

Implementing Monetary Policy

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IMPLEMENTING MONETARY POLICY

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Foreword

The series of *Handbooks in Central Banking* and the accompanying *Lecture* series form a key part of the activities of the Centre for Central Bank Studies (CCBS) at the Bank of England. The CCBS has been in existence since 1990, delivering seminars, workshops and expert advice to central banks all over the world. The *Handbooks* and *Lectures* cover the same subject matter; namely the technical and analytical aspects of central banking.

The *Handbooks* and *Lectures* are aimed primarily at central bankers, and have proved an extremely popular and useful reference works for all those looking for materials that provide both a clear analytical framework together with the practical application of these ideas.

Most of the CCBS *Handbooks* and *Lectures* are also available from our website www.bankofengland.co.uk/ccbshand.htm. Several have been translated into Spanish, Russian and Arabic, and these versions are also available on the website.

Our aim is to continue to add to the series, covering new areas of interest and also updating existing *Handbooks* to take account of recent developments. Some of the latest *Handbooks* will include econometric exercises developed in our workshops, thus making these available to a wider audience.

We hope you find the new additions to the series useful, and would welcome any comments on the *Handbooks* and *Lectures* and any suggestions for future topics.

We should note that all views expressed are those of the authors and not necessarily those of the Bank of England or Monetary Policy Committee members.

Andrew Blake and Gill Hammond
Series Editors

Abstract

The purpose of the paper is to discuss how monetary policy decisions made by the board or monetary policy committee of a central bank can be implemented. It distinguishes between the polar extremes of direct and indirect methods of implementation, and explains why indirect methods are generally preferred. It describes the circumstances in which various elements of a central bank's balance sheet can grow very quickly, threatening to cause the growth rate of central bank money to rise to levels inconsistent with the objectives of monetary policy, and discusses what offsetting measures the central bank can take to contain the growth of central bank money. It describes in detail how open market operations can be conducted, and discusses techniques of intervention in foreign exchange markets. Finally, it reviews the usefulness of direct controls of instruments of monetary policy, and discusses the conditions in which such controls might be needed and how they can best be designed.

1. General principles

1.1. Introduction

Those of the liabilities of central banks which are redeemable on demand are known as central bank money, and represent the only ultimate means of settling debts within their currency area. Thus, central banks have a monopoly of the supply of the ultimate means of settling debts, and that implies that they have much power to influence economic developments.

Because central banks have this monopoly, they also have a responsibility to ensure that there is a payments system which enables payments to be made securely and promptly, so as to meet the needs of the economy. The design of systems for making payments, and for transferring securities safely and efficiently from one holder to another, is an important subject, but it is not the subject of this paper.

Central banks normally use their monopoly of the supply of central bank money to dictate the terms on which they will make central bank money available. Countries can choose among a range of monetary policy strategies in order to achieve their objectives. The available strategies can be classified into two categories – exchange-rate-oriented strategies and domestically-oriented strategies.

Some of the exchange-rate-oriented strategies mean that monetary policy becomes purely automatic, with no autonomy allowed to the central bank. These include dollarisation – that is, the use of a foreign currency, such as the US dollar or the euro, as the national currency. Monetary policy is also purely automatic in countries where there is a currency board, in which the exchange rate is fixed by law against an anchor currency (eg the dollar or the euro), and the domestic currency has to be 100% backed by foreign exchange – in other words, the currency board has to hold high-quality liquid assets in the anchor currency which are at least equivalent to its domestic currency liabilities.² Therefore the question of implementation of monetary policy does not arise if either of these techniques is employed.

However, with a fixed-but-adjustable exchange rate, or with a domestically-oriented strategy like a monetary target or an inflation target, the central bank has the power to manage the supply of central bank money with some degree of autonomy. This paper is not about the choice of monetary policy strategy, or about the setting of macro-economic policy instruments, such as the level of the exchange rate peg in a fixed-but-adjustable exchange rate arrangement, or the level of short-term interest rates. It is about implementing the decisions that have been made about these things by the board or monetary policy committee of the central bank, exploiting the central bank's monopoly of the supply of central bank money for the purpose.

1.2. Direct and indirect methods of monetary policy implementation

There is a fundamental distinction between direct and indirect methods of implementing monetary policy. Direct methods involve the state (the government or the central bank)

² If a currency board holds excess reserves – ie if it holds more foreign currency than it needs to back its domestic currency liabilities, then it does have some limited autonomy in monetary policy. This is currently the case in Hong Kong, for example.

giving instructions to the commercial banks on what loans they should and should not make, or on what interest rates they should charge to borrowers or pay to depositors, or on other aspects of their relationships with their customers. Direct methods of control are characteristic of state-controlled economies – for example, they were used in the Soviet bloc before it collapsed in the early 1990s.

Indirect methods of monetary control, in their most idealised form, allow the state no role at all in the relationship between commercial banks and their customers. In the idealised model, the state, in the guise of the central bank, deals only with commercial banks and perhaps some other financial institutions. The role of the central bank is purely to supply central bank money to the financial system in such a way as to enable the objectives of monetary policy to be achieved. Decisions about how much credit to extend to non-bank borrowers, and at what interest rate, and about what interest rates to pay to depositors, are all left entirely to the private sector. Of course, those decisions are influenced by the behaviour of the central bank. To give an obvious example, if the central bank increases the interest rate at which it is willing to lend central bank money to commercial banks, then it can be expected that the commercial banks will increase the interest rates at which they lend money to borrowers. They may also reconsider the amounts of money which they are willing to lend. But the state does not directly control decisions about lending money.

It is important to acknowledge that, in practice, no country in the world matches this idealised model in every respect. There are two particular respects in which they commonly differ from the idealised model:

- (i) All countries maintain lists of individuals, companies and countries with which financial institutions within its jurisdiction are forbidden to deal. For example, in the United Kingdom, commercial banks are forbidden to have any dealings with identified terrorists and their associates. More generally, anti-money laundering legislation requires commercial banks to report suspicious transactions to the authorities, and to check the identity of new customers who open accounts with them.
- (ii) All countries conduct official supervision of commercial banks within their jurisdiction. The purpose of official supervision is to ensure that commercial banks are managed prudently. This is in order to reduce the risk of a commercial bank getting into financial distress. If a large commercial bank were to get into distress and fail, it would be likely to cause widespread losses to depositors and costly disruption to the economy. In order to avoid such consequences, the government might decide to recapitalise the bank using public funds. Such operations can be extremely costly. The table below shows some of the costs of the East Asian financial crisis of 1997-98, which took the form of both substantial falls in GDP in the affected countries (reflecting economic disruption arising from financial instability) and the financial cost to the government of restructuring the financial services industry.

Table 1: Costs of the East Asian financial crisis 1997-98		
	Fall in GDP 1996-98	Public cost for financial sector restructuring (% of GDP)
Indonesia	9%	51
Korea	2%	13
Malaysia	½%	5
Thailand	12%	25

Sources: IMF [International Financial Statistics](#); C-J Lindren, T J T Balino, C Enoch, A M Gulde, M Quintyn and L Teo, [Financial Sector Crisis and Restructuring: Lessons from Asia](#), IMF Occasional Paper No 188, 1999.

Official supervision of commercial banks is intended to help prevent financial instability of this kind. However, in doing so, it cannot avoid affecting in some degree the way in which commercial banks deal with their borrowing customers.

In addition, in some countries, including the United Kingdom, competition law requires the government to regulate commercial banks' dealings with their customers with the separate objective of ensuring that commercial banks do not collude or act as a cartel so as to increase the prices which they charge for their services, and more generally that customers are treated "fairly". And governments sometimes encourage commercial banks to establish codes of practice which prescribe minimum standards for them to observe in dealing with customers.

Thus, even in capitalist countries, the state regulates the commercial banks' dealings with their customers in many ways in addition to simply managing the supply of central bank money. Nevertheless, certainly in long-established industrial countries, and increasingly in emerging market countries, commercial banks have a very large amount of discretion and autonomy in their dealings with their customers. It is true to say that credit decisions are made by the private sector and not by the state. In that sense, monetary policy implementation is truly indirect.

1.3. Why is indirect implementation of monetary policy preferable?

Indirect implementation of monetary policy involves a very much smaller role for the state than direct implementation. The argument for indirect implementation is therefore much the same as the argument for relying on market forces rather than state control in economic affairs more generally. That argument is partly based on the belief that market forces allow more personal freedom than state control, and the political principle that personal freedom is intrinsically desirable. It is also based on the practical observation that market economies have grown faster, and met their citizens' needs more fully and more effectively, than state-controlled economies. Indeed, the collapse of the Soviet Union in 1991 can be explained mainly by the failure of its state-controlled economy, in which credit decisions in particular were made by the state rather than by the private sector, by comparison with capitalist economies.

Most countries consider that these advantages of indirect methods of monetary policy implementation are decisive. There are now (2004) very few countries in which monetary policy is implemented through direct controls, and none of them has recently enjoyed any great economic success. However, one of the consequences of abandoning direct controls and adopting indirect monetary policy implementation is that the behaviour of the commercial banking system, and of the monetary and credit aggregates, becomes for a period

very unpredictable, and hard for the monetary authorities to understand. In the United Kingdom, this happened in the 1970s. Monetary and credit aggregates grew very fast indeed after direct controls were removed in 1971, but it was very difficult to interpret their growth and to assess its significance for the economy. Specifically, it was impossible to say with any confidence whether the rapid growth was simply the natural result of the commercial banks expanding their businesses after a long period (of over 30 years) in which they had been subject to controls, or whether it represented a dangerous monetary expansion threatening a serious rise in inflation. In the United Kingdom, both interpretations turned out to be correct. The rapid growth of money and credit did represent a natural expansion of the commercial banking business after 30 years of controls, but it also carried a serious inflationary threat. In addition, some of the additional lending turned out to be of poor credit quality, and the United Kingdom consequently experienced a banking crisis in the mid-1970s. The general point is that managing the economy, and in particular managing monetary policy, is much more difficult during the temporary period of transition from direct to indirect methods of monetary policy implementation, because the transition process affects the information on which monetary policy decisions are based and makes it very hard to understand. Monetary policy has to “fly blind”.

1.4. What indirect implementation of monetary policy requires from the central bank

Implementation of monetary policy through direct techniques involves issuing instructions to commercial banks about how they should manage their affairs. It is desirable that the central bank, when it formulates the instructions, should be familiar with the practical problems that the commercial banks will face in carrying out the instructions, so that the instructions do not add unnecessarily to the costs incurred by the commercial banks in managing their affairs. Therefore it is useful for the staff of the central bank to have a sympathetic understanding of the pressures on commercial banks.

Indirect implementation changes the relationship between the central bank and the commercial banks. Central banks’ most important dealings with commercial banks are mediated through a financial market, rather than being conducted bilaterally. Central banks need to acquire the skills and ethics that are needed to deal in a market, and to understand and interpret the information that financial markets can provide about the current and likely future behaviour of the economy. They also need to be aware of the risks that the central bank is taking in its monetary policy implementation, including credit risk, as described below, and they need the ability to analyse and manage those risks. This will be explained in more detail later. In other words, the skills they need include not only the skills of a bureaucrat, formulating and implementing official policy, but also some of the skills of the commercial banker. Thus central banking straddles the worlds of both government and banking.

