluctuations in exchange rates and since the monetary authorities u
ally have an exchange rate 'preference' (even if there is no explicit targ
they can hardly be indifferent to these flows.

Frequently, therefore, it is foreign exchange flows and the reaction
forex markets that central banks must anticipate. The most dramatic exa
ple, applying to the UK in recent years, is provided by the end of the U
membership of the ERM in 1992. The details are set out in Section 10
The Bank of England was endeavouring to maintain an exchange rate
DM2.95:£1 at a time of rapidly rising unemployment and against ba

ket took the view not so much that interest rates were 'wrong' but that
appropriate interest rates were simply unattainable. The situation was ma
worse by existing interest differentials between sterling and the DM and
reluctance of the Bundesbank to reduce its rates despite pressure from ot
EU partners. With unemployment climbing into double figures, the mar
gambled that the authorities (remember that the Bank of England was
then independent) would not tolerate the level of interest rates necessary
maintain DM2.95. Bearing in mind that forex dealers themselves had a gr
deal of influence over what level of interest rate would be necessary
achieve this, it was perhaps a reasonably safe bet. A simpler way of looki
at the episode is to say that markets simply did not see DM2.95 as a cre
ble rate of exchange, given the state of the real economy. It also shows h
the choice of appropriate interest rate can be heavily influenced by the le
of rates being set in other major centres. On any interpretation, it was
reaction of forex markets which brought the policy to an end.

As a recent paper by Cornford and Kregel (1996, p.2) shows, the brea
down of fixed exchange rates in the 1970s and the increase in internatio
capital flows has been accompanied by a step increase in volatility, parti
larly of exchange rates. The standard deviation of percentage mont
changes has rose from 0.4 in the 1960s to about 1.7 since the 1980s. Th
explanation for this is that the bulk of such flows now are asset flows, lar
ly unrelated to trade and represent the application of standard capital as
pricing model principles to an ever increasing portfolio of risky asse
Under the CAPM, rational investors are assumed to diversify across
whole market of risky assets. As barriers to capital flows are reduced, ad
tional currencies and assets become part of the whole market portfo
Portfolio managers are then required to hold these additional currencies a
assets with effects on their price which is analogous to the effect on the pr
of a stock which becomes a member of the FTSE-100, for example. The
of fund managers (to continue the analogy) is to earn the best returns
exploiting return differentials. Many of the newcomers to the whole mar
portfolio, 'emerging' markets for example, have very high yields. This m
reflect a higher level of risk but if the fund manager is ill-informed ab
the level of risk then funds will flow to these markets, pushing up th
exchange rates. Exchange rates (and asset prices and returns generally,
that matter) are no longer determined by fundamentals. Not only do th
circumstances make it more difficult for central banks to pursue the sin
price stability objective (because of effects on import prices), they

means for limiting international financial flows (see Section 10.7).

More specific examples of markets constraining central bank behavi are provided by the short history of European monetary union. In Sect 13.6, we refer to the difficulties for the ECB in setting an appropriate r of interest caused by forex markets steadily marking down the value of euro against the US dollar (from about US$1.18 in January 1999 to US$0 when notes and coin went into circulation in January 2002). A more int esting example, since it involves market sentiment in the design even of institutions of policy, occurred in the spring of 2002 when the French g ernment commissioned a report on the functioning of the ECB with a vi to possible reforms. One such reform was the suggestion that the inflat target should be changed from 'between 0 to 2 per cent' to 'between 1 a 3 per cent' to remove the alleged deflationary bias which arises from sett zero as the lower limit and thus risking falling prices. Another proposal v for the ECB to publish more information about how its decisions are arriv at and to be open to examination about the decisions. In deciding upon wisdom of these proposals, much discussion centred on the reaction financial markets. It was argued against raising the inflation target that t would alarm financial markets and lead to further weakness in the e while, on the other hand, markets would respond positively to suggestio to make ECB policy-making more transparent.

On 19 October 1987, the UK stock market declined very sharply, los about 30 per cent of its value over two days. The collapse followed a la fall on Wall Street at the end of the previous week. In both cases the cen banks, the Bank of England and Federal Reserve responded by cutt interest rates and indicating their readiness to create liquidity to meet borrowing needs of financial institutions whose stability might be thre ened by the fall in asset values. In the UK case at least, it was widely argu (e.g. Goodhart, 1989b) (after the event) that the Bank's willingness to e monetary conditions was excessive, lasted for too long and helped to f what became known as the Lawson boom. As we saw in section 11.4, UK was subject to strong inflationary pressures from the beginning of 19 The cut in interest rates began to be reversed in June and eventually reach a peak (of 15 per cent) in October 1989. This incident was the first of s eral in which central banks acted to support financial markets. Another v the liquidity crunch associated with the dramatic falls in South East As stock markets and exchange rates in 1998. Here again, central banks, led the Federal Reserve cut interest rates and made clear their readiness to p

for central banks eventually gave rise to the remark by the *Financial Tim*
which we quote at the beginning of this chapter. We are familiar with
role of central banks as lenders of last resort to financial institutions. If c
tral banks have become lenders of last resort to markets as well then
effect is rather like giving investors access to a free, market wide,
option. The 1987 and 1998 incidents suggested that stock markets h
acquired limited downside risk. Unsurprisingly, prices eventually reflec
this. Though US shares fell sharply in the stock market crash of 1987, th
then appreciated at a record-breaking pace into the new millennium. T
broad-based S&P 500 index of top US companies, for example, increas
360 per cent from its pre-crash peak of about 330 in August 1987 to
recent peak of just over 1,500 in August 2000, an average annual grow
rate of about 12 per cent. This asset price boom implied that, relative to
past, estimated dividend growth rates had risen, the risk premium had fa
en, or there was a bubble. (Miller *et al*, 2002 p.C172)

Shiller (2000) explains the behaviour of stock prices in the 1990s as
example of a 'bubble' — driven ultimately by psychological factors wh
encouraged the view that rising prices would go on rising. Cecchetti *et*
(2000) first drew attention to the possibility that the price trend may ha
something to do with reduced risk by carrying out a small survey of ma
fund managers and chief economists in London and New York in ea
2000. 'The results are quite clear. All respondents believe that the F
reacts more to a fall than a rise, and all except two believe that this type
reaction is in part responsible for the high valuations on the US marke
(Cecchetti *et al*., 2000, p.75). To see by what order of magnitude perce
tions of stock market risk would have to change in order to justify the pr
levels of the late 1990s, they computed a long-run equity risk premium
the period 1926-97 of 4.3 per cent p.a. They then took the actual level
dividend yield on the S&P500 in early 2000 and added a dividend grow
rate for three different assumed rates of growth ('low', 'medium' a
'high'). Comparing these three different equity returns against the long r
real rate of interest suggested actual equity risk premia for early 2000 ra
ing from -0.1 (assume slow dividend growth) to 1.8 (the fast scenar
(Cecchetti *et al*., 2000, table 3.1). As Miller *et al.* subsequently pointed
(2002, p.C173), the dividend yields required to restore the risk premium
'normal' levels needed to be some 2-3 times higher than they actually we
Another way of expressing this is to say that, given the actual divide
yields, stocks were overvalued by the order of 50-67 per cent.

of last resort to securities markets? This is the issue tackled by Miller *et al*.(2002). The paper shows how the belief that the Fed can prevent mar prices from falling by more than 25 per cent from a previous peak redu the equity risk premium from its long-run normal level of 4.3 per cent about 2.6 per cent. This still does not justify the stock price levels of 20 and the effect is weakened still further if agents perceive the insurance only partial credible. But Miller *et al*. do not claim this is the only sou of market overvaluation. Shiller's argument that the late 1990s represen classic price bubble is almost certainly true for technology stocks; there m well be genuine reasons for a lower risk premium to do with better r management and/or distribution. What they show is that beliefs in the s bilising effect of central bank behaviour may have played a substantial p in the stock market boom.

The problem for policy-makers, and central bankers especially, is h these beliefs about free stockmarket insurance can be unwound with causing a major market collapse. A dramatic collapse, through its effects wealth and the cost of capital, would have a major deflationary effect. T is especially true in the United States where the direct ownership of sto is much more widespread. While these beliefs persist, and until a control way of eliminating them can be found, central banks have to tread very ca fully, especially when it comes to raising interest rates.

12.4 Markets as a source of information

Until the mid-1980s the setting of policy instruments was based to a la degree on the forecasts of future economic developments derived fr large-scale, structural, models of the macroeconomy. However, the lack forecasting success of these models, together with the Lucas critique wh appeared to explain why they were bound to fail, forced a reappraisal of t approach during the 1980s (Fisher and Whitley, 2000). The result, in UK at least, was a shift towards a 'suite' of small-scale models of limi but critical relationships. This was a period of growing optimism in abilities of markets, illustrated by widespread privatisation of public ass deregulation of financial markets and the growing conviction that even c tral banks might benefit from independence from government. Thus i perhaps not surprising that markets came to be seen as potential sources wisdom and prescience from which information might be derived wh would be a useful supplement to traditional forecasting methods (see Be

(1946).

Pause for thought 12.2:

What sort of central bank behaviour might give rise to speculation that it was op ating a market wide *call* option? Why might a central bank want to give such impression?

The starting point in the argument that financial markets might be p ticularly useful sources of information is that the return on virtually financial assets lies in the future. From this it follows that in their *curr* pricing of financial assets, agents must be taking a view about future sta of the world. Then it is argued that if these views are well-founded, o least contain no systematic bias, *and* if the views can be derived from current prices (or yields) then markets may be able to tell us something u ful, on average, about the future. The unstated implication of the argum is that the disaggregated pursuit of self-interest by large numbers of age combined with their ability to learn quickly from mistakes, is likely on b ance to produce a better forecast of the future than the painstaking c struction of mathematical models embodying relationships estimated fr past data.

Pause for thought 12.3:

Why should markets know anything about the future?

One example of the use of financial markets for this purpose is discuss in Appendix 2 and involves the term structure of interest rates in the g ernment bond market. Ignoring, for the moment, any term-varying risk p mium that might be involved in the return on bonds of longer maturities, term structure of interest rates should be such that current long rates refl current expectations of *future* spot rates. Restricting the discussion t 'two-period' yield curve and assuming all yields are equilibrium yie then:

$$(1+i_2)^2 = (1+i_1)\times(1+E\,{}^2i_1) \qquad \ldots 1$$

which says that agents must be indifferent between investing for two pe ods at the current two period (i.e. 'long') rate, i_2, and investing for one pe od at the current one period (i.e. 'short') rate, i_1, and reinvesting in a yea

$$E\,{}^{2}i_1 = \frac{(1+i_2)^2}{(1+i_1)} - 1 \qquad \ldots 1$$

Since the future one year rate, ${}^{2}i_1$ is only *expected*, it is likely practice that:

$${}^{2}i_1 = E\,{}^{2}i_1 + \varepsilon \qquad \ldots 1$$

but provided that ε is a normally behaved error term, then $E^{2}i_1$ will be optimum forecast of ${}^{2}i_1$ and the *current* relationship between short and lo rates tells us something useful (i.e. correct on average) about future sh rates.

Exercise 12.2:

One year spot rates are 5 per cent while 2 year spot rates are 6 per cent. If the te premium on two year rates is 25 basis points, what does this relationship tell about one year rates expected in a year's time?

Further more, if we now introduce the so-called Fisher hypothesis wh says that the nominal rate of interest, i, is composed of a stable real rate and an inflation premium, π, then:

$$E\,{}^{2}i_1 + \varepsilon = r + {}^{2}\pi \qquad \ldots 1$$

Again, provided that ε is well-behaved (and provided that we know the s ble real rate), then $E^{2}i_1$ contains an optimum forecast of inflation.

In practice, the picture is further complicated by the need to estimat term premium which has to be extracted from our expectations of fut rates, and as we say in Appendix 2, more fundamentally compromised the empirical evidence that the current difference between long and sh rates does not forecast the path of future short rates particularly w Nonetheless, while we may be sceptical of the ability of the term struct to forecast the absolute level of future short rates (and future rates of in tion) it might still be the case that *changes* in the shape of the yield curve steepening, for example) tells us something about the future *direction* changes in short-term interest rates and inflation (upwards, in this cas

and Sleath (1999).

One reason why the Bank wishes to know the markets' expectations future interest rates is that it wishes to know whether or not a given chan in its repo rate is likely to surprise markets or not (we discuss the imp tance of this issue in the next section). In this case, the Bank wishes to kn market expectations of two week repo rates for dates in the near future. W the exception of very short-dated gilts, bond yields are less than ideal sin bonds are much longer term instruments than 14-day repos. But guidan may be possible from money market yields. The Bank of England curre ly makes judgements about market expectations of official repo rate mo ments from a range of market ('general collateralised' or 'GC') repo dea interbank loans, short sterling futures contracts, forward rate agreeme and swap contracts involving six month LIBOR and the sterling overni interbank average rate (Brooke, Cooper and Scholtes, 2000). The approa is very similar to the one that we described for estimating future interest a inflation rates from the gilt yield curve and the difficulties and limi results illustrate well some of the points we made above.

Firstly, yields have to be collected from instruments which are stric homogeneous in all respects but term. The advantage of the gilts marke that it contains a large population of bonds with varying terms to matur but with absolutely identical risk. Money market instruments all carry degree of risk which is greater than gilt repos with the central bank (G repo probably comes closest). Hence estimates of future central bank re rates derived from, for example, interbank rates, are found to have a s tematic upward bias when their predictions of official rates are compar with the actual outturn. Unsurprisingly the bias increases with the length forecast horizon, rising to about 100bp at two years. Brooke *et al* estim that interbank rates probably contain a credit risk premium of around 25 But this leaves the conclusion that the remainder of the bias is due to so unknown term premium or systematic expectational errors. Similar cons erations (albeit with different values) apply to the whole range of mon market instruments. 'No particular money market instrument is likely provide a "best" indication of Bank repo rate expectations at all maturiti (Brooke *et al*, 2000 p.398). In practice the Bank estimates two forwa curves, one based on CG repo and the other on a combination of instrume based on LIBOR (London interbank offer rate) but subjects both to a deg of *ad hoc* adjustment.

With the development in recent years of markets for financial derivati

1995 and 1997, for example, Malz showed how information in optic
prices might be used to indicate the probability of exchange rate reali
ments in the ERM (Malz, 1995, 1997). Options are contracts which g
agents the right to buy or sell an asset at a given future date for a given pr
(the 'exercise' or 'strike' price). 'Call' options are options to buy and v
be exercised if the market (or spot) price is above the strike. Thus the pr
of a call option is telling us something about the market's perception of
probability that the spot price *will* be above the strike price. Since the lov
the strike price, the greater the probability that it will be exceeded at a giv
future time, the price of the call varies inversely with the strike price. Cle
Panigirtzoglou and Proudman (2000) show how an implied risk-neu
probability density function (pdf) can be extracted from a short sterling c
option. A series of pdfs (from a series of calls) then tells us the probabil
(as seen by the market) that the sterling three month interest rate will
within a particular range on a future date. These estimates then form
basis of the famous fan charts in the Bank's quarterly *Inflation Report*.

Given that the flow of benefits from virtually all financial assets lies
the future and thus that current price must incorporate something of agen
views of the future, scarcely any class of assets is immune from the sea
for potentially useful information. So far, we have considered the possib
ty of uncovering markets' expectations of future interest rates (of differ
kinds) and possibly of inflation. More ambitiously, it has been suggested
recent years that financial markets might be made to yield information ab
future developments in the real economy.

As with many fundamental insights into the working of financial m
kets, Irving Fisher (1907) was amongst the first to point out that changes
the spreads between the returns on different fixed income securities mi
foreshadow changes in the macroeconomy. The idea was further explo
by Merton (1974), since when the growth in confidence in market wisd
has led to a near-explosion of empirical studies. The basic idea draws on
inverse relationship between risk and return. Thus, in any given econo
government paper will have the lowest rate of return, followed by 'AA
bonds issued by the corporate sector and so on up to the returns available
'junk' or sub-investment grade bonds. The spreads represent compensat
for different degrees of risk and, provided the risk is correctly priced, m
function simultaneously as an index of the risk contained in each secur
It is a short step from here to assuming that changes in the spread are in
cating changes in the degree of risk. The principle is familiar, indeed c

bond price and quadrupling of its yield after the disastrous profits warnin
in 2001. What Fisher was pointing out, however, was the possibility t
aggregate movements in corporate bond yields and thus in the corpora
gilt spread might tell us something not about changes in the riskiness
individual firms but about the degree of risk facing the corporate sector
a whole. If it did this, then it might be telling us something about the pr
imity of recession (the spread widens) or boom (the spread narrows).

Why should there be a connection between the economic cycle and
corporate-gilt spread? There are essentially two arguments which are mu
ally reinforcing. Firstly, the perception of the future possibility of recessi
causes investors to revise downward their estimates of firms' future ca
flows out of which bond interest (and eventually the principal) have to
paid. The risk of default increases and so prices fall and yields ri
Secondly, the rise in yields represents an increase in the cost of capital
firms. Faced with a test that they cover this higher cost, fewer investm
projects will pass. Firms will reduce the quantity of real capital demanc
and this reinforces the recession. Notice that, since we are interested
spreads, nothing here contradicts the wisdom that faced with the prospect
a recession there is a 'flight to quality' or certainty by investors — fr
equity towards bonds. This undoubtedly happens and means that bo
yields in the aggregate fall relative to the return on equity. But *within*
range of bond yields corporate yields will widen relative to governm
yields because there will be a 'flight' from both equity and corporate bon
toward government paper.

As we noted above, studies of bond spreads and their forecasting abil
are many. Surveys include Stock and Watson (1989), Bernard and Gerla
(1996) and Dotsey (1998). Specific applications to the UK include Da
(1992) and Davis and Henry (1993) who found that including financ
spreads in VAR models of output and prices improve our ability to anti
pate turning points. The theory, and its application to monetary policy ma
ing at the Bank of England is explained by Cooper, Hillman and Lyn
(2001). One interesting feature of the recent work carried out at the Bank
that it suggests recent developments in these spreads are harder to link to
economic cycle than earlier episodes, say in the early 1990s. This is becau
the widening of spreads during 2000 was much more concentrated and v
dramatic in particular sectors of the economy (notably in telecom and tec
nology firms). This widens the *average* corporate-gilt spread but may
more indicative of sector- or firm-specific difficulties than a general dow

responsible for a large fraction of aggregate investment which they forced to abandon by the sharp increase in the cost of capital.

Exercise 12.3:

Suppose that the differential between 'AAA' corporate bond yields and yields government bonds have normally averaged about 75bp. In the last two quarters have observed this spread fall to about 40bp. About 20 per cent of the corpor bond market (by value) consists of bonds issued by firms in the media and comm nications industries and shares in these firms have increased sharply in value o the last year. What useful information, if any, might you be able to draw from change in bond spreads? Explain any difficulties you may have in drawing con sions.

The most recent efforts to extract information about macroeconom trends from financial market data involves profit warnings. In the U London Stock Exchange and the Financial Services Authority require fir to disclose to the Company Announcements Office without delay a change in the company's condition which might lead to substantial mo ment in the price of its listed securities. Recent work at the Bank has exa ined the response of returns on a company's securities to trading stateme in general and to negative trading statements ('profits warnings') in par ular. Two notable results, though not especially relevant to policy, are t returns begin their response to the warnings up to two days before they made and the adjustment is complete on the day of the announcement (le ing support to the semi-strong version of the efficient market hypothes and that the response to negative statements is much stronger than response to positive statements. More relevant to the question of whet company news can provide useful leading information about the state of macroeconomy is the correlation between the number of profit warnings month and *subsequent* GDP growth. Preliminary results suggests that it m be (Clare, 2001).

12.5 Markets as a test of credibility

In Section 8.4, we explored the Kydland and Prescott argument that elec governments would always be faced with the problem of time inconsist cy in their formulation of appropriate monetary policy. Knowing this, p vate sector agents are unlikely to believe governments whose stated ai are to reduce high rates or maintain low rates of inflation. This lack of cr

the result that the economy lies to the right of the vertical Phillips curve w
high unemployment and low output — a situation that may have to pers
for some time. Various ways of gaining credibility were noted, includi
linking the exchange rate to that of a low inflation country and/or removi
monetary policy from the hands of government altogether and handing
over to an independent central bank. Credibility matters to the moneta
authorities then because it means that agents will incorporate policy sta
ments more quickly into their own plans and any necessary adjustment
market behaviour will be carried out at lower cost.

An optimum monetary policy does not just require that the moneta
authorities are *believed*, however. It also requires that their actions can
seen and understood. Thus in addition to *credibility*, policy also requi
what has come to be called *transparency* . This is an unfortunate term sin
what is required is that policy actions and the reasons behind them can
clearly *seen*. Henceforth we use the term 'accountability' since having
account for one's actions involves to explain and justify. The argument
accountability is that private sector agents can learn and then *anticip*
what the authorities' reactions will be in any given set of macroeconom
conditions. We shall see in Section 13.7 that the ECB's lack of accountab
ity has had the effect of making its thinking obscure and that this has co
fused financial markets. By contrast, with a high degree of accountabil
policy actions themselves contain little 'news' since markets would alrea
know what the authorities were going to do. Since the ideal monetary po
cy is one in which prices can be stabilised without increasing instabil
elsewhere (in growth, output, unemployment etc), the best the moneta
authorities can achieve is a predictable monetary policy. In principle, t
could be achieved by having a simple rule, for example one which link
interest rates to the money growth rate. The rule could then be built int
policy reaction function so that agents could observe *actual* money grow
trends and anticipate monetary policy changes. Experience has told
however, that money growth rates do not contain sufficient informati
about the likely course of future inflation. It is the failure of any single in
cator to provide adequate information about future inflation rates that l
led to the direct targeting of inflation itself, with forecasts being based up
a wide range of variables. Once the forecast is known it could then be f
along with a measure of the output gap into a well-publicised version of
Taylor rule and agents could read off the next change in interest rat
Beyond accepting the general principle that its interest rate decisio

vate sector agents are to learn about the setting of interest rates, they ha
to learn alongside the Bank, or more specifically the Monetary Pol
Committee, and this requires a great deal of openness on the part of
Bank. As we saw in Section 11.4 the Bank of England first adopted an inf
tion target in 1992. Since then it has worked to create transparency
scheduling and announcing the dates of the monthly monetary policy me
ings, issuing press releases immediately following each meeting, publish
minutes of the meeting together with a record of the votes (since 1997) a
most importantly perhaps, publishing the quarterly *Inflation Report* wh
contains the information on which the decisions are based. It may be h
work, but this should make it possible for analysts to learn over time h
interest rates are likely to move in the face of given macroeconomic tren

Given the importance of credibility and accountability, therefore, it is
surprising that central banks should look for evidence on their performa
and financial markets are an obvious place to look. For example, if pol
is 'transparent' then changes in short-term interest rates should generally
anticipated and the prices and yields of short-dated assets should show
tle response on the day of the announcement. If policy is credible, and
the central bank is promising lower inflation (for example) in the futu
then the yield curve should slope downward , after allowing for any te
premium. Attempts to use information from financial markets in this way
recent years are many and varied. In the case of the UK where there ha
been two major changes in the monetary policy framework in the last
years - the adoption of inflation targeting in 1992 and the independence
the Bank of England in 1997 — several of the studies have been of
'before and after' variety.

In 1998, for example, Mervyn King (Deputy Governor of the Bank) pu
lished a study showing the *changed* shape of the yield curve after
announcement of Bank of England's independence. Long-term yields
by about 40bp in response to the announcement, suggesting that the bo
market took the promises of a low inflation environment in years ahe
more seriously from an independent Bank of England than they did from
predecessor (King, 1998). Independence, even when limited to instrumen
did indeed seem to add to credibility.

Haldane (1999) looked at changes in the shape of the yield curve
response to changes in official rates for the period 1984 to 1997 and for
two sub-periods 1984-1992 and 1992-1997 by calculating the avera
change in yields at various maturities in response to a one per cent cha

the whole period; (b) that the 'jump' was largest at short-maturities (up two years) where it seemed that about one-third of the official change w not fully-anticipated and (c) that the jumps were very much smaller for later period than for the earlier one, suggesting that the switch to inflat targeting and the information that went with it had reduced the news co tent of monetary policy announcements.

Exercise 12.4:

Two central banks increase their refinancing rates by 50bp. The consequence country A is that the whole yield curve shifts upward by c.50bp. In country B, yield curve is unchanged at the short end and *falls* at the long end by 30bp. Wh conclusion do you draw about the credibility and openness of the two banks?

More recently, Clare and Courtenay (2000) have updated these findin by looking for evidence of the news content in monetary policy announc ments before and after the movement to independence, studying the min -by-minute change in price in a variety of interest and exchange rate co tracts. Their findings seemed to suggest that the *immediate* impact of announcement was generally greater after May 1997, though the to impact when cumulated over the day was less. The latter is some eviden that the news content of announcements has fallen since independence. T former, they suggested, may be due to 'pre-positioning'. Traders now kn exactly when the announcement will come and are waiting for it.

