

**BIS ECONOMIC PAPERS**  
**No. 23 – January 1989**

**CHANGES IN CENTRAL BANK  
MONEY MARKET OPERATING  
PROCEDURES IN THE 1980s**

by  
**J.T. Kneeshaw and P. Van den Bergh**

**BANK FOR INTERNATIONAL SETTLEMENTS**  
**Monetary and Economic Department**  
**BASLE**

## Table of contents

|   |     |
|---|-----|
| I. Introduction .....   | 5   |
| II. Common tendencies and the broad objectives of the changes.....                          | 7   |
| III. A framework for analysing central bank operating procedures .....                      | 10  |
| IV. Central bank credit facilities .....  | 23  |
| V. Market operations and fine-tuning instruments .....                                      | 46  |
| (a) Outright market transactions in securities and bills ..                                 | 46  |
| (b) Reversed transactions in securities and bills .....                                     | 56  |
| (c) Reversed foreign currency operations .....  | 68  |
| (d) Transfers of non-bank deposits between the central bank and the banks .....             | 71  |
| VI. Reserve requirements and the demand for bank reserves.....                              | 75  |
| VII. Government finance and monetary control.....   | 84  |
| VIII. Operating procedures and the behaviour of the money and foreign exchange markets..... | 91  |
| (a) The development of domestic money markets .....   | 92  |
| (b) Operating procedures and responses in the money and foreign exchange markets .....      | 95  |
| IX. Concluding observations .....   | 100 |
| Annex .....   | 104 |
| Selected references .....   | 106 |

## Tables

|   |     |
|---|-----|
| 1. Influences on changes in bank reserves . . . . .   | 16  |
| 2. Institutional characteristics of central bank credit facilities with posted interest rates . . . . . | 24  |
| 3. Central bank market operations and fine-tuning instruments . . . . .                                 | 47  |
| 4. Bank of France money market operations . . . . .   | 63  |
| 5. Italy: Bank reserve creation on Treasury account . . .   | 67  |
| 6. Institutional characteristics of reserve requirement regulations . . . . .                           | 76  |
| 7. Belgium: Main components of bank liquidity . . . . .   | 87  |
| 8. United Kingdom: Influences on bank reserves . . . . .  | 90  |
| Annex: Influences on changes in bank reserves (analytical framework and data sources) . . . . .         | 104 |

## Graphs

|  |    |
|--|----|
| 1. United States: Money market interest rates and Federal Reserve operations ..... | 30 |
| 2. Germany: Money market interest rates and Bundesbank operations .....            | 35 |
| 3. Netherlands: Money market interest rates and Netherlands Bank operations .....  | 37 |
| 4. Sweden: Money market interest rates and Riksbank operations .....               | 42 |
| 5. Japan: Money market interest rates and Bank of Japan operations .....           | 53 |
| 6. France: Money market interest rates .....                                       | 62 |
| 7. Italy: Money market interest rates .....  | 66 |
| 8. Canada: Money market interest rates and Bank of Canada operations .....         | 73 |
| 9. Switzerland: Money market interest rates .....                                  | 79 |
| 10. Belgium: Money market interest rates .....                                     | 87 |
| 11. United Kingdom: Money market interest rates .....                              | 90 |

# CHANGES IN CENTRAL BANK MONEY MARKET OPERATING PROCEDURES IN THE 1980s<sup>1</sup>

## I. Introduction

In the last few years central banks have made extensive changes in the procedures they use for regulating bank reserves and influencing developments in short-term interest rates. Such money market operations have long been the principal means for implementing monetary policy in some industrial countries, particularly in large ones with broad financial markets. Money market policy has, however, assumed a larger role in recent years as reliance on direct credit and interest rate controls in domestic monetary management has declined and as financial markets have become more integrated internationally.

Though the techniques employed by individual central banks in their money market operations are still strongly influenced by differing institutional, legal and political environments, common aims and tendencies can be observed in the recent changes. In general terms, innovations affecting the use of central bank credit facilities, new market instruments and the adaptation of reserve requirements have been designed to make the implementation of money market policy more flexible and to ensure its effectiveness in a more complex environment.

The essential characteristics and objectives of central bank operating procedures can be set out and compared in a fairly simple analytical framework. The central bank has a monopoly of the note

<sup>1</sup> The authors gratefully acknowledge advice from Dr. H. Bockelmann and Dr. J.R. Bisignano and comments from colleagues including P. Andersen, C. Borio, J. Marquardt and P. O'Brien. They have also been able to draw upon discussions with central bank economists and their presentations at a meeting at the BIS in November 1985. Errors of fact or interpretation are, of course, the authors' own. Our thanks go to S. Arthur for preparing the graphs.

issue, acts as banker to the banks and the government, and normally also operates the interbank clearing system. In most countries the central bank also holds the official external currency reserves of the country and may purchase domestic securities for its own account. All these functions are reflected in the central bank's own balance sheet. Provided the central bank has adequate control over developments in its total assets and liabilities other than bankers' deposits, it is in a position to control the terms under which banks can obtain the central bank balances they wish to hold for clearing purposes or need for meeting compulsory reserve requirements. The credit or market instruments which the authorities use for making marginal adjustments to the reserve position of the banking system influence interest rates in markets used by individual banks as alternatives for making reserve adjustments – particularly the interbank market. Indirectly they also influence interest rates on banks' short-term borrowing and lending operations and other interest rates in the economy.

The central bank's money market operations may be guided by proximate or operating guides for money market interest rates or for bank reserves. These normally have to be set and adapted flexibly in order to meet more basic objectives. In many cases the operating objectives have been designed to be consistent with the achievement of intermediate targets for the growth of the money stock or for particular exchange rate relationships. Money market policy in Group of Ten (G-10) countries – on which this paper focuses – does not, however, rely to any significant extent, or even presuppose, direct causal influences running from the volume of bank reserves to the money stock. Except to the extent that they have influenced the central banks' money market operating procedures, the intermediate and final objectives of monetary policy are not discussed in this paper.<sup>2</sup>

<sup>2</sup> Parallel developments in central bank money market operating procedures have taken place in recent years in many other industrial countries – see BIS Annual Report, various recent issues.

Some general characteristics of the recent changes in central banks' money market procedures and the reasons for them are identified in Section II of this paper. A framework for analysing the impact of these operations on the supply of and demand for bank reserves and on the determination of interest rates in the money market is set out in Section III. The following three sections outline the changes which have taken place in individual countries in central bank credit facilities, market instruments and reserve requirements, and analyse in some detail the way the procedures now used in individual countries operate. Section VII turns to the link between control of money market and central bank credit to the government, and looks at the ways in which government debt management has constrained money market policy in individual countries. Section VIII discusses the impact of structural changes in money markets and of external constraints, which have become tighter in most countries in recent years, on the use of instruments. Throughout, the focus is primarily on comparisons of the problems encountered and the solutions adopted in different countries. Given that the changes in procedures are in many cases very recent and that for many countries the kind of daily or weekly data which would be needed for meaningful statistical analysis is not available or is difficult to access, the approach is essentially descriptive and graphical. The concluding observations contain some reflections on the likely implications of foreseeable further changes in the domestic and external environment for the effectiveness of the procedures central banks use in implementing money market policy.

## **II. Common tendencies and the broad objectives of the changes**

The recent changes in central banks' money market operating techniques and procedures display several common tendencies. *Firstly*, steps have been taken in many countries to restrict or discourage recourse by the banks to conventional open-ended central bank credit facilities. Typically, posted interest rates for official

discount or secured credit can be changed only by a rather cumbersome and conspicuous process, and in many countries these rates had in the past tended to serve as a fairly rigid peg for money market interest rates. In some cases these lending charges are now changed more frequently on the basis of a formula or are scaled in ways that permit the central bank to change the effective marginal cost of accommodation by action to influence the banks' need for it. In others official rates are still set in the conventional way, but they are now at penal levels which tend to serve as an upper limit for market rates. *Secondly*, central banks in many countries have in recent years made increasing use of flexible market operations and other fine-tuning instruments both for increasing the supply of bank reserves over time and for counteracting influences on reserves over which the central bank has little direct control. *Thirdly*, in many countries the burden of reserve requirements has been lowered in recent years, and only limited use is now made of changes in reserve ratios as a means of making adjustments in banks' reserve positions. Reserve requirements still serve, however, as a fulcrum for money market management in many countries.

A comparison of the broad objectives of the changes in central bank operating procedures during the last ten years shows a desire for more flexibility in interest rate determination to be a recurrent theme. However, the kind of flexibility that has been aimed at and the underlying objectives have changed over the years.

The concerns about inflexibility in interest rate setting which emerged in some countries in the late 1970s and early 1980s primarily reflected a belated recognition of a bias towards delaying increases in interest rates to the extent necessary to counter a build-up of inflation. In one or two countries the difficulties involved in deciding upon or implementing changes came to be seen as so intractable as to call for changes in procedures intended to give the market a greater role in short-term interest rate determination. That operational changes designed to reduce the degree of discretion available to the authorities in setting interest rates would permit closer monetary control had long been a main thrust of academic monetarist criticism.



Thus the shift in the *United States* from interest rate to bank reserve operating objectives in 1979 was intended to put in place a mechanism which would permit interest rates to respond "automatically" to deviations in the money stock from the target course in a way which would tend to counteract the deviations. Though an element of discretion was retained, the change was followed by large gyrations in interest rates at both short and long term but also by increased volatility in the growth of the money stock. In the *United Kingdom* procedural changes made in 1981 were designed to permit a bank-reserve-based system of money stock control which was not, in the event, implemented. Efforts were made to confine official influence over interest rates to the very short end of the maturity spectrum, but these soon had to be abandoned. In most other G-10 countries, however, money market policies retained an explicit interest rate orientation. Apparently, central banks experienced little difficulty in judging the level of interest rates required to bring inflation under control. In *Japan* and *Germany*, in particular, they accepted responsibility for timely interest rate increases and were able to limit interest rate volatility.

Short-term interest rates now play an important role as operating objectives in nearly all G-10 countries. Increased flexibility in short-term interest rates has come to be seen mainly as a way of adapting interest rate oriented money market policies to cope with shocks in the economy, volatility of expectations in the private financial markets and exchange market pressures. In many countries interest rate determination in the financial markets has become more competitive as a result of deregulation and/or financial change brought about on private initiative. Individual financial markets have also become more closely integrated internationally. Inevitably, central banks have had to take into account faster responses of market interest rates and exchange rates to changes in expectations about developments in the economy and in policy. Generally, the new instruments have been designed to facilitate the conduct of monetary policy in this new environment.

The basic aim of central banks has been to create adequate scope

for changes in money market interest rates or for stabilising rates through appropriate adjustments in bank reserve positions. However, in many cases new procedures have also been designed to permit more complex interest rate strategies to be pursued. In particular, while attempting to stabilise inflation expectations and to protect domestic money market rates at the longer maturities most relevant for influencing investment decisions in the economy, some central banks have sought to let very short rates take the burden of countering exchange market instability. In some countries new instruments have also provided a means for testing market reactions to changes in interest rates before giving stronger signals which might prove difficult to retract.

### **III. A framework for analysing central bank money market operating procedures**

Changes in central bank money market operating procedures and some of their implications can conveniently be compared and contrasted in the context of a simplified model of the demand for and supply of bank reserves. This framework can be used to explain how the central bank can influence the determination of short-term interest rates.<sup>3</sup> The basic idea is that given the demand for central bank liabilities in the form of bank-notes and reserve deposits held by

<sup>3</sup> The underlying assumptions are that institutional constraints prevent banks achieving full balance-sheet adjustment immediately and that most other variables in the economy can be taken as given. Ways in which market expectations of longer-term developments may influence interest rates are discussed below, and the analysis is extended in Section VII. Even so, the aim is not to consider interactions between the evolution over time of short-term interest rates and developments in the intermediate targets or ultimate objectives of monetary policy. Feedbacks from developments in the economy to conditions in the money market may be considered as subsumed in the central bank's calculation of the objectives of and constraints on money market policies.

the banks – whether for clearing purposes or for meeting reserve requirements – the central bank can control short-term interest rates in the interbank market<sup>4</sup> fairly accurately by operating on the supply of bank reserves which the central bank monopolises. Transactions by individual banks designed to procure reserves from other sources net out in the interbank clearing and merely redistribute reserves provided by the central bank. The central bank's ability to control short-term interest rates fundamentally depends on its capacity to ensure that the banking system can be induced to call upon it for marginal accommodation. A precondition for this is effective control over the volume of bank reserves supplied by movements in the other components of the central bank's balance sheet.<sup>5</sup>

In principle, the central bank can accommodate the banking system's marginal reserve needs either by providing credit to the

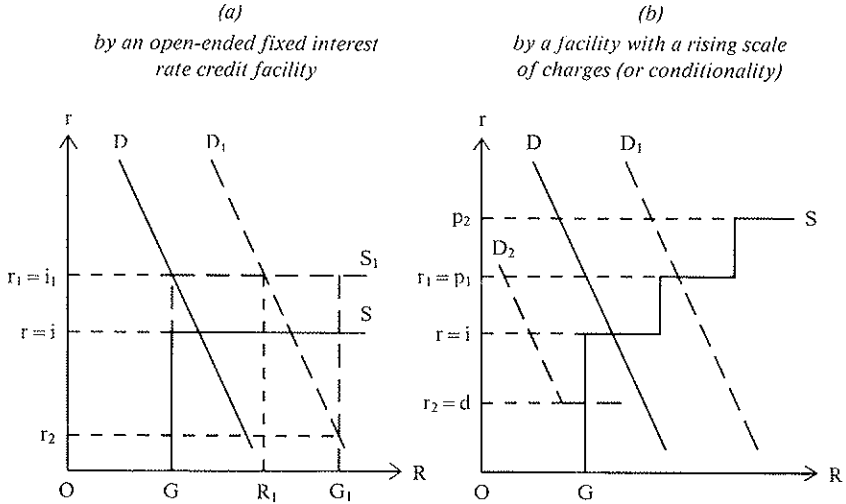
<sup>4</sup> In most countries there is a well-defined domestic market for short-term interbank deposits or loans or for transactions between banks in the deposit liabilities of the central bank. In some countries a limited range of non-banks, such as particular government agencies (e.g. the post office), security dealers and discount houses, or even insurance companies, may participate. Typically, transactions are executed in day-to-day, overnight or call money, though term markets (including, in some cases, markets in Treasury or private bills), in which participation is largely confined to banks, may be included.

<sup>5</sup> The process of interest rate determination on the money market need not be essentially different in countries where there are no reserve requirements. Even if banks do not hold reserves at the central bank, the latter can influence money market interest rates flexibly by adjusting the terms and conditions on which it accommodates the residual demand for bank-notes, provided the banks are kept dependent on such residual accommodation by suitable developments in the other items in the central bank's balance sheet. Where this cannot be done, interbank rates may be pegged to the rates applied on reserve-absorbing facilities offered by the central bank or by the government, including facilities for investment in short-term government securities, provided the interest rates applied are determined by the central bank. Of course, control over the position of the supply curve for bank reserves is not sufficient for direct quantitative control over reserves (or central bank money) when the demand for reserves changes. This requires, in addition, that the supply curve be made vertical (see below).

## Diagram

### Interest rate determination in the money market

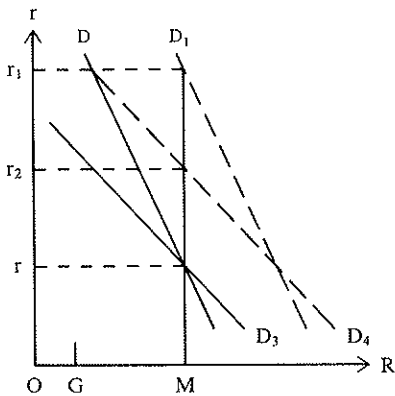
*Central bank accommodation of bank reserve needs*



If a shift in the demand for bank reserves (from  $D$  to  $D_1$ ) is met at a single posted official lending rate ( $i$ ), the market interest rate ( $r$ ) can be raised (to  $r_1$ ) or lowered only by changing the posted rate (to  $i_1$ ). If the amount of reserves provided by transactions outside the central bank's control ( $OG$ ) is not limited effectively ( $OG_1 > OR_1$ ) the market rate can fall below the official rate (e.g. to  $r_2$ ). The analysis remains essentially the same even if the banks hold extremely small amounts of reserves or if they use credit facilities to finance their holdings of bank-notes.

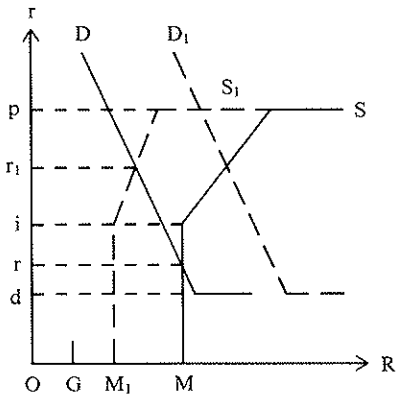
If a rise in the demand for bank reserves is partly accommodated at posted charges ( $p$ ) set higher than the basic lending rate ( $i$ ), the market rate rises (from  $r$  to  $r_1$ ) without any need for central bank action to change the discount rate. The effect may be similar if conditionality, in effectively graduating the cost to banks of increasing recourse to central bank credit, implies that the supply curve slopes smoothly upward to the right. Should the demand for reserves fall short of  $OG$  at  $i$ , a floor can be placed under market rates (at  $r_2$ ) by an open offer to accept placements of excess reserves. This would make the demand for reserves perfectly elastic at the rate applied ( $d$ ).

(c)  
by open market operations only



An inelastic supply of reserves provided only by market operations (GM) may have to be adjusted very flexibly to prevent large movements in market interest rates (from  $r$  to  $r_1$ ) in the event of shifts in an inelastic reserve demand schedule (from  $D$  to  $D_1$ ) or of changes in the non-controlled supply of reserves (OG). The potential movement in rates may be smaller ( $r$  to  $r_2$ ) to the extent that averaging or carry-over provisions in the reserve requirements make the demand for reserves more interest-elastic ( $D_3$  and  $D_4$ ).

(d)  
by a combination of market operations and credit facilities



Quite complex strategies become feasible. For instance, a reduction in the supply of reserves provided by open market operations (from GM to  $GM_1$ ) which induces the banks to borrow from the central bank to satisfy their marginal reserve needs could cause the market interest rate ( $r$ ) to rise above the basic official lending rate when credit at this rate is rationed ( $r_1 > i$ ). Under some arrangements the slope of that part of the supply curve which relates to borrowing (i.e. borrowed reserves) may be influenced by the banks' expectations. As in the other cases, relatively high charges on open-ended central bank lending facilities ( $p$ ) and relatively low rates on special placement facilities ( $d$ ) may set upper and lower limits to movements in market rates.

banks, for example through facilities for the rediscounting of commercial bills at posted interest rates (borrowed reserves), or by engaging in open market operations to provide non-borrowed reserves to the banking system on a temporary or more permanent basis. The choice of instruments for supplying reserves can be seen as influencing the elasticity of the supply curve for bank reserves or as “fine-tuning” its position. To the extent that central bank credit is made available unconditionally through traditional open-ended facilities for discounting or advances, the supply curve for borrowed reserves may be represented as a horizontal line drawn at the level of the charge applied (case (a) in the diagram). Changes in interest rates can, in these circumstances, only be effected by deliberate action to shift this curve. The introduction of conditionality and a rising scale of charges for central bank credit can make the supply curve step or slope upwards to the right (case (b)). Alternatively, open-market operations may be used to shift the supply curve so as to permit the authorities to encourage flexible and inconspicuous interest rate adjustments at their discretion (case (c)). The new market instruments introduced in many countries in recent years may also be used to keep the total supply curve stable by offsetting incipient changes in the supply of bank reserves attributable to factors over which the central bank has little direct control. A combination of borrowed and non-borrowed reserve procedures can also be used to influence the shape of the supply curve in the range of its intersection with the demand curve (case (d)). In addition, some central bank operations may have an impact on the position and slope of the demand curve, especially to the extent that they influence the banks’ expectations about the future availability of reserves and interest rates. Finally, as is discussed in other sections of this paper, the use of specific instruments may serve as important signalling devices in ways which are difficult to depict in the comparative static framework of a diagram.

Some of the major influences on the *supply of bank reserves* and the role of the new instruments can be illustrated by analytical tables of the kind many central banks use in reviewing their money market

policies. Central banks in most G-10 countries publish such tables, which are based essentially on their own balance sheet, though some presentations extend beyond it. (In some cases, for instance, movements in the government's position vis-à-vis the central bank are related to the government's overall financing requirement, and its borrowings outside the central bank are itemised. Developments in Treasury-owned foreign exchange accounts, corresponding to movements in official foreign exchange reserves held by the government, are also shown separately in some cases.) The arrangement of countries' presentations differs in other ways, which partly reflect differences in operating objectives and institutional arrangements such as the inclusion in the definition of banks' reserve assets of items other than claims on the central bank.<sup>6</sup> Even so, it is possible in most cases to identify balance-sheet items indicating similar categories of central bank operation and to classify them in broad categories which facilitate comparisons between countries (see Annex).

One such presentation can be seen in Table 1. It shows key influences on the growth of bank reserves in two periods which together span the 1980s. This kind of conceptual framework serves to highlight the way developments in bank reserves normally depend on movements in the central bank's balance sheet. However, the influence of the central bank over some of these items may be quite limited, especially in the short run. Thus central banks' net foreign assets, which grew only moderately or fell on balance in the early 1980s in most of the G-10 countries, expanded very strongly in the second period shown in the table. In *Germany* and *Japan*, in particular, the rise mainly reflected purchases of foreign exchange

<sup>6</sup> Typically, the presentation is in terms of stocks prior to valuation adjustments or of changes in such stocks, the idea being to isolate the effect of actual transactions from valuation changes (which may be strongly influenced by accounting conventions). The choice of the basic time unit and between end-of-period data and some kind of average for the period as a basis is typically related to the specification of banks' reserve requirements (see below).

Table 1. Influences on changes in bank reserves  
(changes in annual average levels as a percentage of average level of central bank money stock in previous year\*)

|                | Official net foreign assets (1) |       | Government finance (2) |       | Note issue increase (-) (3) |       | Central bank market operations (4) |        | Central bank lending to banks (5) |       | Bank reserves increase (+) (6) |       |
|----------------|---------------------------------|-------|------------------------|-------|-----------------------------|-------|------------------------------------|--------|-----------------------------------|-------|--------------------------------|-------|
|                | 1980-83                         |       | 1984-87                |       | 1980-83                     |       | 1984-87                            |        | 1980-83                           |       | 1984-87                        |       |
|                | period averages                 |       |                        |       |                             |       |                                    |        |                                   |       |                                |       |
| United States  | 0.0                             | 0.0   | - 0.1                  | - 0.4 | - 4.4                       | - 5.6 | 5.1                                | 7.9    | 0.0                               | 0.0   | 1.2                            | 2.8   |
| Japan          | - 1.9                           | 4.6   | 13.8                   | - 7.8 | - 5.0                       | - 5.9 | 0.1                                | 5.1    | - 0.2                             | 2.6   | 0.9                            | 0.5   |
| Germany        | - 4.3                           | 3.1   | 1.1                    | - 0.3 | - 2.9                       | - 4.1 | 2.1                                | 3.4    | 0.0                               | - 0.8 | 2.2                            | 2.0   |
| France         | - 5.6                           | 16.5  | - 0.6                  | - 1.7 | - 7.5                       | - 4.1 | 12.3                               | - 4.8  | 3.0                               | - 3.8 | 0.5                            | 5.7   |
| Italy          | - 0.1                           | 0.6   | 17.6                   | 11.6  | - 5.7                       | - 3.4 | - 0.5                              | 1.4    | 0.0                               | 0.1   | 9.8                            | 9.3   |
| United Kingdom | - 0.4                           | 7.3   | - 20.7                 | - 4.2 | - 5.5                       | - 4.7 | 24.0                               | - 3.8  | -                                 | -     | - 0.6                          | 0.1   |
| Canada         | 3.4                             | - 3.3 | - 0.1                  | - 0.2 | - 4.0                       | - 5.4 | 5.2                                | 3.9    | 0.0                               | 1.2   | 0.5                            | - 1.0 |
| Belgium        | - 8.6                           | 5.4   | 10.0                   | - 1.7 | - 1.6                       | - 1.9 | -                                  | -      | - 0.5                             | - 3.7 | 0.0                            | 0.0   |
| Netherlands    | 4.1                             | 4.9   | - 1.1                  | - 1.4 | - 7.0                       | - 5.7 | 1.2                                | 0.9    | 2.3                               | 0.7   | 0.0                            | 0.0   |
| Sweden         | 4.8                             | 14.5  | 5.6                    | #     | - 7.0                       | - 6.1 | -                                  | - 15.9 | 3.8                               | - 1.4 | - 0.3                          | 3.1   |
| Switzerland    | - 0.4                           | 2.5   | -                      | -     | - 1.4                       | - 1.6 | 5.6                                | 3.4    | 0.3                               | 0.1   | - 2.0                          | - 0.9 |

\* i.e. percentage contributions to changes in the annual average level of the central bank money stock. Relationship between the items: 6 = 1 + 2 + 3 + 4 + 5 + (not shown) capital and other central bank balance-sheet items, net. # Break in series.  
Based on national data published in central bank bulletins and annual reports. The data differ conceptually from country to country - for details see Annex.



made in 1986 and 1987 in an effort to counter the depreciation of the dollar. In other countries movements in central bank net foreign assets were mainly influenced by tighter exchange rate commitments implied by the exchange rate agreements in the European Monetary System (*France, Italy, the Netherlands and Belgium*) or by unilateral policy decisions to stabilise the exchange rate of the domestic currency in relation to another currency or a basket of currencies (*the United Kingdom, Switzerland and Sweden*).