In addition to human resources and skills, central banks which use indirect methods of monetary policy implementation also need certain pieces of physical infrastructure:

- (i) Secure telephone contact with other market participants, so that deals can be agreed, and so that the central bank can receive information about market sentiment and market developments. Telephone conversations need to be recorded so as to help resolve any disputes about what deals have been agreed.
- (ii) Access to information about market prices, either on screens, or by telephone contact with brokers or other market participants.

- (iii) Access to secure and efficient payment and settlement systems, through which payments can be made and securities delivered in order to settle agreed transactions.
- (iv) Accounting systems, so that changes in the central bank's balance sheet can be promptly and accurately recorded.
- (v) Access to information about the creditworthiness of the central bank's assets, and of the commercial bank counterparties with which the central bank has financial dealings.

There needs to be a degree of separation between those members of the central bank's staff who are responsible for agreeing deals with other market participants, and those who are responsible for settling the deals by making the necessary payments and deliveries of securities. This is to reduce the risk of collusion for the purpose of fraud, and it is standard practice in all commercial banks and other market participants.

2. Managing the balance sheet of the central bank

2.1. The structure of the balance sheet

Indirect monetary policy implementation means managing the supply of central bank money to achieve the objectives of monetary policy. The term "central bank money" describes those of the liabilities of the central bank which are redeemable on demand, and which are therefore immediately available to settle debts. Central bank money is a liability of the central bank, and central banks do not give money away.³ So a change in the amount of central bank money outstanding is matched by a change in at least one other item in the central bank's balance sheet.

Central bank balance sheets vary in structure from country to country, but it is possible to construct a kind of stereotype central bank balance sheet, as shown below.

Table 2: Stereotype central bank balance sheet	
Liabilities	Assets
Currency in circulation	Loans to government*
Required bank reserves	Loans to commercial banks*
Excess bank reserves	Foreign exchange and gold reserves
Other liabilities	Other
Capital	

* These items should be interpreted broadly, to include (among loans to government) holdings of government securities, including on repo, and (among loans to commercial banks) holdings of commercial bills endorsed by commercial banks.

Which of the central bank's liabilities count as "central bank money"? Currency in circulation is certainly central bank money, since it is immediately available to make payments. What about required bank reserves? If the reserve requirement to which commercial banks are subject obliges them to meet the requirement each day, then required

³ Though Milton Friedman famously discussed an experiment in which the central bank chartered a helicopter and dropped banknotes from the sky.

reserves are not immediately available to make payments, and are not central bank money in any meaningful sense. However, if the reserve requirement can be met on average over a period (for example, over a month), then within that period, required reserves are available to make payments, but on condition that if as a result they fall below target on one or more days, the shortfall has to be compensated for on other days in the period.⁴ Thus with reserve averaging, required reserves have some but not all of the characteristics of central bank money. Finally, excess reserves are reserves held by commercial banks in excess of the minimum required. They are immediately available to make payments and therefore do constitute central bank money.

Some of the other items in the balance sheet are outside the control of the central bank, or may be outside its control in certain circumstances. To be specific:

- (i) Most central banks supply currency on demand to commercial banks, which need it to meet demand from their customers. Equally, they buy back currency on request from commercial banks. When commercial banks purchase currency from the central bank, they pay for it by running down their reserves (required or excess), or by borrowing from the central bank. In the United Kingdom, the demand for currency varies considerably from day to day. It typically increases sharply each Friday, ahead of the weekend, and falls back each Monday. In addition, it increases very greatly before Christmas each year, and falls back again after Christmas. Longer-term variations of the public's demand for currency depend, presumably, on real incomes and prices, which are not directly under the central bank's control. They also depend on interest rates, which are potentially under the central bank's control, but the dependency is not close or precise. Thus in the short term – in other words, in the period relevant for the implementation of monetary policy between one policy decision and the next – the public's demand for currency is something which affects the central bank's balance sheet, but which the central bank cannot control.
- (ii) For those central banks which are obliged to meet the residual financing needs of their national government – that is, those financing needs which the government is unwilling or unable to satisfy through commercial borrowing – the item “loans to government” is not directly controllable. It depends on the budget deficit, and on how much of the budget deficit is financed by borrowing from commercial sources. Governments which behave irresponsibly by having large budget deficits which they cannot or will not finance by commercial borrowing typically finance the deficits instead by borrowing from the central bank. Thus the total of central bank loans to the government rises steadily, offset initially by a fall in central bank loans to commercial banks (because the flow of payments from the central bank will help the commercial banks repay loans from the central bank) and then by a rise in excess bank reserves. This increase in excess bank reserves, if not offset by some other central bank action, is likely to encourage the commercial banks to extend credit, thereby potentially aggravating the inflationary effects of the budget deficit.

Not all government borrowing from central banks is harmful. For example, some governments use the banking services provided by the central bank, and borrow from the central bank at those times of year when expenditures exceed revenues, and place

⁴ On the last day of the period over which the reserve requirement has to be met, required reserves are not immediately available to make payments.

funds on deposit with the central bank (or repay their borrowings) at those times when revenues exceed expenditures. Over a whole year, the government may borrow nothing on balance from the central bank, but it may borrow temporarily during the year to smooth out seasonal fluctuations in its cash flow.

Because governments can abuse their ability to borrow from their central banks, some central banks are forbidden by statute to lend to their governments at all. This is the case for central banks in the European Union – though they are allowed to buy government securities, on condition that they do so on their own initiative and in the secondary market.

- (iii) Where a country has a fixed exchange rate commitment, the central bank has to sell domestic currency and buy foreign exchange if the exchange rate reaches the bottom of the fluctuation band, so that the foreign exchange and gold reserves increase.⁵ The offsetting changes in the central bank balance sheet are likely to be a fall in central bank lending to commercial banks, or to the government, if the commercial banks use the domestic currency they have bought from the central bank to repurchase government securities that they had sold on repo to the central bank. There is also likely to be a rise in excess bank reserves. Contrariwise, if the exchange rate has reached the top of the band and market participants are selling domestic currency to the central bank, then the foreign exchange and gold reserves will be falling. The offsetting changes in the central bank's balance sheet in this case are likely to be a fall in excess bank reserves, and a rise in central bank loans to commercial banks, to finance the purchase of foreign currency from the central bank. There may also be a rise in loans to government, if the commercial banks finance purchases of foreign currency from the central bank by selling government securities to the central bank, either outright or on repo.

If the central bank does not take any action to offset the impact of foreign exchange intervention on its balance sheet, it is said to be sterilising the intervention. Thus, in the case where the exchange rate is weak and the central bank is buying domestic currency, the central bank would be sterilising the intervention if it did nothing to restrict its lending, for example by raising the interest rate at which it lends. There are serious doubts about the effectiveness of sterilised intervention as a means of influencing the exchange rate.

Intervention in the foreign exchange market to support the domestic currency – ie to try to prevent a devaluation of the exchange rate – is limited by the amount of foreign exchange reserves available, the amount of external borrowing facilities available, and the willingness of the central bank and the national government to use them. There are no such limits on the amount of intervention that can be undertaken to prevent a revaluation of the exchange rate, because there is no upper limit on the amount of domestic currency that a central bank can create, other than any self-imposed limit, which might be dictated, for example, by the objective of maintaining or achieving price stability. In many countries, accumulation of foreign exchange reserves has threatened to cause a major expansion in central bank money, and central banks have therefore been anxious to find ways of sterilising foreign exchange inflows so as to

⁵ The “bottom” of the band, for the purposes of this paper, means the point at which the lowest number of units of domestic currency is required to purchase one unit of foreign currency, ie the point at which the domestic currency has the highest value.

reconcile, even if only temporarily, a conflict between an exchange rate commitment and domestic economic objectives, despite the doubts about the effectiveness of sterilised intervention in influencing the exchange rate.

2.2. How can the central bank contain the growth of central bank money?

The previous section described the ways in which some elements of the central bank's balance sheet can be out of the immediate control of the central bank. This section describes what the central bank can do to maintain a satisfactory level or growth rate of central bank money in the face of fluctuations in the other elements of its balance sheet.

Large long-term fluctuations in particular elements of the central bank's balance sheet can be offset, for a period, in their effects on the central bank's balance sheet by the devices described in this section. However, they can normally only be permanently changed by an act of macro-economic policy. Thus if the central bank's lending to government is increasing rapidly because the central bank is financing a large budget deficit, ultimately the only way of containing the growth of central bank money is for the government either to eliminate the deficit, or to finance it by borrowing from commercial sources. Likewise, if the foreign exchange reserves are increasing undesirably rapidly because of strong demand for the domestic currency in the foreign exchange market, then the government and the central bank face a hard choice between, first, continuing to accumulate foreign exchange reserves and accepting the consequences for domestic monetary policy, while no doubt hoping that the demand for domestic currency will decrease, and second, revaluing the exchange rate parity. And if commercial banks' required reserves are rising rapidly because of rapid increases in their lending to customers, then a rise in short-term interest rates would be the natural way of reducing the growth of credit and of required reserves, if such a reduction was thought to be desirable.

The use of macroeconomic policy instruments, such as changes in the budget deficit or its financing, changes in exchange rate parities, or changes in short-term interest rates, is beyond the scope of this paper, which is about the implementation of a monetary policy in which the setting of these policy instruments has already been determined (eg by the board or monetary policy committee of the central bank). Adjustments to the technique through which monetary policy is implemented cannot avert the need for changes in macroeconomic policy. However, they can accommodate short-term fluctuations, and they can sometimes "buy time" – in other words, contain market pressures for a period to enable the persistence of the pressures to be assessed and to enable changes in macroeconomic policy to be considered. Nevertheless, the amount of time that can be bought in this way is strictly limited, and moreover the time limit is uncertain. When the time limit expires, policy changes are enforced, eg by the impossibility of maintaining a fixed exchange rate any longer. So "buying time" can be risky.

A preliminary general observation on the implementation of monetary policy through the management of the central bank's balance sheet is that it is not technically difficult to deal with fluctuations which have the effect of draining funds from the commercial banking system – that is, of reducing the supply of central bank money. In that situation, it is normally sufficient for the central bank simply to make good the reduction in the supply of central bank money, eg by purchasing more assets from the commercial banks (either government securities or privately-issued securities such as commercial bills), or by reducing required bank reserves.