12.6 Summary

The relationship between monetary policy making and financial markets complex. On the one hand, central banks appear to have considerable inf ence over short-term interest rates, an influence which looks surprisi when the scale of their intervention is set against total money market flo However, markets can still set formidable constraints on central bank op ations. This is especially true for small, open, economies for example wh central banks find that they can only set interest rates within what financ markets regard as a 'credible' range, a range which is often set by referen to interest rates being set in other, major, financial centres. The behavio of asset prices can also complicate the setting of interest rates, especially markets come to believe that central banks are unwilling to see a major in prices. On the other hand, because of their forward looking nature fin

tions of such developments). Furthermore, the information in such mark
can be used to give feedback on the degree of credibility and transparen
in the conduct of policy.

Key concepts used in this chapter

- money markets
- basis points
- conflict of objectives
- volatility
- capital asset pricing model
- fundamentals
- call options
- put options
- stockmarket insurance
- leading indicators
- term structure of interest rates
- yield curve
- LIBOR
- probability density function
- policy credibility

Questions and exercises

1. Why do money market rates move so closely together?

2. Why do central bank repo deals have such a large impact on money m
ket interest rates?

3. What are ‘open mouth operations’? On what does their influence depe

4. Why do international capital flows make the conduct of monetary pol
more difficult?

5. Why might central banks be concerned about major price fluctuations
asset markets?

6. Why might the yield on corporate bonds fluctuate relative to the yield
government bonds? What assumptions would you have to make in orde
draw information about the economic cycle from these yields?

What might this tell you about market expectations of future interest r
developments. Make explicit any assumptions you have to make.

8. What useful forecasting information might there be in (a) company pr
it announcements and (b) corporate-government bond spreads. Explain h
you might go about trying to extract that information.

Further reading

A comprehensive survey of the problems caused for monetary policy ma
ers by inrenational capital flows is provided by Cornford A and Krege
(1996). For more detail of specific incidents involving sterling's exit fr
the ERM and the crises in Mexcio and Thailand, see H M Treasury (200

On the economic information which may be contained in current fina
cial market prices and yields see Bernard and Gerlach (1996) or Cl
(2001) or Cooper, Hillman and Lynch (2001).

Useful sources on central bank support for financial markets
Cecchetti, Genberg, Lipsky and Wadhwani (2000) Miller, Weller a
Zhang (2002).

Haldane (1999) shows how changes in the yield curve may indic
something about the credibility of central bank policy.

13 in the European Union

'The Mony of this kingdom is of a good Alloy', Morland, *Geog. Re*
Asiat. Tartaria (1685) p.396

What you will learn in this chapter:

- The difficulties involved in determining the desirable membership of a single cu rency area
- The application of the general arguments about membership of a single curren area to the question of UK membership of the euro area
- The nature of the monetary policy institutions in the euro area
- The form of monetary policy in the euro area
- An approach to the analysis of ECB monetary policy since 1999 and of the impact of that policy on the value of the euro
- A comparison between the monetary policy institutions of the euro area and th UK.

13.1 Introduction

In the lead up to the establishment of monetary union in Europe and sin the establishment of the euro as a single currency in January 1999, the iss of monetary union has been much debated. A number of economists co tinue to argue that the European single currency project will produce ma problems and eventually fail. There has also been much argument o future membership of the euro area both for present members of the EU the UK, Denmark, and Sweden — and for prospective members of the E The issue of the desirable membership of a single currency area is cons ered in Section 13.2. Section 13.3 deals with the particular case of U membership of the euro area. In 13.4, we move on to look at the exist monetary policy institutions of the euro area, while 13.5 examines the fo of monetary policy and the way in which it has been influenced by movement towards monetary union. Section 13.6 considers monetary po cy as practised by the European Central Bank since January 1999 and loo particularly at the relationship between monetary policy and the value of single currency. The chapter concludes with a comparison between practice of monetary policy in the UK since June 1997 and that of the Eu and asks whether reforms of the ECB institutions or approach to policy desirable.

In principle, there is no difference between the operation of monetary po
cy in a single nation state such as the UK and in a monetary union consi
ing of a number of nation states. In each case, a central bank operates a s
gle monetary policy for the whole country or group of countries. In the
times of independent central banks and the dominance of price stability
a policy goal, the constitutions and practices of the central banks are lik
to have much in common. In no case are monetary policy decisions of
central bank likely to suit all regions or all economic sectors. Much of
debate over the European single currency has been of the 'one interest r
does not suit all' variety — that a policy decided by the ECB in Frankf
might be helpful for some member states but not for others. Yet it is a
true that an increase in interest rates by the Bank of England that suits
south east of England might not please manufacturing industry in Scotla
or Northern Ireland. A difference between the two cases only arises if i
more likely that a central bank decision will be wrong for some parts of
euro area or that it will do more damage to some parts of the area than is
case for the UK. We are talking about questions of degree rather than pr
ciple. We could, thus, express the issues at the heart of the debate throu
the following questions:

- How likely is it that the interest rate set by the central bank of a mo
  etary union will be unsuitable for some member countries?
- How much damage is the wrong interest rate likely to do to tho
  economies that it does not suit?
- Are there other types of flexibility in the economy of the moneta
  union that will help the disadvantaged economies to cope with the wro
  interest rate decisions?
- Are the likely costs of wrong interest rate decisions for some parts
  the area likely to outweigh the benefits expected from the single curre
  cy?

The usual theoretical approach to these questions is known as optimum c
rency area theory. This seeks to determine the optimum size and compo
tion of a single currency area. The logic is clear. Start with a very sm
single currency area. Then, as the area is enlarged, the costs increase a
the net benefits (benefits−costs) of having a single currency decline.
some point, the benefits and the costs become equal and we have reach
the optimum size. Beyond this, it would be advantageous to retain mo

Firstly, the composition of the area is important. In practice, we are concerned with the idea that an existing single currency area (such as UK or France) should introduce additional currencies, even if this seem justified by a strict application of optimum currency area theory.[1] Rath we are interested in which existing nation states should give up their c rencies and join a single currency area. Thus, we ask which countr should be members and this introduces considerations other than the g graphical area of the union.

Secondly, the size of both the costs and benefits of a group of countr moving to a single currency and a single monetary policy is uncertain a strongly disputed. This is true of the economic costs and benefits cons ered alone and is true, *a fortiori*, when one acknowledges that the movem to a single currency is inevitably a political as well as an economic proje This is especially true in the case of Europe where integration has alwa been expected to deliver dividends in terms of lasting international pea and harmony. Here, we shall largely endeavour to keep to economic arg ments, but the political issues cannot be forgotten.

Pause for thought 13.1:

Do not peace and harmony, in turn, deliver economic benefits? Is it ultimately possible to distinguish clearly between economic and political factors?

We cannot, then, be precise about the size of an optimum currency ar All we can do, at most, is to ask whether the benefits of a single curren appear to outweigh the costs for a specified set of countries — for examp the current 12 of the euro area, the EU 15, or the enlarged EU we are li ly to have in the near future. To do this, we start by enquiring about characteristics of groups of countries for which the costs of adopting a s gle currency are likely to be low. These are based on the idea that the pr cipal costs are:

(a) the loss of the ability to adapt to changing economic circumstan by altering the exchange rates between the currency of the domes economy and those of the other member countries and

(b) the loss of an independent monetary policy.

Box 13.1 sets out the most important of these characteristics.

of countries introduces an element of rigidity into macroeconomic pol
and there are costs associated with doing so. However, the extent to wh
countries fail to meet these conditions varies. Further, flexibility in ot
areas of the economy might keep the costs associated with the adoption
a single currency relatively low. We need to estimate how large these co
are in particular cases. Unfortunately, this is extremely difficult to do a
is complicated by the possibility that increased integration of the Europe
economy might either increase or decrease the likelihood of future shoc
affecting member countries symmetrically.

Box 13.1: Characteristics of an area in which the costs of adopting a single currency are likely to be low

1. The economies should be sufficiently similar that:

   (a) shocks affect them symmetrically and do not create balance of payments imbalances among member countries;
   (b) business cycles are synchronized so that all member countries want inte est rates to be moving in the same direction;
   (c) monetary policy changes affect them in similar ways.

2. Where balance of payments imbalances arise among the countries, there should be sufficient labour market flexibility and capital mobility to keep the cost of adjustment relatively low.

3. There are fiscal mechanisms that automatically transfer resources within the single currency area from rich regions with low unemployment to depressed regions with high unemployment.

On the one hand, to the extent that the growth of the market allo
greater specialization through economies of scale, member countries mi
diverge and shocks become less symmetrical. On the other hand, to
extent that production is driven increasingly by consumer preference
variety and trade is increasingly intra-industry in nature, production patte
are likely to converge and shocks to become more symmetrical.

It is also difficult to be certain about the impact of wage flexibility a
capital mobility. Wage flexibility requires money wages to fall to all
countries to recover from slumps in the economy. Where the slump
caused by an external demand shock and the immediate problem is a lack
demand, wage flexibility hardly provides an efficient adjustment mec
nism.

Does it follow that, because of the operation of economies of scale, there will be greater specialization among member countries? Alternatively, might geographical areas in which industries specialize overlap national boundaries?

Labour market flexibility requires labour to be able to move eas between jobs and between member countries of the single currency area. is unlikely that this is always beneficial since one possible outcome is t young and skilled workers move leaving depressed regions to become m depressed.

In any case, even if we were to accept wage and labour flexibility unmitigated advantages, we might have to admit that neither exists in pr tice. For example, wages and labour markets are certainly not flexi across the euro area. The numbers of people moving from employment unemployment and vice versa are much greater in the USA than in the eu area. The risk of employees becoming unemployed is smaller in the eu area, but those who become unemployed in the euro area have much l chance of getting back into work than have their American equivalents. the 1990s, about half of the unemployed in Europe had been out of work more than a year. In the USA, this was true of only about an eighth of unemployed. In addition, the adoption of the single currency might redu wage flexibility by increasing wage transparency, encouraging trade unio to push for greater equality of nominal wages across the single curren area.

A good deal depends on the level of economic and financial integrati Clearly, where there is a high level of economic integration, the conditio in point 1 of Box 13.1 are more likely to be met and the benefits of a sin currency would be higher. Further, the provision of fast, cheap and relia financial services across an internal market should allow that market function more effectively, increasing the level of economic integrati Again, the higher is the level of financial integration the more mobile ca tal becomes. Only small interest rate differentials are required to produ large capital movements and, as we saw in Section 10.2, independent mo etary policies become impossible to sustain in the absence of frequent a perhaps, large movements in exchange rates. This would mean that a cou try wishing to be part of an economically and financially integrated area to retain its own currency might have to accept a high risk premium in domestic interest rates to offset potential fluctuations in the value of the c rency in the minds of international investors. This leaves open the quest

both sides of this issue, but the evidence in Europe so far suggests that i more likely to favour convergence.

When the costs of the single currency have been estimated, they need be compared with the benefits from its adoption. The most important be efits are listed in Box 13.2.

Box 13.2: Benefits from membership of a single currency area

1. Transactions costs associated with the exchange of currencies and of keepir records in multiple currencies are reduced.

2. There is greater price transparency across the single market, which might increase competition and raise the level of efficiency across the market.

3. Welfare gains result from the reduction of uncertainty:

   (a) the variation of profits around the mean is likely to be smaller;

   (b) real exchange rate uncertainty is likely to fall, reducing uncertainty about the future prices of goods and services and allowing better investment and consumption decisions to be made; and

   (c) real interest rates should be lower because the risk premium built into int est rates falls with the removal of exchange rate risk.

4. There are possible benefits from having a major international currency:

   (a) countries whose currency is used by other countries obtain seigniorage i the form of additional revenue to the central bank (in Europe's case, the ECI as the issuer of the money;

   (b) the international use of the euro might also help domestic financial mar- kets.

These, too, are difficult to judge and, indeed, might not all be positi There is no doubt that there are some savings on transactions cos However, there are differences of opinion over the size of these savings particular cases. By any measure, the gains under this heading for the eu area are absolutely large but only small in relation to GDP. There is a plenty of evidence that price discrimination occurs across national mark in Europe. However, we do not yet know how much of this discriminati will be removed as a result of the greater price transparency produced b single currency. After all, there are other barriers to the free movement goods and price discrimination remains in national markets such as that the UK.

There is little evidence that the use of multiple currencies greatly impe ed trade and the efficient allocation of resources in Europe. Trade grew ra

impact of reduced uncertainty on profits and investment is also mixed.

Overall, it is extremely difficult to come to clear conclusions ab whether the loss of the exchange rate instrument in the euro area mi result in net benefits or net costs in the long run. This is likely to be the c in any ambitious single currency project.

Pause for thought 13.3:

Why might a reduction in uncertainty lead to better investment decisions and an increase in the efficiency of the market? How do market agents normally protec themselves against uncertainty?

13.3 The UK and membership of the euro area

The above arguments have been highlighted by the debate over UK me bership of the euro area. The single currency was established in Janu 1999 with 11 members. Greece had applied but was excluded at that po because it did not meet the requirements of convergence established in Maastricht Treaty of 1992. However, Greece became the twelfth mem of the area on 1 January 2001. This left three EU members outside of single currency area.

Denmark had met the convergence conditions in 1999 but had chos not to join following the rejection of membership in a national referendu The decision was confirmed in a second referendum conducted on September 2000. At the second referendum, the margin was the quite la one of 53.1 to 46.9 per cent against membership. The size of the 'no' maj ity made it unlikely that the question would again be asked of the Dan people in the near future, although at the beginning of 2002, opinion po in Denmark suggested that there was then a willingness to join. Swed which joined the EU in 1995, had not become a member of the Europe Monetary System and was in no hurry to join the euro area. The UK h obtained an opt out from membership of the euro area in the Maastri Treaty and was also not technically eligible in 1999 because it had not be a member of the exchange rate mechanism of the EMS when the decis on single currency membership was made in 1998. In practice, sterl would almost certainly have been granted membership from January 19 but the government chose to exercise its option to remain outside.

ciple but said that it would not recommend UK membership until the ec
nomic case for doing so was 'clear and unambiguous'. The factors to
taken into account in making that decision were expressed in the 'five ec
nomic tests' set out by the Chancellor of the Exchequer, Gordon Brown,
July 1997. The government also committed itself to seeking the peopl
permission to join through a referendum.

The five economic tests were:

*(1) Are business cycles and economic structures compatible so that we a
others could live comfortably with euro interest rates on a permanent bas*

This relates to point 1 in Box 13.1. We have identified three separate issu
there, although 1(a) and 1(b) are closely related. 1(a) asks whether exter
shocks are likely to affect the UK economy in the same way as they do
other 12 member countries of the EU. 1(b) concerns the issue of timi
We have the general argument that the UK economy might require inter
rate cuts when the German economy, say, requires interest rate increases
vice versa. In both cases, the debate centres on the level of convergence
the UK economy with the rest of the euro area.

Opponents of UK membership of the single currency often hark back
UK experience as a member of the EMS between 1990 and 1992. In 19
the UK economy was heading into recession and there was a strong arg
ment for interest rate cuts. However, the Bundesbank increased Germ
interest rates and this required the UK government to keep interest rates
in order to defend the exchange rate of sterling against the DM. Of cour
in 1992, the UK government could have devalued but that would not be
option within the single currency and so is not relevant to the pres
debate. This 1992 example is commonly taken to be evidence of inco
patible business cycles, but is better thought of as an example of an asy
metric shock.

The Bundesbank decision to push German interest rates up stemm
from its fear of rising inflation in Germany as the German governm
attempted to assimilate the East Germany economy following Germ
reunification without raising tax rates. That is, the Bundesbank chose
keep monetary policy tight because it was worried that fiscal policy w
becoming too loose. Thus, this was to a significant extent a special ca
Shocks of the size of the reunification of Germany do not occur often.
any case, even if we take this as evidence of incompatible business cycl
we are now a decade on and it is possible that business cycles are no lon

which stressed the crucial nature of business cycle convergence and argu
that, at that time, the timing of the UK business cycle remained significa
ly different from that of the rest of the EU. In support of this proposition
mentioned that official UK interest rates at the time were 7 per cent in co
parison with rates of just over 3 per cent in Germany and France. Furth
it argued that forward-looking measures indicated that significant diff
ences would remain into 1999 and beyond. The particular worry was t
had the UK joined the euro area at the beginning of 1999, euro interest ra
would have been too low for the UK, resulting in an inflationary boom
the UK.

Pause for thought 13.4:

Does a consideration of the difference between nominal interest rates provide a
conclusive test of business cycle incompatibility? What factors other than differe
positions on the business cycle might have caused UK interest rates to be abov
those of Germany and France in 1997?

This brings us to the question of how well the UK economy is curren
integrated with the rest of the euro area in 2002-3, when H M Treasury w
again charged with making an assessment of the degree of UK convergen
with the euro area.[3] Clearly, the degree of integration has increased grea
over the past 30 years as the proportion of the UK's trade that is with e
area members has increased. Since this is a continuing process, if the U
is judged to be insufficiently integrated at the moment, there might be so
date in the future when this will no longer be so. However, one cannot
precise about this. It is a matter of judgement and different people judge
matter in different ways. It is also possible that membership of the sin
currency would speed up the process of integration, although, as we ha
suggested above, some economists also argue that the single currency w
increase divergence even among the existing euro area members.

Point 1(c) in Box 13.1 relates to other arguments associated with the 'o
interest rate does not fit all' argument. That is, it is argued that the U
economy is different from the European economy in other ways than in p
sibly having incompatible business cycles. There may be differen
between the UK and other members in production, tax, financial and wa
setting systems and other differences in institutional sturctures, wh
would cause a change in a common European monetary policy to have a s
nificantly different impact on the UK economy from that experienced

economies. This raises the possibility that interest rate changes have a mo
powerful impact on household income and consumption in the UK than
the other economies.

This also can be viewed as an extension of what happens in any sin
economy. British interest rate decisions are often criticized for not taki
into account the needs of some sectors of the economy, for example man
facturing industry in the Midlands and the North. It is possible that
problem with a single monetary policy for Europe is as much a regio
problem as a national one — that is, that if the UK were a member of
single currency area, a particular interest rate decision might suit, say,
regions centred on Paris, Hamburg, Madrid and London but cause unhap
ness in the south of Germany, north-east France, the Basque country
Spain and France and Scotland. In the debate about UK compatibility w
the rest of the euro area, there is probably a tendency to overstate the ext
to which all parts of the UK economy are similar. Nonetheless, it is a
possible that interest rate changes do have significantly different impacts
national economies.

(2) If problems emerge is there sufficient flexibility to deal with them?

This concerns the flexibility of the labour market and of fiscal policy (poi
2 and 3 in Box 13.1 — that is, with possible escape routes if the UK ec
omy were affected differently from other euro area countries by econon
shocks or monetary policy decisions and its exchange rate with these co
tries could no longer change.

There are two fiscal policy issues. The first relates to the lack of au
matic fiscal stabilizers across the euro area because tax and governm
spending decisions remain largely in the hands of national governmen
Thus, regions that are badly affected by shocks to the euro area economy
by monetary policy decisions are not automatically supported by transf
from well-off regions through the budget. All that is left are discretiona
disbursements from the structural and cohesion funds of the EU. These
very small relative to the euro area GDP and must deal with the large, ex
ing regional disparities.

The second fiscal policy issue concerns the attempt by the Europe
Commission to constrain the fiscal policy freedom of euro area mem
countries by the application of the Stability and Growth Pact. Article 1
of the Treaty on European Union specifies that where the European Coun
finds economic policies of a member state that endanger the proper fu

than that of fiscal deficits, members need not accept these recommen
tions. Article 104c forbids member states from having excessive bud
deficits and charges the European Commission with the task of monitor
the budgetary situation and the stock of government debt of member sta
The Commission may report to the Council that an excessive deficit exi
The Council may then make policy recommendations that the member st
in question is obliged to follow. Failure to do so may ultimately lead to
imposition of financial sanctions in the form of a non-interest-bear
deposit or a fine.

Detail was added to this clause by the agreement of the Stability a
Growth Pact of 1997, which set out rules for government borrowing of e
area members after January 1999. These rules converted the three per c
of GDP limit on budget deficits in the Maastricht convergence conditio
into a permanent ceiling that might only be breached under exceptional
cumstances. These were defined as a natural disaster or a fall in GDP o
least two per cent over a year. This would only occur in a severe recessi
In cases where GDP has fallen between 0.75 per cent and two per cent i
single year, EU finance ministers have discretion over whether to impo
penalties. Members who break the three per cent barrier in other circu
stances are required to make heavy non-interest bearing deposits with
European Central Bank. These deposits would be converted into fi
should the member's budget deficit remain above the three per cent limi

Pause for thought: 13.5

Is there a general problem with the enforcement of supranational rules within th
EU? What powers of enforcement does the European Commission have short
expelling or suspending members?

Since there is discretion in the application of fines, we do not yet kn
to what extent the Stability and Growth Pact will be enforced. In one sen
the firm application of the Pact would make little sense since the fi
would make it even more difficult for governments to get their borrow
back below three per cent of GDP. The restriction of fiscal policy in t
way would also remove another element of flexibility in the management
national economies and would increase the costs associated with the loss
freedom to change exchange rates. The first major test of the Pact appea
imminent in February 2002 when the European Commission was poised
warn Germany and Portugal over the size of their budget deficits. Howev
in the event, ECOFIN accepted the assurances of the two governments t

have two concerns here. The first is with the ability of the euro area a whole to recover from negative economic shocks because of labour mar inflexibility arising from government regulations regarding wages, worki hours, employer rights to fire workers, and, in general, the 'freedom of ma agement to manage'. The EU's concern with social policy and worke rights is often pointed to as a basic reason for slow EU growth in compa son with growth rates in the USA.

Pause for thought 13.6

Should the EU be prepared to weaken social policy and reduce the rights of wo ers if that is what seems to be needed to have faster rates of economic growth?

The second issue is the lack of labour market mobility across the eu area. It is normally argued that the much greater degree of labour mobil in national economies such as the USA provides a safety valve for regio pressures as labour moves from high to low unemployment areas, helpi to balance the unequal impact of asymmetric shocks or policies. Labo mobility might be hampered again by labour market regulation as well as other aspects of social policy and regulations governing the housing mar and pensions.

It is not clear that the weakening of employment and social policy wou have much effect on euro area labour mobility, given the continuing la guage and cultural differences and lack of information regarding emplo ment opportunities and living conditions across national boundaries. It also not clear, as we have suggested above in 13.2, whether greater labo market mobility always has a positive impact.

(3) Would joining EMU create better conditions for firms making long-te decisions to invest in Britain?

It is difficult to say much about this in advance. There has not (since 199 been a large-scale loss of foreign investment to the UK, but it is difficult read much into this since the investment decisions of firms are influenc by many factors and we cannot know what would have happened to inco ing investment had sterling joined the euro area in 1999. For example, d ing the period 1999-2002, the UK economy performed well in relation most of the euro area economies and this must have helped to persua

produce a loss of foreign investment to the UK irrespective of whether UK joins the euro area. Further, were the UK to join, the question wo remain counterfactual since we should not know what would have happe had the UK not joined. We have a certain amount of anecdotal eviden Several large firms have made it clear that they would prefer the UK to in the euro area and might possibly relocate from the UK into the euro a were the UK to remain outside the single currency for much longer. Th have also been some investment decisions in favour of the euro area agai the UK that have been said to relate largely to the UK's being outside euro area. However, it is hard to judge these statements and actions. So of the unhappiness on the part of foreign firms with the UK's failure to j the single currency in 1999 has related to the strength of sterling against euro. Attitudes might change considerably were sterling to weaken sig icantly against the euro.

(4) What impact would entry into EMU have on the competitive position the UK's financial services industry, particularly the City's wholesale m kets?

As with (3), it is hard to know in advance and would be difficult to judge retrospect. There is no obvious reason why the City of London should b efit from the UK remaining outside the single currency. Thus, the quest appears to be whether continued failure to join might cause the City to l business to Paris or Frankfurt. There is no evidence that this has occur since January 1999, but this does not preclude it from happening in future. The majority City of London preference is for the UK to join one cannot quantify the potential gains here in order to weigh them agai other possible losses.

(5) In summary, will joining EMU promote higher growth, stability and a la ing increase in jobs?

This is even more difficult than the earlier questions. Indeed, ultimately cannot be answered. The UK's failure to join at the beginning of the E in 1957 may well have contributed to the relatively poor performance of economy in the subsequent years, although we cannot know for certain t this was so. Equally, some past monetary unions have failed. Howev arguments of this kind do not provide much guidance for the future. T

of which can be quantified with any degree of precision, if at all. This hardly surprising since little economic analysis of future events produc 'clear and unambiguous' support for anything. Indeed, if we were to acc those words at face value, the five economic tests would seem to provide argument for the UK's never joining the single currency.

The problem, then, with the five economic tests is that they are su ciently open to interpretation that the decision when to hold a referendu on membership remains much more likely to be decided by political facto For example, there is a feeling that the government would be unwilling hold the referendum and recommend a 'yes' vote until they were confid they could win the vote. There is nothing, of course, inherently wrong w this since there can be little doubt that the single currency is to a signific extent a political project and political advantages of greater European in gration should not be left out of the equation. In addition, there is lit doubt that economic problems following the joining of the euro area wou be attributed (whether justly or not) to single currency membership l these would be less likely to lead to social and political upheaval if me bership had been supported by a clear majority of the people in a refere dum.