Rapid expansion of credit to the government is also indicative of at least potential money market control problems in some countries (*Italy, Belgium, Japan*). It is widely understood that it may be difficult to control the supply of bank reserves when the central bank attempts to resist upward pressures on the interest rate on government securities by intervening in the primary or secondary market for government debt. However, the relevance, in practice, of other behavioural and institutional constraints is sometimes overlooked. In many countries the central bank still acts as a residual source of finance for the government, and even when there is an effective upper limit on the government's direct credit line, seasonal or random fluctuations in the government's cash position can be a large potential source of disturbances in the supply of bank reserves (see Section VII). The severity of the constraint implied by lending to the government may to some extent depend on the use that can be made of reserve requirements to influence the demand for central bank money. In a few countries non-banks have also been required at times to place deposits with the central bank – in relation, for example, to payments abroad for specific purposes (*Italy*) or on investment account (*Sweden*). The resulting central bank liabilities and certain other balance-sheet items are excluded from the table. Finally, other constraints can be exacerbated by a relatively slow growth in the demand for currency. Almost universally, central banks accommodate the public's demand for currency, which in many countries has a low interest elasticity.

Some central banks still express the way developments in (or forecasts of) such items tend to be taken as given in planning

short-period operations by labelling them as “autonomous”,<sup>7</sup> so as to distinguish them from items which mainly reflect the use of the central banks’ instruments for meeting banks’ marginal demand for reserves. The table shows increases over time in the quantitative importance of market-type or fine-tuning instruments in some countries (notably *Germany* and *Japan*) at the expense of central bank lending, which grew only slowly or declined in the 1984–87 period in most countries. However, in many countries the averages for this period are influenced by the use of market instruments for *absorbing* the impact on bank reserves of large purchases of foreign exchange (e.g. *Japan*, *Germany*, *France* or *the United Kingdom*), increases in central bank credit to the government (*Italy* and *Sweden*) or a temporary expansion of last-resort lending to banks in difficulties (*the United States* and *Canada*). Moreover, the amount of reserves supplied or absorbed by a particular instrument need not necessarily reflect its importance in the process of interest rate determination.

The extent to which banks hold reserves at the central bank may be influenced by the rules governing the interbank clearing system, and in most G-10 countries non-interest-bearing reserve requirements help, together with banks’ minimum needs for currency, to establish or strengthen the *demand for reserves* and to stabilise it in the short run. Rules governing interbank clearing typically preclude overnight debit positions vis-à-vis the central bank or make them subject to the general rules and conditions applying to central bank credit. In most cases central bank deposits held by banks for clearing purposes can be counted towards a larger need for central bank deposits stipulated in reserve requirements on various categories of banks’ monetary

<sup>7</sup> In the *United States* the somewhat misleading term “market influences” is used. Sometimes a related distinction is made between “defensive” central bank operations, which are designed to offset the impact of autonomous influences on the supply of reserves, and “dynamic” operations, which are designed to bring about changes in the supply of reserves.

liabilities (see Section VI). With only a few exceptions, provisions permitting the averaging of reserve holdings over the reserve period provide an element of flexibility in the early part of the reserve period, while carry-over provisions for excesses or deficiencies or access to central bank credit (even at a penal rate) may do so at the end. Fairly generally, reserve accounting is lagged or semi-lagged so that the holding period starts and ends later than the calculation period – though these periods overlap. In only a few countries do banks need to hold significant amounts of excess reserves.

In fact, the banks' demand for reserves is normally quite interest-inelastic in most systems in the very short run. At the limit, the demand curve may be completely vertical, especially at the end of the reserve-holding period. However, lagged reserve-accounting is not the sole explanation; in systems which link reserve holdings to bank liabilities banks can influence their demand for reserves by changing the pace of credit-granting, but this influences their liabilities only in the medium term.<sup>8</sup> In the short run the banks' capacity to economise on reserves by manipulating the structure of liabilities subject to reserve requirements is limited, and most of the means that individual banks might employ to change their reserve positions, such as borrowing on the money market or abroad, selling securities or efforts to gain additional non-bank deposits, mainly serve only to redistribute reserves, in the absence of accommodating operations by the central bank. Banks may take advantage of averaging provisions in reserve requirements to adjust the pattern of reserve positions in the light of their expectations about interest rate developments during the reserve-holding period. However, the exigencies of the clearing limit the control which individual banks can exercise over current and prospective developments in their reserve positions and also make it difficult for them to distinguish changes in their own relative positions from changes in the position of the

<sup>8</sup> Indeed, their willingness to permit customers to make flexible use of loan facilities and, within limits, to permit withdrawal of many types of deposit at notice may depend on their reserve needs being accommodated in the short run with a degree of flexibility.

banking system as a whole vis-à-vis the central bank. The build-up of large reserve surpluses or deficiencies during the reserve period may be limited by constraints on the incurrence of liabilities to the central bank or by settlement lags in the clearing process which hinder quick market adjustments of reserve positions at the end of the period. Self-imposed limits on the amounts individual banks are prepared to lend one another or concerns that large operations may turn the rate against relatively large banks in the system may also play a role. In practice, in some countries the banks normally seek to follow a trajectory which implies a fairly smooth rate of reserve accumulation over the holding period, irrespective of their interest rate expectations.

Given a fairly stable demand for reserves, the central bank can normally use its position as monopoly supplier to influence *interest rate determination on the interbank market*. On the one hand, the central bank can control short-term interbank interest rates quite closely, even in a context of unpredictable shifts in the demand for reserves or changes in the elasticity of the demand curve during the reserve period, by making the supply of reserves very elastic. On the other hand, action to make the supply of reserves very inelastic, given inelasticity in the demand, could imply very large fluctuations in short-term interest rates unless the position of the supply curve can be adjusted very flexibly. For this reason alone central banks in most G-10 countries have not wished to aim directly at meeting quantitative targets for bank reserves. In the few countries which have aimed at meeting operating objectives for bank reserves, scope has been left for particular kinds of central bank accommodation which could smooth erratic movements in interest rates in the interbank market. A degree of quantitative restraint on the supply of reserves has on occasion played a limited role in money market management in other countries, especially at times when policies needed to be tightened quickly. In particular, steps by the central bank to slow down or accelerate the pace of reserve growth in relation to the banking system's planned trajectory for reserve accumulation may be used to bring upward or downward pressures to bear on

money market interest rates. Even though reserve needs are eventually accommodated, banks may be left uncertain as to whether the accommodation ultimately provided will take relatively expensive or low-cost forms. Action of this kind may pave the way for changes in official rates and may also directly influence the banks' asset or liability management, and even their credit-granting behaviour. Even so, most central banks now normally gear their money market operations mainly to objectives for short-term interest rates and have only been prepared to permit somewhat more flexibility in the determination of money market rates at particular maturities. Central banks can normally rely on their influence on interbank rates being closely reflected in short-term interest rates on domestic markets with non-bank participation, in short-term interest rates in the offshore markets for the domestic currency, and in the rates applied by the banks for short-term lending to their customers.

Different types of *strategy* may be followed in *interest rate policy*. One possibility is for the central bank to seek to exert direct influence only on money market rates at very short maturities, taking action to balance the market day by day and permitting interest rates on longer maturities to be influenced by market expectations. To a large extent, of course, these expectations would reflect market judgement about likely official responses to developments under way, given the objectives of policy. Alternatively, the central bank may seek mainly to influence rates on somewhat longer money market maturities (e.g. at terms ranging from one week to two months) by periodic operations at suitable maturities. Given appropriate averaging provisions in the reserve requirements, banks would tend to stabilise the day-to-day interest rates in the context of purely stochastic disturbances provided they are confident that unexpectedly large or protracted liquidity disturbances will be countered by supplementary official operations at about the prevailing interest rate. Furthermore, the availability of standing facilities for increasing or reducing the supply of reserves on the initiative of the banks may tend to set limits on fluctuations in the day-to-day rate. Day-to-day interbank rates may, however, move quickly in response to changes in expectations

about the near-term prospects for interest rates.<sup>9</sup> In this case, too, the markets will attempt to anticipate changes in interest rate policy. Provided they do so correctly, such responses could be helpful if, for one reason or another, adjustment of interest rates on the authorities' instruments takes time to implement. In some instances quick market interest rate responses which serve, say, to counter exchange market pressures might even obviate the need for official action.

In situations where active arbitrage takes place along the yield curve of money market interest rates or, as in many countries, where only a limited number of banks participate in the markets, signalling devices often play a major role. Such signals may come from changes in the type of instrument used by the central bank in supplying reserves and in the maturity of the operations concerned as well as from changes in the interest rates applied. Widely publicised changes in discount rates which do not normally lie close to market rates (but which may affect the cost of emergency accommodation in the case of reserve shortfalls) may be used mainly for signalling purposes. They may indicate the central bank's intentions with regard to underlying interest rate tendencies or, in the context of discretionary policies, the authorities' views about the relative importance of divergent developments in the different indicators of monetary developments and likely future responses to the persistence of emerging trends.

\* \* \*

<sup>9</sup> It has been argued that profit maximisation should induce banks to adjust their accumulation of reserve holdings so as to eliminate expected changes in day-to-day interest rates within the reserve-holding period – with the result that the rate should tend to follow a “martingale” sequence, irrespective of whether the authorities are targeting interest rates or bank reserves. In fact, as indicated above, bank behaviour evidently displays more risk aversion, and institutional factors constrain reserve accumulation paths. In the *United States* large movements in the day-to-day interbank rate in response to “news” revealed by weekly announcements of developments in the money stock were regularly observed during the 1979-82 period, when the Federal Reserve was targeting non-borrowed bank reserves. However, these movements became less pronounced once the Federal Reserve adopted procedures more adapted to stabilising short-term interest rates (see Section IV).

The following three sections compare developments in central bank operating procedures during the 1980s in individual G-10 countries in the light of the generalisations set out in Section II and the framework outlined in Section III. The emphasis, particularly in Section IV, is on the way the instruments interact in influencing interest rates in the interbank money market. However, an effort is made to consider reasons why procedures still differ from country to country. By the same token, an attempt is made in Sections VII and VIII, which deal with domestic and external constraints on money market policy, to include institutional comparisons that may help to explain why difficulties of which some central banks are acutely aware have not been encountered (or perceived) by others.

#### **IV. Central bank credit facilities**

In most countries central banks have traditionally offered standing credit facilities which could be drawn upon on the initiative of the banks,<sup>10</sup> in case of need, at charges known in advance and normally subject only to infrequent change. Such arrangements may originally have been designed mainly to finance clearing imbalances or, perhaps, as a channel for last-resort assistance at times of stress. In addition, however, though various kinds of conditionality have applied in principle, central bank credit facilities have also served in most countries to meet part of the reserve needs of the banking system as a whole in a regular or continuing way.

In many countries the provisions governing the granting of central bank credit (see Table 2) have been simplified over the years, notably by reducing the range of special facilities for privileged

<sup>10</sup> In some countries, including *Belgium, Canada, France, Japan, the Netherlands* and *the United Kingdom*, money market dealers, bill brokers or discount houses or security dealers which intermediate between the banks and the central bank in certain types of transaction enjoy central bank credit facilities. Typically, either the operations are marginal or the bodies concerned can be considered analytically as part of the banking system.

Table 2. Institutional characteristics of central bank credit facilities with posted interest rates\*

|   | BE | CA | FR | DE | IT | JP | NL | SE | CH | GB | US |
|---|----|----|----|----|----|----|----|----|----|----|----|
| Ordinary discount facility available                            | *  | *  | *  | *  | *  | *  | *  | *  | *  | *  | *  |
| Loan or advance facility available (a)                          | *  | *  | *  | *  | *b | *b | *b | *b | *b | *  | *b |
| Discount rate lower than loan or advance rate (c)               |    |    |    | *  | *d |    |    |    | *  |    | *e |
| Access subject to quotas or ceilings                            | *f | *  |    | *g | *  | *h | *h | *  |    |    |    |
| Quota applicable to average borrowing over a period             | *i |    |    |    |    |    | *j |    |    |    |    |
| Penalty for frequent recourse or borrowing in excess of quota   |    |    |    |    |    |    |    |    |    |    |    |
| Access restricted administratively                              | *k | *l |    |    | *m | *n | *o |    |    |    | p  |
| Key official rate now above market interest rates               | *  | *  | *  | *  | *  | *q |    |    |    | *  | *r |
| Official rate reset regularly in relation to Treasury bill rate | *  | *  | *  |    |    |    |    |    |    |    |    |
| Minimum periods for credit granted                              | *s | *v | *  | *s | *t | *y | *u |    |    |    |    |
| Other special provisions  |    |    | *w |    | *x |    |    |    |    |    |    |

BE: Belgium, CA: Canada, FR: France, DE: Germany, IT: Italy, JP: Japan, NL: the Netherlands, SE: Sweden, CH: Switzerland, GB: the United Kingdom, US: the United States

\* The table summarises the institutional arrangements for central bank credit to financial institutions. As explained in the text, some of the remaining credit facilities may have lost much of their earlier importance.

(a) For Italy, ordinary and fixed-term advances; for France, standing "pension" facility for short-term purchase and resale of Treasury bills; for the United Kingdom, occasional lending at minimum lending rate or under arrangements for afternoon lending. (b) Most central bank credit takes the form of loans or secured advances. (c) After the quoted rates are converted to a comparable basis. (d) Lower rates apply for certain agricultural credits. (e) Higher lending rates apply for extended credit (see text). (f) Rediscouinting and advances subject to separate quota systems. (g) Discount credit only. (h) Rediscouinting and advances under same quota system. (i) Monthly advance facility only. (j) Quotas are set for 3 months for total borrowing under discount and advance system. (k) Since September 1982 the rate for advances exceeding the quota is equal to the basic advance rate. (l) Only one drawing per two-week reserve-holding period at Bank rate; charges for further borrowing fixed at the discretion of the Bank of Canada. (m) Penalty rates increase for operations undertaken within 5, 15 or 30 days of the preceding ones. (n) A surcharge of 4% over the discount rate for lending to city banks in excess of ceiling. (o) The Netherlands Bank can at any time impose a surcharge on borrowing in the upper tranche of the total entitlement. (p) A surcharge was in effect in 1980-81 (see text). (q) Timing, allotment and repayment of lending determined by the Bank of Japan. (r) The Federal Reserve scrutinises the need for adjustment credit. (s) Periods corresponding to the remaining life of the discounted paper. (t) 6 months for certain agricultural credits. (u) 10 days for discount credit. (v) A bank may only take an advance on the last day of a reserve-holding period if on the preceding day its cumulative average cash reserve ratio was at least equal to the legal minimum. (w) A rediscouint facility at a privileged interest rate is offered to banks for medium-term export paper. However, banks have to redeposit the proceeds with the Bank of France at market rate. (x) In May 1985 a commission charge was introduced for unutilised credit lines under the ordinary advance facility. (y) Discount rate is calculated by counting both start and end dates as full days, thereby increasing effective cost.



credit.<sup>11</sup> By the late 1970s advances or secured (lombard) loans had largely supplanted the traditional rediscounting of bills as the normal instrument for meeting banks' reserve needs. In some countries discount credit is still granted on concessional terms in limited amounts or for special purposes, but the rate applied normally has little impact on interest rates in the interbank market.<sup>12</sup>

Fairly generally, however, though elements of flexibility in the effective marginal charges applied were introduced in the early 1980s (see below), the cumbersome procedures laid down for effecting changes in the basic interest rates applied<sup>13</sup> came to be seen as an impediment to prompt adjustments in money market rates. Political difficulties experienced in achieving agreement on, or in implementing highly visible increases in, official interest rates were a major consideration in some countries. In some cases the extent to which the design of the facilities left the initiative in making liquidity adjustments to the banks came to be viewed as a potential obstacle to effective monetary control.

Central bank credit facilities of the conventional kind may not be indispensable but they may nevertheless serve useful purposes. In practice, last-resort assistance has often been provided by purchase of securities or by other means. In some countries open-ended credit facilities have been suspended or abolished altogether and other ways

<sup>11</sup> In this respect the impression given by Table 2 may be somewhat deceptive in that some remaining arrangements may have lost much of their former significance.

<sup>12</sup> In the *United States* the term "discounts" normally also covers secured loans. In some countries minimum periods for which discount (or other concessional credit) is made available raise the effective cost of using it for shorter-term adjustments of reserve positions. In *France*, where rediscounting at privileged fixed interest rates of medium-term export paper had reached a scale which threatened to undermine the authorities' control over money market interest rates, the banks agreed in 1981 to redeposit the liquidity created by new operations with the Bank of France at market-related rates (see also Table 2). The element of subsidy involved in such rediscounting was subsequently reduced substantially by raising the discount rate applied in relation to market rates.

<sup>13</sup> Typically, these call for approval at the periodic meetings of the central bank governing board and in some cases, at least tacitly, for approval by the Treasury.

of coping with clearing imbalances have been found. Other market-related instruments are now available for providing system reserves. Yet closing the discount window need not increase the central bank's influence over interest rates or bank reserves if, for instance, banks respond by holding larger free reserve balances. In the *United States*, in a context of highly developed money markets, discount facilities have continued to be used for relieving liquidity pressures in a way which may even at times have facilitated monetary restraint. Though the use made of them elsewhere is different, central bank credit lines have also remained in place in most other countries, and the impact of the charges applied on market interest rates has been reduced by operational changes which have tended to discourage extensive recourse to the facilities. Typically, banks are still permitted to exercise some discretion in deciding when to use the facilities under arrangements which imply either that the posted rates tend to set an upper limit on fluctuations in market interest rates or that the effective posted rate can be varied flexibly.

A distinction has traditionally been drawn between systems like that of the *United States*, in which the central bank makes extensive use of outright purchases of securities on the open market for supplying (non-borrowed) reserves to the banks, and ones in which the liquidity, not only of individual banks but also of the banking system as a whole, is more dependent on direct central bank lending. In the latter money market interest rates were seen to be inherently more closely influenced by rates applied in central bank credit operations.<sup>14</sup> In the *United States* discount credit is rationed by

<sup>14</sup> The fact that in the absence of large government borrowing requirements (and a large market in outstanding government securities) the expansion of central bank money in Japan and in many European countries was for many years based on lending to the banks (which financed bank lending to the private sector) and the accumulation of foreign exchange reserves was no doubt an underlying influence on the instruments used. Another distinction which is sometimes drawn depends on whether the banks hold free reserves or rely on central bank credit to accommodate their residual required reserve needs. The analytical significance of this distinction may also be limited in a context of uncertainty about the conditions under which reserve needs will be accommodated.

administrative constraints on the use by banks of the Federal Reserve discount window in a way which permits the discount rate<sup>15</sup> to be kept below the day-to-day interbank rate (the Federal funds rate) by a variable margin. Moreover, the Federal funds rate could also differ from the rate on the outright security transactions which constituted the Federal Reserve's archetypal instrument. The tendency in countries other than the United States to restrict access to credit facilities and to make increased use of various market operations in supplying bank reserves may have tended to make any such distinction less meaningful. On the other hand, as pointed out in Section V, some of the new operations still differ from open market operations in the United States in that they are conducted by special procedures in ways which make for a very close relationship between the rates applied and money market rates.

More important, however, is a distinction which has emerged in recent years with the use in the *United States* of operating objectives for bank reserves. Somewhat paradoxically, the net result seems to be that in contrast to the tendency in other countries, where the influence of official discount and secured lending rates on interest rates in the interbank market has decreased, the influence of the Federal Reserve discount rate on money market rates in the *United States*, though still indirect, has increased.

In the *United States* changes in the discount rate typically had little impact on the market rate prior to 1979 because open market operations were geared to keeping the Federal funds rate (the overnight interbank rate) within a narrow range. The adoption in October 1979 of operating objectives for bank reserves changed this situation by permitting the banks' demand for reserves to influence market interest rates. Because large, frequent and prolonged recourse

<sup>15</sup> The basic rate applies for short-term adjustment credit and for seasonal credit to banks in agricultural communities. Higher charges are applied under special facilities for extended credit designed to permit banks to deal with sustained liquidity pressures. Because the pressure to repay extended credit promptly is less strong, the Federal Reserve treats it analytically as non-borrowed reserves (see below).

by banks to the discount window is discouraged by the Federal Reserve, the banks' willingness to borrow depends on the past, present and expected future differential between the discount rate and short-term interest rates in markets which individual banks can use for adjusting their reserve positions – particularly the Federal funds market. This relationship can be expressed by a borrowing function in which this interest rate differential is an important explanatory variable.

Under the procedures in place between late 1979 and mid-1982, when the Federal Reserve employed non-borrowed reserves as the principal operating objective, borrowing at the Federal Reserve served as a safety valve but also as a channel for transmitting reserve pressures to interest rates. The arrangements were ostensibly designed to permit money market rates to respond automatically to deviations of  $M_1$  from the target course in a way that would tend, in time, to stabilise the growth rate of that aggregate – provided the demand for it remained stable. In the case, for instance, of an acceleration in the growth of  $M_1$  in relation to the objective, borrowed reserves would have to rise in the absence of an adjustment in the non-borrowed reserve path (or in the banks' demand for excess reserves). As a result, upward pressure would be placed on the Federal funds rate. In practice, the Federal Reserve Open Market Committee continued to make implicit judgements about the level of interest rates likely to be consistent with meeting the monetary growth targets, and to estimate the corresponding level of borrowing, which was then deducted from the forecast demand for total reserves to derive the target for non-borrowed reserves.<sup>16</sup> Provided that the discount rate remained below the Federal funds rate, the interest

<sup>16</sup> Total reserves (i.e. required reserves plus excess reserves) are forecast on the assumption that there will be little change in excess reserves in the very short run, but some allowance is made for increases around quarterly settlement dates and for a trend increase. (In fact, the influence of the borrowing and reserve requirement regulations, e.g. with respect to carry-over (see Section V), is quite complex.)