Likewise, temporary fluctuations, such as seasonal fluctuations in the demand for currency, are not normally difficult to deal with. A seasonal rise in the demand for currency can, for example, be accommodated by temporary additional purchases of assets from commercial banks, or by a temporary reduction in required reserves. And a seasonal fall in the demand for currency can be accommodated by a temporary reduction in purchases of assets from commercial banks, or by a temporary increase in required reserves.⁶

Temporary fluctuations in foreign exchange flows can be accommodated by using foreign exchange swaps. A foreign exchange swap comprises a delivery of currency A in exchange for currency B on the first settlement date, followed by an opposite delivery of currency B in exchange for currency A on the second, later, settlement date. Suppose, for example, that the central bank has bought US\$10 million in exchange for SYP500 million⁷ and expects to receive the US\$ on 1 March. Its cash flow will be:

	1 March
US\$	+10 million
SYP	-500 million

If it does a suitable swap transaction, with a maturity of, say, a month, it can change its cash flow as follows:

Table 3: Effect of foreign exchange swaps on cash flows					
	1 March			1 April	
	Original deal	Swap	Total	Swap	Total
US\$	+10 million	-10 million	0	+10 million	+10 million*
SYP	-500 million	+500 million	0	-500 million	-500 million*

* These amounts are not exact; they would need to be adjusted to allow for the difference in interest rates between US\$ and SYP.

Thus central banks can use swaps as a means of effectively postponing the date of receipt of foreign exchange, and since swaps can readily be renewed, they are a very flexible instrument.⁸

Longer-term fluctuations can be more difficult to deal with, because they can be symptoms of a need for macroeconomic policy changes. A long-term drain of funds from the banking system might be caused by a government budget surplus, or a large permanent loss of foreign exchange reserves, for example. It could be offset by additional purchases of short-term assets from the commercial banks, or by purchases of longer-term assets, or by a reduction in required reserves. A long-term injection of funds into the banking system, for example

⁶ The temporary fluctuations in the demand for central bank money at the end of 1999 and the beginning of 2000 associated with fears of computer failures related to the millennial date change were more difficult to deal with, partly because the scale of the fluctuations was very hard to predict.

⁷ SYP denotes Syrian pounds: see footnote 1.

⁸ Used in this way, foreign exchange swaps are a means of temporarily withdrawing domestic currency from the commercial banking system. They can also be used in the opposite direction, to inject domestic currency temporarily into the commercial banking system, and to augment temporarily the foreign exchange reserves of the central bank.

resulting from a large unfinanced budget deficit or an accumulation of foreign exchange reserves, can be more difficult to deal with, particularly if it is growing in size. The options, short of changes in macroeconomic policy, are:

- to increase required reserves;
- for the central bank to sell any long-term securities which it owns;
- for the central bank to issue and sell its own long-term securities.

Finally, if commercial bank lending to their customers is growing very fast, that will lead to rapid growth of bank deposits and to rapid growth in required reserves. That growth would naturally be offset initially by a reduction in excess reserves, and later by an increase in central bank purchases of short-term assets from the commercial banks.

2.3. Advantages and drawbacks of central bank policy instruments

The group of policies that can be adopted to adjust the central bank's balance sheet, without a change in macro-economic policy, includes the following:

- changes in the amount of short-term assets that the central bank purchases from the commercial banks;
- purchases of long-term assets from the commercial banks;
- foreign exchange swaps;
- changes in required reserves;
- issues of securities by the central bank itself.

What are the advantages and drawbacks of these policies? The first three of them – short-term assets, long-term assets and foreign exchange swaps – can be used to provide domestic currency funds to the commercial banks.⁹ From the viewpoint of the central bank, they simply represent the investment of incoming domestic currency funds. Thus the choice between them depends partly on the relative financial returns that they offer. It also depends on the desired maturity composition of the central bank's assets, and on the credit risks that they involve, both of which are discussed below.

Most central banks impose reserve requirements on commercial banks in their jurisdiction, based on their domestic currency liabilities.¹⁰ Thus the requirement might be that commercial banks have to hold on deposit with the central bank an amount equivalent to (say) 2% of short-term domestic currency deposit liabilities.¹¹ The requirement is normally based on the lagged total of deposit liabilities, so that at any time each commercial bank

⁹ Foreign exchange swaps can be used either to provide domestic currency funds to the commercial banks, or to withdraw domestic currency funds from them.

¹⁰ Some central banks also impose reserve requirements on foreign currency liabilities.

¹¹ 2% is the minimum reserve requirement of the European Central Bank.

knows the exact amount of its required reserves. The requirement might oblige commercial banks to observe the reserve requirement each day, or it might (as in the case of the European Central Bank) oblige them to observe the requirement on average over a period (for example a month).

Another important aspect of reserve requirements is whether the central bank pays interest on them. If required reserves bear no interest, then they represent in effect an additional tax on commercial banks (additional, that is, to the other taxes to which commercial banks are subject). The tax revenues can be used to help meet the running costs of the central bank. Like all taxes, non-interest bearing reserve requirements create economic distortions. They discourage financial intermediation through domestic banks and encourage financial intermediation through non-banks and banks located in other countries. The distortions to financial flows have become larger as competition among financial institutions has become more intense. For this reason, the general level of reserve requirements has gradually fallen over the past quarter-century, and there has been a growing tendency for central banks to pay interest on required reserves (as the ECB does).¹²

Even if required reserves bear interest, so that they do not represent an additional tax on commercial banks, they nevertheless constrain the commercial banks' asset allocation decisions. Therefore they involve some discouragement to financial intermediation through domestic commercial banks, even if only a minor one.

Issues of short-term securities by the central bank itself are a means of absorbing funds from the commercial banks.¹³ From the viewpoint of the management of the central bank's balance sheet and the supply of central bank money, increasing the amount of securities in issue has the same effect as increasing required reserves by the same amount. However, it has the advantage that it does not forcibly constrain commercial banks' asset allocation decisions. It also has the drawback that the central bank also faces "refinancing risk" – that is, the risk that when the securities mature, it will not be able to refinance them, or at least not on acceptable terms. The central bank can overcome this drawback by retaining the option of increasing required reserves as a means of absorbing central bank money if it proves impossible for the central bank to issue its own securities.

2.4. Profits and losses

In managing their balance sheets, central banks need to take account of the impact of their actions on their profits and losses.

The foundation of most central banks' profitability is the fact that the banknote circulation is non-interest bearing, so that the central bank gets the immediate benefit of the seigniorage – that is, the interest return on the assets corresponding to the note circulation.¹⁴ In addition, if required reserves are unremunerated, they too contribute to central bank profitability. However, three components of the central bank balance sheet can threaten the central bank's profitability and lead to losses.

¹² Central banks do not, however, pay interest on excess reserves.

¹³ Foreign exchange swaps can be used for the same purpose.

¹⁴ In some countries, including the United Kingdom, the government gets the benefits of the seigniorage.

First, loans to government. If, for whatever reason, the central bank is prevailed upon or forced to make low-interest loans to the government, and if it finances those loans by running down assets which bear interest at market rates, or by incurring liabilities which bear interest at market rates, then those loans can threaten the central bank's profitability if they are large enough.

Second, loans to commercial banks. If the central bank makes low-interest loans to one or more commercial banks which are in financial distress, in order to prevent them from failing and to allow them to continue in business, and if it finances those loans by running down assets which bear interest at market rates, or by incurring liabilities which bear interest at market rates, then those loans too can threaten the central bank's profitability. Of course, the effect will be much worse if the distressed commercial banks do not recover and are unable to repay the loans.

Third, foreign exchange reserves. If the central bank acquires large amounts of foreign exchange reserves, eg in low-yielding dollars or in euros, which it sterilises, for example by selling domestic-currency securities, it may find that the interest cost of domestic-currency financing exceeds the interest return on its foreign exchange reserves. In those circumstances, the central bank will incur losses in holding foreign exchange reserves, which will increase as the foreign exchange reserves grow in size.

How much does it matter if a central bank loses money? Central banks are not judged by their financial strength in the same way as commercial banks are. However, if the loss appears to be the result of mismanagement or incompetence, then it can damage the reputation of the central bank and thereby impair its ability to conduct monetary policy credibly, to play a role in maintaining financial stability, and to supervise commercial banks (if that is among the central bank's responsibilities). Moreover, if the central bank's capital erodes to a point at which it requires to be recapitalised by the government, then the relationship between the central bank and the government is likely to be reviewed and whatever independence the central bank has is likely to be threatened.

2.5. The maturity structure of the central bank's balance sheet

The central bank's power to influence the economy depends on its monopoly of the supply of central bank money. In order to exploit its monopoly most effectively, the central bank needs to arrange the maturity structure of its balance sheet in an appropriate way.

On any given day, the commercial banks' demand for central bank money will be a fixed amount, determined by such matters as the public's demand for currency, the amount of required reserves, etc. The amount will not be exactly known until after the end of the working day (eg because there are sometimes unpredictable delays in the payments system), and it will not be sensitive in the short-term to changes in interest rates. (A rise in interest rates might depress the growth rates of bank credit and deposits, and therefore of required reserves, but required reserves are usually calculated with a time lag – ie they are based on past deposits, not current deposits – and there is also a time lag between a change in interest rates and its effect on borrowing. The demand for excess reserves is normally small, and not sensitive to fluctuations in short-term interest rates, at least in the short term.) However, the commercial banks' aggregate need for central bank money on any given day can be forecast. Also, the aggregate availability of central bank money can be calculated. The forecasting process will show that, on any given day, the commercial banks in aggregate will have either

less central bank money than they need (a shortage), or more central bank money than they need (a surplus).

If there is a shortage of central bank money in the commercial banking system, the central bank can exploit its monopoly of the supply of central bank money by dictating the terms on which it is willing to supply central bank money by lending to the commercial banking system to relieve the shortage. Normally, central banks use this device to determine the level of short-term interest rates in the economy. Central banks decide the interest rate at which they are willing to make short-term loans of central bank money to commercial banks, and that level of interest rates has a major influence on the interest rates which the commercial banks charge for loans and pay for deposits.

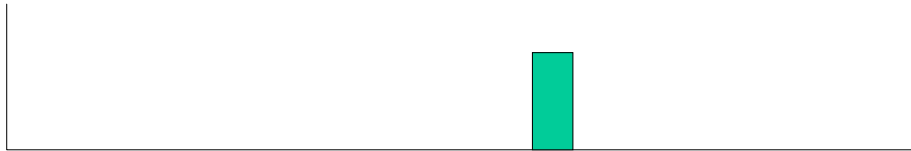
If there is a surplus of central bank money in the commercial banking system, the central bank needs to absorb the surplus reserves in order to contain the growth of central bank money. It usually does so by offering to borrow central bank money. It can borrow central bank money by selling some of the securities that it holds (eg it might sell government securities on short-term repo), or by issuing and selling its own short-term debt securities. The central bank can have a powerful influence on interest rates in this way, by offering short-term securities to the banks at an interest rate of its own choosing. But its influence is perhaps not quite as powerful as in the case when there is a shortage of central bank money in the commercial banking system, because the commercial banks have no obligation to buy the securities which the central bank offers, and there is always a risk that the central bank will be unable to sell as many securities as it wants to at interest rates which it considers satisfactory.