Pause for thought 13.7

Should UK membership of the euro area be decided solely on economic ground

13.4 Monetary policy institutions in the euro area

The euro area was formally established on 1 January 1999 and trading in euro commenced on 4 January. Box 13.3 sets out euro area developme from immediately before the establishment of the single currency area u February 2002.

Monetary policy in the single currency area is conducted by European System of Central Banks (ESCB), which consists of the Europe Central Bank (ECB) and the national central banks of the member stat The ESCB is under the control of the Governing Council and the Execut Board of the ECB. To ensure independence of the ESCB from the Europe Commission and the governments of member states, the national cent banks, although continuing to be owned by their governments, were ma to become independent of the political process in their own countries.

Jun 1 1998	Establishment of ECB and ESCB
Sep 26 1998	Denmark and Greece agree to participate in ERMII with fluctu tion bands around parity of 2.25% and 15% respectively
Oct 13 1998	ECB announces a target inflation rate for the euro area of les than 2%
Dec 1 1998	ECB announces a reference value for monetary growth (M3) 4.5%
Dec 22 1998	ECB sets its main refinancing interest rate at 3%
Dec 31 1998	Conversion rates of the 11 participating currencies into the eu established from Jan 1 1999
Jan 4 1999	Trading begins in euro and ERMII commences operation
Apr 9 1999	ECB cuts refinancing interest rate from 3% to 2.5%
Nov 5 1999	ECB raises refinancing interest rate 50 basis points to 3%
Dec 3 1999	Euro falls below parity with the US dollar for the first time
Feb 4 2000	ECB raises refinancing interest rate by 25 basis points to 3.25
Mar 17 2000	ECB raises refinancing rate 25 basis points to 3.5%
Apr 28 2000	ECB raises refinancing rate 25 basis points to 3.75%
Jun 9 2000	ECB raises refinancing rate 50 basis points to 4.25%
Jun 19 2000	Greece granted membership of the single currency from Jan 2001
Jun 28 2000	ECB changes refinancing operations from fixed to variable interest rate system
Sep 1 2000	ECB raises minimum refinancing rate from 4.25 to 4.5%
Sep 22 2000	ECB is joined by the US, UK and Japanese central banks in int vention in the currency markets to support the weakening eur
Sep 28 2000	Danish referendum decides against membership of the euro area
Oct 6 2000	ECB raises minimum refinancing rate 25 basis points to 4.75%
Oct 25 2000	The euro falls to US$0.8250 - the lowest level of the euro against the dollar
Jan 3 2001	The euro rises above US$0.95 for the first time for over 5 months
May 11 2001	ECB cuts minimum refinancing rate 25 basis points to 4.5%
May 31 2001	The euro again slumps below US$0.85
Aug 14 2001	The euro creeps above US$0.90
Aug 31 2001	ECB cuts minimum refinancing rate 25 basis points to 4.25%
Sep 18 2001	ECB cuts minimum refinancing rate 50 points to 3.75%
Sep 19 2001	In the wake of the September 11 attack, the euro reaches US$0.93178 before starting to slip back again
Nov 9 2001	ECB cuts main refinancing rate 50 points to 3.25%
Jan 1 2002	Euro notes and coin become legal tender in the 12 euro area countries
Jan 2 2002	The euro gets a temporary boost on the back of the issue of t currency and again perks up above US$0.90 - this effect lasts only two days

(a) to define and implement the monetary policy of the Community;[4]
(b) to conduct foreign exchange operations;
(c) to hold and manage the official foreign exchange reserves of
member states; and
(d) to promote the smooth operation of payments systems.

Article 105(1) of the Treaty established the primary objective of
ESCB as the maintenance of price stability. The ESCB was also requir
without prejudice to the goal of price stability, to support the EU's gene
economic policies and to act in accordance with the principle of an op
market economy with free competition, favouring an efficient allocation
resources.

The general economic policies of the EC are stated in Article 2 of
Treaty as being to promote throughout the Community:

- a harmonious and balanced development of economic activities
- sustainable and non-inflationary growth respecting the environment
- a high degree of convergence of economic performance
- a high level of employment and social protection
- the raising of the standard of living and quality of life and
- economic and social cohesion and solidarity among Member States

Article 3a further requires that in attempting to achieve all of this, me
ber states and the Community should comply with the guiding principles
stable prices, sound public finances and monetary conditions, and a s
tainable balance of payments. This gave it a set of objectives similar
those of the Bundesbank, which had been obliged by law to safeguard
currency while supporting the general economic policy of the German fe
eral government.

Although pursuit of general economic policy objectives is not meant
prejudice the achievement of price stability, there is clearly scope for int
pretation under circumstances in which an apparent conflict exists betwe
tightening monetary policy and one or more of the general objectiv
'Price stability', after all, does not necessarily mean the lowest possi
level of inflation. Indeed, with a central bank composed of people fron
number of countries with different economic conditions and problems, c
might expect a range of interpretations of it. Nonetheless, control of inf
tion was intended to be central. Further, the objective of low inflation

Parliament has no influence on the objectives of monetary policy.

Pause for thought 13.8:

What do you think 'price stability' means?

The possibility of the system's objectives being interpreted in differ ways makes the composition of the ECB extremely important and raises question of how the political independence of the decision-makers wit the system can be ensured. Box 13.4 lists factors widely accepted as re vant to the degree of political independence of a central bank.

Box 13.4: Features important in determining the independence of a central bank

1. The existence of statutory guarantees of independence
2. The nature of the statutory objectives set for the central bank
3. Methods of appointment and removal of senior officers, the board of directors and the President
4. The length of the President's term of office
5. The presence or absence of government officials on the bank's board
6. The extent to which the bank is bound by instructions from the government a the range of instruments at the bank's disposal
7. The limits on central financing of the government
8. The ease with which any of the above features can be altered by governmen

The ECB does well under the headings listed in Box 13.4. T Executive Board of the ECB, which runs the bank, comprises a preside vice-president and four other members appointed by the Heads of State a recommendation from the European Council after consultation with European Parliament and the Governing Council of the ECB. All six me bers are required to be of recognized standing and professional experien in monetary or banking matters. In other words, they should be represen tives from the world of finance, making it likely that their interpretation 'price stability' will be conservative.

The term of office for Executive Board members is eight years and non-renewable. Members of the Executive Board may be compulsor retired but only for misconduct, which is defined to include the taking instructions from a member government. To compulsorily retire Executive Board member, the Governing Council or the Executive Bo

maturely only for serious cause, notified either by themselves or the EC council. That is, they cannot be removed by their own national gove ments. The long and non-renewable term is meant to reduce the possibil of Board members following the wishes of governments in the hope being reappointed to their positions.

Pause for thought 13.9:

Why might representatives of the world of finance be expected to have a conse vative view of 'price stability'? What is a conservative view of price stability?

The Governing Council consists of the Executive Board plus the gov nors of the national central banks. Thus, the membership rose to 18 w the entry of Greece to the monetary union at the beginning of 2001. Voti on all issues except those related to the bank's capital, is on a one-pers one-vote basis, with decision by simple majority. This makes it possible the representatives of the national central banks to outvote the Execut Board members and for smaller members of monetary union to outv large members such as Germany on all issues other than those related to ECB's capital. This provided an extra reason for the insistence that national central banks be politically independent.

Where the bank's capital is involved, voting power is proportional to member states' subscribed capital and the Executive Board has no vot The subscribed capital, in turn, is determined by equal weighting of (i) member states' shares of the population and (ii) GDP at market prices, av aged over the previous five years. Subscriptions are revised every f years.

The ECB is responsible for the note issue, open market operations, setting of minimum reserve requirements and other aspects of monet control and supplies liquidity to the banking system. It can make use of national central banks to carry out open market operations. However, ESCB is not permitted to lend to governments except through the acqui tion of their paper in the secondary market. Article 104 of the Treaty expl itly prohibits the provision of overdraft or other credit facilities by the EC or national central banks to any EU member state public body.

As we saw in 13.3, to strengthen the control of high-spending mem governments, the Maastricht treaty forbad excessive government defic and the 'bailing out' of indebted member governments by EU governme

ferent governments should continue to carry different rates of interest reflect the market's assessment of the default risk associated with each g ernment's debt issue. It was being suggested in bond markets in early 19 that the formation of monetary union could see the dramatic downgrad of the debt of countries such as Belgium and Italy because of their high l els of public debt as a proportion of GDP. However, as can be seen fr Table 13.1, this has not happened. Table 13.1 shows the bid yield on sele ed benchmark government bonds of monetary union members on Febru 9 2002. There are three possible reasons for the similarity of the bid yie in this table for bonds with approximately the same maturity dates.

Table 13.1 Coupon rates and bid yields on benchmark government bonds of euro area members

Country	*Redemption date*	*Coupon (%)*	*Bid yield (%)*
Austria	31/7/2003	4.3	3.73
	31/1/2011	5.25	5.07
Belgium	30/4/2004	7.25	3.99
	30/9/2011	5.0	5.12
Finland	30/11/2003	3.75	3.84
	28/2/2011	5.75	5.09
France	31/1/2004	4.0	3.86
	31/10/2011	5.0	5.00
Germany	30/9/2003	3.75	3.76
	31/7/2011	5.0	4.90
Greece	31/1/2004	6.6	3.97
	31/5/2011	5.35	5.28
Ireland	31/10/2002	2.75	3.46
	30/4/2010	4.0	5.11
Italy	28/2/2004	5.0	3.94
	28/2/2012	5.0	5.14
Netherlands	31/1/2004	5.75	3.90
	31/7/2011	5.0	5.04
Portugal	31/8/2004	3.625	4.13
	30/6/2011	5.15	5.16
Spain	31/7/2004	4.5	4.06
	31/10/2011	5.35	5.11

Source: *Financial Times*, 9/10 February 2002 p.17

the 'no bail out' rule. The second is that the worry about countries runni
large deficits in monetary union has been excessive. Indeed, it can
argued that the fiscal discipline on a member of a monetary union is grea
than that on nation states outside monetary union because members of mo
etary union cannot finance their budget deficits through increases in
money supply. The third is that the markets believe that the threat of fi
under the Stability and Growth pact, together with the power granted in
Maastricht Treaty to the European Council to monitor economic develo
ments in each of the member states, will be effective in persuading pote
tially high spending countries to keep a tight control of their budgets. I
one or more of these reasons, the market does not price the bonds to inclu
a significant default risk.

The Maastricht Treaty separated the operation of monetary policy fr
the prudential supervision of credit institutions and the stability of the fina
cial system. The latter remains the responsibility of the member stat
although the ESCB is expected to ensure the smooth conduct of polic
relating to prudential supervision and the ECB may, with the unanimo
approval of the European Council and the approval of the Europe
Parliament, be given specific tasks in this area (Article 105.6). This co
forms to the German model in which prudential supervision was not carr
out by the Bundesbank but by the separate Aufsichtsamt (the Fede
Banking Supervisory Office).

Any attempt to place significant power in the hands of an unelected bo
such as the ECB raises the question of the accountability of that body to ge
ernments and, ultimately, to the citizens of the member states. Accountabil
under the Maastricht Treaty is weak. This is not surprising since:

- the aim of making central banks independent is to prevent as far as
possible the contamination of monetary policy decisions by the attitud
and actions of the democratic political system and
- there is a general problem of accountability within the European Uni

What accountability there is, takes the following forms:

1. The ECB is subject to audit and is under the jurisdiction of the Co
of Justice;
2. The President of the European Council and a member of the Europe
Commission are allowed to attend meetings of the Governing Council
the ECB but are not allowed to vote;

the Executive Board are heard by the relevant committees of the par
ment at either side's request.

None of this gives any power to anyone to genuinely call the ECB
account. Disapproval can, of course, be expressed but there is no provis
beyond this. There is another difficulty, which we shall come across belo
Accountability requires transparency, in the sense that people should be a
to know what the ECB is doing in order to fulfil its mandate. This, in tu
requires full knowledge of what that mandate is. Of course, we do kn
this in a general sense — the achievement of price stability. But t
requires interpretation.

The aim of all of these regulations was to create a strongly independ
central bank. Indeed, it is, in a sense, more politically independent than
Bundesbank itself. When the Bundesbank and the German governm
held different views regarding economic policy, the Bundesbank had a s
gle and united opponent that was able to point to its electoral suppo
Within the monetary union, the counterpart of the German government i
group of governments that may be of different political persuasions a
whose countries may be experiencing different economic problem
Consequently, it is less likely that the Executive Board of the ECB will co
front a united political view than was the case with the Bundesbank.

And yet, despite all of the attempts to preserve the political indepe
ence of the ECB, to enforce strict convergence conditions for members
and forbid loose budgetary policies, the view of both the financial mark
and leading economists before the establishment of the single currency w
that the euro, in the long-term, would be a weaker currency than the DM h
been. One reason for this view stemmed from the high proportion of int
EU trade of monetary union members. This makes the EU a relativ
closed economic area with its external trade making up only a small p
centage of GDP. This, it was held, would cause the ECB[5] to be less co
cerned about the external value of the euro than the Bundesbank was ab
the DM and to behave like the US Federal Reserve — pursuing inter
price stability but being largely indifferent to the impact of the exchan
rate on foreign trade. This would make it more open to pressures for we
er monetary policy to stimulate economic growth, particularly given
slow growth and high rates of unemployment in much of the EU in the l
1990s. A supporting argument was that the euro would be a broader-ba
reserve currency than the DM and, thus, would be less likely to be driv
artificially high on occasions.

Several issues relating to the operation of policy needed to be settled advance of 1999. There were three principal issues:

- The determination of a target rate of inflation;
- Whether to target the inflation rate directly or to target an intermedi variable such as the rate of growth of the money supply;
- The choice of the policy instrument.

The target rate of inflation

The ECB, unlike the Bank of England, chooses its own target rate of inf tion. However, this is referred to as a 'quantitative definition of price s bility' rather than as a target because the Bank denies that it is engaged inflation targeting (ECB 2001). However, we are also told that the quan tative definition 'provides a yardstick against which the public can hold ECB accountable' (ECB, 2001, p.38) and that 'The ECB is required to p vide an explanation for sustained deviations from this definition and to cl ify how price stability will be re-established within an acceptable period time' (ECB, 2001, p.38).

This makes it sound close enough to a target for us to use the wo Initially, the ECB announced a price stability definition of an ann increase of less than two per cent in the newly developed Harmonised Ind of Consumer Prices (HICP). This was quickly changed to a range of 0 per cent to indicate that falling prices were not acceptable. This still l some concern that the policy might be too strict, particularly given the pro lems surrounding the use of price indexes in general and the HICP in p ticular. According to Eurostat, the statistics bureau of the EU, the HI takes account of the latest economic research. However, national pr indexes are probably more likely to overestimate inflation than the rever the same is likely to be true of the HICP.

It has been difficult to know how the ECB has been interpreting its o target range. A range of 0 - 2 per cent appeared to imply that the E would be equally happy with an inflation rate of 0 per cent as with one two per cent and that one might expect a successful monetary policy in ECB's terms to produce a long-term average rate of inflation of around 1 cent. This implies a very tight policy especially given the probability t the HICP overstates the true rate of inflation. Further, since we are deal with 12 economies, an average inflation rate across the euro area of 1

were complicated when calculations regarding money growth and veloc
trends suggested that the ECB was aiming at a point target of 1.5 per c
(Svensson, 2000).

A second problem derives from the fact that the HICP is a measure
headline inflation. That is, the measure is influenced by all factors incl
ing external shocks, even if these have only short-term effects, and pol
changes, although they might be intended to reduce longer-term inflati
ary pressure. This contrasts with many other central banks, which frame
inflation target in terms of core or underlying inflation, such as the RPIX
the UK (see Section 9.6). This seeks to measure sustained domestic in
tionary pressure. The use of a headline rate leaves an element of uncerta
ty as to how the central bank is likely to react to an external shock. T
ECB has argued that it retains a degree of flexibility because its concern
with medium-term inflationary trends — but this leaves open the quest
of the length of the medium term. The ECB defends the choice of a qu
titative definition of price stability as a means of providing both tra
parency and accountability. However, this is not achieved if the meaning
the definition is unclear. In other words, the form of the target reduces
transparency of ECB decision-making and leaves the financial mark
uncertain about the basis of ECB decisions.

Inflation or monetary targeting?

The ECB had to decide whether simply to target the ultimate objective -
achievement of a low inflation rate — or to choose an intermediate tar
through which it would hope to control the rate of inflation. The lik
intermediate target was some measure of the money supply. We have se
in Chapter 9, that the use of a money supply target has the advantage t
the time lag between adjusting short-term interest rates and changes in
objective are shorter than if the intermediate target is nominal income o
no intermediate target is used. Further, there are fewer exogenous inf
ences upon it than is the case with a GNP or inflation target. However,
use of an intermediate money supply target only makes sense if there i
stable short-run demand function for money. For this reason, where
short-run money demand function had been manifestly unstable over
past twenty years, as in the UK, the use of a single money supply target h
been abandoned. Germany, on the other hand, continued to use a target
broad money. Although, in practice, the Bundesbank had appeared to p

was despite the existence of evidence that in the second half of the 199 the German demand for money function was starting to become unsta because of financial liberalization and increased financial innovation Germany. As well as causing short-term instability in the demand money function, financial liberalization had made it harder for central ba to control the money supply because it had become harder to influence r ative interest rates between money and other financial assets.

This meant that there were sufficient uncertainties to make it inadvisa to depend on a single measure of the money supply as an intermediate t get. A money supply target could have been based on past relationsh between the money supply and inflation or on a model of the economy the monetary union but there was a serious possibility that it would be of tle use in making monetary policy decisions. In addition, a failure achieve the single money supply target would have added to the uncerta ty regarding the strength of the ECB's monetary policy.

Thus, instead of a money supply target, the ECB set a monetary grow reference value for a broad measure of the money supply, M3 (see Box for the composition of M3). The monetary growth reference value w established as the first pillar of the ECB's monetary stability strategy. T second pillar of the strategy is a broadly based assessment of the outlook price developments and the risks to price stability, using other availa indicators. These other indicators include the output gap, forecasts of ec nomic growth, and a forecast of the rate of inflation itself. Factors tak into account are considered in more detail in 13.6 below.

Pause for thought 13.10:

Why did the ECB forecast an annual fall in the velocity of money?

The monetary growth reference value was set at 4.5 per cent per annu and has been left unchanged during the first three years of the ECB's op ations. This figure was based on what the ECB referred to as the plausi assumptions of a medium term rate of growth of 2 to 2.5 per cent per annu and an annual decline in the velocity of money of 0.5 to 1 per cent, toge er with the target rate of inflation of less than 2 per cent.[6] The ECB ma it quite clear from the beginning that the figure of 4.5 per cent for moneta growth was not a target and that figures above 4.5 per cent would certain not automatically trigger interest rate rises. The reference value is a described as a medium-term concept. In the view of the ECB, tempora

The choice of instrument

The ECB had first to decide upon its system for providing liquidity to banking system. This is done principally through the main refinanc operations, weekly open market operations that provide liquidity to banking system through repurchase agreements (repos)[7] with a maturity two weeks. Initially, this operated through a system of fixed rate tende with the fixed rate known as the main refinancing rate — 'refi' for sh This rate became the focus of attention at the regular announcement of interest rate decision of the ECB's Governing Council.[8]

In a fixed-rate tender, when the total amount for which banks bid greater than the amount the central bank is prepared to lend, each ba receives the same proportion of the amount for which they bid. T encourages banks to bid for more than they really want since they kn they are unlikely to receive all that they bid for and they know the inter rate they will have to pay on the funds they receive. This gives an adv tage to large banks, which have the collateral to be able to support large b for funds. It also makes it difficult for the central bank to judge the t demand for money in the system.

Thus, it quickly became clear that the ECB would prefer a variable r tender in which banks indicate how much they are willing to borrow fr the central bank at various rates. A cut-off rate of interest is then declar Bids above this cut-off rate are fully filled while bids at the cut-off rate filled proportionately. This gives the central bank a better idea of the st of demand in the market and of market expectations about future inter rates. The official refinancing rate is then simply a minimum rate of int est — no funds are provided by the central bank below this rate but it is p sible for funds to be lent to the banks above this rate. For this reason, ECB was wary about changing to the variable rate system. This was p ticularly the case because the large euro area economies were in recess during the first year of the ECB's operation. This had led the bank to the refinancing rate from 3 per cent to 2.5 per cent on 9 April 1999 an had a clear desire at this point to keep interest rates low. During this pe od only about five per cent of total bank bids for funds were being met the ECB and there was little doubt that the interest rate at which funds w actually provided under a variable rate system would be higher than minimum rate.

concerned about inflation. The ECB wished to keep interest rates as stea
as possible under the new system and so moved to variable rate tenders j
after it had increased the refinancing rate by a half percentage point —
larger increase than many in the market had expected. Changing the syst
at that time made it less likely that the rates at which funds would actua
be provided to the banks would be much above the official refinancing ra
which from that point became the minimum rate.

The main refinancing operations of the ECB are supported by two oth
types of open market operations: longer-term refinancing operations a
fine-tuning operations.[9] Longer-term financing operations are conduc
monthly through repurchase agreements with a three-month maturity. T
purpose of these is to prevent all liquidity in the money market from havi
to be rolled over every two weeks and to provide access to longer-term re
nancing. As their name suggests, fine-tuning operations are conduc
irregularly with the aim of smoothing the impact on interest rates of unc
pected liquidity fluctuations in the money market.

When the refinancing rate is announced by the ECB's Governi
Council, two other rates are also declared. These are the ECB's rates on
marginal lending facility and on its deposit facility. The marginal lendi
facility provides the possibility of emergency overnight borrowing to m
liquidity needs. The rate of interest for such borrowings is always set abo
the refinancing rate.[10] On 22 January 1999, after a brief adjustment peri
the marginal lending interest rate was set 150 basis points (1.5 per ce
above the main refinancing rate. From 9 April 1999, this difference w
reduced to 100 basis points (1 per cent) and the gap between the two ra
has remained unchanged from that date. The deposit rate applies
overnight deposits and is always set below the refinancing rate. The g
between these two rates has stayed steady at 100 basis points (1 per ce
since 9 April 1999. The main refinancing rate (refi) is by far the m
important of the ECB's rates.

Another question was whether to support the control of short-term int
est rates with the requirement that banks hold mandatory minimum reser
ratios. Before monetary union, this was practised in the majority of l
member countries in the belief that it allowed the central bank more eas
to manage short-term interest rates by creating a predictable demand
reserves at the central bank under circumstances in which bank balan
sheets were growing rapidly in response to increased demand for cre
However, because reserves at the central bank usually do not receive int

of profit. This in turn puts downward pressure on the demand for credit

The Bank of England argued that minimum reserve ratios were required in deep and liquid financial markets since the central bank co achieve its objectives in such markets solely through open market ope tions. It was also suggested that the use of minimum reserve ratios c flicted with the Maastricht Treaty requirement that policy should be c ducted in accordance with the principle of an open market economy w free competition, favouring an efficient allocation of resources.

Despite these objections, the ECB settled for a minimum reserves s tem with banks required to hold with the national central bank members the ESCB a reserve ratio of 2 per cent of the liability base. This was defi to include: overnight deposits; deposits with agreed maturity up to t years; deposits redeemable at notice up to two years; debt securities issu with agreed maturity up to two years; and money market paper. A lum sum allowance of €100,000 may be deducted from an institution's rese requirement. The Governing Council argued that without the use of a m imum reserve system, the ESCB would be faced with a relatively h volatility of money market interest rates and would need to engage f quently in open market operations. This could undermine the operatio efficiency of monetary policy as markets have difficulty in distinguish policy signals made by the ECB from technical adjustments necessary reduce the volatility of interest rates. It argued, too, that a reserve ratio s tem would safeguard the role of national central banks as providers of l uidity to the banking system. However, the Council acknowledged the b den that such a system places on banks if reserves at the central bank do earn interest. It thus decided to pay interest on the required minim reserves holdings at the main refinancing interest rate.

13.6 ECB monetary policy since 1999 and the value of the eu

It is difficult to judge the effectiveness of ECB monetary policy. Firstly, must allow for the time lags in monetary policy and accept that the p formance of the euro area economy in 1999 and perhaps a good proport of 2000 had more to do with the monetary policies of the central banks the member countries before 1999 and with the attempt by various gove ments to meet the Maastricht convergence criteria. Secondly, despite setting of an inflation target and a monetary growth reference value, it not been easy to know precisely what the ECB has been attempting to d

the yen and sterling 1999-2002

Date	*$/€*	*Y/€*	*£/€*
4 Jan 99	1.18738	133.159	0.71556
1 Feb 99	1.13027	130.046	0.68874
1 Apr 99	1.07802	129.536	0.67097
1 Jun 99	1.04463	125.483	0.64863
3 Aug 99	1.06798	122.966	0.66023
1 Oct 99	1.07172	112.627	0.64761
1 Dec 99	1.00678	103.069	0.63077
27 Jan 00	0.98947	103.804	0.60455
1 Mar 00	0.97029	100.166	0.61208
1 May 00	0.91240	99.322	0.58664
4 Jul 00	0.95107	101.024	0.62789
1 Sep 00	0.89942	95.140	0.61559
25 Oct 00	0.82737	89.366	0.57468
26 Oct 00	0.82733	89.672	0.57764
1 Dec 00	0.87678	97.478	0.60996
11 Jan 01	0.95246	111.922	0.63610
1 Mar 01	0.92923	108.983	0.63865
16 Mar 01	0.89273	109.718	0.62571
18 May 01	0.87690	108.495	0.61340
1 Jun 01	0.84650	100.643	0.59820
3 Jul 01	0.84786	105.54	0.60307
1 Aug 01	0.87928	109.79	0.61346
4 Sep 01	0.88691	105.94	0.61383
10 Sep 01	0.89907	108.85	0.61636
11 Sep 01	0.91277	108.70	0.62070
19 Sep 01	0.93178	109.34	0.63323
1 Oct 01	0.91608	110.17	0.61958
1 Nov 01	0.90446	110.20	0.61834
1 Dec 01	0.88984	110.26	0.62594
2 Jan 02	0.90343	119.28	0.62512
4 Jan 02	0.89502	117.25	0.61926
31 Jan 02	0.85926	115.10	0.60844
15 Feb 02	0.87312	116.14	0.60972

Source: Pacific Exchange Rate Service - http://pacific.commerce.ubc.ca/xr/

and that monthly figures between 2 and 3 per cent do not, in themselv
suggest a failure of policy. Thus, the Governing Council appears to beco
concerned when the monthly rate moves above 2 per cent only if there
evidence of growing inflationary pressure that would continue in the me
um-term, pushing the rate higher. However, as we have pointed out in 13
it is difficult to know how long the medium term is in the minds of the me
bers of the Governing Council. It has also been difficult to determine
attitude of ECB members towards the desired value of the euro.