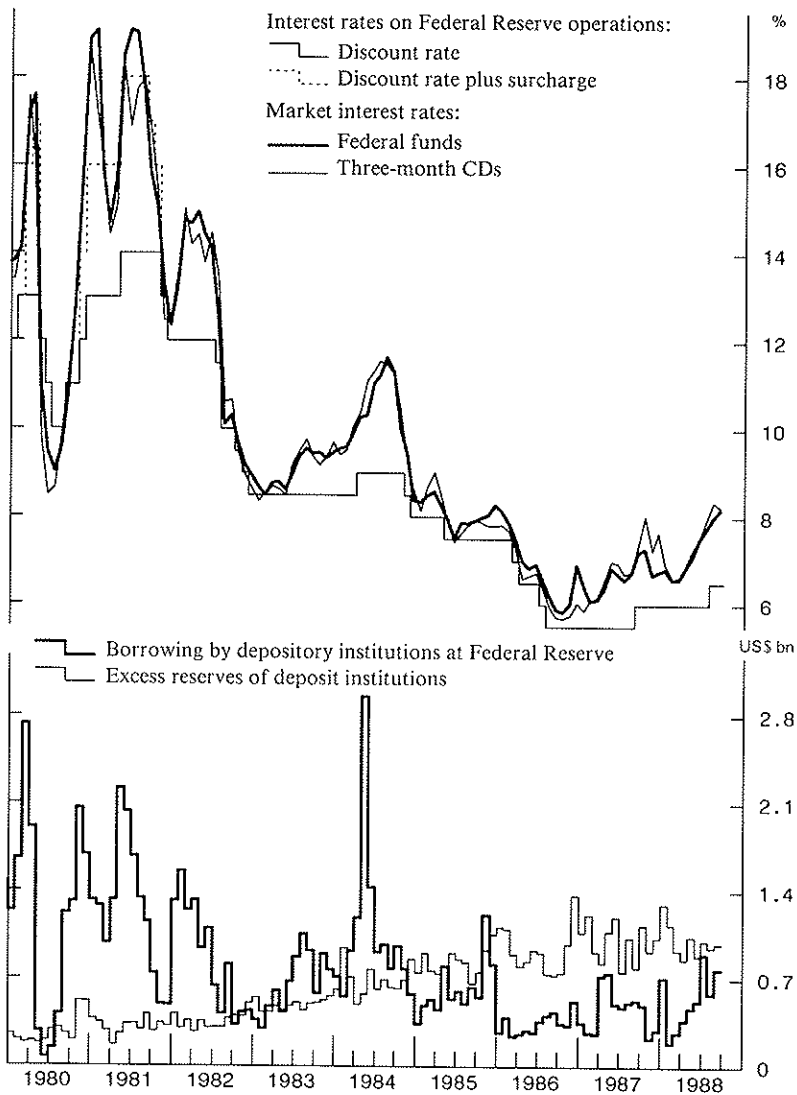
elasticity of borrowing at the Federal Reserve (given interest rate expectations) could serve to moderate movements in the Federal funds rate. Indeed, adjustment and seasonal borrowing became highly volatile and, as can be seen in Graph 1, the fluctuations in borrowing were closely related in the short run to fluctuations in the Federal funds rate (the discount rate being relatively stable). Under a restrictive objective for non-borrowed reserves, increases in the discount rate (or the imposition of a penalty charge) tended, given limited scope for adjustments in bank liabilities in the short run, to strengthen upward pressure on money market rates both directly and indirectly via their influence on perceptions of the stance of policy. The Open Market Committee continued to lay down a tolerance range for movements in the Federal funds rate between the Committee's periodic meetings, but this range was so wide (normally 4 percentage points) that the funds rate usually remained well within it.<sup>17</sup>

Since mid-1982 non-borrowed reserve objectives have been adjusted weekly, in the light of deviations of required reserves from the projections, so as to achieve the desired degree of monetary restraint or ease but also with a view to permitting more stability in the short run in bank borrowings at the Federal Reserve (borrowed reserve procedure). In effect, the incentive to borrowing provided by the margin between the discount rate and the Federal funds rate still serves as a fulcrum for a policy which has brought about more stability in the Federal funds rate.<sup>18</sup> This largely explains why the Federal Reserve never acceded to monetarist proposals to establish market procedures for rationing Federal Reserve credit by attempting to raise the discount rate above the Federal funds rate, though it

<sup>17</sup> Though the funds rate was not always in the middle of the range.

<sup>18</sup> In the short run the Federal Reserve tends in practice to accommodate random or quarter-end influences on the demand for Federal Reserve credit even when they are large enough to affect average borrowing over the reserve maintenance period so as to prevent large swings in the Federal funds rate.

Graph 1. United States: Money market interest rates and Federal Reserve operations



conceded that delays in adjusting the discount rate had at times permitted the margin between the two rates to become very large.<sup>19</sup>

The underlying relationship between the Federal funds rate and the level of bank borrowing at the Federal Reserve – given the discount rate – became less predictable after a lengthening of the reserve-holding period in early 1984 (see Section VI) gave more scope for banks' interest rate expectations to influence the timing of the constitution of their reserves.<sup>20</sup> Subsequent experience showed that in some circumstances the Federal funds rate could still vary over a fairly wide range even in the absence of adjustments to the objectives for borrowing.

In the period following the plunge in stock market prices in late 1987 the Federal Reserve responded to the risk of financial fragility by supplying liquidity generously through open market operations geared fairly directly to norms for the Federal funds rate. In a context of great uncertainty about reserve needs, one objective was to minimise the risk that the Open Market Committee's policy intentions would be misunderstood. Against the background of an apparent rise in the demand for required and excess reserves and of strong disinclination on the part of banks to use the discount window, the Federal Reserve made no attempt to avoid an unexpectedly steep decline in adjustment and seasonal borrowing. For a time management of the supply of bank reserves remained sensitive to the lingering reluctance of banks to borrow from the Federal Reserve, but by the spring of 1988 non-borrowed reserve operating procedures were again in place and were being used to encourage a rise in the Federal funds rate.

<sup>19</sup> A surcharge applied in the 1980-81 phase of severe monetary restraint for excessively frequent recourse to adjustment credit by large banks implied an effective cost much closer to, but still generally below, the Federal funds rate (see Graph 1).

<sup>20</sup> Moreover, in 1984, when funding difficulties experienced by a major bank led to a strong rise in adjustment borrowing, the Federal funds rate came under upward pressure as banks sought to demonstrate the absence of a need to borrow and attempted to protect future borrowing possibilities.

In most other countries central bank operating objectives have continued to be more clearly expressed in terms of interest rates, with central bank lending procedures playing a more explicit role in guiding and stabilising money market rates.<sup>21</sup> The principal changes in the design of central bank credit facilities in recent years have consisted, firstly, in the application of procedures for varying the effective marginal cost of recourse by the banking system more flexibly, and, secondly, in the introduction of disincentives to the use of the facilities. As a result, the posted rates came to serve less as pegs and more as boundaries for market rates which could move in response to market forces or to the use of more flexible instruments. Moreover, in many countries other than the United States the interest rates charged for central bank accommodation under standing open facilities or, in their absence, occasional accommodation are now normally penal.

A variety of instruments for flexibly raising the effective marginal interest cost of central bank credit in relation to the basic discount or secured-lending rate were developed in the 1979-82 monetary restraint period – in some cases, it is true, by refining procedures used previously during the 1970s. In *Germany* for a time in 1981 and 1982 the Bundesbank made lombard credit available only under a Special Lombard Facility at a cost higher than the ordinary lombard rate. In *Belgium* and the *Netherlands* variable penalties for borrowing in excess of credit quotas or for borrowing in the upper of two tranches into which the quota was divided were applied at various times. In *Belgium* and *France* certain types of marginal central bank accommodation were for a time offered only at market-related rates. In *Italy* and *Sweden* reserve supply policy could be adapted so as to

<sup>21</sup> The objectives for specially adjusted concepts of the central bank money stock published in *Germany* and *Switzerland* are intermediate objectives which the authorities seek, at least in *Germany*, to meet largely by appropriate settings of interest rate instruments. To a considerable extent the use of norms for the “monetary base” in *Italy* seems to reflect the difficulties experienced in preventing rises in central bank credit to the Government from undermining monetary authorities’ influence over short-term interest rates (see below).



make penalty charges applicable to borrowing by individual banks at frequent intervals (in the case of *Italy*) or in excess of specified limits (*Sweden*) so as to raise the effective marginal cost of central bank credit to the system. As explained below, arrangements which permitted the central bank to exercise a very high degree of discretion in granting credit to banks and in determining the conditions applied were already operative in *Canada* and *Japan* and were put in place in 1981 in the *United Kingdom*.

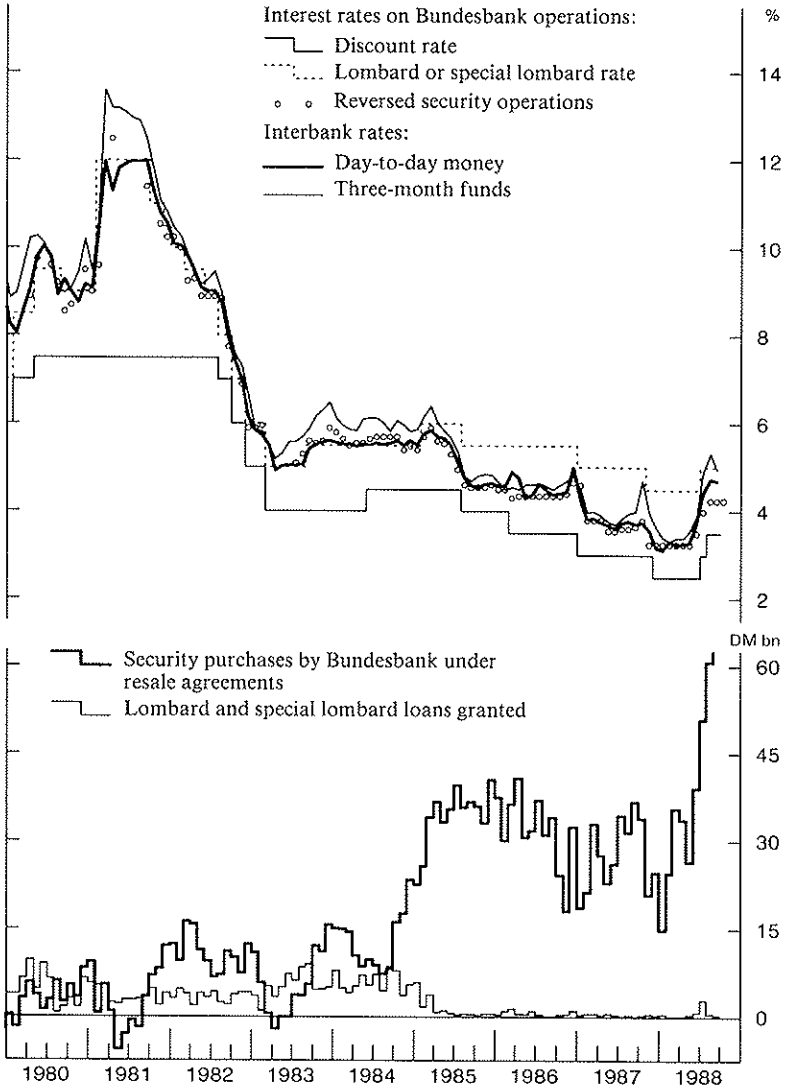
In most of these countries the posted basic rate for central bank advances or loans had normally stood below money market rates in the past. Though the central bank had ultimately been prepared to accommodate system reserve needs in the short run, individual banks were generally discouraged from having recourse to central bank loans and advances other than in limited amounts for short periods. Typically, the steep rises in the effective marginal cost of central bank credit in the early 1980s were accompanied by even steeper rises in day-to-day interbank rates as constraints on access to central bank credit were tightened or administered more stringently. More recently, with the central bank typically making more active use of market operations in supplying liquidity, money market rates could move below the key central bank lending rate in a group of countries which included *Germany*, *Italy*, *Belgium* and *Switzerland*. (A relationship of this kind had been established much earlier in *Canada*.) Though facilitated by economic conditions which made a decline in market rates appropriate, the change was regarded in many cases mainly as a structural one designed to make the last-resort character of the official credit lines more clearly evident. A comparable situation also exists in *France*, where the announced interest rate on a standing facility under which the banks can acquire reserves on their own initiative (see below) now normally stands above money market rates. In *Belgium* and *Canada* the desired rate relationships have been achieved by arrangements providing for the regular resetting of official rates. In most other countries, however, more flexibility in money market rates has been brought about in ways which permit normally stable official lending rates to continue

to serve as an anchor for market rates and allow changes in these rates to retain their traditional function as clear signals of the authorities' intentions. The role now played by central bank credit facilities in the authorities' operating procedures in the various G-10 countries other than the United States is explained in the following paragraphs.

In *Germany*, under the arrangements for supplying bank reserves in operation until 1985, the day-to-day money market rate often tended to remain close to and just above the Bundesbank's lombard lending rate. Although lombard credit was not intended to be used for meeting lasting reserve needs, it in fact often served to accommodate the system's residual need for reserves.<sup>22</sup> The day-to-day rate moved up in relation to the lombard rate after 1978, when the availability of lombard credit was restricted by quantitative limits for a brief period. It came to rest just above the relatively high interest charge on the Special Lombard Facility, which was made available when access to ordinary lombard credit was suspended in 1981. In the event, accommodation under the Special Lombard Facility remained almost continuously on offer, though there was no official commitment to this effect. A progressive lowering of the interest rate on the special facility underpinned the subsequent progressive decline in market rates, and a close relationship between the rate on ordinary lombard facilities and the day-to-day money rate re-emerged when these facilities were reopened. In January 1985, however, a structural change in this relationship took place when the Bundesbank raised the lombard rate to a level above that applied in its temporary security operations and began to use these market operations to supply reserves more liberally (see Graph 2). These changes provided a strong disincentive to the use of lombard credit (other than in exceptional circumstances). It also freed money market rates throughout the maturity spectrum from dependence on the lombard rate, permitting them to move more flexibly in response to

<sup>22</sup> At times of unusual reserve ease the market rate could move lower if the banks had little outstanding lombard credit to repay. In this situation the discount rate could tend to check the fall to the extent that utilisation of discount ceilings decreased.

Graph 2. Germany: Money market interest rates and Bundesbank operations

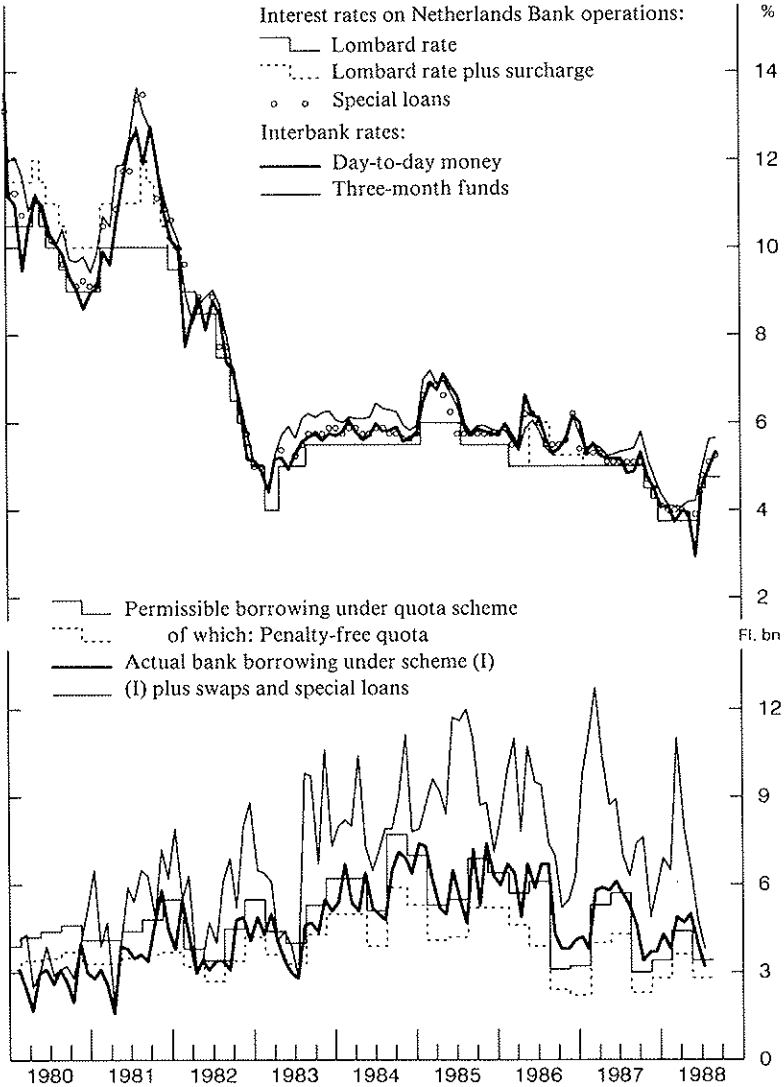


changes in the rates applied to the Bundesbank's market operations. To preclude the possibility of excessive liquidity in the market causing too sharp a fall in the day-to-day interest rate, the Bundesbank introduced a new facility under which it offers the banks Treasury bills with maturities of normally three days as an outlet for surplus funds.

In many respects the new money market control procedures introduced in *France* in December 1986 operate in a similar way to those now in place in Germany, though the institutional arrangements are different. Thus money market rates are now guided mainly by the rates applied in periodic acquisitions by the Bank of France of paper by tender operations in much the same way as rates in *Germany* are influenced by the Bundesbank's temporary security operations (see Section V). Though traditional open-ended credit arrangements have played no steering role since the ordinary discount entitlements were abolished in 1971, a reactivated short-term "pension" (a type of reversed transaction in securities or bills) facility continuously available for use on the initiative of the banks normally sets an upper limit to fluctuations in the day-to-day money market rate. (It was a seven-day facility until August 1988, when in a context of uncertainty about developments in money market rates banks were offered a choice between five and ten-day maturities.) A lower limit can be set by short-term (normally day-to-day) liquidity-absorbing "pension" operations conducted on an ad hoc basis at the discretion of the Bank of France.

It is interesting to compare these arrangements with procedures in the *Netherlands*, where the banking system as a whole has remained dependent on accommodation granted by the Netherlands Bank in the form of traditional credit and "special loans" at market-related interest rates (see Section V(b)). To ensure that this situation would continue to prevail as the Netherlands Bank accumulated a new portfolio of government securities (see Section V(a)), a reserve requirement for banks was introduced in July 1988. The Netherlands Bank regularly announces in advance banks' average entitlement to discount and lombard credit over three-month periods (see Graph 3).

Graph 3. Netherlands: Money market interest rates and Netherlands Bank operations



A surcharge may be imposed at short notice on borrowing in the upper tranche of the entitlement (expressed as a certain percentage of the penalty-free lower tranche, the so-called borrowing quota). Such a surcharge was in effect (for the first time since 1981) between May 1986 and January 1987.<sup>23</sup> Normally, provision of liquidity by special loans has been geared to keeping the banks' residual average credit needs within the limits set by the entitlement, but even when no surcharge has been in effect the quotas have at times been set restrictively so as to keep the banks heavily dependent on accommodation provided by special loans. Under these circumstances day-to-day money market rates, which normally tend to remain just above a level set by the ordinary rate for secured advances (plus the surcharge when it is in effect), have at times risen much higher. The system can help to ensure rapid rises in money market interest rates when losses of official foreign exchange reserves increase the banks' need for central bank accommodation (see Section VIII). However, it lacks the type of downward interest rate flexibility which has been introduced in other countries in recent years in that when market rates move down to a level close to the rate on secured advances, market rates can be lowered only by a lowering of this official rate.

In *Belgium* the official rates for discounts and secured advances have remained at a higher level than most rates in the interbank market since late 1984. However, the former no longer directly influence the latter. Since May 1985 the official rates have been fixed weekly in relation to (in practice higher than) the rate on three-month Treasury certificates, an arrangement which essentially serves to discourage the use of central bank credit by banks to finance the acquisition of short-term government securities. In fact, bank holdings of such securities, of which a proportion matures every day, had become so large that banks were no longer dependent on central bank accommodation.<sup>24</sup> In this situation the rates on short-term

<sup>23</sup> For a time in the early 1980s a second, higher surcharge applied for borrowing in excess of the entitlement.

Treasury certificates, which affect the banks' willingness to acquire and hold them, and, in turn, other short-term interest rates, had become the key rates in the system.<sup>25</sup> One implication is that little scope is left for the play of market forces to influence money rates at any maturity, and virtually any change in rates has to be initiated by an official decision. Another is that in the absence of an official interest rate response, downward pressures on the currency may tend to be reflected both in sales of official foreign exchange reserves and in a decline in Treasury bill sales (or net redemptions). To the extent that this induces the Government to increase its net short-term foreign currency borrowing, the official external reserves are protected by what has been called an "automatic" mechanism, though it is not a market one (see Section VIII).

In *Italy* the basic official discount rate has in recent years also been applied for ordinary advances (under facilities which individual banks can use, within agreed limits, to regulate fluctuations in their reserve position) and as the basic rate for fixed-term advances from the Bank of Italy. Since 1984 it has generally stood above the overnight money market rate,<sup>26</sup> though the overnight rate has moved

<sup>24</sup> As one, two and three-month Treasury certificates are continuously available on tap, banks can use them to invest reserves at any time and can also structure their holdings in such a way as to permit expected reserve losses to be covered by redemptions.

<sup>25</sup> The rates are set by the Board of Management of the National Bank, which can also move the discount rate within a range specified at the weekly meetings of the Bank's Council of Regents, which officially sets the discount rate. The National Bank shares with the Treasury responsibility for setting rates on six to twelve-month Treasury certificates (which are issued by a tender procedure) and those on four-month paper issued by the Securities Market Stabilisation Fund. The overnight interbank rate is determined in a market segmented by regulations relating to the placement of clearing balances (see Section V).

<sup>26</sup> The development of the overnight market began in the 1980s. The interest rate in the longer-established interbank sight deposit market has typically responded only slowly to pressure on bank reserve positions. Given the existence of structural borrowing and lending and the absence, until recently, of a distinct term sector, not all nominal sight deposits may actually have been liquid. The pattern of rates may also at times have been affected by disequilibria in the credit market associated with the use of credit ceilings.

back up above the discount rates in periods when the lira was under pressure in the exchange market. In these circumstances market rates have tended to move up towards the maximum penalty rate applying for frequent recourse to fixed-term advances from the Bank of Italy, as they had done in earlier years at times when the supply of reserves could be effectively restricted. In an effort to make banks' recourse to credit from the Bank of Italy more predictable the maximum periods between the use of fixed-term advances which trigger application of penalties were shortened in 1983 in order to provide banks with a stronger incentive to repay advances as soon as the need for them diminished, and the duration of the advances was made variable, at the Bank of Italy's discretion, up to a limit of twenty-five days. In May 1985 a commission charge for unutilised credit lines available for ordinary advances was introduced, together with arrangements under which the Bank of Italy could cut the lines at short notice if necessary. The proposed averaging arrangements for reserve holdings (see Section VI) will give banks more scope for managing their reserves flexibly. It is envisaged that the ordinary credit lines will be progressively curtailed as the permitted scope for reducing the level of reserves increases. The intention is that the official rates for fixed advances should in future be changed more flexibly and be kept high in relation to market rates.