Therefore, in general, most central banks prefer there normally to be a shortage of funds in the commercial banking system, and the maturity structure of the central bank balance sheet can be adjusted so as to make shortages more frequent. Shortages of central bank money occur on days when the amount of payments to be made from the commercial banks in aggregate to the central bank exceeds the amount of payments to be made in the opposite direction. The central bank can increase the flow of payments from the commercial banks to itself simply by shortening the maturity of its assets. Suppose, for example, that, on 1 March, the central bank makes a loan of SYP100 million, for a week, to be repaid on 8 March. That loan will generate just one payment to the central bank, of SYP100 million (plus interest) on 8 March. If, instead, the central bank had made a series of 1-day loans of SYP100 million, each day for a week, then:

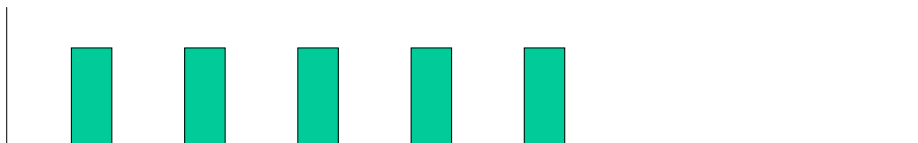
- the amount of lending that it had outstanding at any time between 1 and 8 March would have been exactly the same; but
- on any day between 2 March and 7 March, the flow of payments from the commercial banks to the central bank would have been greater by SYP100 million.

How the maturity of central bank assets affects its cash flows

1. Cash flows from a 1-week loan



2. Cash flows from 5 overnight loans



Equally, the longer the maturity of the central bank's liabilities, the greater the average daily flow of payments to the central bank. For this purpose, the currency circulation can be regarded as having a long average maturity, because although currency can be exchanged by banks in exchange for a payment flow on demand, in practice the amount of currency outstanding is very stable.

Therefore, the maturity structure of the central bank's balance sheet is important in maintaining the central bank's power over the supply of central bank money and over the level of short-term interest rates.

2.6. Credit risk in the central bank balance sheet

Whenever the central bank buys assets from commercial banks, it is exposing itself to the risk that the borrower will be unable to repay. It is not part of the proper function of a central bank to play a major role in allocating savings among investment projects: that function is assigned to the private sector in a market economy. Nevertheless, the central bank has assets and must decide how to allocate them.

When purchasing short-term assets, it is normal practice for central banks to buy government securities on short-term repo, since government securities are of high credit quality in most countries. And the credit risk of the repo is not great, because if the central bank's counterparty in the repo fails to return the money it has borrowed, then in most jurisdictions the central bank has the right to sell the government securities it has taken in the repo and use the proceeds of the sale as repayment of the loan of money. There is a risk that the market price of the government securities will have fallen in the period while the repo is outstanding, and central banks normally insist on receiving an amount of government securities which exceeds the value of the loan by a small margin, to provide reassurance that if it needs to sell the securities in the event of non-repayment of the loan, their market value will be at least equal to the amount of the loan.

Normally, central banks are prepared to buy other short-term assets as well as government securities (for example, if there is a budget surplus, the supply of government securities may not be sufficient to meet the needs of the central bank). For example, many central banks buy short-term bills of exchange guaranteed by commercial banks. These involve some credit risk. Repayment is normally due from the commercial bank which guaranteed the bill. However, in most jurisdictions, if the commercial bank fails to repay, then the liability falls to other parties – namely the commercial bank which sold the bill to the central bank (which need not be the same as the bank which guaranteed the bill), and the original borrower who issued the bill of exchange. All of these parties need to fail if the bill is not to be redeemed, and if they are all of high creditworthiness, then in these circumstances bills of exchange are low-risk instruments. Central banks need to monitor carefully the creditworthiness of the commercial banks whose guarantees they accept, and to set limits on their risk exposures to individual banks. They also need to be ready to reduce (perhaps to zero) the amount of bills guaranteed by commercial banks whose creditworthiness has decreased that they are willing to accept, even though they may in doing so cause problems for the commercial bank concerned, by drawing attention to its worsening creditworthiness.

As noted already, central banks can use foreign exchange swaps to absorb temporarily the domestic liquidity created by inflows of foreign exchange. As already noted (footnote 8), foreign exchange swaps can also be used in the opposite direction, enabling the central bank to inject money into the commercial banking system while in effect borrowing foreign currency for a short period. If swaps are used in this second way, then the central bank needs to invest the foreign currency it receives for a short period until the swap matures. As with domestic currency investment, it can choose between government securities (eg US Treasury bills or government securities repo, if the foreign currency in question is US dollars), or private sector assets such as bank certificates of deposit or commercial paper. This is exactly the same problem as the central bank faces in investing its foreign exchange reserves. Foreign exchange swaps carry the same kind of credit risk as repos of government securities, namely the risk that the counterparty will fail to return the foreign currency which the central bank has delivered to it. The central bank can then sell the domestic currency that it has received, but it may nevertheless lose money if the domestic currency has depreciated since the swap was originally agreed. It is, however, harder in the international market for foreign exchange swaps for the central bank to require an additional margin to protect it against this risk than in the domestic government securities repo market. The central bank therefore needs to monitor and manage its swap exposure to commercial banks very carefully.

Foreign exchange swaps involve an additional kind of credit risk: settlement risk.¹⁵ For most countries, the two parts of a foreign exchange transaction are settled separately. For example, if bank A buys SYP for US\$ from bank B, then the delivery of SYP from B to A takes place separately from the delivery of US\$ from A to B. Moreover, because of the rotation of the earth and the difference in time zones, a delivery of SYP on a particular day will normally take place earlier than a delivery of US\$. Therefore, there is normally a period (often of several hours) when B has delivered SYP to A, but not received any US\$ in exchange. If A were to become insolvent during that period, A would not deliver US\$ to B as agreed. B would be exposed to a potentially heavy loss, since in exchange for the delivery of SYP to A, B would receive in exchange only an unsecured claim of uncertain value on the residual assets of A. For the most heavily traded currencies, a new institution (Continuous Linked

¹⁵ Settlement risk in transactions in domestic financial markets can be eliminated by Delivery versus Payment (DvP) settlement systems.

Settlement Bank – CLSB), which eliminates this settlement risk (through a technique known as Payment versus Payment, or PVP), began operations in 2002, but in most currencies, the risk remains; and central banks therefore need to monitor the creditworthiness of the commercial banks with which they deal in foreign exchange swaps and set limits to their risk exposures to individual commercial banks.

When central banks are buying longer-term domestic-currency securities, they again have the option of buying government securities. Alternatively, there may be available other long-term domestic-currency securities of sufficiently high credit quality for the central bank to buy.

3. Open market operations

3.1. What open market operations are

Open market operations are the main device through which central banks adjust the supply of central bank money by buying or selling short-term assets. Central banks buy assets if there is a shortage of funds (ie of central bank money) in the commercial banking system, so as to provide the commercial banks with additional funds; and they sell assets if there is a surplus of funds, so as to drain the surplus from the commercial banks and prevent a build-up of excess bank reserves.

Since central banks have a monopoly of the supply of central bank money, they can dictate the terms on which they are willing to supply funds to the commercial banks to relieve a shortage. They normally do so by prescribing the rate of interest at which they are willing to make funds available.¹⁶

Thus open market operations simultaneously achieve two objectives:

- they meet the aggregate needs of the commercial banks for central bank money; and
- they help the central bank to achieve its objectives for interest rates.¹⁷

It is important to note that while open market operations are used to meet the aggregate needs of the commercial banks for central bank money, they cannot ensure that each individual commercial bank has all the central bank money it needs. Individual commercial banks which get into financial distress may be unable to get the central bank money they need. When that happens, there is a question as to whether any kind of official intervention is warranted, either to provide emergency official funds or to ensure an orderly winding-down of the bank's business. Such issues are not discussed in this paper.

¹⁶ In other words, they prescribe the minimum yield that they are prepared to accept on the short-term assets that they buy.

¹⁷ Central banks which use monetary base control in its purest form (of which there are not many) control the quantity of central bank money and allow interest rates to float. Thus they have much less control over interest rates, but more control over the quantity of central bank money.

3.2. Forecasts

In order to plan its open market operations, a central bank needs a forecast of the future aggregate need of the commercial banks for central bank money. The forecast is made by forecasting how the various elements of the central bank's balance sheet are likely to develop. The open market operations conducted on a particular day adjust the supply of central bank money from what it would have been had no open market operations been conducted. Thus, in planning a particular day's open market operations, what is important for that day's dealings is not the level of the commercial banks' demand for central bank money, but the change in their demand for central bank money since the last day on which open market operations were undertaken, and autonomous changes in the supply of central bank money.

Table 4 shows an illustrative forecast of money market flows for a week (Monday-Friday).¹⁸ The main elements are:

- (i) the currency circulation, which falls sharply on Monday (because of the return of currency to the commercial banks after the weekend) and rises sharply on Friday;
- (ii) required reserves, which rise on Wednesday, either because of a regular periodic recalculation or because of an increase in the percentage requirement;
- (iii) desired excess reserves, which reflect the commercial banks' demand for balances with the central bank which they can use freely;¹⁹
- (iv) the financing by the central bank of the government budget deficit. In the illustration, the government has a large net inflow of funds on Monday, which could reflect tax receipts or, for example, the receipt of the proceeds of an issue of government securities;
- (v) foreign exchange and gold flows, which may, for example, reflect official sales of domestic currency in exchange for dollars, undertaken in order to prevent the exchange rate from appreciating;
- (vi) maturing assets. The central bank will have bought short-term assets in earlier open market operations, and will receive payment when they mature.

¹⁸ It is assumed in the illustration that open market operations are undertaken each day. The frequency of open market operations is discussed below.

¹⁹ Actual excess reserves will reflect errors in forecasting and cash flow management made by the commercial banks, and will normally not be equal to desired excess reserves.

	Monday	Tuesday	Wednesday	Thursday	Friday
Currency circulation	+2,500	+200	-50	-150	-2,500
Required reserves	-	-	-1,500	-	-
Desired excess reserves	+20	-	-	-	-
Financing of government budget	-3,500	-500	+750	+600	+1,000
Foreign exchange and gold	+400	+350	-	-	-
Maturing assets	-250	-400	-300	-250	-100
Total	-830	-350	-1,100	+200	-1,600

Note: A – sign denotes a flow which absorbs central bank money from the commercial banking system, while a + sign denotes a flow which supplies central bank money to the commercial banks.

The total of these elements is the daily forecast shortage or surplus of central bank money in the commercial banking system. In the illustration, a shortage is forecast for every day except Thursday.

3.3. How the forecasts are made

The different elements of the forecast are made in different ways, and with varying degrees of accuracy.