Pause for thought 13.11:

Whose monetary policy was most important in determining the rate of increase
the HICP during 1999? If your answer is not the ECB's, why not?

We have mentioned the doubts that surrounded the likely policy of
ECB and hence the likely strength of the euro following its launch
January 1999. The constitution had been designed partly to convince
markets that the euro area would be a low inflation area with a strong c
rency. However, the ECB was a new institution and new institutions u
mately only establish a reputation through their behaviour over a number
years. In January 1999, no one knew precisely how the ECB would beha

Despite these doubts, no one forecast the dramatic fall that took place
the value of the euro, particularly against the US dollar and the Japan
yen, in its first two years of life. The extent of this fall is shown in Ta
13.2. The euro, having begun trading on 4 January 1999 at a rate of €
$1.1743 rose on the first day to close in New York at $1.18738. Howev
from then until the close on 25 or 26 October 2000 (the days when the e
seemed to have finally reached its low), the euro fell 30.3 per cent agai
the dollar, 32.9 per cent against the yen, and 19.7 per cent against the pou
sterling. It then recovered, reaching $0.95246 on 11 January 2001 but fai
to sustain this improvement, falling back below $0.90 in March 2001.

There were many reasons for the fall in the value of the euro. Its
against the US dollar was partly a reflection of the strength of the US d
lar as the USA economy continued to grow rapidly and European fir
invested heavily in the USA.

In addition, because the markets had no clear no notion of how low
ECB were prepared to see the euro fall before they took action, mar
agents frequently 'tested the market' — they sold euro to see if falls wo
produce some indication of likely future action by the ECB. This do

ments about the euro. The markets did not like this apparent lack of lea ership. Nor were they convinced that the ECB would, despite its consti tion, be truly immune from political pressure. This concern was streng ened by the confusion over the length of the term of office of the fi President of the ECB, Wim Duisenberg of the Netherlands.

Duisenberg was appointed in 1998 to serve an eight-year ter However, there had been conflict over his appointment because of the fe of some member states, notably France, that Duisenberg's approach to p icy would be too conservative and that monetary policy might be deflatio ary. It was generally understood that there had been a behind-the-scen agreement that Duisenberg would not serve his full term of office and wou be replaced by a French nominee, although the exact terms of the agreem were unclear. There was a widespread view that Duisenberg would ser only four years, although he consistently denied this. In the event, February 2002, he announced that he would be retiring from the job on 68th birthday, on 9 July 2003. By then, he will have served just over fi years of his term of office.

Pause for thought 13.12:

If there had been a fear on the part of some member countries that Wim Duisenberg would be a too conservative President of the ECB, why did the valu of the euro rise slightly, when, in February 2002, he announced his retirement?

In addition to the worry about leadership, because the euro was a n currency, there was no firm view as to the long run exchange rate indica by economic fundamentals. The starting exchange rate of the euro w simply a weighted average of the values of the 11 participating currenc at the end of December 1998. There was no reason to believe that the n currency would behave in the same way as this weighted average had do before 1999. Indeed, it was probably the case that recessions in the ma economies would have a more depressing impact on expectations about t future of the European economy than was suggested by the weights appl in the old ERM.

Under these circumstances, other factors that might normally not ha had much impact on the currency provided additional excuses for selling t euro. These included the resignation of the president and members of t European Commission and the NATO bombing of Serbia and Kosovo. T

because of rumour and political uncertainty. Thus, the fall resulted fro
mixture of genuine economic news, the existence of uncertainty about
attitudes of the authorities and a variety of short-term political factors. T
doubts about when the euro would 'bottom out' encouraged speculators
continue to sell the euro.

For most of 1999, the ECB was able to take a relaxed view of the va
of the euro. At this time, the major European economies were in deep rec
sion with high levels of unemployment and low rates of growth. There w
little inflationary pressure in these economies and the HICP showed inf
tion rates well within the ECB's target range of 0 – 2 per cent. This
shown clearly in Table 13.3, which sets out changes in the ECB's main re
nancing rate since January 1999, together with inflation, unemployme
and money growth rate figures over the period for the euro area. We no
to note that at the beginning of 2001, Greece became a member of the eu
area, requiring some small adjustment of the statistics. We should also n
that the base of 100 for the HICP represents average 1996 prices. At
beginning of the operations of the ECB in January 1999, the HICP stood
102.8.

In the first half of 1999, there was little desire to invest within Euro
and the ECB was able to keep interest rates low to help the recovery of
European economy. The HICP remained almost stationary for much of
year. The ECB's initial interest rate of 3 per cent was lowered in early Ap
to 2.5 per cent and was then left unchanged for seven months.
November, however, although the inflation rate was still well within the t
get range, it had begun to rise. The monetary growth rate had climbed
6.2 per cent, the euro was plunging towards parity with the dollar and une
ployment, while still high, was beginning to fall. The ECB responded
what they saw as developing inflationary pressure by pushing the main re
nancing rate back to 3 per cent.

The euro continued to fall, breaching parity with the dollar for the f
time on 27 January 2000. Despite a temporary fall in January 2000,
monetary growth rate remained well above the reference value and une
ployment continued slowly to decline. The ECB responded with a series
quarter point interest rises in February, March and April and a half point r
in June. Under this pressure, monetary growth fell back towards the ref
ence value and the euro picked up to some extent. This was mislead
since it began to fall again sharply in August and September. Meanwh
the inflation rate continued to rise, reaching 2.8 per cent in September. T

in September and on 22 September 2000, the ECB joined with the cent
banks of the USA, Japan and the UK to purchase euro in the attempt to pr
up the currency. This, together with a further interest rate rise in Octob
had no immediate effect and the euro reached a low of $0.825 during
day's trading on 26 October.

None the less, the euro area economy appeared soon after to be respon
ing to the ECB's rate rises. By January 2001, the inflation rate had fal
towards the target range; the monetary growth rate had reached the ref
ence value for what was to turn out to be the only month of the first
months of the operation of the ECB; and the fall in unemployment had v
tually come to a halt. The ECB felt able to relax. Following the Octob
2000 increase, the main refinancing rate was left unchanged for sev
months. During this period, however, the US economy had started to he
toward recession and fears of a global recession had begun to emerge. T
Federal Reserve had begun to slash US interest rates and the financial m
kets were expecting the ECB to follow suit. The problem for the ECB w
that monetary growth was again heading for 5 per cent and the inflation r
was under pressure from rising world oil prices as well as the weak eu
The impact on the HICP of the temporarily high world oil price provide
good example of the problem mentioned in 13.5 of using a headline rate
inflation as the target of monetary policy. It is at least possible that the E
was unduly slow to cut interest rates because of the high rate of inflation
shown by the HICP, which reached a peak of 3.4 per cent in May 2001.

Following the May cut, the ECB resisted pressure for further cuts u
the end of August. In the period between May and August, the inflation r
began to decline but remained well outside the target range. Monet
growth continued to rise. The 11 September attack on the World Tra
Centre in New York and the Pentagon in Washington DC led to increas
worries about world recession and the ECB responded with a half-point
in rates on 18 September and a further quarter-point cut in November.
this time inflation had fallen to 2.1 per cent, just outside the target range

The monetary growth rate continued to climb but this was dismissed
the ECB. It argued that the relatively high growth of M3 was the result
people shifting into the liquid and relatively safe short-term assets that ma
up M3 because of the uncertainty following the September 11 attacks in
USA. Support for this view was drawn from the fact that the growth of p
vate sector credit had been continuously falling over recent months. No
the less, the ECB then felt that the main refinancing rate, which stood af

Official interest rate for the euro area January 1999–February 2002

Date		Inflation rate [1]	Money growth rate [2]	Unemployment rate [4]	Interest rate [3]
1999	Jan	0.8	5.8	10.4	3.0
	Feb	0.8	5.3	10.3	3.0
	Mar	1.0	5.4	10.2	3.0
	Apr	1.1	5.3	10.2	2.5 (9 April)
	May	1.0	5.5	10.1	2.5
	Jun	0.9	5.5	10.1	2.5
	Jul	1.1	5.9	10.0	2.5
	Aug	1.2	5.7	10.0	2.5
	Sep	1.2	6.0	9.9	2.5
	Oct	1.4	5.7	9.8	2.5
	Nov	1.5	6.2	9.7	3.0 (5 Nov)
	Dec	1.7	6.1	9.6	3.0
2000	Jan	1.9	5.3	9.5	3.0
	Feb	2.0	6.2	9.4	3.25 (4 Feb)
	Mar	2.1	6.6	9.3	3.5 (17 Mar)
	Apr	1.9	6.7	9.2	3.75 (28 Apr)
	May	1.9	5.9	9.1	3.75
	Jun	2.4	5.3	9.0	4.25 (9 Jun)
	Jul	2.4	5.1	8.9	4.25
	Aug	2.3	5.4	8.9	4.25
	Sep	2.8	5.0	8.8	4.5 (1 Sep)
	Oct	2.7	4.9	8.7	4.75 (6 Oct)
	Nov	2.9	4.7	8.7	4.75
	Dec	2.5	4.9	8.7	4.75
GREECE		JOINS	EURO	AREA	
2001	Jan	2.4	4.5	8.5	4.75
	Feb	2.6	4.8	8.5	4.75
	Mar	2.6	4.7	8.5	4.75
	Apr	2.9	4.7	8.4	4.75
	May	3.4	5.3	8.4	4.5 (11 May)
	Jun	3.0	5.5	8.5	4.5
	Jul	2.8	5.7	8.4	4.5
	Aug	2.7	6.0	8.4	4.25 (31 Aug)
	Sep	2.5	6.9	8.5	3.75 (18 Sep)
	Oct	2.4	7.4	8.5	3.75
	Nov	2.1	7.8	8.5	3.25 (9 Nov)
	Dec	2.1	7.7	8.5	3.25
2002	Jan	2.5			3.25

Notes: 1 annual rate of growth of Harmonized Index of Consumer Prices. 2 annual rate growth of M3 3 ECB's main refinancing (refi) rate at the end of month (date of interest ra change in brackets) 4 Unemployment as a percentage of the labour force

Source: *ECB Monthly Report*, various months, Tables 2.4, 4.1 and 5.4

concluding this brief account of the ECB's decisions by listing the fact that were considered in making this decision. As listed in the EC *Monthly Report* of December 2001, they were:

- quarter-on-quarter real GDP growth was close to zero in the third qu ter of 2001and economic activity seems to have remained subdued in fourth quarter;
- surveys in November continued to indicate low business and consun confidence;
- conditions existed for economic growth to improve during 2002;
- the fall in oil prices and the expected continued decline in consun price inflation would lead to higher growth in real disposable income
- participants in financial markets were being more optimistic ab growth prospects in the euro area and in the world economy;
- forecasts by the international institutions and by ECB staff were fo strengthening of growth in the euro area.

Thus, we can interpret the decision of the 6 December as follows. T inflation rate was above the target range but had been falling for the pre ous six months and was highly likely to continue to fall. This view was su ported by the weak GDP figures and the low level of confidence in the ec omy. The money supply was growing at a rate well above the referer value — but this seemed to be the result of temporary factors and had implication for future inflation. Therefore, there was certainly no need increase interest rates.

The current weakness of the economy and the low levels of confider might suggest, rather, the need for further interest rate cuts. However, ECB believed that, on current policies, the growth rate in the euro a would increase in 2002 and 2003. In support of this, it quoted the foreca of other organizations and a revival of confidence in financial markets (f lowing the conventional wisdom discussed in Chapter 12 that financial m kets are constantly looking ahead). It argued in the report that structu reforms had taken place in the euro area but that further reforms would needed if higher rates of growth than the 2 – 2.5 per cent per annum bu into its calculation of the monetary growth reference point were not to inflationary. Thus, it decided that a further cut in interest rates in Decem

Governing Council of the ECB, therefore, chose to leave interest ra unchanged.

In the light of the performance of the euro and the targets established itself by the ECB, what can we say about European monetary policy sin 1999? First of all, we should note that, in the 37 months during which ECB has been responsible for monetary policy, the inflation rate has be within the target range on only 16 occasions. All of these were in the ea months of operation of the ECB when, as we have suggested above, inflation rate was being influenced more by the separate monetary polic in existence before 1999 than by anything done by the ECB. Indeed, inf tion was outside of its target range for 20 consecutive months from Ju 2000 to January 2002. Despite this, we are not in a position to suggest t ECB policy has failed since, as we have indicated above, its approach policy is sufficiently opaque to leave us uncertain regarding the prec intentions. Inflation has certainly not run out of control and shows no s of doing so. Indeed, the forecast for 2002 shown in Table 13.4 suggests t the average annual inflation rate for the euro area in 2002 will be only per cent, well within the target range.

Part of the problem stems from the dubious role of the monetary grov reference value. In December 2001, the ECB reaffirmed the monet growth reference value as 4.5 per cent, but we have noted a tendency attribute growth rates above this level to temporary and irrelevant facto It should be clear from other sections of the book that we have no probl with the downgrading of a monetary target. However, it seems odd t monetary growth continues to be acknowledged as the 'first pillar' of po cy when all that occurs is that 'developments of M3 are continuously a thoroughly analysed by the ECB in the broader context of other monet indicators and information from the second pillar to assess their impli tions for the risks to price stability over the medium term.'[11]

To conclude, we need to mention two other possible concerns regard monetary policy in the euro area. The first concerns the unevenness inflationary pressures across the area. The Organization for Econon Cooperation and Development (OECD) figures for the annual increase consumer prices (per cent, p.a.) in the euro area for the year 2001 were:

Austria	1.9	Germany	1.7	Netherlands	4.4
Belgium	2.9	Ireland	4.2	Portugal	3.7
Belgium	2.9	Italy	2.4	Spain	2.7
France	1.4	Luxembourg	1.7		

between the lowest and highest inflation rates. Whether this is a probl
depends on the extent to which above- or below-average inflation rates
individual countries are temporary or long-lasting. There are a number
factors including different patterns of consumption and weather conditio
and variations in the timing and magnitude of government policies that c
account for temporary deviations in inflation rates from the average. It
also possible that, in the early years of monetary union, the process
'catching up' causes differences in inflation rates. That is, some countr
experience faster rates of economic growth and consequent higher inflati
rates.

A problem only arises if the inflation rate in a country remains stuck w
above or below the average for a significant period or if there is a clear la
of synchronization of business cycles. If a country's inflation rate remain
well above the euro area average for, say, two to three years and showed
sign of moving back towards the average, it would seem that the ECB
monetary stance was too weak to tackle the underlying inflationary pr
sures in the country. The higher rate of inflation would begin to underm
the country's competitiveness — and this can no longer be tackled by
devaluation of the national currency. Equally, a particularly low rate
inflation might indicate that the centrally determined monetary policy w
being too restrictive for the country in question.

In recent years, particular concern has been expressed about the positi
of Ireland because the inflation rate had reached 5.9 per cent in the y
2000 and had shown little sign of falling in the early months of 200
However, as the figures show, the Irish inflation rate fell back towards
average in the later part of 2001 and the forecast inflation rates for the eu
area for 2002 shown in Table 13.4 suggest that the Irish inflation rate w
fall more or less in line with the euro area average. According to this fo
cast, the difference between highest and lowest inflation rates will fall ba
to 2.6 percentage points in 2002.

Therefore, it is not yet clear that there is a problem of divergent inflati
rates in the euro area as it is currently constituted. We shall need to w
longer to see how the situation develops. If a problem is revealed by
forecast figures for 2002, it is that monetary policy may have been too tig
from the point of view of the German and French economies.

The ECB's view regarding divergent inflation rates is that it needs
determine its monetary policy on the basis of average economic perfor
ance across the euro area and leave individual countries to deal with a

tionary effects of an over-tight inflation rate since attempts to use fiscal p
icy to correct for this may run into difficulties with the Stability and Grov
Pact.

Table 13.4 Inflation forecasts for the euro area 2002

Country	*Inflation forecast for 2002*
Germany	0.9
France	0.9
Italy	1.8
Spain	2.5
Netherlands	2.6
Belgium	1.7
Austria	2.0
Finland	1.8
Greece	3.1
Portugal	2.3
Ireland	3.5
Luxemburg	1.4
Euro zone	1.5

Source: ABN-AMRO

The last possible concern stems from the political desire for the euro
challenge the US dollar as the major world currency. Some have argued t
the early weakness of the euro would undermine the attractiveness of
currency for financial markets and prevent it from challenging the US d
lar. However, the euro has done reasonably well in international securit
markets, although the US dollar clearly remains the currency of preferen
for the issue of securities. This is hardly surprising and any slowness in
growth in use of the euro is almost certainly attributable more to the div
sity of traditions, practices, regulations and tax regimes across the euro a
that prevent the full integration of the euro area capital market.

13.7 Possible reforms of the ECB strategy and procedure

The ECB has faced criticism because of both its perceived lack of accou
ability and its monetary policy strategy. Svensson (2000) suggests t

Sweden and the UK. We have seen that there has been a particular probl with the ECB, that it has been difficult to understand the Governi Council's interpretation of its mandate and, hence, difficult to judge its su cess. The problem of accountability is highlighted by the comparison w the Monetary Policy Committee of the Bank of England, set out in B 13.5. Suggested reforms of the ECB have included the publication of inflation forecast and greater openness regarding the voting record and de sion-making process of the Governing Council.

The monetary strategy criticisms have concentrated on the inflation t gets set and the role of the monetary growth reference value in the pol deliberations. Proposals have included the move to the use of a core rate inflation in place of the headline rate provided by the HICP and a raising the target rate to a range of 1 – 3 per cent. There has been no suggesti however, that the euro area should move to the UK system of having inflation target set by the political system.

13.8 Summary

In principle, the practice of monetary policy is the same in a moneta union as in a single country. However, the success of any monetary pol is strongly influenced by the size and composition of the area that it cove Thus, when a single currency area is established across a number of nati states, we must ask whether this makes economic sense and must look at costs and benefits associated with a country's giving up the possibility changing its exchange rate. To do this, we must look at the characterist of the countries involved. In particular, we must look at the extent to wh the separate economies are coordinated and at the extent to which other e ments in the economies are sufficiently flexible to cope with the loss o traditional instrument of policy. In particular, we must look at the labo market and fiscal policy. In carrying out this exercise, we must realize t there are no precise answers and we must not forget that important politi issues are also involved.

To help it to decide whether or not to join the euro area, the UK gove ment has set out 'five economic tests' based on a mixture of general prin ples about the membership of monetary union and specific issues of imp tance to the UK, notably the impact of the decision on the City of Lond and on inward foreign investment. The Chancellor of the Exchequer h suggested that the UK will not join unless the answers to the questi

1. The ECB sets its own inflation target (currently 0-2%); the UK inflation target set by the Chancellor of the Exchequer (currently 2.5%). Thus, the Bank of England has instrument independence but not goal independence. The ECB has both.

2. The Bank of England practices inflation targeting, setting its interest rate with the aim of meeting the inflation target set by the government. The ECB has two pillars of policy: (i) the monetary growth reference point (currently 4.5 %) (ii) a broadly based assessment of the outlook for price developments and the risks to price stability, using other available indicators. The ECB has an inflation rate target but its intentions in relation to that target are not always clear

3. The Bank of England issues minutes of the meetings of its Monetary Policy Committee and voting records so that it is known whether the decision was closely contested and how individual members voted. The ECB publishes neither minutes nor voting records. Indeed, it is forbidden from publishing voting records. All that is issued after the meeting is a not-very-detailed press release.

4. The Bank of England publishes a three-monthly inflation report that sets out the Monetary Policy Committee's inflation forecast together with an assessment of the factors likely to influence the rate of inflation over the following two years. The ECB does not publish an inflation forecast. It does publish a weekly financial statement, monthly and quarterly reports and an annual report, the last of which comments on its monetary policy over the last two years.

5. The MPC of the Bank of England is subject to biannual interrogation by the Treasury Select Committee of the House of Commons. The President of the ECB appears quarterly before the European Parliament's Committee on Economic Affairs and answers questions. Transcripts of these hearings are published on the ECB website.

6. If it misses its target by one per cent or more in either direction, the MPC is required to write an open letter to the Chancellor of the Exchequer setting out the reasons for its failure and explaining what steps it will take to remedy the situation.

7. The Annual Report of the Bank of England goes to parliament; the ECB's annual report goes to the European Parliament, Commission and Council.

8. The Court of the Bank of England commissioned a review of monetary policy making, which was published in 2000.

to major economic questions.

Monetary policy in the euro area is conducted by the European Syst of Central Banks, which consists of the European Central Bank and national central banks of the member states. The constitution of the E was modelled as closely as possible on that of the Bundesbank. All c stituent elements are required to be politically independent and the prin pal task of the Bank is to achieve low and stable inflation. The Europe parliament has no influence on the objectives of monetary policy. Becau of the determination to convince markets that the ECB would be fierc politically independent, it is now only weakly accountable to the gove ments and citizens of the euro area. This has sometimes resulted in the r soning behind its decisions being opaque and has led to some uncertainty financial markets about its likely future course of action. This has been p ticularly true in relation to its attitude towards the value of the euro. T was one factor behind the large slide in the value of the euro against the dollar in the first two years of the euro's life.

The ECB, in its explanation of its policy, refers to two pillars of its inf tion strategy — a monetary growth reference value, and an assessment the outlook for the future using a range of other indicators. In practi however, it is probably closer to being engaged in inflation targeting th anything else, although it has not always been clear how it has been int preting its own inflation target range of 0 - 2 per cent.

Key concepts used in this chapter

- optimum currency area
- symmetric and asymmetric shocks
- synchronized business cycles
- labour market flexibility
- convergence/divergence of economies
- Stability and Growth Pact
- the main refinancing rate (refi) of the ECB
- European System of Centra Banks
- European Central Bank
- Governing Council of the ECB
- Executive Board of the ECB
- political independence of centra banks
- accountability of central banks
- Harmonized Index Of Consume Prices (HICP)

variable rate tender

target inflation rate

minimum reserve ratio

Questions and exercises

1. How useful is the exchange rate as an instrument of policy:
   (a) in a closed economy?
   (b) in a very open economy?

Why is the answer different in the two cases?

2. In 13.2, we suggest that wage flexibility does not always provide an e
cient means of adjusting to external shocks. What is the basis of that ar
ment?

3. Why might the business cycles of the UK not be synchronized with th
of the 12 current members of the euro area?

4. Do you think that the business cycles of Ireland are likely to be better s
chronized with the rest of the euro area than are those of the UK? If
given Ireland's long-standing economic links with the UK, why might t
be so?

5. What does the Executive Board of the ECB do? What does it not do'

6. In Table 13.1, compare and comment on the following sets of inter
rates:

(a) the bid yields for French, Netherlands and Greek bonds wit
redemption date of 31 January 2004;

(b) the bid yields for German and Netherlands bonds with
redemption date of 31 July 2011;

(c) the bid yields for French and Spanish bonds with a redempt
date of 31 October 2011.

7. Why is the accountability of the central bank an important issue?

rency than the DM would be less likely to be driven artificially high occasions.'

Explain this statement. How did it relate to the question of the likely futu strength of the euro?

9. When the ECB began operation at the beginning of 1999, how did ensure that all members of the Executive Board would not end their ter of office at the same time? What would be wrong with the terms of all members of the Board ending on the same date?

10. Outline the arguments for and against fixed and variable rate tenders the instrument for the provision by the central bank of liquidity to the ban ing system.

11. Look at the latest interest rate decision made by the ECB and explain in terms of the first and second pillars of the ECB's monetary strategy.

Further reading

For a good text book account of the economics of monetary integration, s P De Grauwe (2000). Among a wide range of other text books with use material on European monetary policy, we would also recomme Eijffinger and de Haan (2000).