In *Switzerland*, too, the official lombard rate has generally been kept at a higher level than term money market rates in the last few years. Prior to a change in January 1988 (see Section VI), the banks' compliance with the high cash liquidity requirements specified in banking legislation was monitored only at the month or quarter-end. Under these circumstances the banks' demand for Swiss franc reserves typically surged up strongly for one or two critical days each month. Between 1981 and early 1988 the National Bank placed quantitative limits on the extent to which it was prepared to accommodate these "ultimo" demands for reserves by discounts and secured loans and called for binding advance notification of the banks' end-month accommodation needs. Partly reflecting the difficulties banks experienced in forecasting their end-month reserve

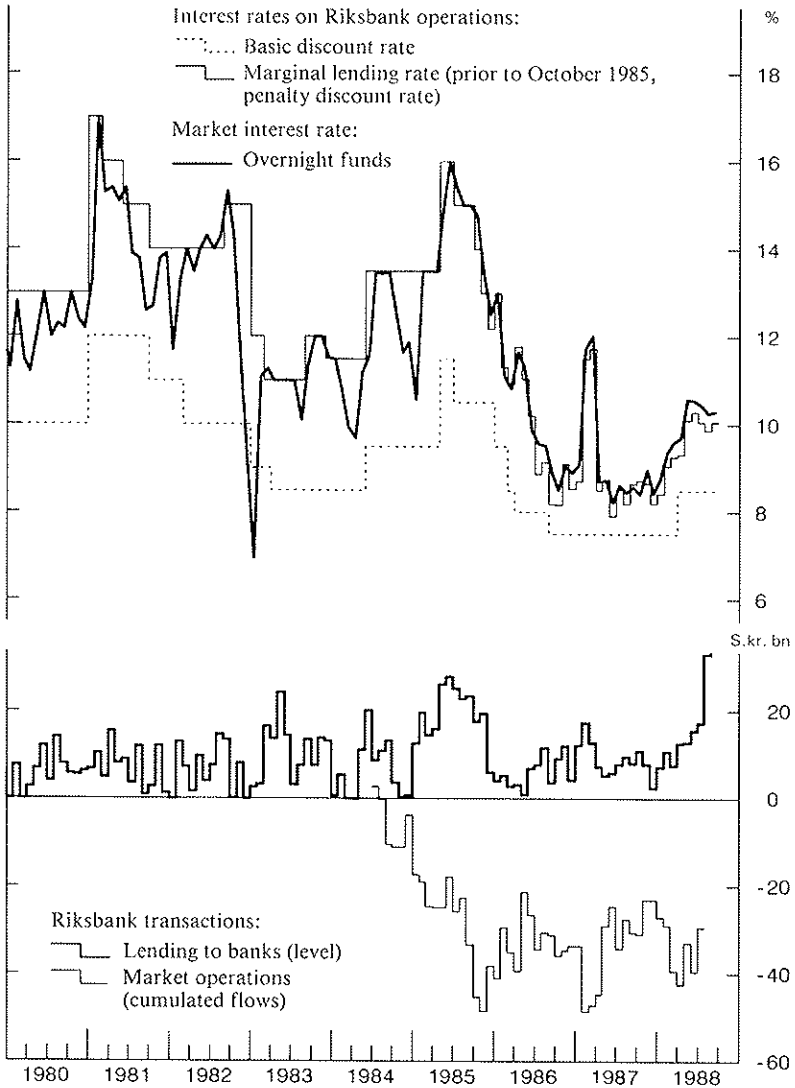


positions, very short-term interest rates at times rose very steeply at the "ultimo" – with two-day Euro-currency at times reaching peaks of over 100% (on an annualised basis). The National Bank is under an obligation to rediscount a particular category of stockpiling bills, but it could quintuple the effective cost of funds which are needed only for one day by imposing a minimum five-day term. In early 1988, when the monthly pattern of money market rate developments had become much smoother, the five-day rule was abolished, and the rediscounting facilities have come under more general review. One question is whether it would not be appropriate to set the basic discount rate at a level which would be normally higher than market rates.

In *Sweden* new money market mechanisms introduced in December 1985 included a graduated scale of charges rising above the basic discount rate for Riksbank lending to the banks, with the steps based on each bank's borrowing in relation to its own capital. The change resulted in the development of an active interbank market for day-to-day money at interest rates which can be flexibly influenced by changes in the banking system's need for accommodation brought about by central bank transactions in government securities (see Graph 4). Arbitrage ensures that the day-to-day money rate is determined by the cost to the marginal borrower of central bank credit. A refinement of the scale of borrowing charges in early 1988, when each step of the scale was split into two, enhanced the Riksbank's ability to guide the day-to-day interest rate at levels above, but largely independent of, the basic discount rate. Should an excess of reserves emerge, the interest rate paid on a deposit facility at the central bank, which is below the lowest rate in the scale of charges for borrowing from the Riksbank, would place a floor under the day-to-day rate.

In *Japan* the basic official discount rate still lies well below the call-money and bill rates in the interbank market. Central bank credit is rationed by credit lines established under the provisions of the bank credit control ("window guidance") system. Moreover, decisions about the daily allocation to banks are made completely at the

Graph 4. Sweden: Money market interest rates and Riksbank operations



discretion of the Bank of Japan, which may also withdraw at any time credit granted previously, so as to impose "repayment pressure". Decisions about the daily allocation of credit also affect the charge applied, which is calculated (both start and end-dates are calculated as a full day) to make the effective cost of using Bank of Japan credit rise as the period of utilisation falls and can reach twice the basic charge in the case of use for one day.<sup>27</sup> In Japan, therefore, central bank lending has long been a highly flexible and powerful instrument which is still used, in combination with new market instruments, either to offset daily fluctuations in bank reserve positions or to tighten or ease these positions. The discretion which the Bank of Japan can exercise in setting the terms of accommodation can place the banks in a situation of great uncertainty as to the conditions under which future reserve needs will be met. Any acceleration or deceleration of the pace at which reserves are provided in the course of the reserve-holding period in relation to a steady growth path normally has an immediate effect on interest rates in the interbank call-money market. In recent years the deregulation of the money markets has allowed these rates to move somewhat more freely than in the past in response to changing pressures on reserve positions.<sup>28</sup>

In *Canada* Bank rate (the Bank of Canada's official lending rate) has since March 1980 been set each week at a level normally  $\frac{1}{4}\%$  above that of the average rate in the previous Treasury bill tender – a similar formula had been used for setting Bank rate between November 1956 and June 1962 and had remained in effect between 1962 and 1980 for setting the rate charged for liquidity assistance

<sup>27</sup> In principle a surcharge of 4% over the basic rate applies when individual banks have to borrow in excess of their quota, but banks avoid such recourse, and in effect the daily allocation procedures usually function as the effective limit on recourse. Arrangements for "special lending" by the Bank of Japan for periods of up to three months at rates higher than the discount rate were made in 1981 but have not been put into effect.

<sup>28</sup> The amplitude of the movements has not, of course, been large by the standards of many other countries.

granted by the Bank of Canada to security dealers under purchase and resale agreements (see Section V). Under these arrangements, which were largely designed to help cope with increased volatility in interest rates in the United States, Bank rate normally remains above the interest rate on day-to-day interbank loans, though changes in the term structure of money market rates can influence the size of the margin. Advances by the Bank of Canada are used only occasionally by individual banks to meet shortages of reserves caused by the exigencies of the clearing.<sup>29</sup> Indeed, accommodation at Bank rate is available to individual banks only once in each fourteen-day reserve-holding period; the charges for more frequent recourse are entirely at the discretion of the Bank of Canada. Moreover, the imposition of a one-day lag in the crediting of the proceeds of payments for short-term securities transactions and interbank loans in the books of the Bank of Canada implies, in effect, that individual banks have been able to cover shortages of cash arising on the last day of the reserve-holding period only by advances from the Bank of Canada. Uncertainty about the terms on which end-period reserve needs will be met has provided them with an incentive to aim at holding a buffer of free precautionary reserves at the end of the reserve period, with the result that increases or decreases in the day-to-day interbank rate can be induced by raising or lowering the daily supply of reserves in relation to the banks' planned trajectory for the accumulation of excess reserves during the holding period. Although it is planned to restructure reserve requirements, retention of the special clearing rules should permit the Bank of Canada to retain close control over the day-to-day interbank interest rate.<sup>30</sup>

<sup>29</sup> In 1985 term loans and other short-term advances were extended on a large scale to individual banks which encountered liquidity problems, but the amounts outstanding have subsequently been reduced.

<sup>30</sup> New clearing settlement arrangements introduced in July 1986 eliminated the cost to banks of the one-day lag by an accounting procedure involving backdating, but did not change the incentive to build up excess reserves since banks still cannot adjust their reserve positions on the last day of the reserve-holding period without recourse to the Bank of Canada.

In the *United Kingdom* continuous publication by the Bank of England of a minimum lending rate was terminated by the 1981 money market reforms. This change formed part of an effort to overcome a propensity to delay making changes to official posted rates by permitting market judgements – formed on the basis, inter alia, of developments in the money stock – to exert more influence on interest rates. At the same time, the authorities terminated the practice of deliberately creating reserve shortages by issuing Treasury bills in excess of expected Treasury cash needs at the weekly auction and of relieving them subsequently – either by purchasing Treasury bills at posted dealing rates or by lending to the discount market<sup>31</sup> so as to make the authorities' chosen minimum lending rate effective. The authorities have since sought, in effect, to balance the money market each day, offsetting estimated surpluses and deficits by market operations without the aid of reserve-averaging or other arrangements for absorbing disturbances in the supply of reserves. They have continued to operate an interest rate based monetary control system. At first they tried to confine their operations to very short-term market transactions in bills at interest rates quoted by the discount houses at the invitation of the Bank of England. If the rates offered were unacceptable (in that they lay outside an unpublished band), additional reserves could be supplied or withdrawn. However, these arrangements were not successful in disengaging longer-term money market rates from direct official influence (see Section V). In addition it came to be recognised that in some contexts procedures which could permit a clearer official lead in the formation of interest rates were needed. Since 1985, therefore, the Bank of England has from time to time refrained from buying the full amount of bills necessary to accommodate the system and has instead invited the discount houses to borrow from it – once, in January 1985, at a minimum lending rate posted in the morning for one day and on

<sup>31</sup> Most Bank of England money market and lending transactions have traditionally been conducted with specialised bill discount houses, which in effect play an intermediary role between the authorities and the banks.

many occasions under the "2.30 arrangements" which come into effect at a time of day when the position of the market is fairly well established (see Graph 11). Such lending is effected at interest rates and for periods chosen by the authorities. The duration is normally a week or less but has been longer on occasions when the aim has been to stabilise interest rate expectations.<sup>32</sup>

## V. Market operations and fine-tuning instruments

Outright purchases of securities in the open market, often regarded as a kind of prototype of open market operations, are still of minor importance in money market management in most countries. It is more in the development of new techniques and instruments for use in supplying and withdrawing bank reserves on a short-term temporary basis and for fine-tuning interest rates that the major changes have taken place. Some of the instruments concerned are similar in certain respects to ones developed earlier in private markets. In some cases their use by the central bank involves transactions in private markets at prices quoted by dealers. In others, however, the interest rates applied can be flexibly set by the central bank, though in other respects the transactions may be little different from an ordinary credit operation. Since these newer techniques and their implications for the conduct of monetary policy are less well known, some fairly technical information is included in the following sections. The use of market instruments in individual countries is summarised in Table 3.

### *(a) Outright market transactions in securities and bills*<sup>33</sup>

Outright purchases in the secondary market of Federal Government and, to a more limited extent, Federal Agency securities

<sup>32</sup> In addition, "late assistance" may be given on undisclosed terms at the end of the day, when the outcome of the clearing is known.

<sup>33</sup> Including sales by the central bank of its own or government paper for the purpose of absorbing bank reserves.

Table 3. Central bank market operations and fine-tuning instruments

|   | BE | CA | FR | DE | IT | JP | NL | SE | CH | GB | US |
|---|----|----|----|----|----|----|----|----|----|----|----|
| Outright market transactions in securities and bills      |    |    |    |    |    |    |    |    |    |    |    |
| - outright purchases of government bonds and notes (a)    |    | *  |    | *  | *  | *  | *b |    | *c | *d | *  |
| - outright sales of government securities (a)             |    | *  |    | *  | *  |    | *b |    |    | *  | *  |
| - outright purchases of Treasury bills                    |    | *  | *  |    | *  |    |    | *  |    | *  | *  |
| - outright sales of Treasury bills                        | *e | *  | *  | *f | *  | *  |    | *  |    | *  | *  |
| - outright purchases of private bills                     |    |    |    |    |    | *  |    |    |    | *  |    |
| - outright sales of private bills                         |    |    |    | *  |    | *  |    |    |    |    |    |
| - outright sales of bills issued by the central bank      |    |    |    |    |    | *  |    |    | *  |    |    |
| - other   |    |    |    |    |    | *g |    |    |    |    |    |
| Reversed transactions in securities and bills             |    |    |    |    |    |    |    |    |    |    |    |
| - purchase and resale operations in government securities |    | *  | *  | *  | *  | *  |    | *  |    | *h | *  |
| - sale and repurchase operations in government securities |    | *  | *  | *  | *  |    |    |    |    | *  | *  |
| - purchase and resale operations in private bills         |    |    |    |    |    |    |    |    |    |    |    |
| - sale and repurchase operations in private bills         |    |    | *i |    |    |    |    |    |    | *  |    |
| - other   |    |    |    |    |    |    | *j |    |    | *  |    |
| Reversed foreign currency operations                      |    |    |    |    |    |    | *  |    | *  | *  |    |
| Transfer of government deposits to market                 |    | *  |    | *  |    |    |    |    | *  | *  | k  |

BE: Belgium, CA: Canada, FR: France, DE: Germany, IT: Italy, JP: Japan, NL: the Netherlands, SE: Sweden, CH: Switzerland, GB: the United Kingdom, US: the United States.

(a) Not including smoothing operations of the authorities for government account. (b) A portfolio of government bonds is being built up by the Netherlands Bank for use in capital market operations designed only to influence the term structure of interest rates. (c) Mainly cantonal and bank bonds. (d) Including purchases from the Treasury for subsequent resale in the market. (e) The National Bank issues short-term Treasury bills (1, 2 and 3 months) on tap to the banks and sets the interest rate on these bills. (f) Mainly as a short-term investment facility for absorbing excess bank reserves (usually 3 days); the Bundesbank has also at times sold "mobilisation" paper (see text). (g) In 1986 the Bank of Japan purchased certificates of deposit in the market for the first time. (h) Including government-guaranteed export and shipbuilding paper. (i) Mainly very short-term liquidity-absorbing operations (day-to-day pensions). (j) Special loans at market-related interest rates. (k) At times the Federal Reserve may ask the Treasury to adjust its balances with the System to assist in the management of bank reserves.

have long been the principal instrument for providing bank reserves on an enduring basis in the *United States*. Transactions are handled “over the counter”, the bulk of the orders being placed with so-called “primary” dealers in Treasury securities, some of which are specialised departments of money-centre banks. Normally, dealers are requested to tender for securities of a particular type and maturity. Allocations take place at the most favourable bid prices, up to the point at which the desired amount is purchased or placed (“US allocation system”). The institutional context is one of an unusually sharp distinction between debt management operations, which are conducted by the Treasury, and monetary policy operations, essentially consisting in net purchases in the secondary market, conducted by the Federal Reserve. The Federal Reserve does not acquire government securities in the primary market, though it may, in effect, redeem securities directly<sup>34</sup> and does so in periods when large reductions in bank reserves become necessary.

Generally, the Federal Reserve engages in only three or four outright purchase transactions in notes and bonds each year and not more than two open market sales. Normally, transactions are heavily concentrated in the Treasury bill market, which is very broad. Operations are typically conducted in a way which minimises their direct impact on the structure of yields.<sup>35</sup> Market participants are

<sup>34</sup> By submitting low bids which seem unlikely to be successful in funding operations. For securities it wishes to replace it may make “non-competitive” bids. Such bids, which are often also made by small investors, are allocated in full at an interest rate determined by setting “competitive” bids against the remainder of the amount offered for tender. “Even-keel” procedures, under which Treasury funding operations were taken into account in the conduct of Federal Reserve operations, were abandoned in the 1970s.

<sup>35</sup> In the long run a rough proportionality is maintained between the maturities of Federal Reserve holdings and that of total Treasury issues. In purchasing medium or long-term securities, the Federal Reserve seeks neither to utilise nor to impose a particular view of the interest rate outlook and accepts the existing market yield curve. At times, however, sales of bills have been undertaken on a large scale with a view to underscoring the thrust of policy.



usually able to anticipate the timing of these transactions and do not interpret them as a policy indicator. As much as half the System's total outright transactions are handled by it acting as counterparty to foreign central banks instead of passing their orders on to the market.

In *Canada*, too, purchases of government securities have long constituted the main asset counterpart of the expansion of central bank money over time. However, in contrast to practice in the United States, the Bank of Canada acquires securities for its own account in the primary market to a considerable extent by buying government bonds at issue and by participating in the Treasury bill tender. These operations do not play an important role in the short-term management of bank reserve settings, but they have been used to signal the Bank of Canada's interest rate intentions, for instance at times when the management of day-to-day rates was ineffective in countering downward pressures on term money market rates coming from strongly held market expectations of capital gains on securities induced by falls in interest rates in the United States. Open market operations in bonds have also, on occasion, been aimed at directly influencing the term structure of interest rates, while the influence of operations in Treasury bills, either in advance of or at the tender, may be enhanced by market awareness of the link between the Treasury bill rate and Bank rate. The Bank of Canada's ability to influence the tender rate has decreased, however, in recent years as the volume of purchases by other participants has increased.

In most other countries outright purchases of *long-term* securities by the central bank have been limited in scope and have played virtually no role in the conduct of day-to-day money market policy. Given the narrowness of the markets for fixed interest securities other than government bonds, many central banks have wished to avoid operations which might tend to distort developments in long-term interest rates or might tend to circumvent limits on central bank lending to the government. Such considerations still carry some weight in *Germany, Belgium, the Netherlands* and *Switzerland*. In addition, the development of open markets in negotiable public or private sector short-term paper is still impeded by taxes on security

transactions in *Germany* and *Switzerland*; in the *Netherlands* the Treasury deliberately restricts its recourse to short-term financing, and in *Belgium* short-term Treasury paper is available only to banks. However, in *Japan*, *France*, *Sweden* and *Italy*, in particular, the authorities have actively encouraged the development of open markets in short-term securities in recent years, partly with a view to paving the way for open market operations. In some countries the central bank has regularly taken up government securities either direct from the Treasury (as in the case of bonds for subsequent sale "on tap" in the *United Kingdom* or Treasury bills in *Japan*) or in the process of, in effect, underwriting syndicated issues or auctions (as in *Italy*). In such cases market operations by the central bank in the securities concerned may at times have to serve mainly for absorbing bank reserves. In *Japan* and *Sweden* outright open market operations in bills and short-term securities are now used to a significant extent for regulating the supply of bank reserves and for influencing the term structure of money market interest rates. However, only in the *United Kingdom* do they constitute the principal instrument for money market management.

In *Belgium* and the *Netherlands* the central banks have not operated on the market for government securities at all in recent years and have also refrained in principle from purchasing other kinds of bonds.<sup>36</sup> The Netherlands Bank has recently decided to build up a small portfolio of government bonds acquired from the Treasury at issue for use in transactions which could signal the Bank's views with respect to bond yields and the term structure of interest rates. However, the intention is not to make any significant change in the procedures for money market management or in short-term interest rate policy, which is still mainly geared to ensuring that commitments within the European Monetary System with respect to the exchange rate of the guilder are met. Instead, open market operations in the

<sup>36</sup> In *Belgium* intervention on the secondary market and amortisation operations are carried out by the Securities Market Stabilisation Fund (Fonds des Rentes), an independent body which is, however, managed by the central bank.

capital markets would serve as a supplementary indirect instrument of policy – in place of direct credit restraint<sup>37</sup> – which, if effective in exerting an independent influence on the term structure and the demand for money, might help to underpin the exchange rate objective in the medium term.

In *Germany* the Bundesbank has engaged only sporadically in major open market purchases of securities and has never held a large portfolio of bonds for any length of time. It may not purchase bonds direct from the issuer. It engages in operations designed to ensure a steady market for fixed interest securities issued by the Federal Government and its funds, but only for the account of the issuer. In order to absorb bank reserves, the Bundesbank has at times sold “mobilisation” paper (Treasury bills and Treasury discount notes (“U-Schätze”) issued by conversion of a long-standing illiquid claim on the Government) and “liquidity” paper (liabilities of the Bundesbank) to banks and non-banks.<sup>38</sup> The interest rates are determined by the Bundesbank in accordance with money market policy: as in the case of “financing” paper issued by the Treasury, which is not specified as being within the Bundesbank’s “money market regulating arrangements”, only certain types of “mobilisation” and “liquidity” paper are, in principle, eligible for sale to the Bundesbank prior to maturity. A standing facility offered by the Bundesbank for the temporary investment of excess bank reserves in Treasury paper now effectively serves to place a floor under fluctuations in the day-to-day money rate in normal circumstances. In *Switzerland* the National Bank has in recent years

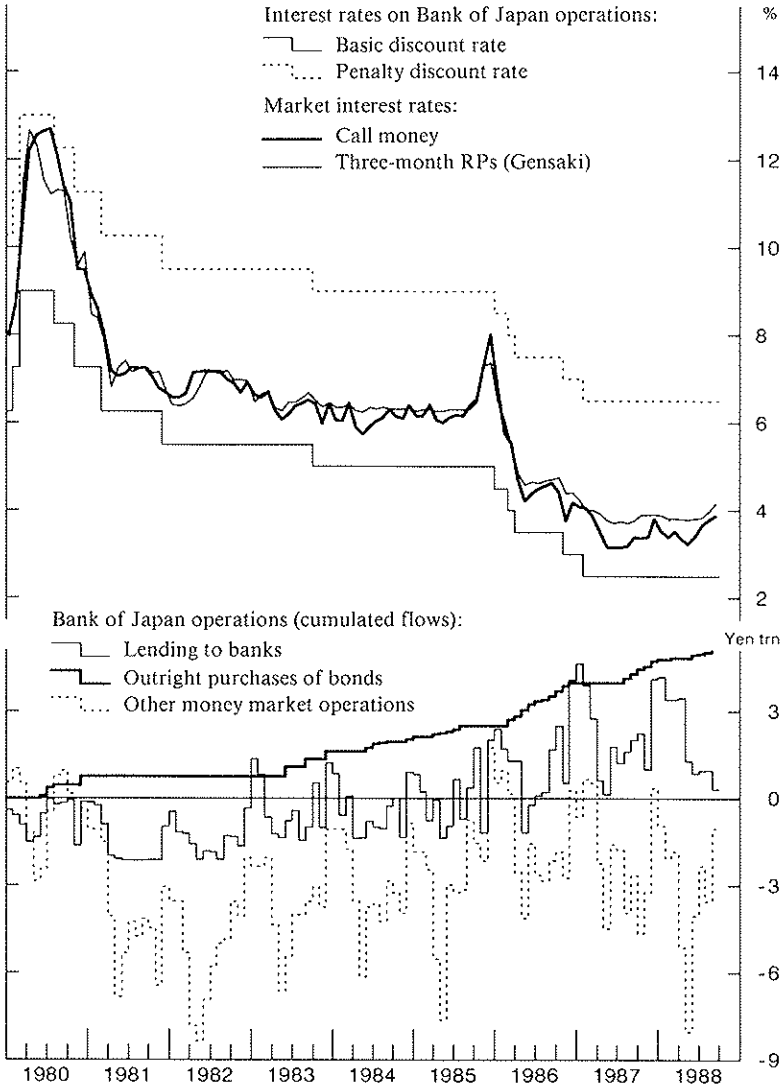
<sup>37</sup> In 1986 and 1987 the banks had undertaken under arrangements concluded with the Netherlands Bank to limit their contribution to domestic liquidity creation (essentially, bank credit to the private sector and long-term lending to the public sector minus the increase in banks’ long-term non-monetary liabilities). In providing an incentive to borrowing by banks on the capital market, these arrangements had been intended to help steepen the term structure of interest rates and to moderate the public’s demand for monetary assets.

<sup>38</sup> In practice, mainly public bodies such as the Post Office and foreign central banks.

gradually built up a portfolio of securities – mainly bank and cantonal bonds – with a view to diversifying its liquidity-supplying instruments. In the 1960s and early 1970s the National Bank issued special sterilisation paper (“rescriptions”) on behalf of the Treasury to neutralise some of the effects on bank reserves of official purchases of foreign exchange; it is empowered to issue and repurchase interest-bearing, non-negotiable notes drawn on itself but has not used this instrument for managing bank reserves. (Some issues were held by a foreign monetary authority in 1980–82.)