- (i) The currency circulation can be forecast by statistical methods. In the United Kingdom, it has a pronounced within-week pattern (it rises before weekends and falls back afterwards); a seasonal pattern (it rises before Christmas and Easter, and falls back afterwards); and a continuing upward trend. Forecasts made using statistical techniques are very useful and normally fairly accurate, except that, in the United Kingdom, the big seasonal changes at Christmas and Easter are often difficult to forecast accurately. Flows of currency may not be known with certainty until after they have taken place, because of delays in reporting.
- (ii) Required reserves are regularly recalculated using new information about the deposits of individual commercial banks. Between recalculations, total required reserves do not change unless there is a change in the percentage requirement. Forecasts of required reserves over periods of several months in the future depend on assumptions about the future growth of bank deposits and bank credit, which can prove to be seriously inaccurate.
- (iii) The commercial banks' desired excess reserves are likely to be small, because excess reserves do not normally bear interest. They can usually be forecast fairly accurately by statistical means, or simply assumed to remain constant.
- (iv) If the central bank is required to finance the residual government budget deficit – that is, the part of the deficit which is not financed by commercial borrowing – then it needs forecasts of what the residual deficit will be. Inevitably, it will have to rely on the government for the forecasts; experience in the United Kingdom is that such forecasts can often be seriously inaccurate. For one thing, governments often make mistakes in forecasting their tax revenues and expenditures over horizons of a year or so; but in addition, the central bank needs information about the timing of cash flows, which often depends on the unpredictable timing of the clearing of large payments. These flows are generally not known with certainty until after they have taken place.

Incentive schemes can be designed to encourage governments to forecast more accurately.

- (v) Foreign exchange transactions in wholesale spot markets normally settle two working days after the deal is agreed. Therefore, on a Monday morning, foreign exchange settlements due on Monday and Tuesday are normally known with certainty, since the relevant deals will have been done on the preceding Thursday and Friday. Settlements from Wednesday onwards depend on transactions done from Monday onwards. If the motivation for the central bank's dealing in the foreign exchange market is to prevent the exchange rate from moving in one direction or the other, or to dampen any movement, it is extremely difficult to predict what future flows will be, since they depend on market demand for domestic currency, which can be highly volatile. So forecasts of foreign exchange flows are often very inaccurate.
- (vi) The schedule of maturing assets held by the central bank is known with certainty, so that forecasts should be completely accurate.

3.4. Managing uncertainty about cash flows

The previous section described the sources of information which the central bank has about its own cash flow, and explained that forecasts of the shortages or surpluses of central bank money in the commercial banking system are uncertain – even forecasts made for the same day. Commercial banks face the same uncertainties in forecasting their cash flows. Since they are normally required to keep their excess reserves accounts with the central bank in credit, they need to find ways of protecting themselves against unexpected adverse flows of funds. Such protection can be provided in a number of ways:

- (i) Commercial banks can aim to hold a cushion of excess reserves, so that they can absorb unexpected outflows of central bank money at short notice.
- (ii) Some central banks (including the Federal Reserve and the European Central Bank) allow commercial banks to observe their reserve requirement on average over a reserve maintenance period, rather than obliging them to observe it every day.²⁰ This means that, except on the last day of the reserve maintenance period, commercial banks can react to an unexpected outflow of funds by temporarily undershooting their reserve requirement, provided they compensate later by an equivalent overshoot. Reserve averaging is discussed below.
- (iii) Most central banks have “standing facilities”. These facilities enable commercial banks to borrow overnight from the central bank against high quality collateral, so as to help them finance unexpected outflows of funds. The interest rate charged on this central bank lending facility is usually set at a high level relative to the rates that the central bank sets in its open market operations, so as to ensure that commercial banks use it only when they have exhausted all other possibilities for borrowing. Some central banks also have a standing facility in which commercial banks can deposit funds overnight with the central bank if they have surplus funds. The interest rate on such deposit facilities is usually set well below the rate that the central bank sets in its open market operations, again to ensure that the facility is used only as a last resort.

²⁰ In the United States, the reserve maintenance period is two weeks. In the euro area, it is about a month.

If the central bank provides standing facilities for both borrowing and lending, then the interest rates on those facilities constrain the fluctuation of the market interest rate for overnight loans. No commercial bank will pay a higher rate to borrow overnight than the lending rate on the central bank's standing facility, and no bank will accept a lower interest rate for an overnight deposit than the deposit rate offered by the central bank in its standing deposit facility. Thus the central bank can create a corridor within which overnight interest rates can fluctuate. And the limits to the fluctuation of overnight rates will also constrain the volatility of longer period rates. If the corridor is relatively narrow, then interest rates will be relatively stable, and the standing facilities will be relatively heavily used, but the development of a commercial market in overnight loans is likely to be inhibited. A wider corridor is likely to be more conducive to market development, but will allow greater interest rate volatility, at least in the short term.

By conducting open market operations, by allowing reserve averaging, and by providing standing facilities, central banks enable the commercial banks to hold smaller excess reserves than would otherwise be necessary. Thus central banks contribute to the efficiency of the commercial banking system by making it possible for a larger proportion of commercial bank deposits to be lent to borrowing customers, and a correspondingly smaller proportion to be kept on deposit with the central bank as excess reserves, than would otherwise be the case.

3.5. Conducting open market operations

As the previous section explained, once it has established its standing facilities, the central bank is passive in their use. It is for the commercial banks to decide whether to borrow on the standing facility from the central bank, and, if so, how much to borrow. In open market operations, the central bank has a more active role. It decides in advance how much money it wants to supply or absorb, and then does so by buying or selling assets from the commercial banking system.

The central bank needs to decide how frequently to conduct open market operations. Open market operations are intended to handle the majority of the supply of central bank money. Therefore they need to be conducted at least once in each reserve management period. Many central banks conduct them more than once in each reserve management period – for example, in the United States, the Federal Reserve has the option to conduct open market operations each working day, even though the reserve maintenance period is two weeks. The arguments in favour of frequent open market operations are:

- (i) Because the forecasts of the central bank balance sheet are inaccurate and therefore prone to large revisions, and because they cannot run their required reserve accounts a the central bank below zero on any day, commercial banks need to keep their cash management under constant review. Frequent open market operations help the commercial banks to adapt to the revisions with less risk of becoming excessively dependent on, for example, overnight borrowing on the central bank's standing facility.
- (ii) The above argument is reinforced if there are limits on access to the central bank's standing facility to borrow.
- (iii) Concentrating the central bank's provision of central bank money for each reserve management period on one round of open market operations may strain the capacity of the settlement system.

When the central bank receives offers of securities, it must decide how to respond. Suppose, for example, that there is a forecast shortage of central bank money of 830 (as in the Monday illustration in Table 4); suppose that the level of interest rates announced by the central bank's board or monetary policy committee is 4.00%; and suppose that it receives the following offers:

Table 5(a): Illustrative open market offers (a)	
Amount	Interest rate
200	4.25%
1,260	4.00%

The central bank wants to supply 830 of central bank money. It will accept the 200 of securities offered at 4.25%, since they represent the most attractive opportunity available for the use of the central bank's money. The central bank will also buy 630 of the securities offered at 4.00%, and will therefore accept 50% of each offer made at 4.00%.

Now suppose that the offers are as in Table 5(b).

Table 5(b): Illustrative open market offers (b)	
Amount	Interest rate
230	4.00%

If the total amount of offers falls short of the forecast shortage, the central bank cannot supply enough central bank money through open market operations to relieve the shortage. In these circumstances, the central bank will accept all of the securities it has been offered, and market overnight interest rates will rise as commercial banks try to borrow funds in the market to meet their needs. Commercial banks will meet their residual need for 600 of central bank money by borrowing overnight on the central bank's standing facility.

The central bank needs to decide on several issues before it embarks on a round of open market operations:

- (i) What amount of assets it wants to buy (assuming there is a shortage of central bank money in the commercial banking system; if there is a surplus, the central bank needs to decide what amount of assets it wants to sell).
- (ii) What period to maturity the assets should have.
- (iii) Whether the central bank should specify in advance the price (or interest rate) at which it will supply central bank money, or whether it should allow offers of securities at different prices (interest rates).
- (iv) Which counterparties (banks or other financial companies) may take part in open market operations.
- (v) What information to publish about open market operations.

- (vi) Logistical issues, such as a time by which offers of securities must be made, the form in which they must be made (telephone, fax, internet), and settlement deadlines.

3.5.1. What amount to buy

The desired amount depends on the forecast shortage of central bank money in the commercial banking system. For example, if the forecast was as in the illustration shown in Table 4, it would be natural for the central bank to aim to buy securities in the amount of 830 on Monday.

3.5.2. Period to maturity

The maturity of the assets may be determined by convention, so that it does not change from one open market operation to the next. For example, in the United Kingdom the Bank of England normally buys assets with 2 weeks to maturity, though there is some discretion to vary the period by up to 2 working days in either direction.²¹ This reflects the Bank of England's objective of influencing market interest rates at the 2-week maturity. The European Central Bank likewise buys 2-week assets as a matter of convention. However, the Federal Reserve, which aims to influence the interest rate for overnight Federal funds, has discretion to vary the maturity of its purchases. The shorter the average maturity of the assets bought in open market operations, the larger the average shortage of central bank money in the commercial banking system, and the greater the strain on settlement systems and the costs of setting open market operations.

Any discretion to vary the maturity of asset purchases can be used to manage the pattern of future cash flows. In the illustration in Table 4, if the assets that the central bank bought on Monday had a maturity of 3 days, so that they matured on Thursday, the maturing of the assets would create a flow of funds on Thursday from the commercial banks to the central bank, which would helpfully turn the surplus forecast for that day into a shortage.

Where the maturity of assets bought (or sold) in open market operations extends beyond the date of the next decision (by the central bank board or monetary policy committee) about the level of interest rates, expectations about that decision will influence the behaviour of the central bank's counterparties in open market operations. If a rise in rates is expected, counterparties will want to sell the longest maturity assets that it can to the central bank at the existing rate level. If a fall is expected, counterparties will not want to sell any but very short-term assets at current rate levels, and will want to retain longer-term assets to sell to the central bank at the expected future lower rate levels. In effect, the central bank is offering a free option to its counterparties and must expect on this account to receive an average return on its assets somewhat below the average rate of interest announced by its board or monetary policy committee. This is an argument for keeping the maturity of assets bought in open market operations short, since the value of the option is less, the shorter the maturity of the assets.

The central bank needs to decide on various other issues when conducting open market operations. For example, it needs to decide what kind of securities it is willing to buy. This has already been discussed in section 2.6 (credit risk in the central bank balance sheet). Most

²¹ 2 weeks (\pm 2 working days) is the maturity of the repos of government securities which the Bank of England offers. The Bank of England is also willing to buy outright eligible commercial bills maturing on or before the maturity date of the repos.

central banks buy securities mainly on repo rather than outright, because the maturity date of the repo can be determined to meet the central bank's requirements. The supply of eligible securities which happened to mature on (or before) the date specified by the central bank for the maturity of its open market operations might be small, and insufficient to meet the central bank's needs, whereas the supply of eligible securities which could be bought on a repo maturing on the date would be very much greater.

3.5.3. Should the central bank specify the price at which securities are to be offered?

If the board or monetary policy committee of the central bank has announced the level of interest rates which it has decided on, in order to achieve the objectives of monetary policy, then the central bank's counterparties in its open market operations know the minimum interest rate (maximum price) at which the central bank will buy assets from them. Some central banks, for example the Bank of England, require that all offers of securities are made at that price.