The European Central Bank has published a detailed account of aspects of its monetary policy as European Central Bank (2001). This fully downloadable as a pdf file from the ECB's website: www.ecb.int

An extraordinary amount of material of all types and levels, from new paper reports to difficult academic articles is available on the website Giancarlo Corsetti of Yale and Bologna Universities www.econ.yale.edu/~corsetti/euro/

14 in the USA

'The almighty dollar is the only object of worship.' Anon.
Philadelphia Public Ledger, 2.12.1836

What you will learn in this chapter:

- The story of the development of central banking in the USA
- The structure of the Federal Reserve System
- The approach to monetary policy of the Federal Open Market Committee of the Fed
- The way in which monetary policy is implemented by the Fed
- The extent to which and ways in which the Fed is independent and accountab
- The nature of the monetary policy practised by the Fed in recent years.

14.1 Introduction

The United States central bank, the Federal Reserve System, is wid regarded as the most powerful economic policy institution in the world a its present Chairman, Alan Greenspan, as the single person having the m influence. This is a testament to the size and strength of the US econor the return to importance of monetary policy in the minds of economi industrialists, and politicians and, perhaps above all, the dominance financial markets in the modern imagination. We have indicated at seve points in this book that the real power of the monetary authorities is rat less than this might suggest, but the Fed certainly has sufficient impact mean that no account of current monetary policy could omit considerat of it. Thus, in Section 14.2, we provide some necessary background hist ical information and look at the structure of the Federal Reserve Syste We also look at the position within the system of the Federal Open Mar Committee, the body responsible for US monetary policy. In 14.3, we co sider the form of US monetary policy. In 14.4, we consider the indepe ence and accountability of the Federal Reserve, while 14.5 looks at rec US monetary policy.

14.2 The story of central banking in the USA

The current US central bank, the Federal Reserve System (the Fed), was established until the early years of the 20th century. Unlike the Bank

early attempts were made to set up a corporate central bank, chartered
the state, but owned by private investors.

The First Bank of the United States commenced business in 1791 a
survived until 1811. The Second Bank of the United States also surviv
for twenty years (1816-36).[1] Both met with strong opposition. This ca
partly from banks given operating charters by state governments (sta
chartered banks). The state-chartered banks wanted a share of the natio
government's banking business and did not like the attempts by the cent
banks to exercise control over them. For example, in 1791, the First Ba
of the United States had attempted to control the number of bank no
issued by state banks.

However, not all the criticism was self-interested. There was a stro
feeling that the central banks were too large and privileged and that this co
flicted with the democratic ideals of the USA. This attitude is well ill
trated by a statement made in 1836 by the US president, Andrew Jackso
that the Second Bank of the United States was a 'concentration of power
the hands of a few men irresponsible to the people'.[2] One problem was
private ownership of the bank, which included some foreign investors.
second was the geographical concentration of the bank.

From the beginning, the development of US banking was influenced
two major fears — of centralized authority and of domination by money
interests. These fears reflect the origins of the US nation state. Settlem
from Europe had been by separate, relatively small groups often flee
from religious or political domination — the first united action by settl
was the struggle against the distant authority of Britain. The two fears co
bined to produce a determination to prevent the financial system being co
trolled either by large institutions in the financial centre of New York or
political forces concentrated in Washington. The result was an idiosyncr
ic banking system that consisted of large numbers of small independ
banks, restricted from opening branches across state boundaries.[3] In
18th and 19th centuries, any attempt to control the operation of banks fr
the centre met with deep suspicion. The failure of the early central ban
was one reflection of this.

In the absence of a central bank, for much of the 19th century the fed
al government had to act as its own banker. In doing so, Treasury offici
gradually realized that funds might be added to or withdrawn from the p
vate sector on a discretionary basis to prevent financial panics and as an e
ment of macroeconomic policy. That is, the Treasury began to develop

control of money and finance and, hence, the economy. We find here, t
an early example of the view at the heart of much of the modern argum
for independent central banks that the Treasury, because it was controlled
politicians, would have a long-run bias towards easy money and inflati
Perhaps more importantly, it was thought that the Treasury might fav
particular financial, geographic, and economic interests.

Pause for thought 14.1:

What was the point of stopping banks from opening branches in other states?

However, the extreme decentralization of the banking system cau
problems. In recessions, small banks regularly ran into problems and t
frequently led to runs on banks, multi-bank panics, and the collapse of ma
banks. This was not helped by the absence of a central bank. There w
nine multi-bank panics between the closure of the Second Bank of
United States and the end of the first decade of the 20th centu
Consequently, following the panic of 1907, a commission of enquiry was
up and the *Federal Reserve Act*, which established the Federal Rese
System, was passed in 1913.

The form of the system was strongly influenced by the continuing f
of excessive control from the centre. Instead of setting up a single bank,
1913 Act brought into being twelve regional Federal Reserve banks ov
seen by the Federal Reserve Board in Washington D.C. The system w
designed to provide a broad view of economic activity in all parts of
country. By the time the Fed was set up, US commercial banks consisted
both nationally chartered and state-chartered banks.[4] All nationally ch
tered banks were required to become members of their regional rese
bank. State-chartered banks could choose to become members, as long
they met standards set by the Fed. The regional reserve banks do
receive funds from the central government. They were individually ch
tered and required to raise their own capital, which is contributed by
member commercial banks in each district. They are profit making a
twice a year pay their member banks a dividend on the subscribed capita
a fixed rate of six per cent. Earnings above those needed for operations a
the payment of the dividends are paid to the US Treasury at the end of ea
year. The income of the district banks comes from fees paid for the serv
es provided to commercial banks and from interest on their holdings of

Board membership should reflect the interests of the various sectors of t economy including business and industry, agriculture, labour, the financ sector and consumers. To this end, reserve bank boards consist of n members: six representatives of nonbanking enterprises and the public a three of the banking industry. Reserve bank presidents serve five-y terms while the members of the boards of directors serve for three yea Where there are branches of a federal reserve bank, each branch also has own board of directors to try to ensure that local interests are always tak into account.

When the banks were set up in 1913, the regional reserve banks retain considerable power. They had a monopoly of the nation's note issue, ac as fiscal agents of the government, banks of rediscount and reserve member banks, and lenders of last resort in their districts. They w involved in the regulation and supervision of the banking system althou because of the late establishment of the Fed, this had to be shared w already established state banking authorities and federal agencies. T intention of the decentralized structure was to ensure a sufficient supply credit in each region. This was to be achieved principally by each reser bank re-discounting commercial paper at rates set according to each regio al its view of the needs of its region. Further, each bank was able to det mine for itself which bills were eligible for rediscounting.

Member banks held legally prescribed reserves as deposits in th reserve banks and in return were entitled to rediscount their eligible co mercial paper at the banks when in need of temporary liquidity. They w also able to use the Fed clearing facilities including electronic funds tra fers and the currency and information services of the banks. It was anti pated that the availability of these services to members would encoura state-chartered banks to join the system.

Pause for thought 14.2:

Why might state-chartered banks have chosen not to join the Federal Reserve System?

The original Federal Reserve Board comprised five members[5] appoint to staggered ten-year terms by the US president with the Secretary of t Treasury and the Comptroller of the Currency as *ex-officio* members. T Board was required to oversee and supervise the operations of the reser banks, co-ordinate their activities, and handle the System's relations w

icy across the country. Indeed, the Board probably had less power than unofficial Governors' Conference set up by the regional reserve ba under the chairmanship of the Governor of the Federal Reserve Bank New York.

The possession of the chairmanship of this unofficial body was mer one indication of the growing power of the New York bank. This ar largely because New York had by far the largest money and capital mark in the USA and the Federal Reserve Bank of New York soon started to as agent for the other reserve banks in the purchase of securities. Follow the entry of the USA into the First World War in 1917, government b rowing increased greatly and had to be financed. Government paper beg to dominate commercial bills in the portfolios of the banking system. T principal objective of the Fed became, in effect, to finance the centraliz needs of the Treasury. Since government securities were largely placed the New York capital market, their prices were strongly influenced by policies of the New York Reserve Bank.

Regional policy diversity began to decline. When, in 1921, the N York bank raised its interest rate to 7 per cent, the other reserve banks so followed. In 1922, the New York Governor set up a committee of five g ernors to coordinate open market operations and between that year a 1928, the Fed began increasingly to act as a unified central bank.

However, in the late 1920s and again during the Great Depression, se ous disagreements over policy resurfaced, both among the regional ba and between them and the Board. During the depression, the Fede Reserve Bank of New York favoured expansionary policies to stimulate economy. Following the appointment by President Roosevelt in 1933 c new Governor, the Board also favoured expansion, but this was opposed several of the other district Banks and did not happen. This led to a ca paign to increase the power of the Board. The behaviour of the Fed imm diately before and during the depression is the subject of Box 14.1.

In the early 1930s, multi-bank panics and collapses continued.[6] A consequence of these problems, two major pieces of bank legislation w enacted — the Banking Acts of 1933 (the Glass-Steagall Act) and 19 The Glass Steagall Act introduced the federal insurance of bank depos and restrictions on the activities of insured banks, in an attempt to redu the riskiness of the system. Among other things, the Act prohibited inter payments to owners of federally insured sight deposits and authorized setting of limits on rates paid on federally insured savings deposits of va

There are differences of opinion regarding the performance of the Fed in the lead up the stock market crash of October 1929, although it is widely held that it did not perform well. There are two issues:

1. To what extent did Fed policy in 1927 fuel the speculative boom in equity prices of 1928 and 1929?
2. Was the Fed responsible for the financial crash and the conversion of that crisis in a general, deep, and long-lasting economic slump?

In the spring of 1927, the Fed cut its rediscount rate from 4 to 3½ per cent and sold government securities, adding liquidity to the banking system. Did the provision of liquidity cause the speculative fever that followed? Or was the Fed at this point acting a passive supplier of liquidity? The Fed raised interest rates in August 1929. In nominal terms, the money supply steadied and then fell. It did not grow during 1928, fell 2.6 per cent from August 1929 to October 1930 and continued to fall until March 193 Was this the cause of the stock market crash in October 1929?

Friedman and Schwarz blame the Fed on both counts, particularly for the collaps As believers in exogenous money, they argue that the restrictions on liquidity brough about the crisis. Other economists reject both propositions. Galbraith (1954, p. 15) rejects the view that the Fed's actions encouraged speculation in the early stages of the boom as 'formidable nonsense' as, in his view, the interest rate was relatively hig Temin (1976) rejects the Friedman and Schwarz argument about the causes of the crash on a number of grounds, one of which was that interest rates fell rather than rose. If the fall in money supply had been the cause of the crash, that part of the transmission process that worked through the interest rate should have been:

$$\downarrow \text{money supply} \rightarrow \uparrow \text{interest rate} \rightarrow \downarrow \text{investment and consumption} \rightarrow \downarrow \text{income}$$

A standard monetarist argument, of course, requires that the exogenous reductio in the money supply does not have real effects in the long run. To explain these, Friedman and Schwarz depend on the banking collapses that followed the Wall Stree crash. 8,812 banks collapsed between 1930 and 1933 and total bank deposits fell b 42 per cent between 1929 and 1933. These clearly had a large impact on the real economy. Thus, money is not neutral in this case because of institutional failures brought about by the Fed's actions. Temin, however, argues that the problem had begun with consumption. A fall in consumption would have caused a fall in the trans actions demand for money, causing interest rates to fall. The falls in the money supp would have occurred as a result of the decline in demand for bank loans. In fact, mo interest rates declined sharply after the 1929 crash.

Kindleberger (1996) worries, however, that this still leaves the fall in consumption to be explained and finds none of the several explanations of this convincing. He als worries that neither the monetarist nor the Keynesian view explains the fact that indu trial production had started to fall in advance of the financial crash. It fell in Septemb 1929 and then continued to fall sharply so that an index of industrial production that had stood at 127 in June 1929 had fallen to 99 by December. Kindleberger relies on the instability of the credit system to explain the facts. He quotes the view of Simons (1948) that changes in business confidence had led through an unstable credit syste to changes in liquidity and effects on the money supply — which is again seen as endogenous here.

Whether the Fed was responsible or not, however, no one has a good word for them in this period. Galbraith, indeed, describes them as 'a body of startling incomp tence' (1954 p.33).

The 1935 Act replaced the Federal Reserve Board with the Board Governors of the Federal Reserve System. The new Board comprised sev members, each appointed by the President with the advice and consent the Senate. Membership of the Board should provide 'a fair representat of financial, agricultural, industrial and geographic divisions'[8] again in cating concern about the concentration of power in the centre and the p sible neglect of the needs of industry. The new Board was given additio powers, including the authority to adjust member-bank reserve requi ments, order the Federal Reserve Banks to change their discount ra restrict discount window loans to member banks deemed to be mak excessive loans for speculative purposes, and limit the volume of lo made by member banks. The term of Board members was lengthened fourteen years.

The Federal Open Market Committee (FOMC) was set up to cond monetary policy. The FOMC comprises the seven members of the Board Governors, the president of the Federal Reserve Board of New York a four other reserve bank presidents, serving one-year rotating terms. T district banks are grouped for this purpose to ensure that all areas of country are always represented on the FOMC. For example, the preside of the Cleveland and Chicago Federal Reserve Banks alternate since th come broadly from the same part of the country. The presence of the sev Board members gives the Board a permanent majority on the FOMC.

The form of the Federal Reserve System established by the 1935 A remains in place today. As the Bank of England did until its reform in 19 the US central bank carries out all possible functions of a central ba being:

- the bank to the banking system
- the bank to the US government
- the body responsible for monetary policy
- the operator of the payments system
- a major part of the system of supervision and regulation of deposit institutions

It also has a responsibility for the protection of consumers' rights in de ing with banks and for promoting community development and reinve ment. The modern role of the 12 district Federal Reserve Banks is set ou Box 14.2.

Although monetary policy has, since 1935, been centralized and rests with the Board of Governors of the Federal Reserve System, the 12 district Federal Reserve Banks continue to play a number of important roles.

- They provide 5 of the 12 members of the FOMC and have the specific task of helping the Committee stay in touch with the economic conditions in all parts of the country
- They supervise banks and bank and financial holding companies, helping to maintain the stability of the financial system
- They provide financial services to depository institutions
- They market and redeem government securities and savings bonds and condu nationwide auctions of Treasury securities as well as maintaining the Treasury's funds account
- They provide payments services — the safe and efficient transfer of funds and securities throughout the financial system
- They distribute coins and currency
- They are heavily involved in research and have an educational role
- The Federal Reserve Bank of New York carries out open market operations ar intervenes in foreign exchange markets on behalf of the Board of Governors.

14.3 The aims and form of monetary policy in the USA

Policy objectives

The monetary policy goals of the Federal Reserve System were initia broad. They included the provision of an 'elastic currency' — ensuring s ficient liquidity in the banking system to guard against bank panics. Pr stability was important, but so were the other standard goals of macroe nomic policy. In the 1970s, the Fed listed its broad objectives as 'to h counteract inflationary and deflationary movements, and to share in cre ing conditions favourable to sustained high employment, stable valu growth of the country, and a rising level of consumption'.[9]

As with other central banks, however, the goal of price stability has do inated since the beginning of the 1980s. The Fed now sums up its obj tives as 'price stability and sustainable growth'. However, in practice, two goals almost appear to become one. For example, in his testimony the US Congress in July 2001, the Chairman of the Board of Governo

price stability for realizing the economy's full growth potential over time

In other words, price stability is now seen as the *sine qua non* for achievement of sustainable growth, an issue discussed Section 9.2.

Pause for thought 14.3:

What is an 'elastic currency?'

None the less, the representative structure of the Fed appears to lead greater attention being paid to the real economy and to economic perfor ance across the country than is the case with many other central ban Unlike the ECB and the Bank of England, the Fed does not specify the g of price stability in the form of a target rate of inflation. The minutes of meetings show that the FOMC heeds a wide variety of real and monet indicators in arriving at its decisions and appears to pay considerable att tion to anecdotal evidence of business conditions in diverse industries a regions.

At its January/February meeting each year, the FOMC establishes ani al monetary growth ranges.[11] These are specified, on a fourth-quarter- fourth-quarter basis, for the broader monetary aggregates, M2 and M3. T aim is to identify monetary growth ranges that are consistent with Committee's policy goals for inflation and economic growth. However, FOMC is aware of the potential instability of money velocities and acce that monetary growth rates have not recently been reliable guides for m etary policy. They are now just one indicator among many. The Commit also sets an annual monitoring range for the growth of aggregate debt of nonfinancial sectors — allowing credit growth to be given at least an eq role in policy deliberations as that given to monetary growth.

Instruments and intermediate targets

Similarly to the Bank of England and the European Central Bank, the F seeks to achieve its monetary policy targets by changes in short-term int est rates. In the case of the Fed, the interest rate that is central is the Fede funds rate (Fed funds rate). This is the rate that depository institutions p when they borrow reserves overnight from each other in order to m reserve requirements set by the Federal Reserve, and to ensure adequate b ances in their accounts at the Fed to cover cheque and electronic payme

Since the *Monetary Control Act* (MCA) of 1980, the Fed has set reser requirements for all depository institutions, whether or not they are me bers of the Federal Reserve System. The MCA authorized the Fed's Boa of Governors to impose a reserve requirement of from 8 to 14 per cent sight deposits and of up to nine percent of nonpersonal time deposits, b not to impose reserve requirements on personal time deposits except extraordinary circumstances. The reserve requirement on sight deposits currently 10 per cent, although concessions apply for the first part of total[12] while no reserves are required for time deposits. The lack of reser requirements on time deposits means that important components of broader money measures M2 and M3 can expand without any concern abo reserve levels. In practice, reserve requirements now play only a very li ited role in monetary policy and the Fed's reserve requirements are chang only infrequently.

Pause for thought 14.4

The Fed has long wanted to pay banks interest on the reserves that must be he with them, but the US Congress has refused to allow this. Why do you think the Fed would like to pay interest? Why does the Congress say no?

Reserves may be held as vault cash or as deposits at the Fed. Banks t fail to meet their reserve requirements can be subject to financial penalti Required reserves are calculated on net sight deposits, using 'contempo neous reserve accounting'. That is, they are based on deposits more or l concurrently held. This is not fully contemporaneous but is calculated a daily average[13] over a two-week period: a bank's average reserves over period ending every other Wednesday must equal the required percentage its average deposits in the two-week period ending Monday, two days e lier. Thus, banks can work out how much they must hold in the last t days to raise their average reserves over the period to the required avera

Banks short of reserves can borrow in the Federal funds market or fr the discount window of the Fed. Reserves borrowed from the discount w dow are referred to as borrowed reserves. Nonborrowed reserves constit the bulk of total reserves. They are supplied principally through Fed op market purchases of Treasury Bills in the secondary market.

A discount window is operated by each of the 12 regional reserve ban and each decides its own discount rate (the rate that applies to borrowi

below the Federal funds rate. This means that, in theory, it provides
cheapest way of acquiring reserves. Indeed, if the gap between the F
funds rate and the discount rate grew sufficiently large, there would be
opportunity for round tripping — with banks borrowing from the disco
window and lending at the Fed funds rate. However, the Fed's aim is
keep the discount window for lender-of-last resort borrowing, after ban
have exhausted other borrowing possibilities. Thus, the Fed discourages
use of the discount window, certainly for profit but also as a normal way
making up shortfalls in reserves.

To do this, the Fed operates rules governing the extent and frequency
borrowing and ultimately may turn away frequent borrowers through
discount window. This means that banks realize that if they borrow
often from the discount window, they may be unable to do so when th
have a genuine need. In addition, too frequent borrowing by banks throu
the discount window creates a bad impression in the financial marke
Thus, there are non-pecuniary costs (commonly known as 'frown costs')
borrowing from the discount window that more than balances the differen
between the Fed funds rate and the discount rate. Banks, then, are only li
ly to borrow from the discount window for reserves purposes in emerg
cies. Rather, they seek to borrow reserves that they require initially in
Federal funds market, despite the greater financial cost of doing so.

Under current arrangements, the FOMC, which normally meets ei
times a year, sets a target for the Fed funds rate and the Federal Rese
Bank of New York conducts open market operations on the Fed's behalf
try to ensure that the rate remains close to the target. To do this, the N
York Reserve bank must forecast each morning the total reserves (
reserves required together with any additional reserves the banks mi
wish to hold minus those reserves that will be borrowed through the d
count window). If it decides that the quantity of reserves available is
low or too high, it seeks to adjust this by direct intervention in the gove
ment securities market, making use of repos,[14] matched transactions[15] a
outright purchases/sales of securities. Outright purchases of Treasury B
are made when the Fed projects that commercial bank needs for reser
will last for a period of several weeks; repos and matched transactions wh
it projects only a temporary shortage or surplus of reserves. When
FOMC wishes to influence the Fed funds rate, it does so by directing
New York Fed to vary the supply of reserves through its open market op
ations. A purchase by the Fed reduces available reserves relative to dema

close to the FOMC's target rate. Some details of the process of open m
ket operations are provided in Box 14.3.

Box 14.3: Federal Reserve Bank of New York open market operation

At the end of its regular meetings, the FOMC issues a directive to the New York Federal Reserve, which indicates the approach to monetary policy considered appropriate in the period until its next meeting. This guides the day-to-day deci sions regarding the purchase and sale of securities by the manager of the Syste Open Market Account at the New York Fed. Each working day, information is gathered about the market's activities from a number of sources.

- Discussions are held with the primary dealers in government securities
- Discussions are also held with banks in the large money centres about the reserve needs and plans for meeting them
- Data is received on bank reserves for the previous day
- Projections of factors that could affect reserves for future days are received from reserve forecasters
- Information is received from the Treasury about its balance at the Federal Reserve.

Forecasts of reserves are then made and a plan of action for the day is develop and reviewed with a reserve bank president currently serving as a voting memb of the FOMC. A summary of this discussion is sent to members of the FOMC later in the day to allow the FOMC to monitor closely the implementation of its directive. Conditions in financial markets, including domestic securities and money markets and foreign exchange markets are also reviewed each morning. The Trading Desk of the New York Fed then enters the government securities market to execute any temporary open market operations (repos or matched sa purchase transactions) by sending an electronic message to the primary dealers asking them to enter bids (if the Fed is selling) or offers (if the Fed is buying) wi in 10 to 15 minutes. The terms of the operation are stated but not its size — thi is announced after the operation is completed. The dealers' bids/offers are eva ated on a competitive best-price basis and the dealers are notified whether thei bids/offers have been accepted or rejected. This usually happens about five mi utes after the bids/offers were due. Outright sales and purchases are arranged various times during the day, following a similar procedure.

This system clearly makes the money supply endogenous. Once the t get interest rate has been set by the FOMC, non-borrowed reserves are su plied by the Fed through open market operations on demand from the ban ing system. As we have said above, no use is made of reserve ratios to co trol the rate of expansion of the banks' balance sheets. We have a straig

has, however, attempted to introduce some control over the rate of grow
of the money supply from time to time over the past 30 years.

Pause for thought 14.5:

If reserve ratios are not used to control the rate of expansion of bank balance sheets, why are they set?

From 1970 to 1979, the FOMC tried to achieve this by specifying at ea
meeting both a target rate for Fed funds and a target range for the rate
the period up to the next meeting. Then, if the money supply was judged
be rising too rapidly, the New York Reserve adjusted the supply of reser
to allow the Fed funds rate to drift up towards the top of the target ran
Nevertheless, once the top of the target interest rate range was reach
additional demands for reserves would be met and the stock of mon
would be allowed to rise. That is, the money supply again became endo
nous. Although it was true that extra pressure could be applied by rais
the top of the target range at the next FOMC meeting or, indeed, betwe
meetings,[17] the Fed was not controlling the money supply effectively dur
this period.

A more wholehearted effort was made from October 1979, when the F
sought to engage in what Fazzari and Minsky (1984) referred to as 'prac
cal' monetarism — the use of the quantity and rate of change of a monet
aggregate as the intermediate target of monetary policy. Interest rate targ
were replaced by targets for non-borrowed reserves. Increases in Fed fun
rates brought about by increases in the demand for reserves would, then,
be limited by the target range for interest rates. In theory, this was a mo
in the direction of monetary base control. Yet, the Fed still failed to cont
reserve growth.

One reason given in the early 1980s for this continued lack of cont
was that from 1968 a system of lagged reserve accounting had operated
calculating the reserves required by banks. As we point out in Section 4
the current level of required reserves was thus predetermined by the p
level of deposits and there was nothing banks could do to accommod
deposits to reserves. The required reserve ratios could only be met by
Fed supplying the reserves.

Yet, when the change was made to contemporaneous reserve account
in 1984, the Fed's ability to control reserves did not improve. This w

economize on reserves and by increasing competition for other sources them — the Fed funds market, international sources and idle cash balan of firms.[16] When these sources failed, banks could still borrow from the d count window. Thus, interest rates were pushed up and the Fed was ag seeking to control bank behaviour through prices rather than quantities.

Goodhart (2002, p.16) argues that this episode of 'experimental mo tarism' was not a genuine attempt at monetarism at all, but simply a ruse get Congress and the US public to accept higher interest rates than wo otherwise have been politically possible, by persuading them that agg gates mattered and that the level of interest rates was an unfortunate s effect. If this is a correct reading of the situation, it shows again the pol cal pressures to which interest targeting is subject (see Sections 4.3 a 11.2).