For some years the Bank of *Japan* has also followed a policy of gradually increasing its holdings of securities, including ten-year government bonds, to help meet the trend rise in the demand for central bank money. These purchases are made in the open market (i.e. from dealers as well as banks) by means of a tender procedure which at first took four to five days to complete but was subsequently simplified to permit same-day transactions. Tenders have become smaller in amount and more frequent, but the operations are still not normally used for very short-term or seasonal reserve adjustments. To help offset the impact on bank reserves of seasonality in the government accounts and in the note issue, the Bank of Japan has since the early 1970s purchased and sold first-class corporate bills (and bills of financial institutions with corporate bills as collateral) in the market on a considerable scale. However, the average stock of commercial bills which it holds has grown little over time (see Graph 5). Sales in the call-money and bill markets of self-addressed and self-accepted bills drawn by the Bank of Japan with maturities ranging from several days to a few months have also been made from time to time. (The longer-term bills drawn for sale in the bill market are normally resold in the market by short-term money market dealers.) This instrument can be used to supplement changes in lending, in making day-to-day or hour-to-hour adjustments in bank reserve positions and for helping to counteract seasonal swings. Most of the Treasury bill issue is still normally taken up directly by the Bank of Japan, but the Bank has since 1981 sold short-term Treasury finance bills to a limited extent in the market for the purpose of

Graph 5. Japan: Money market interest rates and Bank of Japan operations



absorbing seasonal surpluses of bank reserves. Its degree of freedom in determining the timing and amount of these sales has increased gradually, but the market has not expanded enough to permit the execution of buying operations. In 1986 the Bank of Japan purchased certificates of deposit for the first time, and it is considering commencing transactions in commercial paper in 1989. Market operations at different maturities and in different instruments (which may be used simultaneously to supply and absorb bank reserves) permit the Bank of Japan to exert an influence on the term structure of money market interest rates and help to ensure that interest rate policy impulses are effectively transmitted from the interbank market, which can be closely controlled by the Bank of Japan, to markets which are open to the participation of non-banks. Operations in Treasury paper and in CDs were explicitly developed with the latter objective in mind.

In November 1988, following a period in which open market rates had moved well above interest rates in the call and bill markets, the Bank of Japan announced that it would in future directly influence only rates in these markets at maturities of up to seven days. It would rely more on market forces for influencing rates at longer term. To facilitate arbitrage the commercial bill market was extended to terms of less than one month and the uncollateralised call-money market to transactions at up to six months.

In *France* outright purchases of private and public sector paper by the Bank of France from credit institutions via discount houses under a tender procedure introduced in 1973 (“achats fermes sur appels d’offres”) subsequently constituted the principal instrument for meeting banks’ foreseeable liquidity needs, at least in periods when interest rates could be kept fairly stable. Since December 1986 these transactions have been replaced by similar “pension” (security repurchase) transactions (see below). With participation essentially confined to credit institutions, these public tenders have never been regarded as true “open market” operations. However, the Bank of France reserves the right to undertake anonymous transactions in the secondary markets in bonds and other securities and has since

December 1986 purchased and sold Treasury bills in this way on a limited scale.

In *Sweden* open market transactions by the Riksbank, in the form of outright purchases and sales of Treasury discount notes from banks and dealers, were undertaken for the first time on a significant scale in May 1984. Since then they have replaced the old form of debt management (mainly secondary market sales of government securities) as the principal instrument for actively influencing bank borrowing from the Riksbank, particularly in circumstances in which the aim is to bring about changes in interest rates (see Graph 4). Transactions in Treasury discount notes at different maturities are also designed to influence the term structure of money market interest rates.

In the *United Kingdom* the 1981 reforms were designed to make market transactions in bills by the Bank of England the principal instrument for regulating the money market – the idea being that transactions should take place at a range of best prices quoted by the discount houses. In fact, against a background of strong pressures on money market liquidity and a depletion of the supply of Treasury bills in the market which came about in a context of persistent overfunding of the Government's borrowing requirement (see Section VII), official purchases of private bills became, for a time, a large and continuing source of reserves for the banking system. The Bank's efforts to lengthen the short average maturity of its bill holdings so as to reduce the huge volume of purchases necessitated by redemptions alone implied that the determination of term money rates could not be left to the market, as intended. Term operations may also, at times, have imparted a downward bias to market interest rate expectations which made rate increases more difficult to implement. Though the market could initiate declines in interest rates, the responsibility for making increases was clearly passed back to the authorities, and, contrary to the original intentions, the political profile of short-term interest changes, which came to be interpreted as an indicator of the success of overall government policy, actually seems to have risen. After the decision to cease

overfunding was taken in April 1985, the stock of Treasury bills in the market, by then barely enough to keep the market in existence, was able to rise and the Bank of England's holdings of commercial bills fell.

In *Italy* open market operations by the Bank of Italy traditionally consisted mainly in sales of government securities bought at issue in an effort to control the impact on bank reserves of Treasury borrowing at the central bank. The aim in recent years has been to reduce the need for these sales and to create conditions in which temporary security operations could form an effective instrument of monetary policy. The measures taken included an agreement concluded with the Treasury in July 1981 ("the divorce"), under which the Bank of Italy's purchases of Treasury bills at the auction for subsequent sale on tap were to be limited to an established proportion of the issue, and various changes were made in the procedures used by the Treasury for selling securities (see Section VII).

*(b) Reversed transactions in securities and bills*

In recent years central banks in many G-10 countries have made increased use of reversed transactions in domestic securities for regulating money market developments - in some of these countries these transactions are now the principal instrument used for this purpose. Purchase and resale transactions, consisting in the purchase of securities under a contract providing for their resale at a specified price on a given future date, may be used to supply reserves in very flexible ways, while sale and repurchase agreements can serve to absorb reserves.<sup>39</sup>

The attractiveness of these instruments to central banks is not difficult to explain. The operations can usually be implemented

<sup>39</sup> In the *United States*, where established market terminology is based on the viewpoint of the dealer, "repurchase" or "RP" transactions by the System are reserve-supplying operations, while reserve-absorbing operations (in effect reverse RPs) are known as "matched sale/ purchase (MSP) transactions".



quickly, without a significant effect on the price of the underlying securities. In some cases existing private markets can be used; in others special procedures lend the transactions many of the characteristics of a secured loan. Yet in using them, central banks need not be committed to previously published official lending rates. In fact, the central bank can retain the initiative in setting the amount, timing and duration of the contract and in deciding whether to renew it or to let it unwind upon maturity. Hence the instrument can easily be adapted for countering movements in the supply of bank reserves from other sources while, if desired, preserving a degree of uncertainty about the terms on which banks' future liquidity needs will be met. Reversed security transactions are now used in implementing monetary policy in the *United States, Japan, Canada, Germany, France, the United Kingdom* and *Sweden*, while a special loan instrument with some comparable attributes is used in the *Netherlands*. However, the nature of the operations and the purposes for which they are used varies from country to country in some significant respects.

In the *United States*, where the private market for reversed transactions in government securities has long been large and active, the Federal Reserve now uses reversed security transactions on a regular and continuing basis for adding to and withdrawing bank reserves in large amounts for very short periods. The System can normally effect transactions in large amounts within the day by calling for tenders from dealers for particular maturities, which may range up to fifteen days but are usually for one day.<sup>40</sup> Even when the scale of System RP operations has been geared mainly to objectives for bank reserves, their timing has been influenced by awareness that the Federal funds rate could record large fluctuations in the absence of offsetting Federal Reserve operations (especially around quarter-

<sup>40</sup> In 1987, for instance, gross repurchase transactions on the Open Market Account came to \$315 billion and gross matched transactions came to \$951 billion, compared with gross outright purchases of \$37 billion and a total net increase in the System's portfolio of \$11 billion.

end statement dates). RP transactions can contribute directly to stabilising interest rates in that they often serve to finance dealer positions which might otherwise have to be liquidated. That dealers normally have an option to terminate repurchase agreements in advance of maturity and tend to do so if market conditions turn out to be easier than expected can also at times help to moderate fluctuations in interest rates. Most System operations are in government securities; some are in Federal Agency securities, but System RP transactions in bankers' acceptances were terminated in July 1984. The Federal Reserve itself normally offers repurchase facilities as an investment instrument for balances of foreign official customers. However, by passing these transactions through to the market it can neutralise the impact of increases in foreign balances on the reserves of the US banking system.<sup>41</sup>

In most other countries the nature and impact of the central bank's reversed security transactions is somewhat different. In most cases private markets for reversed security transactions, where they exist, are narrow and central banks have established special arrangements for their own operations. In *Germany* and *France* periodic reversed security transactions offered under an auction procedure for periods of several weeks or more now constitute the principal instrument for supplying banks' foreseeable reserve needs and for steering short-term interest rates. Central bank reversed security transactions may also, however, be used flexibly for various other purposes which have varied from country to country and over time.

In *Germany*, where the Bundesbank had published special market-related rates at which it was prepared to purchase certain types of domestic bills from banks under repurchase agreements outside banks' discount quotas at various times between 1973 and

<sup>41</sup> "Customer RPs" are frequent but usually relatively small and, given that the Federal Reserve normally indicates when it is undertaking such transactions, the market usually attaches more significance to "System RPs" as an indicator of Federal Reserve interest rate intentions. (There is no analogous instrument for absorbing reserves.)

1982, reversed purchases from banks of securities eligible as collateral for lombard loans began in 1979. These operations were used more intensively as from 1982, first to smooth the development of bank reserves in a context of large annual transfers of Bundesbank profits to the Government and then to test market reactions to progressive declines in interest rates. At that time the practice was still to avoid a build-up over time in the total outstanding balances by using reductions in reserve requirements and increases in banks' rediscount quotas to consolidate the provision of reserves by temporary instruments. As from late 1984, however, the terms of the repurchase operations were lengthened and they were used to supply reserves in a more durable way. Reversed operations became even more important, both as a source of reserves and as an influence on market interest rates, when the lombard rate was raised above the level of market rates in 1985. A subsequent decline in the outstanding stock of claims mainly reflected its use to cushion the impact on bank reserves of large net purchases of foreign exchange by the Bundesbank in 1986 and 1987 (see also Graph 2).

In recent years reversed security transactions have generally been geared to covering the prospective reserve requirements of the banking system for a month or two ahead in a way which ensures that the banks' needs for other types of central bank credit remain limited. When a very short-term adjustment in reserve positions becomes necessary, it is typically effected by other instruments such as foreign currency swaps and the transfer of government deposits from the Bundesbank to the banks. In these circumstances the interest rates applied on reversed security transactions have served as a centre of gravity for interbank money market rates at about one month, while the type of tender used has served as a sensitive indicator of the central bank's intentions with respect to the flexibility of the day-to-day interbank rate, as influenced, for instance, by exchange market conditions.

The two different tender procedures which have generally been used for security purchase and resale operations differ in the extent to which they permit bids to influence the rate applied. Both permit the

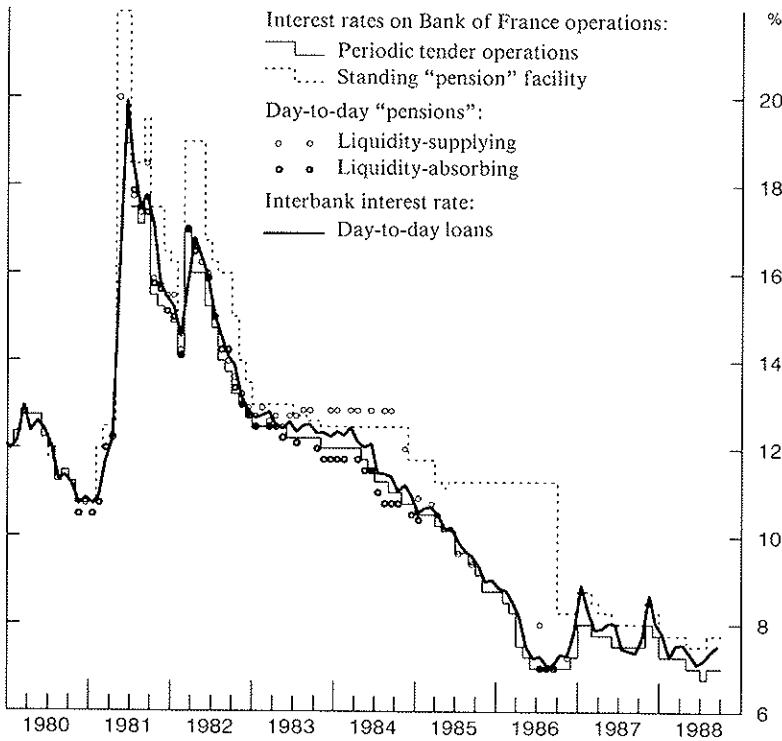
Bundesbank to exercise close control over the amount of reserves supplied by reversed security transactions as well as over the timing and duration of the operations. For "volume" tenders the Bundesbank quotes a fixed interest rate at which it is prepared to accept bids and allocates the total amount on which it decides by scaling down individual bids. "Interest rate" tender procedures, which have been used at times when it seemed appropriate to permit somewhat more flexibility in the determination of short-term interest rates, more closely resemble market practice in that banks are asked to submit prices and amounts. Even so, a minimum rate announced by the Bundesbank has tended to be followed in tendering by most banks that are not active borrowers or lenders in the money market. Until recently allocations have always been made uniformly at the rate of the last bid which is within the framework of the total envisaged allocation ("Dutch" allocation procedure). However, as from September 1988 the Bundesbank used interest rate tenders for two-month accommodation with "American" allocation procedures (under which each bidder pays the rate indicated in the bid) together with a volume tender for one-month accommodation. In November 1988 the American allocation procedure was extended to the tender for one-month accommodation. In a period in which market interest rates had been high relative to the uniform tender rate banks with ample collateral had an incentive to bid for very large amounts. More important, the replacement of the single fixed allocation rate by a range of rates quoted by banks potentially implied a substantial further lowering of the profile of the charges applied in central bank operations. Tenders originally took two days to implement but under simpler procedures introduced in April 1987 can now be effected in one day. The securities involved are typically lodged with the Bundesbank in advance so as to facilitate the transfer under arrangements similar to those applying to security for lombard credit.

In *France* "pension" operations<sup>42</sup> of various types have been used for supplying bank reserves since 1969, with relatively more reliance being placed on regular day-to-day operations or standing, term

“pension” facilities than tender operations in periods in which external considerations called for close control of money market interest rates (see Graph 6 and Table 4). Under the arrangements in place since December 1986 the Bank of France supplies the bulk of the banks’ envisaged reserve needs by “pension” operations in which it acquires by tender global mobilisation certificates representing eligible paper maturing within a given period held in the portfolios of credit institutions. (Normally the underlying paper need not be deposited with the Bank of France.) Participants in the tender, which now include major banking institutions as well as discount houses acting on behalf of their client banks, are invited to indicate amounts of central bank money desired at each rate they quote up to a limit set by their holdings of eligible paper. Allocations are made at a uniform rate fixed by the Bank of France to banks bidding at or above that rate. (In practice, banks tend to make applications, at prevailing rates, for the full equivalent of the eligible paper they hold, and the bids have to be scaled down to a total chosen by the authorities.) Usually there are about three to five operations per month with an average term of about three weeks, but on occasion shorter maturities have been offered in addition. As in *Germany*, the interest rate applied has had a signalling effect and usually acts to stabilise term interest rates in the money market. The procedures permit the central bank to exercise a good deal of discretion with respect not only to the size, frequency and duration of the operations, but also with respect to the interest cost of reserves supplied in this way. Even so, consideration has been given to the possibility of accepting bids at the rates quoted, which could remove the subsidy implied in the use of a uniform rate which is generally below the cost of comparable financing in the market. The Bank of France also periodically uses day-to-day “pensions” conducted at market rates with large banks,

<sup>42</sup> To a considerable extent interbank operations on the money market take the form of “pensions” – temporary transactions in securities and bills in which the titles are not transferred from one balance sheet to another. (The standing official fixed rate facility described in Section IV also takes this legal form.)

Graph 6. France: Money market interest rates



mainly for offsetting unexpected reserve shortages or deficiencies which seem likely to cause large fluctuations in money market interest rates. Since the termination of the fixing in December 1986, the Bank of France has been able to exercise its discretion in deciding to report such transactions to the market. A substantial volume of reserves was supplied temporarily by means of this instrument following the stock market collapse in October 1987.

Tender procedures comparable to the "volume" tender in *Germany* are also used in the *Netherlands* for allocating special loans (i.e. loans to banks which are not counted against the entitlements

Table 4. Bank of France money market operations  
(Amounts outstanding, in billions of French francs)

|  | 1972 | 1974 | 1976 | 1982  | 1984  | 1986  | 1987  |
|--|------|------|------|-------|-------|-------|-------|
| <i>At variable interest rates:<sup>1</sup></i> | 33.5 | 86.8 | 30.7 | 72.4  | 92.4  | 37.3  | 77.5  |
| Day-to-day "pensions"                          | 14.6 | 1.0  | 0.3  | 8.4   | 0.4   | 1.8   | } 9.5 |
| Term "pensions"                                | 17.2 | 15.9 | 19.4 | 21.0  | 12.3  | 6.2   |       |
| Tender operations                              | 1.7  | 69.9 | 11.0 | 43.0  | 79.7  | 29.3  | 59.8  |
| Treasury bills bought in market                | -    | -    | -    | -     | -     | -     | 8.2   |
| <i>At fixed rates:<sup>2</sup></i>             | -    | 13.5 | 21.3 | 66.2  | 55.5  | 35.2  | 30.5  |
| Discount credit <sup>3</sup>                   | 11.4 | 13.5 | 21.3 | 78.8  | 88.9  | 77.2  | 68.2  |
| Blocked redepositing                           | -    | -    | -    | -12.6 | -33.4 | -42.0 | -37.7 |
| <i>Total<sup>1</sup></i>                       | -    | 97.2 | 51.5 | 143.7 | 147.9 | 72.5  | 107.9 |

<sup>1</sup> Daily averages, calendar year as from 1984; previously end-month averages. <sup>2</sup> Daily averages, calendar year as from 1984; previously daily averages for banking months.

<sup>3</sup> Mainly privileged export credit (for 1972, end-of-year).

which apply to borrowing under standing facilities). The duration of special loans is generally seven or fourteen days, a new tender being held when they reach maturity. The rate applied is normally related to current market rates. The loans are secured, eligible paper usually being left in the custody of the Netherlands Bank to facilitate the operations. As the Bank has until recently held virtually no negotiable domestic paper, loans have accounted for the bulk of domestic assets, and, though the quotas for ordinary loans have been increased from time to time, the outstanding stock of special loans was on average quite large in the 1980-86 period. In the late 1970s prospective shortages of collateral prompted the experimental introduction of a system under which the banks could assign part of their private sector portfolio to the Netherlands Bank. Against a background of weak private demand for credit, holdings of government paper in the banking system subsequently increased, but because they are unevenly distributed, the system's collective quota cannot always be exhausted unless some parties play a channelling function in the market.

Because of the strong signalling effect of the interest rate on special loans the Netherlands Bank has often been reluctant to use it

to initiate a rise in the level of market rates. In fact, even in a context of infrequent special loan operations the market has often adapted short-term interest rates in a way consistent with stabilising the guilder/DM exchange rate, given the credibility of the authorities' commitment to this objective. At times when banks expected interest rates to fall they have been inclined to defer recourse to special loans in a way which has tended to delay the decline in interest rates. In cases of this kind the Bank has sometimes issued a second overlapping special loan. Use of special loans to supply liquidity temporarily on a very short-term basis was formerly avoided, but since mid-1986 loans for periods as short as one to three days have been granted.

In the *United Kingdom* the Bank of England has in recent years periodically carried out purchase and resale transactions with banks in government securities (and in paper relating to government-guaranteed, fixed interest rate shipbuilding and export credits) outside the market on market-related terms proposed by the Bank. Originally only used to meet peak seasonal liquidity needs in the market arising in the main tax collection period, these transactions came to be used more often to help take some of the load of providing cash to the banking system off normal day-to-day operations. The use of the technique remained restricted by the availability of suitable collateral in the banking system. Purchase and resale transactions in commercial bills with the discount houses have been conducted more frequently, also on terms proposed by the Bank, either to mobilise long-term bills not eligible for purchase by the Bank of England or on occasions when expectations of declines in interest rates made the market unwilling to offer long-term bills for sale on terms acceptable to the Bank. Neither type of purchase and resale operation directly contributes to establishing the official view of interest rates against that of the market, however.

In *Italy* the central bank has since 1979 conducted reversed operations in Treasury bills, variable interest rate Treasury certificates and, to a lesser extent, other Treasury securities. Since 1981 competitive tender arrangements with an American allocation

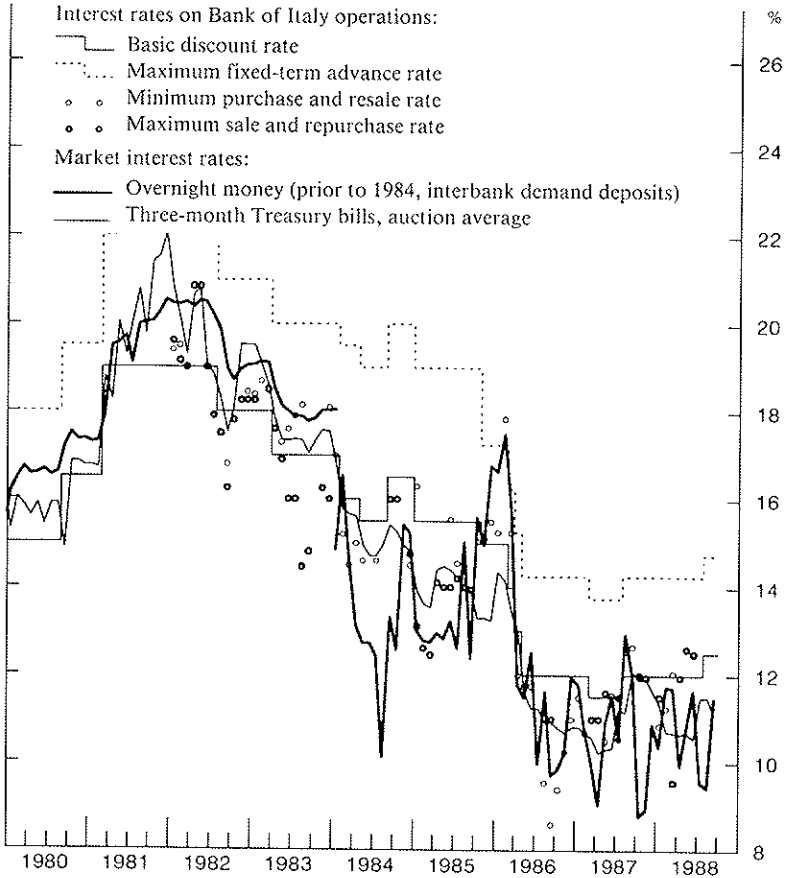


system have been used. The Bank of Italy does not announce a maximum or minimum rate but reserves the right to refuse bids submitted on conditions that seem extreme. Operations are usually conducted at irregular intervals for durations of one to thirty days, as specified by the Bank of Italy. In addition, since March 1984 the Bank has regularly financed – by repurchase agreements concluded at the Treasury bill tender rate – a predetermined proportion of the quota of the issue which the underwriting syndicate of banks is committed to take up. In 1988, to facilitate the development of a new secondary market in government securities, the Bank of Italy undertook to finance primary dealers within certain limits for up to seven days by reversed operations concluded at the interest rates on the securities involved.

Reversed security operations have been used to help moderate short-term movements in bank reserves in conjunction with the fortnightly Treasury bill tender, the monthly inpayment of compulsory reserves by the banks, and, more generally, swings in the Government's position vis-à-vis the Bank of Italy and in the country's official external reserves. The predominant need has been for reserve-absorbing sale and repurchase transactions. However, since late 1985, in periods when bank reserves were absorbed by outflows of funds and unusually strong demand for government securities in a context of interest rate declines, the Bank of Italy has been able for much of the time to make flexible use of sale and repurchase agreements to help steer short-term interest rates. With the official basic discount rate generally at a higher level, the overnight interbank rate has often followed the marginal rate at the tender quite closely (see Graph 7).