Some central banks, however, allow counterparties to offer securities at different interest rates (ie lower prices). This is normal practice where there is no interest rate policy announcement from the central bank board or monetary policy committee. It enables counterparties which are particularly anxious to receive a full allotment of the funds on offer to bid a higher interest rate in order to improve their chances. It can mean that the lowest interest rate at which funds are allotted in open market operations is higher than the lowest rate at which the central bank would have been willing to allot them. This is particularly likely to happen at times when a rise in official interest rates is expected, and counterparties are therefore anxious to sell longer-maturity assets to the central bank at close to the existing rate level.

3.5.4. Choice of counterparties

The central bank needs to decide in advance which commercial banks and other companies it will be willing to deal with in its open market operations. This is because it will need to sign legal agreements with them specifying the terms of the relationship. The central bank needs to consider the following criteria in choosing its counterparties:

- They need to be financial institutions which are involved in the money market.
- There need to be enough of them to ensure competition.
- They should be willing to provide general information about market developments to the central bank, though they should not go so far as to disclose information about their customers or counterparties to the central bank.
- At least some of the central bank's counterparties should be willing and able to act as market-makers in the money market, distributing central bank money to financial institutions and others which are not counterparties of the central bank. By doing so, they make the market accessible to newcomers, and make it easier for new commercial banks, and foreign commercial banks, to build up activity in the domestic currency. This enhances competition in the commercial banking industry and makes the industry more efficient.
- Not all counterparties need to be commercial banks.

3.5.5. What information to publish

Most central banks publish the level of interest rates which they are aiming to maintain in order to achieve the objectives of monetary policy. Such announcements are normally made immediately after the board of the central bank, or its monetary policy committee, has made the decision.

Many central banks also publish information about their open market operations. For example, each time they conduct open market operations, they announce to the public (not just to their counterparties) what the forecast shortage or surplus is, and what amount of securities they wish to buy or sell, and at what maturities. They make the announcements on market screens (eg Reuters, Bloomberg and in some cases on the internet). After the operations have been completed, they announce the amount and maturity of the securities they have bought or sold, and the interest rates. They also publish the total amounts lent or taken on deposit in the standing facilities.

3.5.6. Logistical issues

The central bank needs to have legal agreements with its counterparties setting out the precise terms of the dealing relationship. It also needs to specify a convenient time by which offers of securities in open market operations are to be received (or bids for securities, if there is a surplus). It needs to specify in what form offers and bids are to be communicated – eg telephone, fax or electronic communication, eg via the internet. It is important that the mode of communication be secure. And the central bank needs to specify a secure means of settlement, so that it can be sure of receiving securities before committing irrevocably to deliver money, and vice versa.

3.6. Dealing with surpluses

When there is a surplus of central bank money in the commercial banking system, the central bank needs to absorb it so as to prevent a build-up of excess reserves and a consequent unwanted expansion of commercial bank credit. The open market operations that central banks conduct in absorbing surpluses are a mirror image of those that they conduct in relieving shortages: they sell securities, rather than buying them. As already indicated in section 2.5, central banks are in a slightly weaker position to influence interest rates when there is a surplus, because the commercial banks are not obliged to bid for the securities that the central bank offers to absorb the surplus, though it is normally in their interest to do so, whereas, when there is a shortage, the commercial banks are obliged to raise money to meet the reserve requirement, and must therefore either sell securities to the central bank in its open market operations or borrow on its standing facility.

Central banks can choose the maturity of the securities they offer to absorb surpluses, and the maturity can be chosen to coincide with a forecast shortage. Where surpluses are rare events, and shortages are normal, then it may be sufficient for the central bank to sell short-dated securities, maturing in the next reserve maintenance period (or perhaps later in the same reserve maintenance period). Where surpluses are persistent, central banks often try to sell longer-dated securities, because, as explained in section 2.5, that helps to increase the net cash flows from the commercial banking system to the central bank. Thus the Bank of Korea has sold Monetary Stabilisation Bonds with maturities of up to 2 years to absorb the central bank money created by the very large purchases of foreign exchange that it has made since the East Asian crisis.

In practice in the United Kingdom, where surpluses are only occasional, there is usually very strong demand for the short-maturity securities that the Bank of England offers to absorb the surpluses. They are auctioned on a bid yield basis, so that the bidder receives the yield (or interest rate) at which s/he bid, rather than the highest interest rate at which bids were allotted or in the interest rate announced by the Monetary Policy Committee. Thus the Bank of England is often able to borrow funds quite cheaply when it needs to absorb a surplus.

In other respects – ie choice of counterparties, publication of information about open market operations and logistics – the same considerations apply to surpluses as to shortages.

3.7. Reserve averaging

When specifying reserve requirements, central banks need to specify whether the requirement can be observed on average over a reserve management period (which is the practice in the euro area and the United States, for example), or whether it must be observed each day (which is the practice in the United Kingdom).

If the reserve requirement must be observed each day, then commercial banks need to do more inter-bank borrowing and lending, since they cannot temporarily undershoot the reserve requirement. Thus in countries where the requirement has to be observed each day, inter-bank borrowing and lending tends to be more active and overnight interest rates tend to be more volatile. In countries with reserve averaging, borrowing and lending activity and interest rate volatility tend to spike up on the last day of the reserve maintenance period.²²

4. Foreign exchange intervention

4.1. What is foreign exchange intervention?

Foreign exchange intervention means central bank purchases or sales of foreign currencies in exchange for domestic currency. In countries where there is a fixed but adjustable exchange rate, the central bank is committed to buy foreign currency without limit at the bottom of the exchange rate band, and sell it without limit at the top of the band. Likewise, a currency board is obliged to exchange domestic currency banknotes for banknotes denominated in the anchor currency at the exchange rate prescribed by law. These are purely passive, automatic, forms of intervention, that require no policy decision apart from the initial decision to adopt the fixed-but-adjustable exchange rate or the currency board, and the decisions about the exchange rate parity and the width of the fluctuation band (if any).

In addition to passive intervention of these kinds, central banks have often undertaken discretionary intervention. For example, intervention may be undertaken by central banks with a fixed-but-adjustable exchange rate at exchange rates within the band (below the top but above the bottom), or by central banks with no exchange rate commitment at all.

²² Some central banks, eg the Bank of Thailand, allow part of any excess or shortfall in required reserves to be carried forward to the next reserve maintenance period so that the end-of-period surge in activity and interest rate volatility is less sharp.

4.2. Reasons for discretionary intervention

Why would central banks undertake foreign exchange intervention when they are not obliged to? There are a number of possible reasons.

- (i) Purchases or sales of foreign exchange on behalf of the government or other customers.
- (ii) Concern about inadequate market-making capacity.
- (iii) Belief that the market exchange rate is at the “wrong” level.
- (iv) Desire to give a signal about future monetary policy.
- (v) Desire to accumulate foreign exchange reserves.
- (vi) Desire to prevent the exchange rate from appreciating, or restrain its appreciation.

Intervention for these various purposes is discussed below.

4.3. Purchases or sales of foreign exchange on behalf of the government or other customers

Most central banks act as bankers to their national governments, and many of them have other customers as well. As part of this function, they meet the foreign exchange needs of their governments and other customers. Where those needs are small in relation to the size of the market, the central bank can satisfy them by transacting in the commercial foreign exchange market in just the same way as a commercial bank would do when conducting business on behalf of a customer. In some cases, however, the government’s transactions are a very large part of the market. For example, in oil producing countries, much of the government’s revenue is in dollars, whereas its spending is mainly in domestic currency. Therefore the government needs to sell dollars for domestic currency to finance its spending. In Iraq and Nigeria, such sales are made by means of auctions organised by the central bank.

4.4. Concern about inadequate market-making capacity

Particularly in countries where the domestic financial system is not fully developed, and where capital and other controls prevent commercial banks located in other countries from participating in the foreign exchange market, there can be concerns that market-making capacity in the foreign exchange market is inadequate. That would be the case if the flows of orders in one direction or the other were simply too large for domestic institutions to absorb, so that they led to very wide fluctuations in the exchange rate that were clearly not warranted by changes in economic fundamentals. Such fluctuations might easily inhibit international trade and investment, to the detriment of the domestic economy. In those circumstances, central banks can supplement the market-making capacity of the private sector.²³

In order to do so, they would need to maintain a continuous presence in the market and to place orders each day. For example, if the SYP/USD exchange rate at the beginning of the day was USD 1 = SYP 52.50, then the central bank might issue the following set of orders:

²³ The Bank of Canada performed this function for many years in respect of the Canadian dollar.

Table 6: Supplementing market-making capacity in foreign exchange	
Rate level (SYP/USD)	Order
55.00	Sell USD 10 million
54.50	Sell USD 10 million
54.00	Sell USD 10 million
53.50	Sell USD 10 million
51.50	Buy USD 10 million
51.00	Buy USD 10 million
50.50	Buy USD 10 million
50.00	Buy USD 10 million

The presence of these central bank orders ensures that the reaction of the exchange rate to a transaction of any given size is smaller than it would otherwise have been. Thus exchange rate volatility is reduced, and any inhibition of international trade and investment that might result from exchange rate volatility. If, in the illustration in Table 6, the exchange rate were to reach either USD = SYP 55.00 or SYP 50.00 on the day in question, the central bank would need to consider whether to place further orders of the same kind.

Intervention of this kind can be expected to yield profits for the central bank provided the flow of orders is roughly balanced – in other words, provided that, over time, the sell orders and buy orders are roughly equal in amount. If the flow of orders is not balanced – for example, if orders to buy USD generally exceed orders to sell USD – then that is clear evidence that the SYP is overvalued and that the exchange rate needs to rise. In those circumstances a central bank following a market-making intervention strategy of this kind will tend to lose money by selling USD at prices which prove to be too low on average.

This intervention strategy has two other possible drawbacks. First, it may encourage international capital flows of a kind that damage the welfare of the domestic economy, rather than promoting it. During the East Asian financial crisis of 1997-98, international investors were suddenly extremely anxious to reduce their exposures to the countries afflicted by the crisis, but in many of those countries the liquidity of the foreign exchange market had largely evaporated and it was practically impossible for investors to sell the currencies. Instead, some of them resorted to “proxy hedging”, in which they sold instead the currencies of countries which were not afflicted by the crisis, but whose exchange rates had previously been closely correlated with those of the crisis countries, and whose foreign exchange markets were more liquid, perhaps with market-making capacity enhanced by the central bank pursuing an intervention strategy of the kind described in these sections. Such countries saw their currencies depreciate heavily, and consequently suffered a serious loss of real income, at least temporarily, for reasons that were nothing to do with their domestic economy. South Africa in particular suffered this experience. Thus it is not always welfare-promoting for the central bank to act to increase market-making capacity in foreign exchange.

The second drawback of this intervention strategy is that, by taking it on itself to enhance market-making capacity in foreign exchange, the central bank is likely to reduce the

incentives for private institutions to act as market-makers. Market-makers earn a financial return by eliminating short-term volatility in market prices. If the actions of the central bank eliminate part of that volatility, then the scope for private sector market-making will be correspondingly reduced. Thus market-making by the central bank, if continued over a long period, is likely to hold back market development.