In 1982, the Fed introduced another variant by targeting borrow reserves, only to find that it was again, in effect, supplying reserves demand. An increase in the demand for reserves would cause the Fed fu rate to be bid up and, as it rose further above the discount rate, banks wo increasingly turn to the discount window as a source of reserves. T would push the quantity of borrowed reserves above target. To avoid th the Fed would have to engage in open market purchases to increase ba reserves because only in this way could they sufficiently discourage ban from using the discount window to enable the target for borrowed reser to be met. We were back to interest rate targets. Nonetheless, Lewis a Mizen (2000) argue that the post-1982 system was more flexible than t in use before October 1979 because the Committee was more easily able choose, depending on the source of the increase in the demand for reserv between providing additional reserves through open market operations a allowing interest rates to be pushed up. The result was that the Fede funds rate fluctuated much more from day-to-day. In other words, pol became more discretionary in nature — hardly likely to be approved monetarists. During the 1980s, the focus of policy gradually shifted ba toward targeting a specified level of the Federal funds rate, a process t was largely complete by the end of the decade, taking the system back simple interest rate control. From the beginning of 1995, the FOMC h announced its target level for the Federal funds rate after each meeting.

Overall, despite the changes in practice from time to time, there can little doubt that the US money supply has been endogenous throughout period discussed.

Independence

When it was established in 1913, the Fed was intended to be independ
of:

(i) private financial business interests;

(ii) duly constituted government authorities (executive and legislatu
and

(iii) partisan political interests.

By the usual standards applied (see Box 13.4), the Fed is highly in
pendent politically and has been since its inception apart from a period d
ing the Second World War and up to 1949. Although the seven member
the Board of Governors are political appointments, their long and stagge
terms (even if the majority of Governors do not serve the full fourt
years) ensures that any one government cannot stack the Board with its o
appointees in order to ensure the results it wants. The duties and power
the Fed are not enshrined in the US constitution but are statutorily prote
ed and difficult to change. The Fed has full control of its policy instrume
and has the freedom to interpret the mandate given to it. The governm
has no direct representative with voting power on the FOMC.

This leaves us with the interesting question of independence from 'p
vate financial business interests'. This is interesting firstly, because i
mentioned at all. The usual assumption in the modern literature is t
'independence' in connection with central banks means independence fr
politicians and governments. We have seen, however, why independe
from financial and business interests was included as a requirement for
Fed — again the general concern over possible domination by 'money
interests' especially in New York. We have seen also that at every poin
the constitution of the Fed, attempts are made to ensure representation of
industries and geographical areas. The representation of consumers
banking services is also considered in the membership of the Boards of
regional Reserve Banks. Yet, there remains a potent distrust of the Fed
parts of American society. This can be found on both the right and left
US politics. On the right, it is part of the rejection of all big governm
and centralized institutions.

On the left, it is often seen as over-concerned with the world of finan
For example, Greider (1987) sees the Fed as a non-elected body with
anti-inflationary bias that restrains economic growth in order to preserve

omy in the regular deliberations of the FOMC. It remains that any pol
cally independent policy-making body is bound to be strongly influenced
not controlled, by experts from the field. For independent central ban
this means control by bankers and experts from other areas of finance, w
may well share values that do not chime with those of the majority of
people, especially of workers and the poor. Further, the very nature of
task that the FOMC performs brings its members into touch daily with
representatives of high finance. In this time of the partial eclipse of ol
democratic ideals, in which in all countries and all areas of life public de
sions are being made increasingly by committees of unelected experts,
independence of the Fed from private financial interests is not an iss
However, it will continue to surface from time to time in the future.

Pause for thought 14.6:

Do you think it would be possible to have a politically independent central bank
that was also independent of the financial sector of the economy?

Accountability

The Fed's mandate has been changed by Acts of Congress over the ye
but, at any time, is clearly stated and known. The Fed's interpretation of
own mandate also changes as conventional economic wisdom chang
Thus, the objectives of price stability and economic growth, which w
once thought to be conflicting, have now effectively become the single g
of price stability. Again, however, the Fed's general interpretation of
mandate is always clear. We have seen, however, that the Fed does not
an inflation target. Nor does it publish an inflation forecast or report su
as that of the MPC of the Bank of England. This reduces transparency sin
we lack knowledge of precisely what the Fed regards as 'price stabilit
And, indeed, this can be interpreted differently at different times. On
other hand, this is hardly worse than the case of the ECB, which has a qua
titative target but still succeeds in leaving us unclear what its intentions a

Furthermore, the Fed is a more open institution than is the ECB. T
principal form of Fed accountability is through its twice-yearly reports
Congress — in February and July each year. The report is presented by
Chairman of the FOMC (who is also the Chairman of the Board
Governors). The Chairman is then subject to questions by Committees

indicators relevant to monetary policy. It also includes specific ann
growth ranges for money and debt aggregates, consistent with expectati
for inflation and growth of employment and output. In July, the Chairm
reports any revisions to the plans for the current year, along with preli
nary plans for the following year. Questioning by Congress committees
be detailed and tough. The reports are published by the Fed.

The meetings of the FOMC are also quite open. Although there are o
twelve voting members, attendance at the meetings is much wider. T
seven presidents of the regional reserve banks who are not currently vot
members of the FOMC attend and are allowed to speak. At the Octo
2001 meeting, another 35 people were present, including the Manager of
New York Fed's Open Market System, and economists and associate ec
omists of the various divisions of the Office of the Board of Governors, s
eral of whom provided reports to the Committee on the present state of
economy and the financial markets. The decisions of the FOMC meeti
are published immediately after the meeting.

At its December 1998 meeting, the FOMC decided also to announ
immediately major shifts in its view about prospective developments re
vant to the likelihood of a future increase or decrease in the targeted Fede
funds rate. The aim was to communicate to the public more quickly
FOMC's assessment of the balance of risks and its policy leanings. The F
became worried, however, about the impact that these statements were h
ing on the markets and now releases a statement after each meeting, whet
or not it feels that there have been changes affecting future developmen
These statements choose among a set of standard phrases to express
Committee's view. Thus, throughout 2001, all post-meeting stateme
concluded with the phrase that, in the view of the Committee, 'the risks
weighted mainly toward conditions that may generate economic weakn
in the foreseeable future'. Minutes of FOMC meetings are published a f
days after the following FOMC meeting and full transcripts become ava
able five years later. Minutes include voting records, although these
often not very useful. This is because the FOMC attempts to reach cons
sus before motions are put to the vote and so, when the vote is taken, th
is frequently no dissenting voice. No votes were recorded against decisi
through the whole of 2001.

It follows from this, that the Fed's monetary policy is fairly transpar
and its reasoning well understood. The views of the people, on wh
behalf the FOMC is meant to be acting, can be expressed through elec

appears here also concerning the political remedy available if the people
unhappy with the Fed's actions.

This brings us back to the question of independence from the financ
sector since financial markets can be seen to be the only part of the eco
my capable of damaging the Fed in response to the Fed's policies. Throu
their actions, the financial markets can make it much more difficult for
central bank to fulfil its mandate and can damage the reputations of cent
bankers. We have seen, in Chapter 13, a good example of this in relation
the value of the euro. The result of this is that the central bank might w
feel itself more accountable to financial markets than to the political syste
It is of interest in this regard that, as we report above, the Fed recen
changed the way in which it expresses its views about the future prospe
of the economy because of concern over the way in which its comme
were being interpreted in the financial markets. This, of course, provi
another reason why the desire expressed in the constitution of the Fed wh
it was set up in 1913, that it should be independent of both private financ
business interests and duly constituted government authorities might not,
practice, be possible.

14.5 The Federal Reserve — recent monetary policy

The year 2001 saw the Fed principally concerned with the weakness of
US economy. As the US economy headed towards recession, there was
threat to the goal of price stability, and the Fed saw its task as cutting int
est rates and providing generous liquidity to the banking system in
attempt to avoid recession. Concern about the future weakness of the ec
omy intensified following the attack on the World Trade Centre and
Pentagon on 11 September.

It is clear from the actions and comments of the FOMC that it believ
that monetary policy does have powerful real effects, at least in the short
medium term. This was despite the fact that the interest rate cuts were w
anticipated by the financial markets. Differences of opinion regarding li
ly cuts largely centred on whether the cut would be one-quarter or one-h
of one per cent or on whether the cut would be this or next month. The m
kets were never genuinely taken by surprise. This confirms that monet
policy is thought by practitioners to have powerful real effects whether p
icy is anticipated or not. This does not, of course, refute the proposition t
money is neutral in the long run, but market practitioners act as if:

• short-run gains in employment and output are well worth having.

We return in these circumstances to simple Keynesian truths:

- if unemployment is rising and people fear for their jobs, they w reduce their spending
- if consumers reduce their spending, profits will fall and firms w reduce their output
- as profits fall, firms will cut investment
- as output and investment fall, firms will lay off workers.

The role of monetary policy in these circumstances is to encourage p ple to spend and firms to invest by lowering the cost of doing so. Th points were made throughout 2001 in FOMC statements.

The decade of the 1990s had started with interest rates relatively hi At the beginning of July 1990, the target Fed funds rate stood at 8.25 cent. The early 1990s, however, saw a downturn in all develop economies and the Fed set out on a long series of interest cuts, which s the target rate fall sharply. In 1991, the Fed was extraordinarily active, m ing 10 cuts in the intended Fed funds rate, bringing it down from 7 per c to 4 per cent. That is, the FOMC not only cut the interest rate at each of 8 regular meetings, but also made further reductions in two special te phone linkups. Three more cuts followed in 1992, bringing the rate to 3 cent by September, but this was as far as the Fed was prepared to go and rate was then left unchanged for seventeen months until February 1994, which time the US economy had started on a long period of rapid grow The Fed, worried now about developing inflationary pressure, then push the rate up sharply. It made six increases in the target rate in 1994, two fifty basis points and one (November) by the unusually large amount of basis points. A further 50-basis-point increase in February 1995 meant t the rate had doubled from 3 per cent to 6 per cent in just twelve mont Perhaps this had been too far and too fast. In the following twelve mont three 25-point cuts had restored the target to 5.25 per cent.

Then came a period of extraordinary calm. Almost nothing happen from January 1996 until September 1998. In a period of two and three-qu ter years, there was only a small increase in March 1997 as the econo kept growing but without generating serious concerns of inflation. Towa the end of 1998, a crisis developed in Asian financial markets and spread

and a rescue had to be organized. There were short-lived fears that world was headed for a serious financial crash. The Fed responded by c ting the intended Federal funds rate in its meetings in September, Octob and November to leave it at 4.75 per cent by the end of 1998.

When the crash did not occur, the Fed turned its attention back to the growth rate and the Chairman of the Board of Governors, Alan Greensp became worried by what he saw as excessive speculation leading to overvaluation of equities, especially in the technology sector. The Fed ca tioned calm and tried to bring this about through Greenspan's public sta ments and by steadily raising rates. Three increases in the intended rate the second half of 1999, followed by three further rises in the first half 2000, brought it up from 4.75 per cent to 6.5 per cent in a year. All of the changes are shown in Table 14.1.

At its meeting of 19 December 2000, the FOMC noted the slowing do of the US economy but left the intended Fed funds rate at 6.5 per ce However, they had been sufficiently worried to signal the possibility of emergency meeting before the regular meeting due at the end of Janu 2001. They took advantage of this and reduced the target rate by 50 poi on January 3 and by a further 50 points at the regular meeting on Janu 31. Two interesting questions occur here:

1. To what extent was the FOMC looking ahead at its December 20 meeting?

2. Were the two fifty-point cuts in January at all influenced by the f that the Chairman's report to Congress was rapidly approaching?

We cannot know the answer to either of these questions but the minu of the December 2000 meeting reported that the FOMC had, *inter alia*, be told that:

• economic activity, which had expanded at an appreciably lower pa since midyear, might have slowed further in recent months

• consumer spending and business purchases of equipment and softw had decelerated markedly after having registered extraordinary gains the first half of the year

• housing construction, though still relatively firm, was noticeably bel its robust pace of earlier in the year

• initial claims for unemployment insurance continued to trend upwa and the civilian unemployment rate edged up to 4 percent in Novemb its average thus far this year

• the weakening of factory output in November was reflected in a furt decline in the rate of capacity utilization in manufacturing to a po somewhat below its long-term average and

• consumer spending appeared to be decelerating noticeably further the fourth quarter in an environment of diminished consumer con dence, smaller job gains, and lower stock prices.

Certainly not all the news was bad. The economy had grown very rapi in the first half of 2000 and some slowdown was to be expected and pos bly welcomed given the tight labour markets. However, inflationary pr sures seemed to be declining quite rapidly. The Committee were told t one measure of inflation had 'remained at a relatively subdued lev Another, it is true, 'appeared to be increasing very gradually' but this w attributed to the indirect effects of higher energy costs following earlier price increases.

Rather oddly, in making its statement regarding the assessment of ris the Committee moved from 'risks weighted towards rising inflation' in tion in November to 'risks weighted toward economic weakness' December, not taking advantage of the intermediate balanced risks asse ment. Despite this, no change was made to the target Fed funds ra Overall, the case for doing nothing on December 19 but then dropping intended Fed funds rate by 50 points 15 days later does not suggest that FOMC was looking very far forward on December 19.

As Table 14.1 shows, once the Fed settled into its rate-cutting mo things started happening quickly. The intended Fed funds rate was cut each scheduled FOMC meeting between January 31 and August 21, as w as at another unscheduled telephone meeting on April 18. The first four these cuts were of 50 basis points with the result that the target rate plu meted by 3 per cent in fewer than eight months. Although in the early p of the year, the financial markets remained confident that the Fed wo through its sharp cuts in interest rates keep the US economy out of rec sion, the need to cut rates so quickly as the economy headed down ag raised doubts about the ability of central banks to forecast sufficiently w ahead.

defended the rapid series of cuts in the intended Federal flows rate by arg

Table 14.1: Intended Federal Funds Rate
January 1991 to December 2001

Year	*Date*	*New intended Fed funds rate (%)*	*Change (basis points)*
1991	January 9	6.75	- 25
	February 1	6.25	- 50
	March 8	6.00	- 25
	April 30	5.75	- 25
	August 6	5.50	- 25
	September 13	5.25	- 25
	October 31	5.00	- 25
	November 6	4.75	- 25
	December 6	4.50	- 25
	December 20	4.00	- 50
1992	April 9	3.75	- 25
	July 2	3.25	- 50
	September 4	3.00	- 25
1994	February 4	3.25	+ 25
	March 22	3.50	+ 25
	April 18	3.75	+ 25
	May 17	4.25	+ 50
	August 16	4.75	+ 50
	November 15	5.50	+ 75
1995	February 1	6.00	+ 50
	July 6	5.75	- 25
	December 19	5.50	- 25
1996	January 31	5.25	- 25
1997	Mar 25	5.50	+ 25
1998	September 29	5.25	- 25
	October 15	5.00	- 25
	November 17	4.75	- 25
1999	January 30	5.00	+ 25
	August 24	5.25	+ 25
	November 16	5.50	+ 25
2000	February 2	5.75	+ 25
	March 21	6.00	+ 25
	May 16	6.50	+ 50
2001	January 3	6.00	- 50
	January 31	5.50	- 50
	March 20	5.00	- 50
	April 18	4.50	- 50
	May 15	4.00	- 50
	June 27	3.75	- 25
	August 21	3.50	- 25
	September 17	3.00	- 50
2001	October 2	2.50	- 50
	November 6	2.00	- 50
	December 11	1.75	- 25

faster flow of information coming from the adoption of new technologie
This was expanded later in his statement in the following way:

> Because the extent of the slowdown was not anticipated by businesses, so backup in inventories occurred, especially in the United States. Innovatio such as more advanced supply-chain management and flexible manufactur technologies, have enabled firms to adjust production levels more rapidly changes in sales. But these improvements apparently have not solved thornier problem of correctly anticipating demand.[18]

If all this is so, forecasts of turning points and depths of recessio already difficult, will become more so. Monetary policy will have li choice other than to respond to events as they occur. Yet, we were told t in making the decision to cut rates by only 25 points in July (rather than 50 points of the previous five reductions), the FOMC 'recognized that effects of policy actions are felt with a lag'. If lags in the economy gen ally are changing and becoming shorter but time lags in monetary pol remain as long as ever, the practice of monetary policy will become e more precarious.

The direction of US monetary policy in 2001 may well have be changed by the events of September 11. Although on August 21, the FOM had continued to see the risks 'weighted mainly toward conditions that m generate economic weakness in the foreseeable future', there may well have been a further cut in the target interest rate at the next scheduled me ing on October 2. However, the attack on the World Trade Centre and Pentagon changed that as it led to immediate fears of a further loss in c sumer confidence and serious problems for industries associated with travel. The prospect that the downturn would be deeper than previou thought led the FOMC to have an emergency meeting on September 17 which rates were cut by 50 points and further 50-point cuts followed October 2 and November 6. A 25-point cut on December 11 reduced the t get rate to 1.75 per cent, 4.75 per cent below the rate of 12 months earlie

Of course, the sharp cuts in interest rate in the aftermath of Septem 11 were also, probably principally, intended to provide support for financ markets. The New York Stock Exchange remained closed for a week af the attack on the World Trade Centre and there were considerable fe regarding the way the markets would respond when it reopened. We th had here another example of a Greenspan put option (see Section 12.3).

Although there were some relatively long periods of calm in the 199 there were, as Table 14.1 shows, other periods when the interest rate

etary policy is safe in the hands of the Fed since it shows the Fed as be decisive in the face of rapidly economic conditions. Alternatively, doe indicate that, for all the sophisticated policy models and the placing of mo etary policy in the hands of experts, central banks are still largely flying the seats of their pants?

14.6 Summary

The US central bank, the Federal Reserve System is not a single bank bu set of twelve regional reserve banks coordinated by a board in Washingt D C. This structure can be explained by a look at the story of the develo ment of the US banking system. This was dominated by two fears — centralization with power concentrated in New York or Washington D C a of domination by the 'moneyed interests' of the financial sector. The res was a highly decentralized banking system with very large numbers of sm banks. Two attempts in the late 18th and 19th centuries failed because the fears of centralization. Consequently, the Federal Reserve System w not set up until 1913. The bank was required to be politically independe and independent of the financial sector. Initially, much of the power res with the regional reserve banks. However, continued multi-bank panics a the lack of coordination evident at the time of the Great Depression in 1930s led to a number of changes being made. This replaced the old Fede Reserve Board with the Board of Governors of the Federal Reserve a placed monetary policy in the hands of the Federal Open Market Commit (FOMC), which consisted of the seven members of the Board of Governo and five representatives of the regional reserve banks. One of the regio bank representatives is always from the Federal Reserve Bank of New Yo because it carries out open market operations on behalf of the FOM Power now rests with the centre, with the regional banks largely acting local agencies of the Board of Governors. However, the presence of regio al representatives on the FOMC means that it still pays more attention economic conditions in the different parts of the country than is the ca with many other central banks.

The Federal Reserve (the Fed) was required to act against both inflati and deflation and to act to encourage high employment and econon growth. However, over the past 25 years, price stability has become dor

range of real and monetary indicators. It is required by law to calcul monetary growth ranges for M2 and M3 consistent with its price stabi objective but does not believe that these are a reliable guide to policy.

The Fed carries out its policy through open market operations that s to keep the Federal funds rate of interest — the interest rate that deposit institutions pay when they borrow reserves overnight to meet rese requirements. The reserve requirements are set to help the Fed control uidity within the system but the ratios are seldom changed and are not u as a way of attempting to control the money supply. The Fed made ha hearted attempts to influence reserves in the 1970s and early 1980s (firs through establishing a target range for the Fed funds rate, allowing for va ations in the interest rate; and secondly by targeting non-borrowed and t borrowed reserves). However, these did not succeed in making the mon supply exogenous. There is no doubt that the money supply is now endo nous.

Borrowed reserves are borrowings through the discount windo through which the Fed lends to banks as lender of last resort. The disco rate is usually kept below the Fed funds rate, but banks are discourag from borrowing in this way except in emergencies.

The Fed is certainly politically independent but has in place a number features that make it relatively accountable to the political syste However, the extent to which it can be said to independent of the financ sector is open to doubt. The recent performance of the Fed also raises qu tions regarding the extent to which it succeeds in looking ahead and adju ing interest rates sufficiently early to control problems that are develop in the economy.

bank charters	discount window
state-chartered banks	federal funds rate
federal-chartered banks	reserve ratios
multi-bank panics	matched transactions
elastic currency	frown costs (non-pecuniary costs)
Federal Open Market Committee (FOMC)	open market operations
monitoring ranges	central bank independence
lagged reserve accounting	transparency
contemporaneous reserve accounting	accountability

Questions and exercises

1. List all of the possible functions of a central bank and consider wh ones can be adequately performed without a central bank being in existen What particular problems were caused by the absence of a central bank the USA between 1836 and 1913.

2. Consider the extent to which the current structure of the Federal Rese System is a product of

(a) geography;
(b) history;
(c) planning.

3. How centralized is the US central bank system now? Do the regio Reserve Banks have more or less power than the national central ban within the European System of Central Banks?

4. Discuss whether the change in the balance of the objectives of the Fede Reserve over the years is a product of:

(a) our greater knowledge of economics;
(b) shifts in the balance of economic power within the country;
(c) fashion (doing what other monetary authorities do).

Federal funds rate?

6. Why does the Fed feel the need to maintain a system of reserve rat
when the Bank of England does not (apart from the small prudential rati

7. Why do you think the Fed currently has a reserve ratio for sight depos
but not for demand deposits?

8. Does the FOMC engage in:

(a) inflation targeting;
(b) money supply targeting;
(c) nominal demand targeting?

Explain your answer in each case. If you think it does none of the abo
three, what does it do?

9. How useful are the phrases from which the FOMC chooses for descr
ing its view of likely future developments in the US economy? What is
purpose of making statements of this kind?

10. A distinction is usually made between the 'transparency' of a cent
bank and its accountability. What is the difference? Consider the propo
tion that, while the monetary policy of the Fed is transparent, the FOMC
not genuinely accountable. Is it possible for a central bank to be accou
able without being transparent?

Further reading

For a brief but good history of the Federal Reserve System, see *The M*
Palgrave Dictionary of Money and Finance, (1992). A brief account of
whole US banking and financial system can be found in Howells and B
(2002). A great deal of useful material is available on the web from the si
of the Federal Reserve System (www.federalreserve.gov) and the Fede
Reserve Bank of New York (www.ny.frb.org). Wray (1990) and Mo
(1988) provide detailed evidence to explain precisely why the money su
ply in the United States is endogenous.

The *IS/LM* model

Although it is not without its critics, the IS/LM model has been the dor
nant framework for the analysis of monetary impulses in the macroeco
my, almost since the day it was developed and published by Hicks (193
This being the case, we make frequent reference throughout this book
the way in which particular issues might be represented in that model,
how the model may need to be modified in order to represent a particu
state of affairs. For students not familiar with the model, therefore, t
appendix provides firstly a formal algebraic and geometric derivation
the model, followed by a list of those issues raised in this book wh
might have some effect upon the *LM* curve, with some indication of w
that effect might be.

Before we begin, however, some words of caution about interest ra
are essential. 'The rate of interest' in the IS/LM model has to fulfil t
roles: it has to represent the cost of funds for real investment projects
IS role) and represent the opportunity cost of money (its *LM* role). T
usual convention is to take i to be the long bond rate. This would be
appropriate rate at which to discount the returns from investment proje
and is at least one of many returns available on non-money assets. (If
adopts Keynes's assumption of only two assets, it becomes the only r
available for non-money holders). If i is the long bond rate and it is me
to represent the opportunity cost of money, then we have to make the f
ther assumption that money does not itself pay interest, i.e. money's o
rate, i_m, = 0, otherwise we should need a change in the i-i_m differential
represent a change in the opportunity cost. However, putting such a c
ferential on the vertical axis would violate our first requirement that
interest term also represents the cost of investment funds. We can, as
shall see, introduce the idea of interest-bearing money but money's o
rate has to be thought of as one of the many 'services' that money yiel
Thus changes in i_m cause the money demand curve to shift.

Derivation

The *IS/LM* model is a comparative static representation of simultaneo
equilibrium in the goods market ('real' sector) and the money market. T

supply, while at the same time determining the level of real investmen
spending to which savings must adjust — giving rise to a level of incom
that determines (in part) the demand for active money balances. It is th
simultaneous oscillation between money market and goods market event
which the *IS/LM* model so conveniently captures, that accounts for its lon
popularity, other shortcomings notwithstanding.