Tenders with an American allocation system are also usually used in *Sweden* for reversed transactions in Treasury discount notes by the Riksbank. These are employed, in particular, to counter flexibly the often sizable expansionary or contractionary effects on bank reserves of movements in the Government's cash position and to keep the marginal cost of its lending to banks consistent with the objectives for money market rates. In certain situations, however, the Riksbank has

Graph 7. Italy: Money market interest rates



chosen to specify an interest rate for repurchase operations. All dealers in government securities are invited to participate in reversed security operations. In August 1988 – in a situation in which banks’ reserve shortages were expected to be especially great, and in which a lack of Treasury discount notes in the market precluded the use of

Table 5. Italy: Bank reserve creation on Treasury account  
(Amounts outstanding at end of year, in billions of lire)

|   | 1977             | 1982               | 1987              |
|---|------------------|--------------------|-------------------|
| Treasury securities held by Bank of Italy*  | 29,661           | 38,059             | 71,781            |
| Use of Treasury account at Bank of Italy<br>( <i>Unutilised balance available</i> ) | 4,796<br>(2,986) | 31,910<br>(-2,290) | 61,981<br>(1,101) |
| Total (including other items)   | 35,769           | 76,733             | 137,223           |

\* Including Exchange Office.

reversed transactions for supplying reserves on a large scale – the Riksbank used an auction procedure for allocating a large amount of one-month uncollateralised special loans to banks and security dealers.

In *Japan* purchases of long-term government bonds under resale agreements by the Bank of Japan began in December 1987, the purpose being to increase the flexibility with which the supply of bank reserves could be managed and to permit better control over interest rates in markets which are open to participation by non-banks.

The Bank of *Canada* normally enters into purchase and resale transactions only with specialised security dealers. The operations are carried out at Bank rate and serve only as last-resort accommodation for use when financing is not available from other sources. Any undesired effect on bank reserves is offset by other operations. However, in recent years the Bank of Canada has occasionally acquired short-term government securities from banks and dealers for one day, at terms of the Bank's own choice, in special purchase and resale transactions designed to relieve unusual temporary strains on bank reserves at the end of the reserve period. It is considered that more intensive use of these transactions could reduce the efficiency and speed with which the overnight money markets function. In 1986 a special sale and repurchase transaction was used by the Bank of Canada for the first time to resist unusual downward pressures on the cost of overnight financing.

*(c) Reversed foreign currency operations*

Official spot purchases or sales of foreign exchange are normally geared to objectives for the exchange rate, and their impact on bank reserves and money market interest rates is considered as an actual or potential constraint on money market policies. Even spot foreign exchange market operations may, however, be geared to influencing bank reserves and short-term interest rates, in the first instance, and exchange rates only indirectly – especially in contexts in which forward exchange rate expectations in the market are firmly anchored by credible exchange rate commitments. In some countries prior to 1973, and at least in the Netherlands more recently, the central bank could sometimes regard spot foreign exchange market purchases or sales as an instrument of a money market policy designed to reinforce exchange rate stabilising interest rate behaviour in the market. Outright forward purchases or sales of foreign exchange which have a delayed impact on bank reserves can also be used as an instrument of money market policy in some contexts (as was done, for instance, in the *Netherlands* in 1987). However, swap operations in the foreign exchange market, made under a contract providing for the purchase and sale of foreign currency in the market for two different value dates, are viewed in a number of countries as being more clearly a standard instrument of money market policy.

These transactions have to be seen against the background of an active interbank swap market in the currencies of many G-10 currencies, which has long played a major role in short-term international interest rate arbitrage.<sup>43</sup> For the major currencies arbitrage ensures that premia or discounts quoted in the swap market for a given maturity (converted into percentages per annum) are normally equivalent to the corresponding differentials between interest rates in currencies on the international markets, and the latter

<sup>43</sup> Swap markets, which serve in particular to cover banks' forward foreign exchange commitments to their customers, have normally been more active than forward markets.

in turn normally differ from domestic interbank interest rates only to the extent that the relationship is influenced by exchange controls or reserve requirement regulations. Official swap operations, which in most cases involve spot purchases or sales under a contract providing for their reversal at a future date (in some cases separate spot and forward transactions are used), can be seen as analytically similar in many respects to temporary operations in securities or bills – there is a direct impact on banks' domestic currency reserve balance at the central bank, but the spot (or forward) exchange rate will normally be influenced only to the extent of the impact on interbank interest rates in the domestic currency.<sup>44</sup> (Since the foreign asset the central bank acquires is covered forward, it may be regarded, in effect, as a domestic currency asset.) Central bank currency swap operations may be conducted anonymously in the market at the maturities customarily traded there (normally one week and one, three, six and twelve months with the operation only coming into effect two days after the transaction), but more flexible contracts may be concluded bilaterally with banks at agreed rates. Swap operations are an established technique of money market management in *Germany, the Netherlands* and *Switzerland* and have been used from time to time in other countries, including the *United Kingdom*. In *Germany* foreign exchange transactions under repurchase agreements involving specific foreign currency securities have also been used at times by the Bundesbank to influence bank reserves.

<sup>44</sup> Normally the central bank invests the foreign currency balances which it acquires as a result of a reserve-supplying swap abroad but in some cases it simply returns them to the domestic bank. Generally, US dollars are involved, and it can be assumed that there will be no effect on the level or structure of interest rates abroad. By relying on exchange controls, some central banks have at times sought to influence the swap rate for the domestic currency in the international market directly and selectively or have offered non-market swap rates in an attempt to influence the net foreign currency asset positions of the banks. Currency swaps have also at times been used to influence published official foreign exchange asset positions, but in the countries which now use swaps actively as an instrument of monetary policy the swap positions are published separately.

In *Germany* and the *Netherlands* swap operations constitute the most flexible instrument with respect to maturities, the volume which can be traded in any one deal and the speed with which they can be carried out. They can therefore be used as a buffer to counter undesired fluctuations in the credit institutions' reserve balances in either direction over short periods. Because a disadvantage of the instrument is seen in the limited number of large banks which may act as counterparties, it tends to be used only for this purpose and not for supplying reserves on a permanent basis. In the *Netherlands* the interest rates applied on swap operations by the Netherlands Bank have on occasion been geared to inducing subtle changes in market interest rates, but it has sometimes been found that the signalling effect has not been as strong as hoped for, with the result that very large-scale operations, which complicated the management of bank reserves later in the quota period, were necessary to achieve the desired effect.

In *Switzerland*, where the domestic bill and short-term security markets are extremely narrow, the currency swap has become the main instrument for managing bank reserves. Previously used mainly for meeting the banks' temporary end-month liquidity needs, National Bank currency swaps became a permanent source of bank reserves in the early 1980s in a context in which exchange rate relationships did not call for large cumulative spot purchases of foreign exchange by the National Bank. Beginning in the late 1970s, the maturities of the National Bank's swap transactions were extended to periods of three, six and even, for a time, twelve months. Contracts were regularly renewed and the total amount outstanding subsequently rose progressively. In the 1981-87 period the National Bank often sought to gear maturities to creating uncertainty about the terms on which banks' end-month liquidity needs would be met. At the end of 1987 currency swaps amounted to the equivalent of nearly half of the National Bank's foreign currency assets, which in turn accounted, together with gold, for nearly 90% of its total assets. Operations are concluded at rates close to Euro-Swiss franc swap rates with a relatively small number of banks.

In the *United Kingdom* foreign exchange swaps between the authorities and the banks have been arranged on only a few occasions in the early 1980s, one reason being restrictive legal provisions governing the operations of the Exchange Equalisation Account. Currency swaps have also been used occasionally in *France*, but not primarily for the purpose of managing bank reserves.

*(d) Transfers of non-bank deposits between the central bank and the banks*

In countries where the Treasury normally holds cash balances in excess of immediate needs with the central bank, shifting funds to accounts with the banks may be a convenient way of dealing with disturbances in bank reserves, especially when their timing and expected short duration make it difficult to counteract them through security transactions. Conceptually, one of the simplest and quickest procedures for managing bank reserves, the transfer of government deposits from the central bank to banks and back, can often be effected in an inconspicuous way with little direct impact on short-term market interest rates. However, a framework agreement covering the distribution of the funds among banks, conditions of remuneration and collateral requirements is usually necessary. Such deposit transfers have long been the major instrument for regulating bank reserves in *Canada*, and in recent years they have also been used for fine-tuning purposes in *Germany* and, to a lesser extent, in *Switzerland*. Adjustments in Treasury balances with the Federal Reserve have also been used to assist reserve management in the *United States* on occasion.

In *Canada* it is considered that, although central bank purchases of government securities provide the main instrument for expanding the central bank money stock over time, extensive use of visible open market transactions for adjusting bank reserve positions could have unwelcome impacts on security prices and yields, given the relative lack of depth of the domestic money markets. Although the Government normally maintains most of its surplus funds on

interest-bearing deposit accounts with the chartered banks<sup>45</sup> (a practice which in itself limits the impact of changes in the Government's cash position on bank reserves), the Bank of Canada is authorised by the Minister of Finance to request transfers of funds between the central bank and the chartered banks under an agreement with the chartered banks governing the shares of individual banks in placements and draw-downs. Given that the Government holds only small non-interest-bearing deposits (from which payments are made) with the central bank, the balances available for shifting are sometimes too small. Hence a system has been developed under which the government deposits at the central bank can be created by swap operations in US Treasury paper<sup>46</sup> with the Exchange Fund Account (a government account in which the bulk of the country's foreign exchange reserves are held). These transactions are usually reversed when other factors influencing bank reserves permit (see Graph 8).

In *Germany* the Federal and State Governments are obliged to deposit all their liquid funds in non-interest-bearing accounts with the Bundesbank (Section 17 of the Bundesbank Act). With the approval of the public authorities the Bundesbank can shift these balances to the banking system.<sup>47</sup> Given the uncertainty surrounding developments in the Government's cash needs (and strict limits on its ability to borrow at the Bundesbank), the monetary authorities have

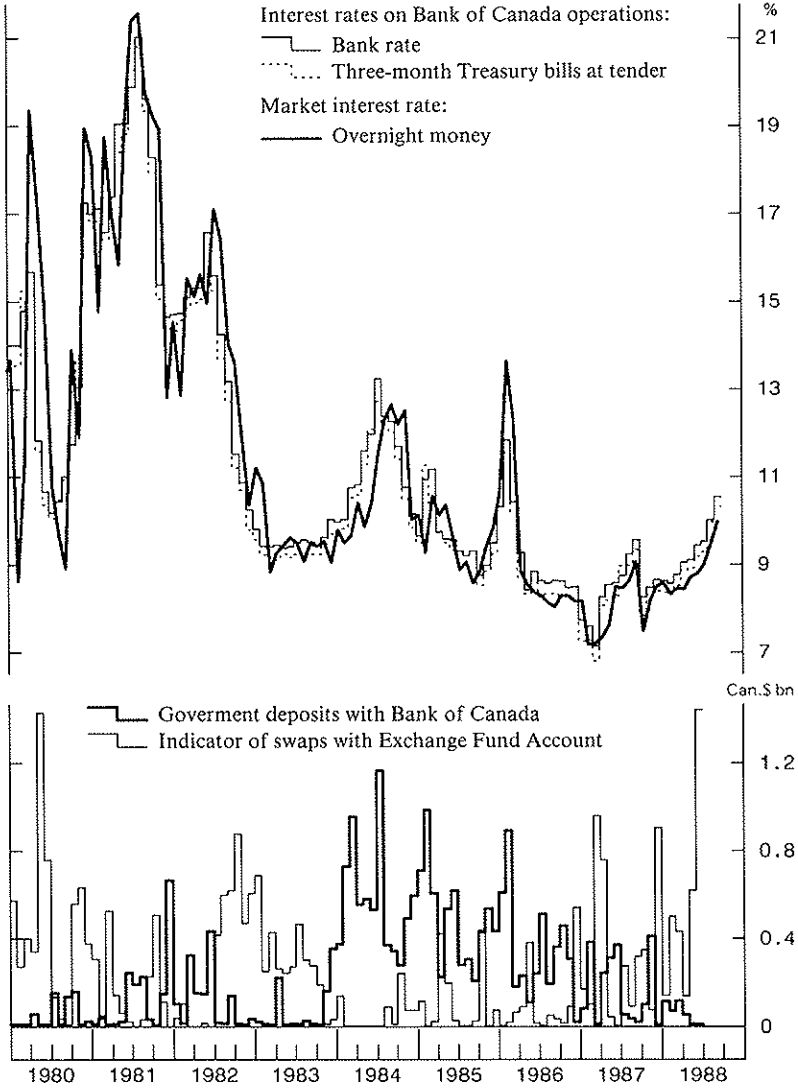
<sup>45</sup> Under a revised arrangement with the financial institutions in effect since April 1986 the Government pays specified charges for particular banking services but earns a basic rate of interest on all its demand deposits, which are allocated to eligible institutions under an agreed formula. Any remaining surplus funds are placed at varying terms (most commonly for seven days) through competitive tenders, usually held on a weekly basis. Financial institutions do not provide collateral.

<sup>46</sup> As such swapped paper constitutes the bulk of the item "other investments" in the Bank of Canada's balance sheet, movements in this item, combined with those in government deposits at the Bank of Canada, provide indications of the volume of bank reserves supplied through shifts of government deposits to the market.

<sup>47</sup> Deposits placed in the market are remunerated at the day-to-day money rate minus an allowance for the cost of reserve requirements.



Graph 8. Canada: Money market interest rates and Bank of Canada operations



been able to use this instrument only for day-to-day operations. Nevertheless, it has proved a useful supplementary instrument for fine-tuning bank reserve positions.

In *Switzerland* the Federal Government in principle holds its cash balances at the central bank. Current-account balances beyond a certain minimum and up to a certain maximum bear interest at discount rate, and the Government may also make term deposits. A convention between the Finance Department and the National Bank which authorises the latter to redeposit such term placements in the market, on the responsibility of the Government, helps to limit their impact on bank reserves.

In the *United States* the management of Treasury balances at the Federal Reserve – though not seen as a policy instrument – is the subject of close consultation between the two organisations. On occasion the Federal Reserve may ask the Treasury to build up or to draw down its balances with it to assist with the management of reserves. Under a 1978 agreement the Treasury undertook to keep the balances on its accounts at the Federal Reserve (which are used for making payments) reasonably steady around a specified level, leaving its remaining balances with commercial banks in “Treasury Tax and Loan” accounts (into which most tax receipts are paid). Large short-run and tax-season swings in the Treasury’s balance at the Federal Reserve could nevertheless continue, partly because the collateral requirements made commercial banks unwilling to accept more than a negotiated maximum amount of Treasury deposits. Fluctuations at the end of the reserve-holding period have proved particularly troublesome. In recent years increased variability in Treasury balances at the Federal Reserve due to major changes in the tax laws, the high level of Treasury borrowing and regular Congressional delays in increasing the Federal debt ceiling has reduced the precision with which the System’s Open Market Desk can forecast factors influencing reserve developments.

In *Sweden* companies and local authorities hold voluntary tax-free investment reserves and compulsory deposits in non-interest-bearing accounts at the Riksbank. These have been built up for

financing approved investments under various schemes that have at times been regarded as important instruments of counter-cyclical fiscal policy. Deposits and withdrawals have to be taken as given for the purposes of short-term money market management. In the *United Kingdom* a long-standing concern that the influence of broader market mechanisms on the interest rates on official operations might be reduced if the authorities were to bypass the bill market by entering into bilateral negotiations with banks has precluded the use of government deposits with banks as an instrument for relieving shortages in the money market.

## **VI. Reserve requirements and the demand for bank reserves**

To a considerable extent the market instruments described above have replaced variations in reserve obligations as an instrument for adjusting bank reserve positions. Reserve requirements are still in place in all but a few G-10 countries, but in most cases the ratios have been reduced substantially since the mid-1970s, and the non-interest-bearing deposits which banks now have to hold at the central bank to satisfy the requirements may not substantially exceed the amounts they need for clearing purposes. In fact, reserve requirements now serve mainly to influence the demand for bank reserves in ways intended to be conducive to the achievement of money market objectives. Most recent changes in the structure of the regulations reflect this, or the hope that they can help to shelter certain domestic interest rates from external influences as controls on international capital movements are liberalised.

The relevant technical characteristics of the arrangements at present in effect in G-10 countries are summarised in Table 6. In particular, as pointed out in Section III, provisions for averaging reserve holdings over a reasonably long period can greatly facilitate the management of short-term money market interest rates in normal circumstances. "Classical" arrangements which require the holding

Table 6. Institutional characteristics of reserve requirement regulations

|  | BE  | CA    | FR | DE    | IT    | JP    | NL | SE | CH  | GB    | US  |
|--|-----|-------|----|-------|-------|-------|----|----|-----|-------|-----|
| Cash reserve requirement in force                              | a   | *     | *  | *     | *     | *     | *  | *  | *b  | *c    | *   |
| Averaging provisions   |     | *     | *  | *     | d     | *     |    |    | *   |       | *   |
| Carry-over provisions  |     |       |    |       |       |       |    |    |     |       | *   |
| Interest payment on reserves                                   |     |       |    |       |       |       |    |    |     |       | *   |
| Contemporaneous (C), lagged (L) or semi-lagged (SL)            |     | L     | SL | SL    | L     | SL    | L  | L  | L   | L     | SL  |
| Length of reserve-accounting period<br>(in days, 30 = 1 month) |     |       |    |       |       |       |    |    |     |       |     |
| Length of holding period (in days)                             |     | 30    | 1  | 30    | 1     | 30    | 90 | 1  | 90  | 180   | 14  |
| End of holding to end of accounting period (in days)           |     | 15g   | 30 | 30    | 30    | 30    | 30 | 30 | 30  | 180   | 14  |
| Highest reserve ratio for demand deposits                      |     | 30/45 | 15 | 15    | 45    | 15    | h  | 60 | 30  | 180   | 2   |
| Highest reserve ratio for term deposits                        |     | 10    | 5i | 12.1i | 22.5j | 2.5i  | ik | 4  | 2.5 | 0.5i  | 12i |
| Highest reserve ratio for savings deposits                     |     | 1i    | 1i | 4.95  | 22.5j | 1.75i | ik | 4  | 2.5 | 0.5i  | 3m  |
| Highest reserve ratio for demand deposits in 1974              |     | 1i    | 2i | 4.15  | 22.5j |       | ik | 4  | 0.5 |       | 3m  |
| Penalty for reserve deficiencies (% above discount rate)       | 6.2 | 12    | 17 | 19.1  | 22.5  | 4.25  | 7n | 5  |     | 12.50 | 18  |
| Reserve requirement for liabilities to non-residents           |     |       | 3p | 3q    |       | 3.75  |    | 4  |     |       | *w  |
| Other provisions   | *x  | *     | *r | *s    | *t    | *     |    | *u | *v  |       |     |
|  |     |       |    |       | *y    |       |    | *z |     |       |     |

BE: Belgium, CA: Canada, FR: France, DE: Germany, IT: Italy, JP: Japan, NL: the Netherlands, SE: Sweden, CH: Switzerland, GB: the United Kingdom, US: the United States.

(a) Last imposed in 1975. A new legal framework for reserve requirements is expected to come into effect in 1989. (b) Liquidity requirement imposed for supervisory purposes; from 1975 until 1988 the Swiss National Bank was authorised to impose cash reserve requirements but never did. (c) The cash ratio is not primarily intended to facilitate the operation of monetary policy, but clearing banks are expected, in addition, to hold balances for clearing purposes. (d) Introduction proposed. A limit to be set for the extent to which banks may reduce the level of reserves is expected to be increased progressively to 5%. (e) Below-market interest rate, currently 5.5%. A higher rate (8.5%) is paid on the proportion of reserves held against certificates of deposit. (f) Normally equivalent to the rate for secured advances from the Netherlands Bank. (g) Banks must maintain the same minimum average reserves for two half-monthly periods (1st-15th and 16th-end of month). (h) Average end-month level in the three months preceding the last month in the previous borrowing quota period. (i) Reserve ratios scaled in relation to levels of banks' deposit liabilities or non-reservable minimum amount. (j) Since 1982 25% of increase until 22.5% of level is reached. (k) The Netherlands Bank can adjust the ratio each month and set it at zero. The holding period may be divided into 2 separate periods. (l) The ratio applies to the monetary sector's eligible liabilities. (m) Non-personal term and savings deposits only. (n) 1973. (o) Until 1981 a reserve asset ratio was in force. (p) Above a monthly average of the day-to-day rate. A maximum penalty of 0.1% per day can be set by the Bank of France. (q) Above the lombard rate. (r) At present the requirement on bank and non-bank non-resident deposits is zero. (s) Currently the ratios for banks' liabilities to residents and non-residents are the same; placements with banks abroad may be netted out of liabilities. (t) In March 1987 a reserve requirement was imposed on changes in banks' foreign currency liabilities net of re-depositing abroad. (u) Exchange controls inhibit short-term banking and non-banking placements in domestic currency. (v) Swiss franc liabilities. (w) 3% reserve requirement on banks' (net) Euro-currency liabilities. (x) At times in the 1970s banks were obliged to observe a minimum ratio between their holdings of public sector debt and their deposit liabilities. (y) A non-interest-bearing reserve requirement applied to lending in excess of credit ceilings when the ceilings were in effect. (z) Excess reserves held on Riksbank accounts are remunerated (currently at 6%). The private non-bank sector also constitutes investment reserves at the central bank (see text).

of deposits with the central bank<sup>48</sup> in amounts linked by ratios to certain categories of bank liabilities and incorporating averaging provisions are in effect in the *United States, Japan, Germany, France* and *Canada*. In *Italy* a transition from a requirement based on the rise in bank liabilities to one based on their level began in 1982, and a proposal to introduce averaging in the course of 1989 has been announced. In *Switzerland*, where there is only a cash requirement established by the Banking Commission for prudential purposes, provisions for measuring compliance on the basis of monthly averages of working days (instead of at the month-end only) came into effect at the beginning of 1988. Averaging is not provided for in the arrangements for reserve requirements introduced in August 1988 in the *Netherlands*, but the averaging provisions in the arrangements for borrowing from the Netherlands Bank under the quota (entitlement) system have broadly similar effects on money market interest rates. (In contrast to the arrangements in other countries the ratios can be varied flexibly from one period to the next.) In most of these countries the holding period is about one month. The main exceptions are the *United States*, where the averaging period has been lengthened from one to two weeks, and *Canada*, where it is split into half-month periods. Provisions which permit a limited carry-over of reserve surpluses or deficiencies from one period to the next are in effect only in the *United States* and *France*.