In many countries where the financial system is not fully developed, the central bank traditionally performs the role of market-maker in foreign exchange. It would simply not be realistic for the central bank to withdraw suddenly and completely from that role. But in many such countries, there is a powerful argument for the central bank to withdraw gradually from market-making, eg by widening the spreads between the rates at which it buys and sells foreign exchange, and reducing the amounts that it is prepared to buy and sell, in order to allow scope for a private market to develop.

4.5. Concern about the level of the exchange rate, or desire to accumulate foreign exchange reserves

Even in countries whose exchange rate is floating, governments and central banks often reach the conclusion that the level of the exchange rate determined by financial markets is in some way inappropriate. In some cases they think it is too strong, thus inhibiting exports, inward investment, and economic growth. In other cases, they think it is too weak, restricting the country's purchasing power unreasonably, and reflecting an inadequate appreciation by investors of the strengths of the economy and its management. In these circumstances, they are often tempted to intervene. They may do so either:

- (i) to change the exchange rate level through the sheer volume of orders they are able to place – ie through “weight of money”; or
- (ii) to accumulate foreign exchange reserves; or
- (iii) to try to provoke investors to reconsider their view of the exchange rate.

“Weight of money” intervention is nearly always intervention to prevent the exchange rate from appreciating, because there is no limit to the amount of domestic currency that a central bank can sell, whereas there is a limit to the amount of foreign currency it can sell. Intervention to prevent currency appreciation has frequently been undertaken even by countries which notionally have floating exchange rates, eg Japan and Korea. The motivation may be to accumulate foreign exchange reserves, as well as (or rather than) to restrain appreciation of the exchange rate. Technically, this kind of intervention is easy to perform. It soon becomes clear to the commercial banks active in the foreign exchange market that the central bank is a heavy buyer of dollars (or other foreign currency), and it is natural for them in those circumstances to notify offers of dollars to the central bank so that the central bank can accept them if it wishes. The more difficult aspect of this kind of intervention is dealing with the consequences in the domestic money market, which was discussed in section 2.2.

Intervention to provoke a market reconsideration of the exchange rate level is likely to involve much smaller amounts of money. The reason why the operation involves intervention at all, rather than consisting just of an advocacy, in words, of the case for a different exchange rate level, is to try to persuade investors that the authorities (government and/or central bank) are convinced of their own case and willing to put public money at risk in support of it.

This kind of intervention is very risky, for two main reasons. Firstly, governments and central banks, like other human institutions, are prone to wishful thinking about their own national economies and about their own management of them. Thus their judgment of the appropriate exchange rate level is quite likely to be biased. Second, assuming that the intervention is made public,²⁴ it is easy for the public to calculate whether it has made a profit or a loss, simply by inspecting the behaviour of the exchange rate after the intervention. Losses made by ill-judged (or unlucky) intervention of this kind can do great damage to the reputation of the government or the central bank; whereas any profits are likely to attract far less public attention than would losses of the same size.

It therefore follows that intervention of this kind should be undertaken only after very careful and dispassionate consideration, and only if the degree of misalignment of the exchange rate is clearly so great that the risks of failure are small.

Intervention operations of this kind are intended to bring about a sudden change in the exchange rate. Thus advance knowledge of them can be used for private profit, and it is therefore extremely important that they be kept secret from the private sector until they are implemented. Leaks of information do great damage to the reputation for integrity of the central bank or government from which the leak emerged.

It is desirable, too, that the news that the intervention is taking place should be released to all interested parties at exactly the same time, but this is difficult to arrange. The normal intervention procedure is for the central bank to place simultaneous orders to sell (or buy) foreign currency with the leading market-makers, or with brokers. But this means that those market-makers or brokers get a commercial advantage through having the information slightly earlier than others. Even if the central bank placed its order in an electronic broking service, the information would be received first by whichever commercial bank happened to be the first to accept the offer of foreign exchange which the central bank had placed.²⁵

Another possibility would be to announce the intention to intervene publicly, before undertaking any financial operations. However, the market reaction to such an announcement would be to propel the market price of foreign exchange downwards (assuming the central bank was planning to sell foreign exchange), making it much less likely that the intervention operation would be profitable.

The success of intervention operations of this kind is often undermined by scepticism among investors about the ability of the domestic government or central bank to make a dispassionate judgment about the appropriate exchange rate level. The credibility of such operations can be enhanced if foreign central banks can be persuaded to take part, since the market is more likely to be persuaded by a judgment made by a foreign monetary authority which can be assumed to be less prone to wishful thinking about the exchange rate. It is particularly desirable if they can be persuaded to put their own funds at risk, but if that is not possible, they can be asked to deal, as an agent, on behalf of the domestic central bank at its

²⁴ Since the purpose of the intervention is to provoke investors to reconsider their view of the exchange rate, there would be little point in intervening but not making it public. In any case, IMF-sponsored transparency standards now make disclosure inevitable.

²⁵ The offer of foreign exchange communicated by the electronic broking service would not disclose the identity of the offeror; that would be disclosed only when the offer was accepted.

risk, ie treating the domestic central bank as a customer. Of course, when other central banks are involved, particularly if there are a large number of them, keeping the operation secret before it is implemented becomes much more difficult.

5. Direct controls as instruments of monetary policy

5.1. What are direct controls?

Sections 1.2 and 1.3 described the difference between direct and indirect methods of monetary policy implementation, and noted that the modern consensus is that indirect methods are generally preferable. Direct methods involve the state giving instructions to the commercial banks on what loans they should and should not make, on what interest rates they should charge to borrowers or pay to depositors, or on other aspects of their relationships with their customers. Indirect methods largely avoid such instructions.

Direct controls may consist of:

- (i) foreign exchange controls;
- (ii) credit controls – ie upper limits on total lending, or on lending of particular kinds (eg consumer lending);
- (iii) interest rate controls – eg upper limits on lending rates, or prescribed rates for lending and/or deposits;
- (iv) taxes or reserve requirements which discriminate according to the source of deposits or the type of lending (eg taxes on consumer credit, or discriminatorily high reserve requirements on foreign deposits);²⁶
- (v) access to central bank credit at sub-normal interest rates for particular types of lending (eg to agriculture).²³

5.2. Why are direct controls used, other than in state-controlled economies?

There are circumstances in which governments and central banks in market economies regard it as desirable to give instructions to commercial banks about their relationships with their customers. Some examples were given in section 1.2. As a generalisation, direct controls are regarded as being warranted in circumstances where, in their absence, there is some good reason to expect financial instability to occur. Perhaps the strongest case for direct controls can be made in countries where the financial system has been subject to pervasive state controls (as was the case for example in the Soviet Union and its satellite countries), and is being liberalised. In those circumstances, it is normally unwise to remove all direct controls on the financial system, including commercial banks, at one go. For example, the financial crisis of 1997-98 in several East Asian countries was widely ascribed to premature easing of direct controls on domestic financial institutions.

There is no generally accepted doctrine that countries can apply when deciding on the timing and sequencing of financial liberalisation. There are always plenty of arguments for

²⁶ Strictly, (iv) and (v) are not direct controls; but they often have much the same effects as direct controls.

gradualism. It is important in assessing such arguments to distinguish between those which are strictly temporary, in the sense that their validity depends on a state of affairs which is likely to come to an end, and those whose validity is potentially permanent. Arguments of the second kind are not really arguments for gradualism, but rather for not liberalising at all, and should be treated as such.

It is, however, clear that there can be problems which warrant the retention of direct controls, at least temporarily. They include:

- (i) Actual or threatened excessive exuberance in lending, resulting from inadequate appreciation of credit and other risks, or poor management of risk, and leading to heavy losses.
- (ii) Actual or threatened excessive exuberance in borrowing, resulting from financial ignorance and leading to financial distress and bankruptcy. For example, many South Korean households have got into financial distress in the past few years as a result of over-enthusiastic use of credit cards, which have recently become available for the first time.
- (iii) Inadequate competition in banking, perhaps resulting from restrictions on the ability of foreign banks to offer banking services in the domestic economy, and resulting in high lending rates, low deposit rates, and high commercial bank profits (or high salaries for their managers). The consequences are that the commercial banking system provides a service to the economy which is inferior to the service that a competitive industry would provide, and the profits of the commercial banks (or the remuneration of their managers) are likely to become a public scandal.
- (iv) Excessive volatility in the exchange rate, or in external capital flows. This may reflect fluctuations in external demand for the domestic currency which are unwarranted by economic fundamentals, or inadequate market-making capacity among domestic financial institutions. Wide and unpredictable fluctuations in the exchange rate can lead to misallocation of resources in the domestic economy. For example when the currency is weak, there is likely to be heavy investment in the production of tradable products, but some of that investment may prove to have been mistaken if and when the exchange rate strengthens. In addition, as already noted, exchange rate volatility is likely to inhibit international trade and investment, to the detriment of the domestic economy. Excessive volatility in external capital flows is likely to complicate the conduct of domestic monetary policy, and to lead to cycles of “feast and famine” in the availability of credit to domestic borrowers.
- (v) The risk that some large domestic financial institutions would experience large outflows of funds and simply collapse, or require massive emergency official support, if controls were removed suddenly, and that the economy would be seriously disrupted as a result.

All of these problems can be addressed, at least for a period, through direct controls, in ways that are discussed below. However, it is important to recognise the drawbacks that direct controls involve for the domestic economy.

5.3. Drawbacks of direct controls

Direct controls are often attacked on the grounds that they lead to resource misallocation. It is certainly true that in an economy where market mechanisms are working well, imposing direct controls is likely to make resource allocation worse rather than better. However, direct controls are not often imposed in such conditions, but rather in conditions in which market mechanisms are not working well, or not likely to work well, because of a problem of the kind described in the preceding section.

Stronger grounds for attacking direct controls are as follows:

- (i) Foreign exchange controls can cut the country off from international trade and investment. (Indeed, the reason for having foreign exchange controls may be to cut the country off from volatile international capital flows.) This is likely to threaten the country's ability to share in the benefits of improving technologies, because "technology transfer" takes place to a large extent through international trade and investment.
- (ii) Credit controls can deter competition and innovation in banking, and thereby inhibit the development of the financial system. They also stimulate credit extension in forms which are not subject to control, such as trade credit. Since forms of credit which are not subject to control are likely also not to be measured, the controls are likely to have the effect of obscuring monetary developments, so that the quality of the information available to those making decisions about monetary policy is degraded. The quality of monetary policy decisions is therefore likely to be damaged.
- (iii) Upper limits on interest rates charged for bank credit are likely to lead banks simply to refuse credit to high-risk borrowers, rather than offering them credit at high interest rates. This is likely to reduce welfare, rather than enhancing it.
- (iv) Governments can abuse controls, eg by requiring commercial banks to hold a minimum percentage of their deposits in government securities. This is likely to depress the yield on government securities (because the commercial banks are obliged to hold a certain minimum amount of government securities, regardless of their yield), and it represents a kind of hidden tax on commercial banks. Like credit controls, it is likely to stimulate financial intermediation by institutions other than commercial banks, and obscure monetary developments.
- (v) Controls can create incentives for corruption. For example, those officials responsible for approving or disapproving foreign exchange transactions are vulnerable to offers of bribes or other inducements from those parties who have a financial interest in their decision.
- (vi) Preferential treatment of transactions in certain categories (eg the availability of low-interest credit from the central bank for loans to agriculture) creates an incentive for transactions of other kinds to be disguised so that they appear to belong to the preferred category.
- (vii) Controls create dependency among those groups which benefit from them – for example, domestic financial institutions and others which the controls protect from competition, and the domestic officials who are paid to enforce the controls. The benefits of removing the controls are likely to be widely spread, and harder to

visualise than the costs, even though they will almost certainly exceed the costs. Moreover, there is likely to be great uncertainty about exactly how the economy will develop after the controls are removed. Therefore conservative political forces may well combine with those who benefit from the controls to form a political constituency in favour of retaining controls, making it harder to remove them, whatever the merits of the case.