Equilibrium in the goods market, shown by the *IS* curve, is defined a
a situation in which planned injections are equal to planned withdrawa
or:

$$J = W \qquad \text{...A}$$

In a closed economy, this amounts to:

$$I + G = S + T \qquad \text{...A}$$

where I and G stand for investment and government spending respectiv
ly and S and T indicate saving and taxation. If I is assumed to be nega
tively related to the rate of interest, while government spending is assume
to be exogenously determined as a policy decision, then:

$$J = Z - ii + \bar{G} \qquad \text{...A}$$

If saving and taxation are both assumed to be proportional to incom
Y, then:

$$W = sY + tY = (s + t)Y \qquad \text{...A}$$

For equilibrium, therefore:

$$Z - ii + \bar{G} = (s + t)Y \qquad \text{...A}$$

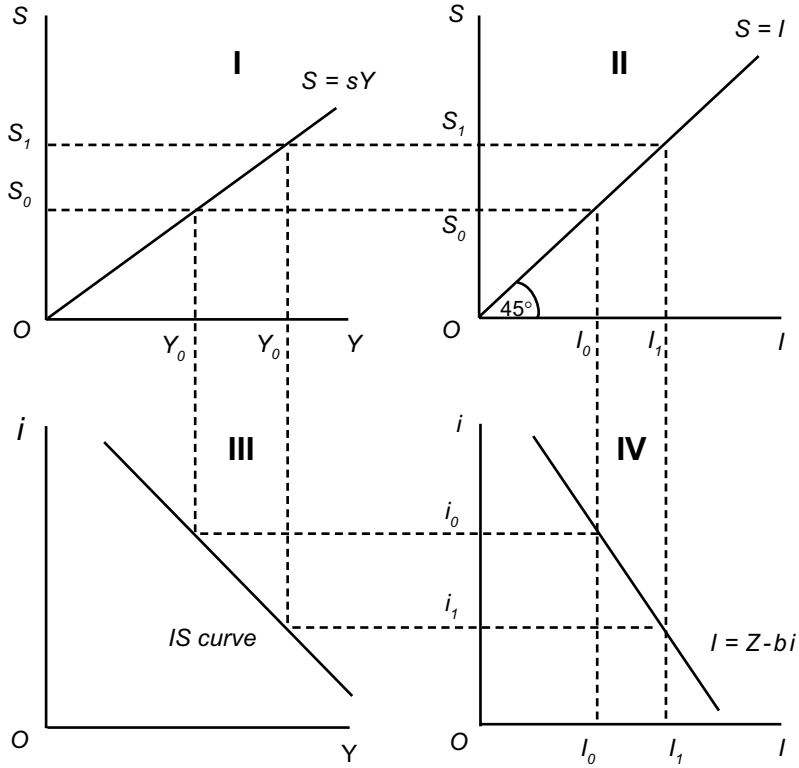
and:

$$Y = \frac{\bar{G} + Z - ii}{(s + t)} \qquad \text{...A}$$

is the equation for the *IS* curve, giving the equilibrium value of income fo
any value of i. Notice that the curve has a negative slope given b
$-(s + t)/i$. Thus any increase in the interest sensitivity of investment,

ues for i is generated (the *IS* curve will shift) for any change in Z or G a
the extent of the shift is given by $1/(s + t)$, the 'full multiplier' effect.

Figure A1: Derivation of the *IS* curve



The same result can be achieved with a four quadrant diagram of
kind drawn in Figure A.1. To simplify the labelling of the diagram,
assume that a fixed amount of government spending is included in qu
rant IV. The 'investment' schedule is really an 'investment plus gove
ment spending' schedule corresponding to equation A.3. Similarly,
'savings' schedule in quadrant I is a 'savings plus taxation' schedule c
responding to equation A.4). At a rate of interest, i_0, injections in quadr
IV (including the interest sensitive component of investment) requir
matching level of withdrawals indicated by S_0. These are forthcoming
quadrant I, at a level of income Y_0. A fall in interest rates to i_1 indu
some increase in injections — how much depends on the interest elast

forthcoming only at Y_1. Plotting the two combinations, i_0/Y_0 and i_1/Y_1, i
quadrant III enables us to draw the *IS* curve, from which we can read o
all the other possible combinations. Proving that a change in tax, savin
and interest coefficients changes the slope of the withdrawals and inje
tions functions (quadrants I and IV) and, thus, the slope of the *IS* curv
and that a change in government spending and autonomous investme
shift the injections function and the *IS* curve, is left as an exercise for th
reader.)

Equilibrium in the money market, shown by the *LM* curve, requires th
demand for money, *Md*, to be equal to the supply, *Ms*:

$$Md = Ms \qquad \text{...A}$$

The latter is assumed to be fixed exogenously by the monetary autho
ities. At its simplest, it is assumed to be invariant to interest rates. Thu

$$Ms = \bar{M}s \qquad \text{...A}$$

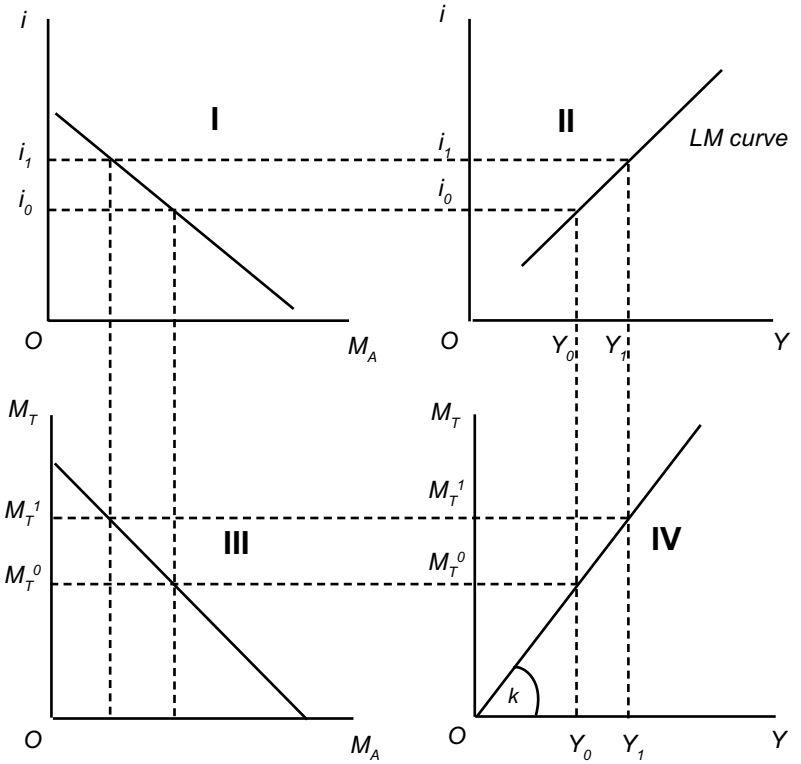
The demand for money responds positively to changes in income, neg
atively to changes in interest rates on non-money assets, the term *i* abov
and positively to money's own rate, i_m. The responsiveness in each case
expressed in the terms *a*, *b* and *c*:

$$Md = aY - bi + ci_m \qquad \text{...A}$$

Solving for *Y*:

$$Y = \frac{\bar{M}s + bi - ci_m}{a} \qquad \text{...A}$$

This is the equation for the *LM* curve enabling us to plot equilibriu
values for *Y* and *i* in the money market. Notice that its slope with respe
to *i*, the rate on non-money assets, is *a/b*. Since this is positive, the *L*
curve slopes upward with respect to *i*. The larger the income elasticity,
the steeper the slope while the greater the coefficient, *b*, on the (no
money) interest rate the flatter the curve. A change in the exogenou
money supply, $\bar{M}s$, or in money's own rate, i_m, yields a new set of *Y* va
ues for each value of *i* (ie the *LM* curve shifts) and a change in the coeff
cient *c*, changes the extent of the shift resulting from any change
money's own rate.



These relationships can be seen diagrammatically in Figure A2. T exogenous money supply is shown in quadrant II and is shown either the distance O to M_A or O to M_T. The line joining the two axes at 45° in cates the money stock may be held either for transactions purposes, M_T asset purposes, M_A. Thus, at M_T the whole of the money supply is held transactions purposes, while at M_A it is held entirely for asset purpos Intermediate positions show the trade-off between money held for ea purpose. Changes in the money stock are shown by parallel shifts (in out) of the line in quadrant II.

Quadrants I and IV show the demand for money, broken down into demand for asset balances and the demand for transactions balan respectively. It is assumed that prices are given and therefore, that in qu rant IV, the demand for transactions balances is a positive function of level of real income. In quadrant I, the asset demand varies inversely w

Thus, beginning in quadrant IV, the initial level of income, Y_0, gene ates a demand for transactions balances, M_T^0, leaving M_A^0 for asset pu poses (quadrant IV). M_A^0 thus becomes the supply of asset balances, an quadrant I tells us that these are willingly held at an interest rate of i Thus, given the existing supply of money, the current level of income, Y generates an equilibrium interest rate of i_0 and this combination is show in quadrant II.

Suppose now that the level of income increases to Y_1. The demand fo transactions balances increases to M_T^1. With a fixed money supply, th supply of asset balances is reduced to M_A^1. This shortage leads wealthold ers to try to restore their desired asset balances by (individually) sellin bonds. In the aggregate, the money supply is unchanged (though its own ership changes) but the bond sales cause prices to fall and yields to ris until, at i_0, the reduced stock of asset balances is willingly held. The ne equilibrium position is at Y_1, i_1.

Notice that the LM curve is upward sloping and that the slope depend firstly upon the extent to which the demand for transactions balance varies with income (quadrant IV). The larger the value of a in equatio A9, the sharper the increase in demand for transactions balances whe income increases; the steeper the demand curve in quadrant IV and th steeper the *LM* curve will be. Secondly, the slope depends upon the exte to which the demand for asset balances varies with interest rates. The larg er the coefficient, b, in equation A9, the smaller the interest rate chang required to accommodate a change in the supply of asset balances; the fla ter is the demand curve in quadrant I and the *LM* curve in quadrant II.

Note, next, that a change in the quantity of money, shown by a shift o the curve in quadrant III, leads to a new set of equilibrium interest rates fo each level of income (the *LM* curve shifts). The *LM* curve shifts dow ward following an increase in money stock and upward following a reduc tion. Lastly, note that a change in money's own rate of return, i_m, causes shift of the asset demand curve in quadrant I. An increase in i_m, *ceter paribus* causes an increase in the demand for money as an asset, th demand curve shifts out and a new, higher, level of (non-money) intere rates is generated. In these circumstances the *LM* curve shifts upward. reduction in i_m results in a downward shift of the *LM* curve.

We turn now to some of the issues discussed elsewhere in this book an their representation in the *IS/LM* framework.

The elasticity of the demand for money (mainly Chapter 5)

The coefficient, b, on i is larger (for high interest elasticity) and sma
(for low elasticity). In figure A.2 the demand curve is steep when the el
ticity is low making for a steep *LM* curve. Notice that in the extreme c
where $b = 0$, equation A9 reduces to:

$$Y = \frac{\bar{M}s - ci_m}{a} \qquad \ldots A$$

and the *LM* curve is vertical. Conversely, when b = ¥, the LM curve is h
izontal.

*Financial innovation and the demand for money (Sections 6.2 a
11.3)*

The effect depends upon the nature of the innovation.

i) Where the innovations result in the creation of additional money s
stitutes, the effect is to increase the elasticity of the demand for mo
with respect to non-money interest rates. The coefficient on i is larg
and the *Md* and *LM* curves are flatter.

ii) Where the innovations lead to a rise in interest rates paid on ba
deposits, or to an increase in the proportion of such deposits which p
interest, then there is a rise in money's own rate, i_m. *Ceteris paibus*
demand for money increases. In figure A2 the demand curve in qu
rant I lies further from the origin and so the non-money rate is high
The LM curve shifts upward.

iii) Where the innovations are part of increased competition on
lending side, a reduction in the spread between lending rates a
money's own rate (i_L - i_m) also leads to an increase in the dema
for money with the formal consequences described in the last pa
graph. This arises because people are more inclined to finance a def
by borrowing than by running down existing holdings of liquid ass
Notice that the same effect follows from a reduction in the non-pe
niary costs of borrowing (lower collateral, higher lending multip
fewer administrative requirements etc). In our derivation of the
curve, we make no reference to the demand for money being affec
by lending rates. Neither does anyone else. But empirical studies of
demand for money do recognize a connection.

In the basic goods and money market equations above, both savings a
the demand for money are given as functions of current income (*Y*
However, it has long been recognized that the economy's stock of wealt
plays a role in both markets. Although it is possible simply to re-wri
these equations substituting wealth (or permanent income - the incom
expected to be generated in the future by the existing stock of wealth) fo
current income, the conventional *IS/LM* approach is to treat wealth as a
additional element in the equations. Thus, a change in the stock of wealt
causes the *IS* and *LM* curves to shift.

An increase in wealth, *ceteris paribus*, causes an increase in deman
for assets of all types including consumer durables. Thus, consumptio
increases at each level of income and savings fall. To maintain equilibr
um, investment must also fall and this only occurs at a higher rate of inte
est. Thus, each level of income is associated in equilibrium with a highe
rate of interest than before and the *IS* curve shifts out to the right. It shoul
also be noted that an increase in wealth produces an increase in the deman
for investment (particularly in the demand for housing) at each rate o
interest. If we consider this separately from the consumption effect, w
see that to maintain equilibrium following the increase in wealth, saving
must increase and this requires a higher current income level. Again, th
IS curve shifts to the right.

This contrasts with the negative effect on the *LM* curve. This arise
because an increase in wealth produces also an increase in the demand fo
money. But since the supply of money is assumed to be exogenousl
determined, it does not change. Thus, to maintain equilibrium the deman
for money cannot change and there must be an offsetting change in th
other variables influencing the demand for money — either the intere
rate must rise, causing a fall in the asset or speculative demand for money
or current income must fall causing a fall in the transactions demand fo
money. Whichever way one looks at it, the *LM* curve moves up to the lef
This is shown in Figures 7.5 and 7.6.

How much the *IS* and *LM* curves shift depends on the strength of th
wealth effect in the consumption, investment and demand for money func
tions.

Instability of the demand for money (Chapter 5)

The *LM* curves we have drawn to this point have assumed that the deman
for money is a stable function of income and interest rate and can be full
explained by them. Thus, a change in Y or i causes a predictable move

the constant *c*. However, if the demand for money is influenced by va ables not included in the equation it shifts around in an unpredictable w As we see in Chapter 5, a crucial part of Keynes's argument was that demand for money was influenced not just by the current interest rate but also by the expected future interest rate and that this would also influenced by a change in *i*. It follows that a fall in the current interest r causes a movement down the existing *LM* curve but may also a produc shift in the whole curve, to the extent that an expectation of a future int est rate change is generated. It may also be the case that expectations future interest rate changes arise from other sources - changes in fore interest rates, political disturbances, forecast rates of inflation etc.. Th the *LM* curve may shift with no change in any of the variables listed equation A8.

What is crucial to the outcome in this example is whether we can s cessfully model expectations and incorporate them into our equation. we can, we shall simply have another variable to which the demand money is stably related. If we cannot, the demand for money functio unstable and the *LM* curve moves around in an unpredictable way. Ot potential sources of instability in the demand for money function are d cussed in Chapter 6.

Elasticity of money supply (Chapter 3)

We derived the *LM* curve under the normal assumption that $Ms = \bar{M}$ More realistically, one might expect *Ms* to respond positively to chan in (non-money) interest rates, even when reserve requirements and quantity of monetary base are fixed exogenously. This arises beca banks' clients switch from cash to deposits and from non-interest bear to interest bearing deposits as interest rates rise. The switch from c makes more of the monetary base available to banks while the swi between deposits usually amounts to a switch towards time depo against which banks need to hold smaller reserves. This is a way of s ing that the bank deposit multiplier is positively related to interest rates. these circumstances, we could specify $Ms = M + gi$, where *M* is determi by the size of base, reserve requirements and the value of the multip when $i = 0$. In Figure 3.1, *Ms* is drawn with a slight positive slope. T reader should confirm that shifting the demand curve up a positiv sloped *Ms* curve generates a lower value of *i* for each shift of the dema curve and the *LM* curve is flatter. In these circumstances equation

$$\frac{dY}{dr} = \frac{}{a} \qquad \ldots(A$$

g is the slope of the *Ms* curve. An increase in g increases the slope an
makes the *LM* curve flatter.

Endogeneity of money supply (Chapters 3 and 4)

In allowing *Ms* a positive slope we have continued the assumption of exo
geneity. The curve shifts only when the monetary authorities choose t
change the quantity of money through changes in the monetary bas
reserve requirements or whatever. As we have seen, however, the autho
ities target the level of interest rates. In this situation the quantity o
money is determined by the demand for loans and the willingness to hol
the resulting deposits at that level of interest rates. The demand (for loan
and deposits) at the going level of interest rates is assumed to be dete
mined by the price level and output. In these circumstances, the mone
supply is determined by other variables within the economy, that is to sa
endogenously. It has become a common practice to represent an endoge
nously determined money supply by a horizontal *Ms* curve. The reade
can easily check that if *Ms* is drawn horizontally, and the demand curv
shifts as a result of income changes, then the *LM* curve must also be hor
zontal. This is a convenient practice but is best thought of as a 'stylize
fact'. A horizontal *Ms* curve implies that $g = \infty$ in equation A11, i.e. tha
the multiplier is infinitely elastic with respect to the interest rate on non
money assets. No one has ever suggested this to be the case. Supporter
of the endogenous money case point to the authorities being willing to sup
ply whatever quantity of monetary base is required, given the demand fo
loans and money at the pre-set level of interest rates. It is *M* in equatio
A11 that adjusts without limit. The strictly correct diagrammatic repre
sentation of this is an *Ms* curve which is free to shift without limit. If th
MS curve shifts at exactly the same rate as the *Md* curve, then the *LM*
curve could still be horizontal, but only in these circumstance
(Perfectionists might also care to note that an *Ms* curve drawn horizonta
ly is drawn horizontally with respect to the wrong rate of interest. Th
endogeneity case is that the money supply is perfectly elastic at the di
count rate set by the central bank. As we pointed out at the start of th
appendix, the rate of interest in Figures A1 and A2 must be the long bon
rate. This is not the same thing at all.)

As with the demand for money, the effect depends upon the nature of innovation. It also depends upon the monetary regime in question a whether the money supply is exogenously or endogenously determin Since this is sometimes a matter of controversy and/or judgement, the p ception of the effects of innovation is also a matter of controversy.

i) Where the money supply is exogenously determined, the key va ables are the size of the monetary base, the size of the multiplier a the elasticity of the multiplier with respect to interest rates. If the b is defined unambiguously to include only liabilities of the central ba the base is held wholly and exclusively by banks and banks are subj to a mandatory reserve requirement, then the scope for innovation affect the money stock through the three channels we have mentio is very limited (though in such a case innovations to facilitate disint mediation may develop rapidly, taking business offshore, for examp In the UK, most of *M0* is notes and coin and notes and coin are h outside the banking system. Thus any innovation which enables non-bank public to economise on cash increases the quantity of b available to banks. The *Ms* (and *LM*) curves shift to the right. Su innovations may also make the switch between cash and deposits ea er, increasing the interest-sensitivity of the multiplier. In equation A the value of *g* increases, the *Ms* curve becomes more elastic and the curve becomes flatter.

ii) Where the money supply is endogenously determined, the autho ties' control is limited to setting interest rates and accepting the resu ing quantities. What is at issue here is the effect of innovation upon interest elasticity of demand for bank lending and upon the demand money. The picture can be very complex since it is often the behavi of relative interest rates that is crucial. The major innovation of int est bearing bank sight deposits in the UK in the 1980s is a good exa ple since it simultaneously lowered the cost of bank lending as a sou of finance relative to drawing on existing deposits and made it m difficult for the authorities to raise the relative cost of bank borrow by raising the official discount rate since all (relevant) rates tended move together. one can show none of this in the stylized world of h izontal *LM* curves. The best one can say is that if an innovation ma borrowing more attractive the *Ms* curve shifts (the authorities prov ing the base to make this possible); if the innovation makes the dema for bank loans less responsive to interest rates then the *Ms* curve sh

IS/LM and the Open Economy (Chapter 10)

The *IS/LM* model must be adjusted in a number of ways to enable it to b used to deal with open economy issues. Most notably, we need a thir curve, the *BP* line, which expresses balance in the balance of payment For the balance of payments to be in balance, any surplus/deficit in the cu rent account must be offset by an equivalent deficit/surplus in the capit account. Thus:

$$B = Bc + Bk \qquad \text{...A1}$$

where *B* is the overall balance of payments, *Bc* is the balance on curre account and *Bk* represents net capital inflow.

In a simple version, the current account is represented by the balance o trade (exports − imports). Exports are taken to be a function of worl income and the international competitiveness of home exports and this, i turn, depends on home prices relative to those abroad, expressed throug the exchange rate, in a common currency. Since the *IS/LM* model assume both constant home prices and a fixed exchange rate, and since both worl income and foreign prices are outside of the control of the home goverr ment, exports may be written as an exogenous variable. Imports, on th other hand, are a function of domestic income and the international con petitiveness of home goods. The net result is that domestic income is th only endogenous variable affecting the current account balance and w may write:

$$B_c = \bar{X} - IM(Y) \qquad \text{...A1}$$

It follows that as income increases, *ceteris paribus*, imports increas and the balance on current account worsens. The extent to which it wor ens as income increases depends upon the country's marginal propensit to import (*IM*). This changes over time (in the UK's case it has steadil increased) but can be assumed to be constant in the short run.

Net capital inflow (the capital account balance) depends on home inte est rates relative to those in the rest of the world and the expected chang in exchange rates. In a fixed exchange rate model, the second term drop out and net capital inflow is seen to depend on home interest rates in con parison with the exogenous world interest rates. Consequently, we have

$$B_k = f(i - i^*) \qquad \text{...A1}$$

extent to which this happens depends on the degree of international ca
tal mobility. The more mobile capital is among countries, the greater is
change in net capital inflow following a change in relative interest rate

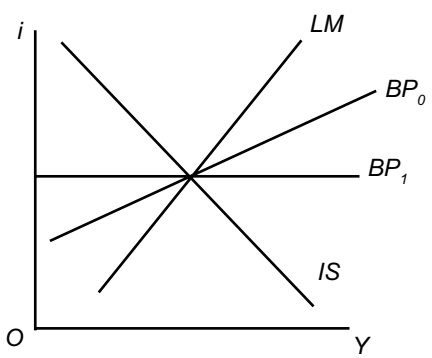
By putting together information from (A13) and (A14) we can come
a conclusion about the general shape of the *BP* curve. Remember, that
income increases, ceteris paribus, the balance on current account worse
Thus, for the overall balance of payments to remain in balance, the balan
on capital account must be improving. But this only occurs if the dom
tic interest rate is rising relative to world interest rates. It is clear then t
the *BP* curve must have a positive slope in the general case. It is also cl
that, other things being equal:

(a) it is more steeply sloped, the higher is the marginal propensity
import;

(b) it is less steeply sloped, the more mobile is international capital.

In practice, for developed countries at least, the degree of internatio
capital mobility is the dominating factor and it is common to draw as a s
cial case a perfectly elastic *BP* curve, which assumes perfect mobility
capital. This implies that domestic interest rates cannot vary from wo
rates (any slight movement of domestic rates above/below world ra
causes immediate inflows/outflows of capital, which drive domestic ra
back to the world rate). The general case is shown as BP_0 in Figure A
while BP_1 represents the case of perfect capital mobility.

Figure A3: Open economy *IS/LM*



that net capital inflow is significantly more interest elastic than the deman for money. A *BP* curve for a less developed economy might, on the othe hand, be drawn more steeply sloped than the *LM* curve. Readers shoul consider what this implies.

The final step with the *BP* curve is to consider what happens when th exchange rate changes. A depreciation of the exchange rate (a fall in th value of the domestic currency), *ceteris paribus*, increases a country exports and reduces its imports resulting in an improvement in the curre account at every level of income. It follows that to maintain overall ba ance in the balance of payments, there must be a matching capital outflo and this only occurs if the domestic interest rate is lower at every level domestic income. In other words, the *BP* curve shifts down. Equally, a exchange rate appreciation will push the *BP* curve up.