Contemporaneous accounting has been advocated only in conjunction with quantitative reserve targeting, and the issue has scarcely arisen in countries other than the *United States*, where the lag between the beginning of the accounting and computation periods was shortened to two days in 1984, long after the shift to borrowed reserves targeting had greatly reduced the potential significance of such a change. Lagged or semi-lagged accounting, which is operationally more convenient for the banks and also for the

<sup>48</sup> Banks' holdings of currency count towards fulfilment of the reserve requirements in the *United States, Germany, Canada* and *Sweden* and the cash requirements in *Switzerland*.

authorities in a context of interest rate oriented money market policies, is used in all other countries.<sup>49</sup>

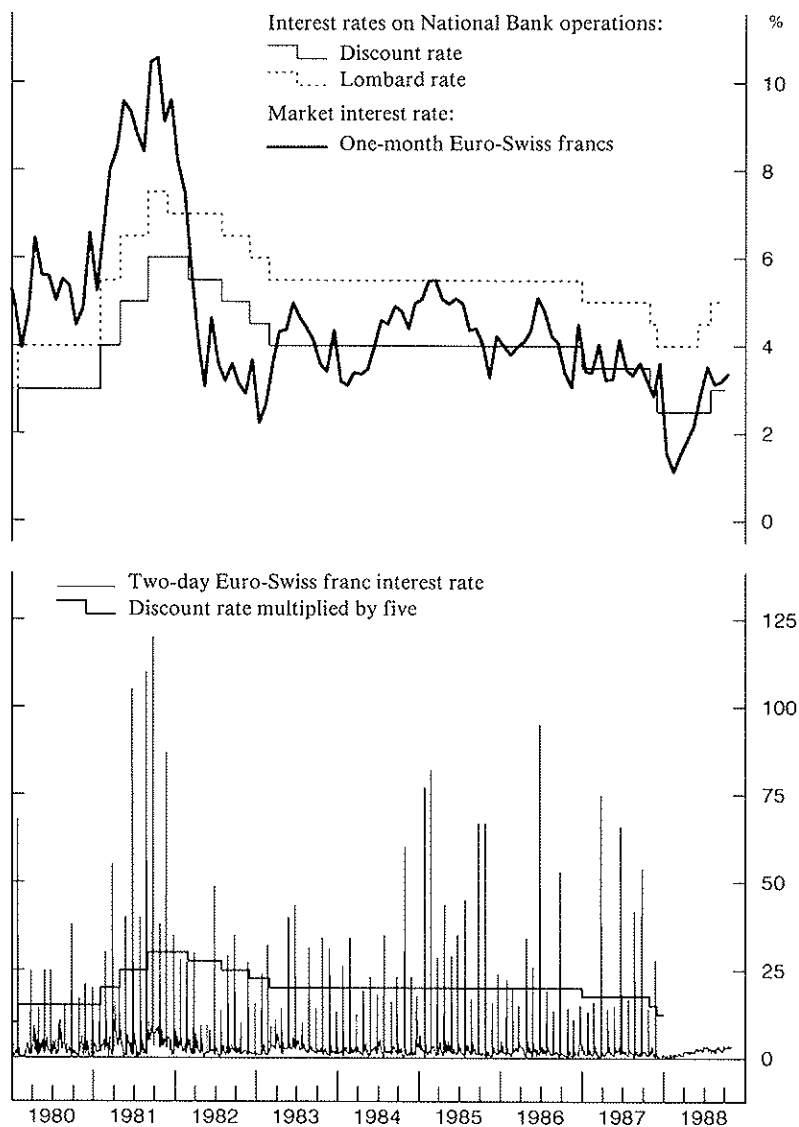
In the *United Kingdom*, where no averaging provisions have been in effect since 1981, the authorities seek to balance the market each day, normally through operations in bills. These operations are, however, facilitated by arrangements which call for the holding of non-interest-bearing deposits with the Bank of England in small amounts fixed for six months at a time in relation to six-monthly averages of banks' "eligible" liabilities. Reserve requirements which stipulate minimum amounts to be held throughout the computation period are in effect in *Sweden*, where the arrangements for borrowing and depositing with the Riksbank (see Section IV) serve to balance the day-to-day money market. This rate often fluctuates considerably from one day to the next, and the Riksbank seeks only to meet goals for it in terms of averages for periods of a week or two. The extreme kind of interest rate behaviour which may arise in the absence of averaging can also be seen in the regular month-end surges of very short-term Swiss franc rates which occurred until the end of 1987 in *Switzerland* (see Graph 9).<sup>50</sup>

In *Italy* high coefficients applying to the growth of bank liabilities served for many years to counteract the effect on bank reserves of increases in lending by the Bank of Italy to the Government. The paying-in by mid-month of amounts based on the rise in bank deposits in the previous month complicated short-run money market management, particularly at the beginning of the year when the

<sup>49</sup> Contemporaneous accounting was applied in conjunction with a three-month holding period for a brief span of time in 1985 and 1986 in *France*.

<sup>50</sup> The form of the averaging may also be important. In *Canada* regular sharp weekend declines in the day-to-day money rate seem to have been stimulated by an averaging procedure based on working days prior to a change in 1983 which gave a weighting of three to Monday positions. In 1986, when the arrangements for the clearing settlement were changed (see Section IV), the weighting of three was applied to Friday (as is the case in the United States). In the other countries applying averaging, the calculation covers all calendar days including non-working days (this may be thought of as giving Friday a weight of three).

Graph 9. Switzerland: Money market interest rates



deposit growth was boosted by interest payments. However, this problem should be mitigated by the proposed arrangements for measuring compliance with reserve requirements as an average over a thirty-day period. Reserve requirements set in relation to credit-granting or to credit-granting in excess of certain limits have been used in the past in *France* and *Italy* but are not at present in effect in any G-10 country.

In the *United States* the Monetary Control Act of 1980 provided for the phased extension of the application of a new system of reserve requirements related mainly to transaction accounts<sup>51</sup> to all deposit institutions (formerly Federal Reserve member banks only). This change was intended to facilitate the targeting of  $M_1$  by using operating objectives for bank reserves. In *Italy* the reserve requirements were extended in 1982 to new types of bank liability, but in 1983 yields on reserves held against fixed-term CDs were increased so as to differentiate them from yields on reserves held against sight deposits. In *Germany* reserve requirements were restructured to ensure that they covered liabilities in the form of bearer securities at up to two years in 1986, when German banks were authorised to issue certificates of deposit. At the same time, the rate schedule for time and savings deposits was lowered and simplified. In *Japan* a change from a very progressive structure, under which all deposits of financial institutions were subject to higher ratios when deposits exceeded a certain amount, to one in which the increase applied only to additional deposits was implemented in 1986.

Total bank demand for reserves depends on the interaction of the reserve requirement regulations with the rules governing the clearing and the provision of central bank credit. In most countries banks can count their clearing balances at the central bank towards meeting

<sup>51</sup> A lagged requirement applies to short-term time deposits and banks' Euro-currency liabilities (i.e. borrowings from related foreign offices (net) and from unrelated foreign depository institutions (gross); loans to US residents by foreign offices of US depository institutions; and sales of assets by US depository institutions and US offices of foreign banks to their foreign offices).



reserve requirements. However, the incurrence of overnight liabilities to the central bank is strictly limited by penalties in the *United States* (where steps have also recently been taken to limit daylight overdrafts), by convention and administrative procedures in *Japan*, and by the application of penalty rates in cases of borrowing more than once in each two-week reserve-holding period in *Canada*. In *Switzerland* the banks must hold balances at the National Bank to permit individual transactions to be cleared throughout the course of the day, but the introduction of new automated clearing procedures in 1987 enabled the banks to economise on the holding of such balances. In the *United Kingdom* clearing banks are expected to maintain the credit balances required for clearing purposes in operational accounts at the Bank of England (in addition to the required non-interest-bearing deposits mentioned above). In *Germany, Italy, France, the Netherlands, Belgium* and *Sweden*, on the other hand, individual banks can, in case of necessity, usually cover unexpected deficiencies at the end of the day, typically on the terms applicable to secured advances from the central bank (but subject to special conditions). In *Belgium* banks can lend positive clearing balances held at the end of the day in the call-money market but may not be net borrowers in this market on average during the month. Surplus clearing balances are taken up by the Rediscount and Guarantee Institute (IRG), a semi-official market-maker in discount bills, and the Securities Market Stabilisation Fund (Fonds des Rentes). Banks hold virtually no deposits with the National Bank.

The differences in arrangements for settling clearing imbalances affect not only the extent to which banks can take advantage of averaging procedures to adjust their compulsory reserve holdings in the light of their interest rate expectations, but also the incentive to hold excess reserves, at the end of and in the course of the reserve period. In the *United States* the demand for excess reserves is normally assumed to be stable in the short run, but it has in fact undergone some marked shifts in recent years. Increases in the volume of transactions on reserve accounts and the phasing-in of changes in reserve requirements under the 1980 Monetary Control

and Depository Institutions Deregulation Act contributed to a trend rise. However, movements have also been indicative of supply influences. Excess reserves tended to rise, for instance, in periods when, under borrowed reserve targeting, policy was designed to prevent the Federal funds rate from moving far above the discount rate. Typically, these were periods in which borrowings and short-term interest rates were low. In *Switzerland* the cash holding now specified in the prudential requirement is much lower than under the pre-1988 arrangements and is designed to correspond only to the amount which would normally be held by a well-conducted bank. Given the special arrangements, holdings of cash reserves by the banking system as a whole substantially exceed the minimum laid down. Fairly accurate forecasts by the National Bank of bank demand for excess reserves thus became a precondition for the continued viability of a money market policy which is geared more to operating objectives for bank reserves than in any other G-10 country. Partly because of the difficulties experienced in making such forecasts in a period following the introduction of the new reserve requirement and interbank payment system, money market policy has subsequently been guided more by developments in money market rates and in the exchange rate of the Swiss franc. In *Canada* uncertainty as to the cost of borrowing from the Bank of Canada induces the banks to aim, under present arrangements, at accumulating a stock of excess reserves at the end of the reserve period which, though relatively small, is considered to play a central role as a fulcrum on which the Bank of Canada could operate for raising or lowering day-to-day money market interest rates. The special clearing arrangements (see Section IV) should ensure that the banks continue to aim at holding reserves for transactions purposes when the reserve requirement is abolished. In the *United Kingdom* the banks notify the Bank of England of the target balances in their operational accounts at which they will aim to assist the Bank in its daily forecasts of the money market's cash position. In *Italy* the banks' demand for excess reserves should be substantially reduced by the introduction of averaging provisions in reserve requirements. In

other G-10 countries bank holdings of central balances beyond what is needed for meeting reserve requirements are negligible and play little role in money market management.

In *Japan*, *Germany* and *France* adjustments in the course of the accumulation of required reserves in relation to the path desired by the banks can be used by the central bank to bring about changes in interest rates even though the banks do not aim at holding excess reserves on average for the period or at the end of it. Developments of this kind cannot be detected from published statistics of reserve holdings in relation to required amounts averaged over the holding period. Where banks do not aim at holding excess reserves, their actual holdings at the end of the reserve period (or of the day in the absence of averaging) normally reflect only unexpected disturbances to which individual banks were exposed or, in some cases, difficulties experienced by the central bank in countering disturbances in the supply of reserves. Wider measures of free bank liquidity incorporating, for instance, unused discount credit entitlements or holdings of liquid government securities are published in some countries, including *Italy* and *Belgium*. However, these do not necessarily indicate much about the capacity of banks to expand credit in countries where policy is geared mainly to influencing the terms and conditions under which banks' marginal reserve needs are accommodated. In this context the distinction between borrowed and non-borrowed reserves also has little meaning, and one between reserves provided on a temporary and permanent basis may be more useful.

In recent years, efforts to cope with external constraints have led to a tightening of reserve requirements. In *France*, in a context of declines in money market rates in response to a strong position of the French franc in the exchange market, reserve requirements were raised on two occasions in 1986 with the aim of limiting the effects on banks' average costs, and hence their lending charges. Similar considerations may have influenced the increase in the reserve requirement in *Sweden* when the new money market arrangements were introduced in 1986. In *Germany* the reserve ratios were

increased in February 1987, for the first time since 1979, to offset the effect on bank reserves of large Bundesbank purchases of foreign exchange. In *Italy*, in a context of inflows of foreign exchange, reserve requirements were extended in March 1987 to the increase in the foreign currency liabilities of the credit institutions calculated net of amounts reinvested abroad or on-lent to other domestic credit institutions. This requirement was suspended in September 1987.

## **VII. Government finance and monetary control**

The ability of the central bank to control interest rates in the interbank markets by using its instruments to make marginal reserve adjustments ultimately depends on its ability to restrain the growth of its other balance-sheet items, such as the currency issue, float and net position vis-à-vis the government and net foreign assets.

Some of the new instruments described above have been designed to cope with troublesome seasonal and short-term fluctuations in these influences on the supply of bank reserves, and in most countries procedures for ensuring a suitable evolution over time have long been in place. In a few cases, however, special efforts have been needed to restrict financing of the government.<sup>52</sup> Normally this is essentially a matter of establishing effective institutional limits on direct central bank credit and domestic debt management procedures which ensure adequate sales of securities in the markets at interest rates consistent with the central bank's objectives for short-term interest rates. In some cases special arrangements have been needed to restrain borrowing abroad by the government in foreign currencies because the central bank was committed to converting the proceeds into disposable domestic currency deposits. Technical problems may also

<sup>52</sup> In the *United States* banks have found ways of increasing Federal Reserve float at times when interest rates were very high, and special measures (including the imposition of charges) have been taken to limit this.

arise when non-monetary financing of the government becomes very large in relation to the borrowing requirement – i.e. in a context of “overfunding”.<sup>53</sup>

The central bank does not, in practice, make loans or advances to the Treasury at all, or to any significant extent, in the *United States*,<sup>54</sup> *Canada*, *Japan*, *the United Kingdom*, *Sweden* or *Switzerland*, while direct central bank credit to the Government is effectively limited by ceilings in *Germany*, *France* and the *Netherlands*. In *Germany* the ceilings have been fixed in amount for many years and cover all types of claims on the Government which the Bundesbank acquires directly. In *the Netherlands* it has been found in recent years that permitting some credit to the Government helps avoid some of the interest rate fluctuations which might result from efforts made by the Government to cover all its needs in the market, but the annual financing arrangements concluded are designed to ensure that the accommodation is only of a seasonal or short-term nature. In *France* the Government’s credit limit at the Bank of France rises (or falls) only in relation to the regular six-monthly revaluations of the official foreign exchange reserves. This neutralises the effect of debiting (crediting) the Treasury with the loss (or gain). In most of these countries the Government holds deposit balances at the central bank.

In *Belgium* a ceiling on direct central bank credit to the Government has remained unchanged since 1977, but a separate ceiling on National Bank credit granted through a “second window” to the Securities Market Stabilisation Fund under lines originally

<sup>53</sup> Principally used in the *United Kingdom*, this term implies net sales of government securities to domestic non-bank residents (or to non-bank residents and non-residents) in amounts exceeding the Government’s borrowing requirement – i.e. (at least in the latter usage) an improvement in the Government’s position vis-à-vis the banking system as a whole.

<sup>54</sup> The previous statutory authority of the Federal Reserve Board to purchase special short-term certificates of indebtedness direct from the Treasury lapsed in 1981, when it was not renewed by Congress. Such accommodation had been subject to a fixed ceiling and a thirty-day limit on the period for which it could be extended and renewed.

designed to finance interest rate smoothing operations in the government securities market rose from B.fr. 30 billion in 1979 to B.fr. 210 billion by the end of 1984. (During the same period the bank-note liabilities of the National Bank rose by only B.fr. 27 billion.) The arrangements under which the National Bank's discount rate has been kept above the interest rate on three-month Treasury securities since 1985 has closed a "third window" through which the central bank might, in a sense, have financed the Treasury indirectly via the banks (see Graph 10 and Table 7). The Securities Market Stabilisation Fund's credit line was lowered to B.fr. 160 billion in two stages in 1987 and 1988.

In *Italy* the limit on the Treasury's overdraft facility at the Bank of Italy increases automatically each year in relation to the rise in government expenditure. In the ten-year period ending in 1987 it rose at an average annual rate of 23%. This has permitted central bank advances to become, in effect, a permanent form of Treasury financing (see Table 5). At the end of 1982, moreover, the Government overran the limit, and the issue was resolved only when Parliament approved an additional extraordinary temporary advance. To date, the growth of banks' compulsory reserves under the incremental requirement has served as an "automatic" offset, but the situation may change in future, as the transition to a system of compulsory reserves based on the stock of bank deposits has begun to slow down the rise in required reserve holdings.

Controlling the accumulation of government securities at the central bank has often been seen as a question of devising arrangements which free the monetary authorities from a commitment to peg interest rates on government securities at low levels – the classical example being the 1951 Treasury/Federal Reserve "accord" in the *United States*. Whether auction procedures are useful for this purpose has been discussed in other countries, and moves towards introducing such procedures for issuing bonds have been made in recent years in *Japan, France, Italy, the United Kingdom, Canada* and *Switzerland*. Tender issues of Treasury bills have been in use for many years in the *United Kingdom, Canada,*

Graph 10. Belgium: Money market interest rates

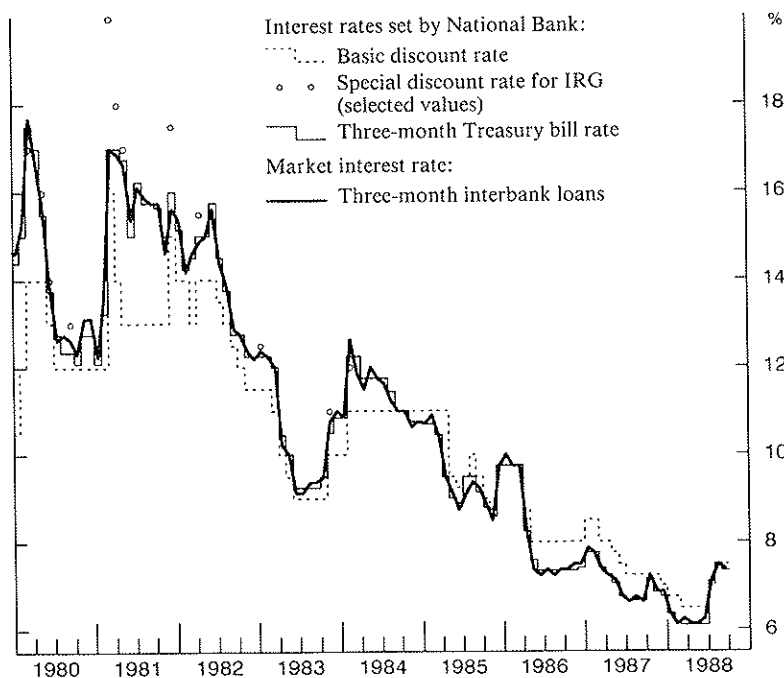


Table 7. Belgium: Main components of bank liquidity\*  
(Amounts outstanding, in billions of Belgian francs)

|  | 1981        | 1983        | 1985        | 1987       |
|--|-------------|-------------|-------------|------------|
| Treasury certificates at up to one year  | 381         | 649         | 842         | 1289       |
| Rediscount ceilings at the National Bank | 117         | 130         | 154         | 188        |
| Bills rediscounted (a)                   | 86          | 88          | 34          | 9          |
| Available margin (b)                     | 31          | 42          | 120         | 179        |
| <i>(Degree of utilisation (a)/(b))</i>   | <i>(74)</i> | <i>(68)</i> | <i>(22)</i> | <i>(5)</i> |

\* Including savings banks and public sector intermediaries.

*France, Italy* and, for some maturities, *Belgium*. They have been introduced in the 1980s for a new type of short-term Federal inscribed security in *Switzerland* and for Treasury discount notes in *Sweden*.<sup>55</sup> Unlike the US procedures, however, the arrangements in effect in other countries still generally make some provision for the central bank to act in some kind of underwriting capacity, and in some countries tap or syndicated issues of government paper still predominate. In fact, as indicated in Section V, the central bank's holdings of government securities have remained quite small in *Germany, France, the Netherlands* and *Switzerland*, and acquisitions have generally remained consistent with the objectives of the central bank's short-term interest rate policy in *Canada* and *Sweden*.

In *Italy*, however, the 1981 agreement between the Bank of Italy and the Treasury ("the divorce") was not fully effective in precluding the need for occasional large residual purchases of government securities by the central bank. The introduction of bi-monthly, rather than monthly, Treasury bill auctions helped to dampen fluctuations in bank reserves caused by Treasury borrowing operations, and in principle the Bank of Italy was thereafter committed only to purchasing an established percentage of sales at the auction rate for its own portfolio and for resale in the market at a lower rate. In March 1984 an underwriting syndicate of banks, which is committed to purchasing a predetermined quota of the issue, was formed to take over the latter function, though, as indicated in Section V, the central bank is prepared to finance, at the auction rate, a part of the syndicate's underwriting. However, except for a brief period in 1983-84, the Treasury sought to avoid fluctuations in its financing costs by setting the minimum price that it announces for the auction very close to rates established in previous auctions. As a result, yields were not free to adapt to changes in market demand, despite efforts to provide more flexibility consistent with minimising the Treasury's borrowing costs by introducing US allocation procedures in auctions

<sup>55</sup> US allocation systems are used (at least for some maturities and for sales to banks and dealers) in the *United Kingdom, Canada, France, Italy* and *Sweden*.



for three-month bills in 1983, for six-month bills in 1984 and for variable interest rate Treasury certificates in 1985. In July 1988 the Treasury agreed to terminate the practice of setting a minimum price.

In *Japan* interest rates on short-term Treasury bills have been kept so far below market levels that, although bills are in principle marketable, few could actually be sold to the public. Bank of Japan purchases have not given rise to a long-term bank reserve-control problem because the Government may issue this paper only for the purpose of covering seasonal liquidity needs.<sup>56</sup> The establishment of a wider open market for short-term government paper in which the Bank of Japan could intervene would widen the range and effectiveness of its money market intervention instruments.

In the *United Kingdom* debt management was used in the early 1980s as an instrument for directly moderating the growth of the banking system's balance sheet in an effort to meet targets for a broad monetary aggregate, sterling  $M_3$ , which included the bulk of the banking system's domestic liabilities. Direct controls over bank credit had been abolished in 1980, and it was not considered that rises in interest rates could be relied upon either to check a fast rise in bank credit or to influence the demand for sterling  $M_3$  in a predictable way. Debt management in this context took the form of large net sales of types of government paper (mainly long-term bonds) which were normally unattractive to banks.<sup>57</sup> Overfunding was associated with a net reduction in the banking system's holdings of Treasury bills and a net improvement in the Government's position vis-à-vis the Bank of England – reflected both in a build-up of government deposits at the Bank and a reduction in the Bank's holdings of government securities as the Bank acted to ease bank reserve positions by progressively

<sup>56</sup> Issue yields on government bonds sold to the issuing syndicate of financial institutions have in recent years been brought more closely into line with market yields.

<sup>57</sup> A strategy of using large-scale long-term financing by the Government to help control the growth of a broad monetary aggregate (which included Treasury bills) has been followed at times in the *Netherlands*, where the credit restraint instrument used in 1985 and 1986 tended to encourage bond issues by the banks. A comparable monetary control instrument was used until 1986 in *France*.

Graph 11. United Kingdom: Money market interest rates

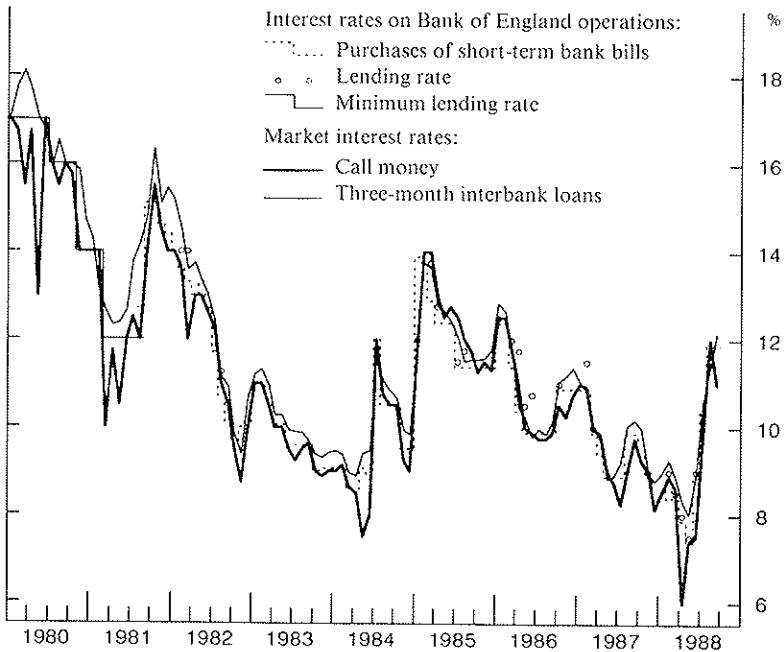


Table 8. United Kingdom: Influences on bank reserves<sup>1</sup>  
(Changes, in billions of pounds)

|   | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|------|------|------|------|------|------|------|
| Government cash position <sup>2</sup>             | -4.3 | -5.5 | 2.5  | -2.2 | -1.7 | 0.6  | -2.4 |
| Official external reserves <sup>3</sup>           | -0.6 | -0.8 | -0.5 | -0.6 | -0.6 | 0.1  | 12.4 |
| <i>Official offsetting operations<sup>4</sup></i> | 3.2  | 5.8  | -0.6 | 3.3  | 1.1  | -0.3 | -7.8 |
| Purchases of commercial bills                     | 2.2  | 6.1  | -1.0 | 3.0  | -0.4 | 2.0  | -5.6 |
| Reversed security transactions                    | -    | -    | -    | -    | -1.7 | 1.7  | -    |
| Sales of Treasury bills in market                 | 0.9  | -0.3 | 0.3  | 0.2  | -0.3 | -0.2 | -2.2 |

<sup>1</sup> Until mid-August 1986, banking month data; thereafter, calendar month data. <sup>2</sup> Central government borrowing requirement minus sales of central government debt other than Treasury bills. <sup>3</sup> Changes, calendar month data. <sup>4</sup> Total, including other items.

adding to its stock of private bills (see Table 8).<sup>58</sup> The resulting downward pressures on bill rates in relation to interest rates in the interbank market and those on bank deposits at times made it difficult to implement changes in interest rate policy and may have provided an incentive to “bill arbitrage” – issues of bills to finance accumulation of bank deposits – which would have run counter to the basic objective of moderating the growth of bank credit and sterling  $M_3$ .<sup>59</sup> In 1985, when it was concluded that fast growth of bank credit to the private sector could safely be attributed to financial innovation, the target for sterling  $M_3$  was abandoned and the objective of debt management policy has since been to avoid recourse by the Government to borrowing from the monetary system on balance over the financial year as a whole by ensuring that sales of government securities to non-banks just match the central government’s borrowing requirement. (In 1987 this rule was relaxed to some extent.)