- (viii) The drawbacks of controls are likely to be the more serious, the longer the controls are in force.

5.4. Minimising the drawbacks

All of these drawbacks represent arguments against the use of controls. But it may well be concluded that controls are necessary in spite of their drawbacks, and, if so, it becomes important to find ways of designing the controls in such a way as to minimise the drawbacks. Some general ideas on how that might be done are set out below.

- (i) Controls should be explicitly temporary wherever possible – ie there should be an announced date on which they will be removed, unless a positive decision is taken to extend their duration. This reduces the incentive for market participants to incur the up-front costs of finding ways to circumvent the controls.
- (ii) While the controls are in force, it is very important to solve or remove the problems which made the controls necessary, so that the controls can be safely removed when they expire.
- (iii) It is desirable for the central bank if possible to explain to the public the consequences of removing controls, so that the public debate on the subject can be well-informed.
- (iv) Controls, when they are used, should be designed so as to minimise their drawbacks. For example, when foreign exchange controls are imposed to protect a country against volatile capital flows, an exception should be considered for direct investment and related flows, since direct investment can be an important conduit for technology transfer.
- (v) Since direct controls obscure credit flows and make it harder to reach well-informed monetary policy decisions, it is important for the central bank to develop and use monetary policy indicators that are not affected by controls.

5.5. Credit controls

As noted in section 5.2 above, the removal of lending controls, particularly if they have been in force for a long period, can lead to excessive exuberance in lending and borrowing, and to consequent distress for both the lenders and the borrowers. This is likely to reflect inadequate understanding of credit risk on the part of commercial banks, and inadequate ability to manage credit risk; and financial ignorance on the part of borrowers.

The ultimate solution is better understanding on the part of all parties. This may be achieved by:

- (i) Bank supervision, to try to ensure that the commercial banks' willingness to make loans does not increase faster than their ability to measure and manage the risks

involved. It needs to be acknowledged that supervisors in countries with underdeveloped financial institutions have a very difficult task. It is not realistic to think that they will have much greater financial expertise than the commercial banks that they supervise; and it is common experience that many of the most able supervisors leave the employment of the supervisory agency to take better-paid jobs with commercial banks. So it is very difficult for the supervisory agency to maintain the quality of its staff.

- (ii) Allowing foreign ownership of domestic commercial banks. Foreign owners of banks are likely to transfer expertise and technology to the domestic banking system. There are particular advantages in permitting foreign bank branches, as well as subsidiaries, to operate in the domestic economy. First, it makes it likely that more foreign banks will be attracted to the domestic economy, so that technology transfer will be enhanced. Second, in the case of foreign bank branches, the task of supervision is shared with the supervisory agency of the home country, so that the burden on the domestic supervisors is less heavy.
- (iii) Monetary policy needs to take account of the risk of over-exuberant lending and borrowing. Decisions by central bank boards or monetary policy committees about interest rates need to recognise that credit growth may be inflated for a period because of inadequate appreciation of the risks by both lenders and borrowers, and interest rates may need to be temporarily somewhat higher than otherwise as a result, in order to contain the inflationary consequences.
- (iv) In addition, there may be a case for temporary upper limits on the rate of increase of credit, either in total or to particular categories of borrower (eg households). If such limits are introduced, they should permit some acceleration in credit, or the purpose of liberalisation will be defeated; they should be gradually eased; and they should finally be removed, according to a pre-determined schedule.

5.6. Foreign exchange controls

Foreign exchange controls can be used to address many of the problems listed in section 5.2 above. Specifically:

- (i) Foreign as well as domestic banks can be excessively exuberant lenders to domestic borrowers. Controls on inflows of foreign funds can curb their exuberance.
- (ii) Likewise, foreign exchange controls reduce the volatility of external capital flows.
- (iii) It seems unlikely, however, that foreign exchange controls reduce the volatility of exchange rate fluctuations, since they reduce the number of institutions eligible to participate in the market and therefore reduce the market's ability to absorb orders without large price fluctuations. Of course, they are also likely to reduce the volatility of orders in the market.
- (iv) If major domestic financial institutions are suspected or known to have such large bad debts that their solvency is in doubt, the government may fear that immediate liberalisation of capital controls would provoke a flight of deposits from these institutions and lead either to their collapse, or to the need for massive emergency official support. In these circumstances, retaining temporary controls on outflows of funds allows time for the bad debt problems to be addressed.

5.7. Interest rate controls

In countries where the commercial banking industry is dominated by one or a small number of institutions, the commercial banks' market power may enable them to charge very high interest rates for loans and to pay very low rates for deposits. In these circumstances the commercial banks will provide a smaller quantity of financial intermediation services than otherwise, and they are likely to make very large profits (or pay very high salaries to their managers), which could become a public scandal and damage the reputation of the commercial banks.

There are a number of ways in which this problem can be addressed.

- (i) Liberalising the banking industry by easing restrictions on the establishment of commercial banks will enhance competition by allowing more institutions to offer banking services, provided that the owners and managers of the new banks are people of sufficient probity and expertise. The easing of restrictions could include allowing foreign-owned banks, including foreign bank branches, to offer services in the domestic economy.
- (ii) The government and central bank can promote the growth of securities markets by removing any legal obstacles to the issue, trading and ownership of securities. Securities markets represent a channel of financial intermediation which competes with commercial banks and therefore limits the market power of commercial banks.
- (iii) If the commercial banks use their market power to keep deposit rates very low, thus discouraging saving, the central bank can use its branches (if it has any) to take household deposits itself, at interest rates that it regards as acceptable. The National Bank of Poland resorted to this device in 1997, and succeeded in forcing the commercial banks to raise their deposit rates.²⁷
- (iv) Interest rate controls – upper limits on lending rates and lower limits on deposit rates – may also have a role. The controls should aim to reduce the excess profits of the commercial banks, not to eliminate them. If the controls were to eliminate excess profits, they would also eliminate the incentive for new institutions to enter the commercial banking industry and perpetuate the problem of market dominance which was the underlying cause of excess profits. The controls need to be designed in such a way as not to induce banks to withdraw completely from particular kinds of business, such as lending to high-risk borrowers where interest rates need to be high to compensate the lending bank for the credit risk to which it is exposed. Finally, the controls must be temporary only.²⁸ If new institutions enter the commercial banking industry, then the increased competition is likely to make the controls unnecessary. If no new institutions enter the market, then the reason is likely to be that the controls are too tight, and easing or removing them will increase the incentive for new institutions to enter.

²⁷ See "Personal Deposits at the National Bank of Poland", *Bank i Kredyt*, No 3, 1998.

²⁸ There may however be a case for a permanent upper limit on the interest rates that commercial banks can charge for loans to poor and ignorant individuals who have no realistic choice of lender and are vulnerable to exploitation.

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23	Consumption Theory	Emilio Fernandez-Corugedo

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www.bankofengland.co.uk/ccbshand.htm

Handbooks: Lecture series

As financial markets have become increasingly complex, central bankers' demands for specialised technical assistance and training has risen. This has been reflected in the content of lectures and presentations given by CCBS and Bank staff on technical assistance and training courses. In 1999 we introduced a new series of *Handbooks: Lecture Series*. The aim of this new series is to make available to a wider audience lectures and presentations of broader appeal. The following are available:

<u>No</u>	<u>Title</u>	<u>Author</u>
1	Inflation Targeting: The British Experience	William A Allen
2	Financial Data needs for Macroprudential Surveillance - What are the key indicators of risks to domestic Financial Stability?	E Philip Davis
3	Surplus Liquidity: Implications for Central Banks	Joe Ganley
4	Implementing Monetary Policy	William A Allen

Handbooks: Research Series

The CCBS began, in March 2001, to publish Research Papers in Finance. One is available now, and others will follow.

<u>No</u>	<u>Title</u>	<u>Author</u>
1	Over the Counter Interest Rate Options	Richhild Moessner

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BOOKS

The CCBS also aims to publish the output from its Research Workshop projects and other research. The following is a list of books published or commissioned by CCBS:-

Richard Brearley, Alastair Clarke, Charles Goodhart, Juliette Healey, Glenn Hoggarth, David Llewellyn, Chang Shu, Peter Sinclair and Farouk Soussa (2001): *Financial Stability and Central Banks – a global perspective*, Routledge.

Lavan Mahadeva and Gabriel Sterne (eds) (October 2000): *Monetary Frameworks in a Global Context*, Routledge. (This book includes the report of the 1999 Central Bank Governors symposium and a collection of papers on monetary frameworks issues presented at a CCBS Academic Workshop).

Liisa Halme, Christian Hawkesby, Juliette Healey, Indrek Saapar and Farouk Soussa (May 2000): *Financial Stability and Central Banks: Selected Issues for Financial Safety Nets and Market Discipline*, Centre for Central Banking Studies, Bank of England*.

E. Philip Davis, Robert Hamilton, Robert Heath, Fiona Mackie and Aditya Narain (June 1999): *Financial Market Data for International Financial Stability*, Centre for Central Banking Studies, Bank of England*.

Maxwell Fry, Isaack Kilato, Sandra Roger, Krzysztof Senderowicz, David Sheppard, Francis Solis and John Trundle (1999): *Payment Systems in Global Perspective*, Routledge.

Charles Goodhart, Philipp Hartmann, David Llewellyn, Liliana Rojas-Suárez and Steven Weisbrod (1998): *Financial Regulation; Why, how and where now?* Routledge.

Maxwell Fry, (1997): *Emancipating the Banking System and Developing Markets for Government Debt*, Routledge.

Maxwell Fry, Charles Goodhart and Alvaro Almeida (1996): *Central Banking in Developing Countries; Objectives, Activities and Independence*, Routledge.

Forrest Capie, Charles Goodhart, Stanley Fischer and Norbert Schnadt (1994): *The Future of Central Banking; The Tercentenary Symposium of the Bank of England*, Cambridge University Press.

***These are free publications which are posted on our web site and can be downloaded.**