The Term Structure of Interes Rates

The relationship between interest rates on assets differentiated solely their term to maturity is known as the 'term structure of interest rates' a a graphical representation is known as a 'yield curve'. We look at this re tionship here for two reasons. The first is that in Section 4.2 we noted t changes in short-term interest rates might not be fully reflected in chan in medium and long-rates because other factors played a part. We look a moment at these factors. Secondly, in Section 12.4 we noted that shape of the yield curve (and changes in its shape) have often played a r in policy-making. We explain the argument behind this use of the curv

Figure A4: The yield curve

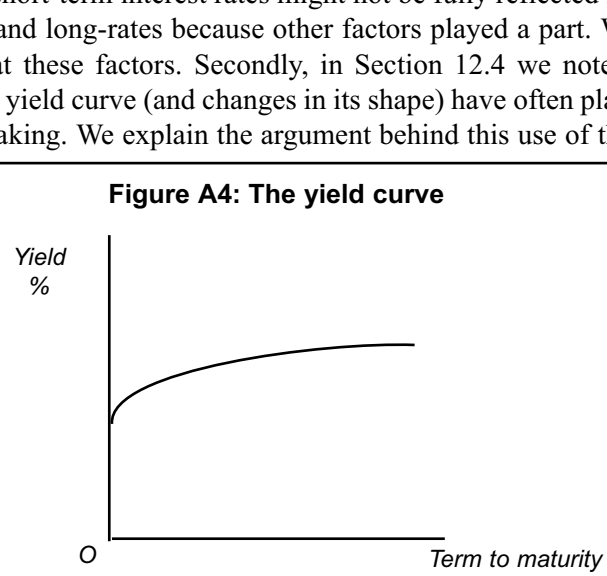


Figure A4 shows what is often referred to as a 'typical' or 'norm yield curve. Notice that it is upward-sloping and thus shows yields incre ing with the term to maturity. The idea that this is a 'normal' shape m be based upon an argument that there is something so systematically un tractive about long dated assets (bonds, for example), that people have be paid an inducement (a premium) to hold them. It is tempting to jump the conclusion that the premium must be due to the comparative illiqui ty of long-dated bonds: if investors are to commit their funds for a lo

bonds today and sell them tomorrow. There is a large and active market fo
bonds of all maturities and she can hold a bond of any maturity for an
period that she likes, up to the date of its redemption. The characterist
that is strictly speaking responsible for the positive term-premium is tha
long bonds show a greater price sensitivity to changes in interest rates tha
do short-dated bonds. If we define 'duration' as the weighted averag
length of time that it takes for an investor to receive the total cashflow
from a bond, then it is pretty clear that duration increases with the term t
maturity. Note also that, for a given term to maturity, duration is als
inversely related to the size of the coupon since the effect of a high coupo
is to bring forward the bulk of cashflows and thus to reduce the weighte
average length of time that it takes to receive them. Now assume that
bond's market price equals the present value of the future cashflows. Th
present value is arrived at by discounting and the effect of discountin
depends upon both the size of the discount rate and the length of time tha
we have to wait for the payment. Consequently, long-deferred paymen
are more seriously affected by a change in discount rate than paymen
which accrue in the near-term. All of this can be demonstrated by the arith
metic of bond pricing and some further arithmetic can show that duratio
measures the elasticity of bond prices with respect to changes in intere
rates (Howells and Bain, 2002, ch.16; Blake, 2000, ch.5)

Even this characteristic, however, is not sufficient on its own to explai
a systematic upward bias to the yield curve. We need the further assump
tion that investors do not like this characteristic or, more strictly, that mo
investors dislike this characteristic of long-dated bonds than prefer th
positive characteristic of long-dated bonds, namely that they provide a
absolutely guaranteed income if held to maturity. We need the assumptio
that, on balance, the bond market is dominated by capital-risk averse, a
opposed to income-risk averse investors. If this is true, the majority o
investors in long-dated bonds need some additional compensation for th
risk of price fluctuations. Other things being equal, the steepness of th
curve indicates the strength of this aversion capital-risk aversion and thu
it follows that changes in the degree of capital risk aversion will caus
changes in the slope and thus in the relation between short and long rate

Furthermore, the slope of the curve is likely to be influenced by expe
tations of future short-term rates. Imagine an investor who is prepared t
invest in bonds for more than the shortest possible period, then he or sh
has the choice of making a single investment for the whole period or
series of shorter-term investments. In the simplest case we might take th

vesting the proceeds in another one-year bond in one year's time. Now
us assume that the current structure of interest rates (whatever it is) is
equilibrium structure. Investors are happy, in other words, with this str
ture (this is a reasonable assumption, since, if they were not, they co
buy and sell bonds of different maturities causing yields to change u
they were happy). Being happy with this structure means that invest
(like ours) must be indifferent between holding a two-year bond and a s
cession of two one-year bonds. Formally speaking, the following m
hold:

$$(1+i_2)^2 = (1+i_1)\times(1+E^2 i_1) \qquad \text{...A15}$$

where i_2 is the *current* two-year interest rate (the rate available now o
two-year) bond, i_1 is the *current* one-year rate and E^2i^1 is the one-year r
expected in the second year. Now suppose that i_1 = 6 per cent while i_2
per cent. It is a fairly simple task to calculate what investors must
expecting about the one year rate in one year's time, by rearranging A

$$E^2 i_1 = \frac{(1+i_2)^2}{(1+i_1)} - 1 \qquad \text{...A}$$

Using our figures we have:

$$^2 i_1 = \frac{(1.07)^2}{(1.06)} - 1 = \frac{1.1449}{1.06} - 1 = 1.0801 - 1 = .0801 \text{ or } 8.01\% \qquad \text{...A}$$

Thus, if the current one year rate is 6 per cent while the current two y
rate is 7 per cent, it must be the case that investors expect to be able to re
vest in one year's time at slightly more than 8 per cent. Clearly, if curr
one year rates are 6 per cent and two year rates are 7 per cent, the yi
curve is upward sloping. In these circumstances, it seems that invest
must expect future short-term rates to be higher, and not just higher th
current short term rates but higher even than current long rates (8.01>
In short, an upward sloping yield curve implies higher short rates in fut
while a downward sloping yield curve implies lower short rates in futu

If there were no other influences on the yield curve (no capital r
aversion, for example) then expectations that current short rates were
going to change would produce a horizontal yield curve. But these inf
ences are not mutually exclusive. If capital-risk aversion is generally pr
ent then all yield curve will have an upward bias added to whatever slo

upward slope as a result of the risk premium; if investors expected intere
rates to fall, then the yield curve might be downward sloping, but les
steeply than it would have been if expectations were the only influence.
expectation about the future course of interest rates are normally distrib
uted around a mean of 'no change', then capital risk aversion means tha
the curve will slope upwards more frequently than it will slope down
wards. Hence the idea of the upward slope as 'normal'.

Now we can see why (in Section 4.2) we suggested that the commun
cation of changes in central banks' official interest rates, at the very sho
end of the maturity spectrum, to medium and long-term rates is comple
We can see that a rise (for example) in official rates could be modified
medium and long parts of the spectrum by changes in capital risk aversio
More likely the effect will be modified by expectations.

Thus, if financial markets believe that an increase in the official rate
the first of a series of rises (because they can see inflationary pressure
developing), longer-term rates will follow short-term rates up. Howeve
an increase in the official rate might persuade the markets that inflatio
will fall in future, allowing official rates to come down again. In this cas
a rise in the official rate would produce expectations of lower future inte
est rates and long rates might even fall, while short rates go up. This
more likely to occur when short rates are moved to what appear to be hi
torically 'extreme' levels in pursuit of policy objectives. Hence, down
ward sloping ('inverted') yield curves do sometimes appear when sho
rates are raised to counter inflationary pressure. As we note in 4.2, muc
depends here on demand conditions in the other major economies, espe
cially that of the USA, and the expected policies of other central bank
notably the Federal Reserve Board (the Fed).

The expectations theory of the term structure has been subjected t
intensive empirical testing over the years (see Malkiel, 1992 for a survey
Generally, speaking, the tests have not been encouraging though it is no
clear, strictly speaking, whether this is because interest differentials are no
driven by expectations or whether they are driven by expectations but th
expectations are incorrect. The testing continues, however, partly becaus
the dataset is almost limitless (different definitions of short/long, differe
time periods etc); partly because changes in econometric techniques allo
new tests to be carried out; and partly because it just is very hard to believ
that agents make forecasts of interest rates which are frequently incorre
or that they are irrational and do not do the sort of calculations we hav
done above. There is another reason, however, for the reluctance to aban

This can be most easily understood if we introduce what is frequen called the Fisher hypothesis which states that the nominal (risk-free, sho term) rate of interest is composed of a real rate of interest which is sta and an inflation premium which varies with inflation so as to maintain stability of the real rate. In symbols:

$$i = r + \pi \qquad \ldots A$$

where i is the nominal rate, r is the real rate and π is the rate of inflati Now, just suppose that the current term structure did enable us to ma reliable forecasts of future short-term rates. We could take our earl example which suggested that short-term rates would rise from 6 to 8 cent in the near future. Then if we knew, from past observation, that real rate was usually about 3 per cent, then our yield curve would enable to forecast future inflation rates as well as future short-term interest ra This would be immensely useful for central banks and other policy make

Unfortunately, as we have said, tests of the term structure's forecast ability have not been very encouraging. Furthermore, the evidence su gests that real interest rates are not so stable as would be required for simple kind of calculation that we have just done. At the moment, it do not seem possible to make accurate forecasts about either the level future interest rates or the level of future inflation rates.

However, the fact that the term structure cannot be used to forecas particular value, does not mean that it has no value to policy make Provided we think that expectations play some part in determining shape of the curve and that an inflation premium plays some part in nominal interest rate, then, with some degree of caution, we might be p pared to regard changes in the shape of the yield curve as indicating som thing about changes in inflationary pressures. A sudden steepening of yield curve, for example, might be read as indicating that markets exp the rate of inflation to rise in future (even if it cannot tell us the actual ra Similarly, a flattening of the curve might suggest a future reduction inflationary pressure and serve as an indication to a central bank that it c reduce the official interest rate, especially if there is other supporting e dence of a moderation of inflation. In this limited role, the yield curve, a more especially changes in the shape of the yield curve has come to be c of the many information variables which central banks have come to u in setting interest rates. We look at attempts to extract information fr the bond and other markets in Section 12.4.

Chapter 1

1. This includes the idea that, in past societies, money has taken the form o colourful objects such as 'cattle, tobacco, leather and hides, furs, olive oil, be or spirits, slaves or wives, copper, iron, gold, silver, rings, diamonds, wampu beads or shells, huge rocks and landmarks, and cigarette butts'. This list taken from Samuelson (9e, 1973).

2. It is possible for a firm to be bankrupted because their resources are insuff ciently liquid but this implies an inability to borrow and, thus, a judgement b financial intermediaries about the true value of the firm's illiquid resources.

3. Essentially notes and coins (see Chapter 1).

4. In making this argument, Wray quotes extensively from Polanyi (1971).

5. In modern economies, seigniorage takes many forms. For example, in inte national economics, the willingness of countries and central banks to hold ar use US dollars after World War II converted US dollars into a world currenc and the US government obtained benefits (or seigniorage) as the issuer of th currency. It gave the USA the ability to run Balance of Payments deficits ar thus to expand the economy to a greater extent than would otherwise hav been possible and to spend freely abroad.

6. This led to Gresham's Law stated by Sir Thomas Gresham in 1558 as 'ba money always drives out good'.

Chapter 3

1. In many systems the expression 'non-bank private sector' is used to denote th general (non-government) public whose holdings of deposits are part of th money stock. In the UK, M4 includes building society as well as ban deposits and so the relevant deposit holders have to be identified as the 'no bank, non-building society, private sector'. Fortunately, this is usually shor ened to 'M4 private sector' or simply 'M4PS'.

2. The suggestion that deposits and loans (and changes in them) must match ma seem strange. It does involve a small simplification in that it abstracts fro shareholders' funds on the liabilities side. But this apart, the statement is co rect since all bank assets are loans in some shape or form. Securities/inves ments are loans (mainly to government) backed by securities. Since notes ar coin are issued by government, holdings of these are also in effect loans to th

incorporated in the following derivations by the addition of a term, ΔNDL
changes in 'non-deposit liabilities'.

Chapter 4

1. 'This, alas, is not a caricature…Indeed this is how the determination of
money supply is introduced in macromodels in most of the current lead
textbooks.' (Goodhart, 2002, p.16). The textbooks include Mankiw, (4e, 20
ch.18) and Burda and Wyplosz (1997, ch.9) amongst others.

2. They need also to be able to make transfers of funds to other banks as payme
take place between clients of different banking firms.

3. Or, indeed, a tightening of monetary policy itself. Assume that this leads t
rise in price, increase in collateral requirements, and reduction in supply
credit from non-bank sources. The inevitable consequence will be a jump
overdraft utilisation and the liquidity problems described here unless
Central Bank relieves the shortage.

4. This illustration also draws attention to an asymmetry in the loan/deposit c
ation process. Central Banks can initiate a monetary expansion, through o
market operations and expansion of the base; they cannot (at tolerable co
initiate a reduction by reversing the process (see Moore, 1986, 1988a).

5. Supporters of the view that central bank behaviour matters little incl
Minsky (1982, 1986), Rousseas (1986), Pollin (1991) and Dow (1993, 199
Niggle (1991) points out that the degree of (and the possibilities for) reser
economising innovation will depend upon institutional features of the regi

6. In its explanation of the 'new monetary policy framework' the UK Treas
makes no reference to 'reserves' or 'monetary base' though it does explain
length the Monetary Policy Committee's responsibility (and procedures)
setting interest rates. It also points out that the responsibility for the mana
ment of government debt was transferred from the Bank to the Treasury's D
Management Office in 1998, thus denying the Bank access to the open mar
operations that would be essential for the targeting of reserves. (Treasu
2002, ch.3).

7. Consider the flow of funds approach again. In this framework changes in
quantity of money are 'explained' by changes in the components of aggreg
bank lending. As Cuthbertson pointed out '..the reader may be wonder
what has happened to the demand for money in this analysis. There is
implicit demand for money in the model but only in *equilibrium*.' (198
p.173. Emphasis in original).

8. In the 'Post-Keynesian' tradition it is sometimes argued that the demand
money is completely irrelevant: agents will hold whatever quantity of depo
are generated by loans. Where money creation is concerned, loan deman

9. At the end of 1995, OFI and ICC shares combined accounted for only 40 p cent of the outstanding stock. The remaining 60per cent was held by the pe sonal sector.

10. For the results of causality tests see Moore (1988a, 1989); Palley (1994 Howells and Hussein (1998); Caporale and Howells (2001).

11. After initially arguing that targeting the (exogenous) money stock was mi guided because of infinitely variable velocity, by the early 1980s Kaldor w adopting the position here, namely that changes in money were an *effect* not cause. (See Kaldor, 1982).

12. A situation recognised by Sprenkle and Miller as long ago as 1980 and muc referred to since in demand for money studies, without apparent recognition its significance.

Chapter 5

1. For a brief but clear survey of pre-Quantity Theory views and of the develo ment of the Quantity Theory, see Visser (1974). More detail is provided Harris, 1985 and Humphrey, 1974. For a discussion of the contributions Alfred Marshall and earlier writers to the Quantity Theory tradition, s Eshag, 1963.

2. Harris, 1985, examines the pre-Keynesian Quantity Theory tradition in son detail and stresses the complexity of the body of thought surrounding it. H refers to the expression of the Quantity Theory in terms of a change in t quantity of money producing a proportional change in the absolute price lev as the Crude Quantity Theory.

3. See Bain and Howells (1991)

4. Patinkin, 1965, argued that the Cambridge approach was quite different fro the Quantity Theory because the Quantity Theory made no assumption as why money was held. It operated through changes in the money stock infl encing the goods market via a real balance effect. In this view, the Quanti Theory should be represented by a hyperbolic market equilibrium curve rath than a demand for money curve. For a full account of the derivation of the re balance effect, the problems associated with it, and its significance see Harri 1985.

5. In other words, people were assumed to hold regressive expectations

6. Short but helpful explanations of the finance motive can be found in Chic 1983, and Rousseas, 1986. Keynes's original article can be found in JM 1973, vol XIV pp 201-23.

good account of both the model and its defects.

8. Sprenkle (1969, 1972) claimed the theory to be useless in regard to large fi with multiple branches and accounts. See also Cuthbertson, 1985a, Cuthbertson and Barlow, 1991.

9. For this criticism, see Fisher, 1989, and Karni, 1974. Gowland (1991) ill trates the point with some approximate calculations.

10. A number of other writers have produced risk aversion models based upon same broad premises as Tobin. For a discussion of these and later models Cuthbertson and Barlow, 1991.

11. The original (1956) version of the equation had the demand for nominal b ances as a function of a similar set of variables plus the general price level (To produce the 1970 version, Friedman assumed the function homogeneous degree one in both prices and permanent income, enabling him to div throughout by *P* and *Yp*.

12. Much to Patinkin's displeasure.

Chapter 6

1. The *Foundations of Monetary Economics* (Laidler, 1999), a recent three-v ume collection, contains 17 essays on the demand for money and nothing the supply of money!

2. Flow variables are measured per period of time (e.g. GDP per annum); st variables are measured at a particular time (the supply of money at December 2001).

3. The date of the 'Big Bang' in the equities and bonds markets, in which ma changes were made in institutional arrangements.

4. Mayer (1978) includes 'reliance on small macroeconometric models' as of his 12 propositions associated with monetarism.

5. Other US studies which indicated instability in the demand for money fu tion at this time include Pierce (1975), Enzler *et al* (1976) and Meyer (197

6. Note, however, that where the income elasticity of demand for money is u to gather up exogenous changes not reflected elsewhere in the demand money function, we cannot draw conclusions about the rate at which the s ply of money should increase in relation to increases in real income. Th Friedman's high (1959) estimate of the income elasticity of M2 in the USA now generally accepted to have reflected influences such as the growth banking. This high income elasticity (1.8) led Friedman to call money a l ury good.

1. Or, of course, if the government controlled the printing presses, through printing of money.

2. The increase in wealth, to the extent that it causes people to feel better of might lead them to choose a higher degree of liquidity — increasing hoardin rather than expenditure. Then, the wealth elasticity of demand for mone might be higher than for illiquid financial or real assets.

3. The strongest Keynesian argument against the Ricardian equivalence positio can be found in Dow and Earl, 1982, p.128, where it is rejected as 'absolu nonsense'.

Chapter 8

1. It could equally well be called the non-decelerating-inflation rate of unemploy ment since any level of unemployment above the natural rate will also only b temporary and will be the result of inflation decelerating below worker expected inflation rate.

2. In most formulations of adaptive expectations, much heavier weights a applied to recent experience but people give some weight to experience fro many previous years. This causes workers' inflationary expectations approach the new rate of inflation relatively quickly but it might be many yea before the expectations are actually correct

3. Although all rejections of hypotheses about expectations-determined event are hard to interpret since they may be rejections of the theory of expectation formation rather than of the hypothesis itself.

4. Compare this list with the points mentioned in Box 13.4

5. That is a central banker who is more concerned about fluctuations in inflatio (as compared to fluctuations in output) than is true of the society in general

Chapter 9

1. This omits other possibilities e.g. that, in periods of high unemployment, it ma be possible to reduce unemployment without inflationary consequences.

2. A prior question is the standard of measurement to be used e.g. in the case inflation, which price index provides the best guide to the success or failure policy: the retail price index, the underlying rate of inflation, the wholesa price index, the GDP deflator, a deflator of value added in manufacturin industry, the rate of increase of private final demand .... This is in turn com plicated by the regular changes in statistical series introduced by the author ties.

costs involved in changing the values of instruments.

4. A vast literature exists on the relationship between democracy and social w fare, stemming from Arrow's impossibility theorem that demonstrates impossibility of forming a social preference through the aggregation of in vidual preferences, without breaking at least one of a number of rules t Arrow takes to be requirements of a democratic system (Arrow, 1951).

5. The discussion here assumes that the purpose of the setting of targets by g ernment is the maximization of welfare through stabilization policy. Howe there may be other reasons for the setting of targets, for example the setting money supply growth targets to provide information to the private sector ab government policy intentions and hence to influence inflationary expectatio

6. This implies that national economies are single entities and that their long-te interests can be identified. This, in turn, stems from a willingness of mac economists to ignore questions of income distribution and regional balan For example, it may well be that people in the North of England would pre a slower rate of growth for the UK as a whole, if it meant a more equal dis bution of income between North and South.

7. An early statement of this argument can be found in Friedman, 1948.

8. For a survey of this work see Blanchard (1990).

9. For good discussions of the relevance of rational expectations to stabilizat policy see Visser (1991) and Cuthbertson and Taylor (1987a).

10. For further discussion of Poole's model and criticisms of it see Benjamin Friedman in Friedman and Hahn (1990) and Gowland (1991).

11. The argument regarding the suboptimality of intermediate targets can also found in Chick (1977) and in B Friedman (1975).

12. DCE = the increase in the money supply — the change in the overseas co ponent of the money supply.

Chapter 10

1. For a development of this argument in relation to the EMS see Giavazzi Pagano, 1988; and Giavazzi and Giovannini, 1989.

2. The phrase used in the agreement governing the Bretton Woods adjustable fixed exchange rate system, which operated from 1945-72.

3. In the event, the 15 per cent remained in force until the establishment of m etary union in January 1999.

6. Mélitz, 1988.

7. Purchasing power parity requires that the exchange rate between two currencies is determined by the price levels of a comparable bundle of goods in the two countries (absolute PPP), or that expected future spot exchange rates reflect the expected future inflation rates in the two countries (relative PPP).

8. Nash non-cooperative games are classed as either Nash-Cournot (actions by other countries taken as given) or Nash-Stackelberg (one country acts as leader and anticipates how the other country will respond to its actions).

9. Williamson and Miller, 1987; McKinnon, 1988.

10. see, for example, Krugman (1991)

11. Kindleberger, 1988, p.137.

12. Portes, 1990, p.226.

13. Walters, 1990, p.54.

14. Horne and Masson, 1988, p.273.

15. Currie, 1990, p.144.

Chapter 11

1. Lord Kaldor was one of several economists on the Radcliffe Committee and argued this particular case against monetary targets. As we shall see later, the rejection of monetary targeting strengthened over the years but the basis for rejection changed fundamentally.

2. Sterling, along with other major European currencies, became convertible for foreign holders of it in 1958. Full sterling convertibility for UK residents dated from 1979. Other European currencies moved towards full convertibility during the 1980s and early 1990s.

3. The Bank of England itself had been nationalised in 1946.

4. Domestic credit expansion is the sum of the domestic credit counterparts of the money supply. In Equation 3.18, for example, DCE is found by ignoring ± ext. The logic was that under a fixed exchange rate regime, there is little the government can do about the impact of external flows, but it could at least be asked to control the domestic sources of money.

5. This process was more eloquently christened 'the regulatory dialectic' by Kane (1984). More examples of regulation-induced innovation are given in section 4.3.

Hall (1983) pp.28-30.

8. See Hall (1983) ch..4.

9. Gowland (1982) p.109.

10. Goodhart (2002) p.17.

11. We return to the issue of relative interest rates and monetary policy in our cussion of liability management later in this chapter.

12. See Goodhart (1984).

13. See Lewis and Davis (1987) section 9.7.

14. See also Howells and Bain (2002) ch.12.

15. Bank of England, *Statistical Abstract*, 1997, vol. I, tables 19.3, 19.4).

16. '...monetary targeting is simply a limiting case of inflation targeting in wh the policymaker assigns a weight of unity to money and of zero to all ot variables'. M King (1997) p.440.

Chapter 13

1. A strict application of optimum currency area theory might, for example, l to the conclusion that south-east and central England should share a comm currency with northern France but that the north of England and Scotl should have a separate currency.

2. H M Treasury (1997) *UK membership of the single currency: an assessmen the five economic tests*, available on the HM Treasury website: www.hm-tre ury.gov.uk

3. The assessment is due to be completed by June 2003, see H M Treas (November, 2001), *Preliminary and technical work to prepare for the asse ment of the five tests for UK membership of the single currency*, available the Treasury website, www.hm-treasury.gov.uk

4. Although we generally use the term European Union (EU) in this book, di reference to the *Treaty on European Union* must use the term Europ Community (EC) because, according to the Treaty, the Economic Commu is the economic and monetary pillar of the three-pillared European Union, other two of which relate to common foreign and security policies.

5. Formally, the exchange rate strategy of the euro area rests with the Europ Council, not with the ECB. However, since the value of the euro has so impact on the future rate of inflation, the ECB must take it into accoun making interest rate decisions.

7. See Box 4.1 in Chapter 4 for an explanation of repurchase agreements.

8. Interest rate decisions are announced fortnightly, except in August when ther is normally only on meeting of the Council

9. 'Structural operations' are also possible. These are intended to adjust the stru tural liquidity of the Eurosystem in relation to the banking system. For an ou line of these, see European Central Bank (2001).

10. This rate was known as the Lombard rate in the Bundesbank's system.

11. ECB, *Monthly Report*, December 2001, p. 5.

Chapter 14

1. In each case the bank was granted a 20-year charter, which was not renewed

2. Quoted in Davies (1994).

3. Even by the end of the year 2000, despite large falls in numbers over man years, there remained 8,315commercial banks in the USA.

4. State governments have the power to charter banks under the US constitutio The National Banking Act of 1863 empowered a federal agency to issue ban charters also.

5. No two members were to come from the same Federal Reserve region.

6. Multi-bank panics occurred in 1914, 1930 and 1933, with the panic of 193 leading to widespread restrictions on the convertibility of deposits into cu rency.

7. See section 11.3 for the part played by Regulation Q in the development of th eurocurrency system.

8. Federal Reserve Bank of New York, *About the Fed*, available o www.ny.frb.org

9. Quoted in Handa (2000), p. 253.

10. Testimony of Chairman Alan Greenspan. Federal Reserve Board's semiannu al monetary policy report to the CongressBefore the Committee on Financi Services, U.S. House of Representatives July 18, 2001.

11. Indeed, the Fed is legally required to do this.

12. The MCA required that in 1980 only 3 per cent of the first $25 million of bank's demand deposits and another banking act in 1982 established a zero p

are adjusted annually to reflect the growth in total demand deposits in
USA. These concessions were intended to reduce the burden of maintain
reserves for small banks.

13. As we explain in Section 4.3, the use of average deposits eliminates day-
day fluctuations and leaves interest rates less volatile at the end of the mai
nance period. That is, it is intended to smooth out interest rate fluctuations

14. For an explanation of how repos (known in the USA as RPs) work, see
4.1.

15. Matched sale-purchase transactions (MSPs) involve a contract for immed
sale of Treasury bills to, and a linked matching contract for subsequent p
chase from, each participating dealer.

16. Although there are only 8 FOMC meetings a year, decisions can be altered
special telephone link-ups — see below in relation to September 11, 2001.

17. Wray (1990) p.249.

18. Testimony of Chairman Alan Greenspan, *Federal Reserve Board's semian
al monetary policy report to the Congress* before the Committee on Finan
Services, U.S. House of Representatives, July 18, 2001

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