### **VIII. Operating procedures and the behaviour of the money and foreign exchange markets**

Changes in central bank operating procedures have taken place in a context of institutional and behavioural changes in the money and foreign exchange markets. These wider institutional changes have contributed to making interest rate determination more flexible but also to increasing integration of the money markets domestically and

<sup>58</sup> Normally the Note Issue Department of the Bank of England is treated as part of the government sector, and its purchases of private bills appear separately as a negative item along with increases in the note issue as an element in government financing.

<sup>59</sup> The Bank’s practice of discounting bills only after they had run seven days from the date of acceptance afforded some protection in permitting a margin between the market discount rate on newly drawn bills and the Bank’s dealing rate.

internationally. In varying degrees both tendencies have been encouraged by governments and central banks.<sup>60</sup> But while interest rate flexibility may give more scope for complex policy strategies, market integration and the greater influence of market expectations on interest rate determination have been tightening the constraints on monetary policy. In particular, while money market strategies and instruments have been geared more to taking exchange rate as well as domestic considerations into account, developments in the markets have increased the risk that exchange rate and domestic money stock or interest rate objectives will come into conflict.

*(a) The development of domestic money markets*

In some countries the introduction of new, more flexible policy instruments was facilitated by, or led to, the development of more active and integrated interbank markets and changes in other markets in which the central bank can effectively operate. Thus day-to-day markets which can more effectively arbitrage individual banks' reserve needs at interest rates which better reflect changes in the marginal supply and demand for reserves in the system as a whole have developed in *Italy* since 1984 and in *Sweden* since 1985. A more active interbank market has developed in *Belgium* in recent years with the approval of the monetary authorities. In *France* the termination in December 1986 of the daily morning fixing in the interbank market left the day-to-day rate more free to vary in the course of the day and also provided more incentive to the development of term transactions. In addition, the Bank of France widened the range of

<sup>60</sup> In recent years exchange controls have been removed in *Japan* and the *United Kingdom* and have been substantially liberalised in *France*, *Sweden* and *Italy*. In *Japan* many other types of administrative measures which formerly restricted cross-border money market transactions have gradually been relaxed, including the liberalisation of interest rates on foreign currency deposits (1980), the authorisation of transactions in foreign commercial paper and certificates of deposit by Japanese banks and security companies (1984), and the abolition of swap limits on the conversion of foreign currency into yen (1984).

agents with which it was prepared to deal, previously limited to discount houses, to include credit institutions. The range of market participants with which the central bank deals has also been extended in recent years in a number of other countries, including the *United Kingdom*.

Numerous steps towards freeing the interbank market have been taken in *Japan* since 1979, when the very rigid formula under which call-money rates had previously been set in a process designed to achieve consensus among borrowers and lenders was replaced with procedures which permitted daily changes in reserve positions to be reflected in the rate. In subsequent years trading in term deposits (in principle subject to interest rate ceilings) was introduced, Gensaki transactions<sup>61</sup> were liberalised, restraints on the conversion of foreign currency into yen were relaxed, financial institutions were permitted to operate in the call-money market as both buyers and sellers, and borrowing in the call-money market by security companies was authorised. In 1985 markets for five to six-month bills and two to three-week call money were opened and unsecured call-money transactions were introduced on a limited basis. Competition among banks to establish market shares, operations of non-residents and expectational influences have at times caused interest rate developments in the CD market, in which the Bank of Japan did not operate until recently, to diverge from those in the secured call-money and bill markets.<sup>62</sup> The steps to extend the maturities of bill and unsecured call-money transactions (see Section V) took account of this. Thus the Bank of Japan is now concerned with ensuring that markets suitable for its own operations are large enough to permit

<sup>61</sup> Repurchase transactions in government bonds.

<sup>62</sup> Until recently the Bank of Japan regarded the principle that call-money transactions should as a rule be secured as useful in ensuring the soundness of the banking system, but difficulties in the provision of collateral were caused by the increasing use of larger and longer-term bills, the introduction of batch bills to consolidate many transactions of a particular enterprise, and a rise in the share of overdrafts in bank lending.

smooth operations and that policy influences are conveyed to other markets.

Other changes, too numerous to survey comprehensively here, have freed deposit or lending rates from regulation or have opened markets in short-term paper to non-bank participation, thereby affecting the channels through which interest rate impulses coming from central bank operations are transmitted throughout the economy. In recent years deposit rate regulation has been narrowed in scope in the *United States*, *Japan* and *France* and has been abolished in *Sweden*, while interest rate competition between banks has increased sharply as a result of other regulatory changes in some countries, such as the *United Kingdom*. Examples of new instruments which have become available in the open market include, in addition to the new types of short-term government securities noted in Section VII, certificates of deposit (in *Japan*, *Germany*, *France*, *Italy*, *the Netherlands* and *Sweden*), commercial paper (in *France*, *the Netherlands*, *Sweden* and the *United Kingdom*) and various types of money market certificates (e.g. in the *United States*, *Japan* and *France*).

Such changes, together with a tendency, evident in a number of countries, for interest rates on bank lending to respond more flexibly to changes in money market rates, may ultimately help to establish a monetary policy transmission mechanism which relies more on interest rate impacts on the demand for money and spending and less on the credit-allocation effects which came about when changes in the relationship between interest rates in the interbank market and relatively rigid rates on bank loans and deposits affected bank profitability or the asset preferences of non-banks. Arbitrage may not always function effectively, however, and the growth of open markets may tend to reduce the central bank's ability to control interest rates at the longer end of the money market through operations which directly influence only the day-to-day money rate. Problems of this kind have mainly been experienced in situations in which the market incorrectly interprets the way flexible policies are likely to be adapted to developments in the economy and to

disturbances in the money and foreign exchange markets. They have sometimes been overcome by operating procedures which directly affect the interest rates at the longer end of the term structure in the money market. Even so, some of the new open money markets may tend to respond to monetary policy mainly via its effects on interest and exchange rate expectations.

*(b) Operating procedures and responses in the money and foreign exchange markets*

The way exchange market objectives have impinged on countries' scope for the pursuit of independent domestic interest rate objectives has also influenced the design of their money market instruments. In some small open economies where clear priority has been given to exchange rate objectives in the conduct of money market policy the instruments used have been designed to permit short-term interest rates to respond quickly to external disturbances in a way which tends to stabilise the exchange rate. In most larger countries, on the other hand, central banks have attempted to keep money market interest rates under close control, and in many cases their instruments are designed more to protect money market rates against external disturbances by facilitating flexible adjustments in the supply of bank reserves. Even in larger countries, however, the efforts made to introduce more flexibility into money market procedures have to a considerable extent been intended, or have served, to permit exchange rates to be taken more into account in the setting of short-term interest rates.

In the *Netherlands* and *Sweden* surcharges for large-scale recourse to central bank credit can imply that official sales of foreign exchange, which induce the banks to replenish their reserves (i.e. to neutralise the intervention) by increased borrowing from the central bank, tend to raise day-to-day interest rates on the interbank market, even in the absence of changes in the settings of policy instruments. In terms of the analysis in Section III the foreign exchange market intervention causes a leftward shift in a supply curve for reserves which has upward steps in the range of its intersection with the

demand curve, which remains fairly stable in the short run. Of course, the central bank can decide to underpin or reinforce this effect through reserve-absorbing market operations or other measures which signal its resolve to defend the exchange rate. In *Sweden*, where there is a fixed scale of charges for the various tranches of central bank credit, official exchange market intervention can have the effect of moving day-to-day interest rates in either direction<sup>63</sup> in a way consistent with helping to meet the Riksbank's target for the effective exchange rate of the krona. The influence of market forces is strengthened to the extent that Riksbank policy is known to be geared to stabilising "external currency flows", which implies efforts to induce private capital movements to an extent which offsets any imbalance in the external current account (the Government has undertaken to abstain from increasing its net debt abroad on a continuing basis). In the *Netherlands*, where decisions about whether to impose a surcharge and about its size are taken flexibly in the light of the circumstances prevailing, shortages of reserves caused by official sales of foreign exchange give rise to uncertainty about the terms on which banks' borrowing needs will be met at the end of the quota-averaging period (see Section IV). This can reinforce the tendency of the interest rate to rise in response to external pressures in a way which has often stabilised the exchange rate of the guilder vis-à-vis the Deutsche Mark, thereby obviating the need for large-scale official exchange market intervention. This mechanism is not symmetrical, however; in a context of large official purchases of foreign exchange explicit official action is required to adjust bank reserves and money market interest rates.<sup>64</sup> The new

<sup>63</sup> Provided the appropriate level does not fall below the published return on deposits at the central bank. In June 1986 this rate and the scale of borrowing charges were lowered and the base for calculating the quotas was increased.

<sup>64</sup> Although the amount of special loans outstanding can be reduced fairly quickly, a large reduction in the level of banks' borrowing from the Netherlands Bank under the entitlement arrangements is difficult to achieve in the short run, since the entitlements are fixed for periods of three months at a time.



adjustable reserve requirement should facilitate the absorption of bank reserves whenever necessary.

In *Italy* the charges for frequent recourse to fixed-term advances from the Bank of Italy can work in a similar way to raise interest rates in the event of losses of official foreign exchange reserves provided that delays in adjusting Treasury bill yields and any resulting increases in the Bank of Italy's claims on the Government do not prevent a contraction of bank reserves. To a considerable extent, however, money market interest rates have been protected against external disturbances by the relatively wide margin of fluctuation of the lira provided for under the exchange rate arrangements of the European Monetary System and by the reintroduction of direct controls at times of crisis. These controls have taken the form of reserve requirements set in relation to the increase in banks' (net) foreign currency liabilities (to discourage inflows of funds) and ceilings on the banks' lending in lire (to encourage inflows). In *Belgium* a response of interest rates to external pressures can only be achieved if the authorities act to raise both the discount rate and the interest rates on short-term Treasury securities. The arrangements for floating the discount rate were designed to facilitate such a response. However, as indicated in Section IV, the presumption that redemptions of bank holdings of Treasury paper will induce the Treasury to increase its borrowing abroad in foreign currencies implies a kind of mechanism for protecting the level of official reserves against the effect of exchange market disturbances which does not rely mainly on quick interest rate adjustments.

Though in most other countries the central bank's present money market operating procedures may permit short-term interest rates to respond to some extent to exchange rate expectations in the market, they normally serve to counteract most of the potential effects of official exchange market intervention on bank reserve positions and money market interest rates. In *Germany* and *France* exchange market conditions are usually taken into account mainly in the setting of the interest rate terms, amounts and duration of the periodic temporary security operations used by the central bank in supplying

bank reserves. In principle, day-to-day rates can normally respond to some extent to changes in banks' expectations of developments in interest rate policy. Rates sometimes react to expectations of exchange rate changes or of official exchange market intervention in ways which tend to check exchange market pressures. However, the movements may be constrained by facilities in place for supplying or absorbing reserves on the initiative of banks and by the central bank's use of fine-tuning instruments or ad hoc market operations to offset the effect of both external and domestic disturbances on the supply of bank reserves.<sup>65</sup> Recent experience has shown that bank reserves can be protected from the impact of even quite large official purchases of foreign exchange simply by not renewing part of the large outstanding stock of security repurchase agreements which has been used to supply bank reserves on a revolving basis. Such an adjustment can be implemented much more flexibly than, say, changes in reserve requirements. The large stock of outstanding National Bank currency swaps which has been built up in recent years in supplying bank reserves can serve as a similar kind of buffer in *Switzerland*. Although the National Bank seeks to control the supply of bank reserves in pursuing targets for the annual average growth of central bank money, norms for the growth of this aggregate over shorter periods have never been published. Especially in the last few years the National Bank has adapted its reserve-supplying policies flexibly with a view to preventing large movements in the exchange rate of the Swiss franc vis-à-vis the Deutsche Mark.

In recent years increasing weight has been given to objectives for the exchange rate in formulating interest rate policy in the *United Kingdom*, partly because of the difficulties experienced in interpreting developments in the monetary aggregates. Yet the authorities still attach importance to letting the market take the initiative in changing interest rates in normal circumstances. The arrangements in place for official bill transactions have proved quite

<sup>65</sup> In terms of the framework in Section III the supply of bank reserves can be made very elastic when interest rates move outside a certain range.

effective in permitting declines in interest rates in response to changes in exchange market conditions but less so in achieving increases in short-term rates. The authorities have also at times wished to resist or to temper declines initiated by the market. For this purpose the official lending instrument was revived and has subsequently been used on many occasions. Reductions in the stock of bank bills built up by the Bank of England during the earlier period of overfunding have recently proved to be a flexible instrument for limiting the impact on bank reserves of large-scale official purchases of foreign exchange in the short run (see Table 9). Over longer periods the use of this method for tightening the money market is limited by the way the funding rule is defined, but bank reserves can readily be absorbed, if necessary, by increases in the supply of Treasury bills in the market. In *Canada* Bank rate policy, which principally affects the day-to-day rate, can be complemented by action to influence the Treasury bill rate at times when strong exchange market pressures are experienced. Even so, to insulate Canadian interest rates against changes in US rates has often proved difficult, and attempts to do so have sometimes been thwarted by the development of extrapolative exchange market expectations. However, the problem may have been not so much one of instruments as of the lack of an anchor for exchange market expectations.

Although the impact on movements in the Bank of Japan's foreign exchange reserves has at times been very large in dollar terms in recent years, by the standards of most other countries, the impact on bank reserves in *Japan* has remained small relative to that of domestic influences and could readily be managed by use of the various instruments available to the Bank of Japan. As in other large countries the influence on interest rates of exchange market developments has come about mainly by adaptation of money market policy.

In the *United States* bank reserve targeting procedures, though designed to facilitate control of the monetary aggregates, might, in principle, give the market some scope for initiating adjustments in short-term interest rates consistent with other assumed Federal

Reserve objectives, including ones for the exchange rate. In practice, as explained above, the borrowed reserve procedures in place since late 1982 have often operated to keep fluctuations in the Federal funds rate within a narrow range, and to the extent that objectives for the exchange rate of the dollar have had an impact on US interest rates the influence has mainly come through adaptation of the Federal Reserve's norms for the funds rate. The US dollar reserves of foreign central banks are principally invested in Treasury bills (or in the Euro-currency markets), and to the extent that changes are reflected in movements in deposits with the Federal Reserve their effect on the supply of bank reserves in the United States is routinely offset by Federal Reserve market operations. The US authorities have intervened in the exchange market only on a few occasions and in relatively small amounts so that any potential effect on bank reserves could readily be counteracted. US Treasury and Federal Reserve holdings of foreign exchange are small but can be supplemented by activating the reciprocal currency swap arrangements with other central banks.

## **IX. Concluding observations**

Central banks in all the major industrial countries now guide short-term interest rate developments, even if some do so indirectly via adjustments in the supply of bank reserves. The new instruments developed in the 1980s have permitted central bank influence to operate via market mechanisms. They have also facilitated faster and more frequent adjustments in money market interest rates and/or bank reserves in response to domestic and external disturbances.

The changes in central bank instruments and procedures have taken place against a background of financial innovation and increasing international financial integration. These trends have been encouraged by the authorities, but there is the question of whether their continuation would tend to undermine the effectiveness of the procedures now in place.

Deregulation and financial innovation have facilitated increased use by central banks of market instruments. Some of the changes were essential to preserve the effectiveness of money market operations. However, the difficulties to which financial innovation could give rise have often been overemphasised. The effectiveness of the operations and procedures described in this paper ultimately presupposes a fulcrum established by the demand for central banks' own liabilities. Financial innovation may facilitate the circumvention of reserve requirements and balance-sheet adjustments which permit the banks to economise on free reserves, while advanced payment systems could, in principle, reduce the role of cash. However, while central bank money has tended to grow more slowly than nominal GNP in most countries over a number of years, in some cases the growth of central bank money has recently been remarkably strong. In practice, there is no definite prospect of the demand for bank reserves and currency being suddenly eroded in a way which would undermine the central bank's ability to influence short-term interest rates.

International integration of the financial markets has also tended to encourage a move away from direct controls towards market-related methods for implementing monetary policy. There is little evidence that this has impaired the ability of central banks in individual countries to control bank reserves and short-term interest rates. Indeed, in many countries new instruments have greatly facilitated the control of bank reserves in the context of the massive official intervention in the foreign exchange markets which has taken place since 1985. Even in the largest countries the unwelcome effects of exchange rate distortions have made central banks increasingly aware of a need to take exchange rates into account in formulating interest rate policy. The problem may have been increased by integration of the financial and goods markets. As long as countries are prepared to accept some movement in the exchange rates of their currencies, however, central banks will continue to be able to use market instruments to pursue differing interest rate policies.

Consistent with the aim of closer economic and financial integration within Europe, the instruments and procedures which central banks in core EEC countries use for influencing short-term interest rates have tended to converge. Increasing integration may strengthen the trend towards market-oriented procedures for setting short-term interest rates which has been increasingly evident in individual countries. Central banks participating in the EMS exchange rate mechanism have increasingly co-operated in setting interest rates. However, discretionary interest rate policies continue to be pursued even in countries which have long been fairly successful in adhering to binding EMS commitments to fixed central rates and narrow margins for exchange rate fluctuations – though the limits imposed by the desire to ensure the credibility of the commitments in some cases seem quite narrow. The remaining long-term interest rate differentials between EMS countries also suggest that many years of experience of exchange rate stability are needed to convince the markets that premia for currency risk should be lowered.

Not all of the innovations in central bank money market procedures have fully met the objectives. For instance, the profile of the interest rates on the new instruments has in some cases become higher faster than central banks might have wished. Participants in the money and exchange markets have quickly perceived their influence on market rates. Strong actual or potential market responses to changes in these rates seem at times to have affected central banks' willingness to adjust them flexibly. In many cases posted rates retain a signalling role in the economy which may tend to decline, however, if trends towards linking the deposit and lending rates of financial institutions more to money market rates continue. As mentioned above, arbitrage between official and market-determined interest rates has not in all cases been fully effective. Problems of this kind have generally been minor and could in time be largely overcome by further development of the central banks' procedures. The process of refining existing central bank instruments and developing new ones is bound to continue as private markets develop and become more integrated internationally. There is every reason, however, to believe

that the process of change will be a gradual and evolutionary one which will reinforce the effectiveness of money market policy and permit it to continue to play a major role in the conduct of monetary policy in the industrial countries in the foreseeable future.

Annex. Influences on changes in bank reserves (analytical framework)

| Central bank (or government) operations   | Country presentation <sup>1</sup>   | Other source <sup>2</sup>   |
|---|---|---|
| <p><u>Underlying influences:</u></p> <p><i>Central bank purchases of foreign exchange</i><sup>3</sup><br/>minus foreign currency swaps with banks<sup>4</sup><br/>purchases by / financing of exchange fund<sup>5</sup><br/>foreign central bank deposits at central bank</p> <p><i>Residual financing of government</i><sup>6</sup><br/>budget deficit less, non-money-market borrowing<br/>plus government borrowing in money market<br/>decrease in government central bank deposits<sup>7</sup><br/>central bank credit to government<sup>8</sup></p> <p><i>Note issue, increase (-)</i><sup>9</sup><br/>(minus part in bank reserves)</p> <p><i>Central bank capital and other items, net</i><sup>10</sup></p>   | <p>FR, IT, (SE), (GB)<br/>DE, NL, CH<br/>JP<br/>US</p> <p>IT, JP<br/>NL, (SE), GB<br/>NL, (SE)<br/>DE, US<br/>FR</p> <p>FR, JP, NL, CH, (GB)<br/>DE, IT, US</p> <p>(ALL)</p>  | <p>BE, SE</p> <p>CA, GB</p> <p>CA<br/>BE, SE</p> <p>BE, GB, SE<br/>CA</p> |
| <p><u>Use of instruments:</u></p> <p><i>Central bank loans to banks</i><sup>11</sup><br/>fixed interest rate credit less redepositing</p> <p><i>Central bank market and fine-tuning operations</i></p> <ul style="list-style-type: none"> <li>- outright purchases of securities</li> <li>- market sales of Treasury bills<sup>12</sup></li> <li>- outright, reversed operations in private bills</li> <li>- market sales of own bills</li> <li>- reversed operations in securities</li> <li>  or special loans</li> <li>  or total operations at variable interest rates</li> <li>- foreign exchange swaps with banks</li> <li>- shifts of government deposits to banks (-)</li> </ul> <p><i>Other central bank instruments</i><br/>rise in discount quotas and (-) reserve ratios</p> | <p>DE, IT, JP, NL, SE, CH, US<br/>FR</p> <p>SE<br/>FR, DE, JP, CH, US<br/>DE, JP, GB<br/>JP, GB<br/>JP<br/>DE, IT, GB, US<br/>NL<br/>FR<br/>DE, NL, CH<br/>DE</p> <p>(DE)</p> | <p>BE, CA</p> <p>CA</p> <p>CA</p> <p>CA</p> <p>CA</p>                     |
| <p><i>Bank reserves, increase (+)</i><br/>deposits with central bank<sup>13</sup><br/>against domestic liabilities at current ratios<br/>deposits and bank holdings of currency<sup>14</sup></p>  | <p>FR, JP, NL, SE, CH, (GB)<br/>DE<br/>DE, IT, US</p>   | <p>BE, GB</p> <p>CA</p>   |

BE: Belgium, CA: Canada, FR: France, DE: Germany, IT: Italy, JP: Japan, NL: Netherlands, SE: Sweden, CH: Switzerland, GB: United Kingdom, US: United States.



<sup>1</sup> Analytical surveys are published in flow terms in Germany, Japan, the Netherlands, Sweden and the United Kingdom, and in terms of stocks in France, Italy, Switzerland and the United States. The basis is monthly averages of daily data for France, Germany, the Netherlands, Switzerland and the United States, and end-month data for other countries (end-quarter in the case of the United Kingdom). Countries' own conventions with respect to the arrangement of the items differ considerably. Brackets indicate items not included in Table 1.

<sup>2</sup> Cases in which items in Table 1 are based on other national data. In general, central bank balance-sheet data are used for Belgium, Sweden (all end-of-period) and Canada (average of weekly data). Official purchases of foreign exchange are on a balance-of-payments basis for Belgium, represent underlying changes in reserves in the United Kingdom, and are an Exchange Equalisation Account item for Canada. For Sweden, increase in the Riksbank's holdings of government securities minus (in the 1984–87 period) the Riksbank's acquisitions of government paper in the market (treated as an instrument). For the United Kingdom, currency and bank reserves are MO liabilities of the monetary authorities (monthly averages of calendar months).

<sup>3</sup> For Italy, external creation of monetary base.

<sup>4</sup> Swaps are treated as a policy instrument.

<sup>5</sup> In Canada, Japan and the United Kingdom the official foreign exchange reserves are held in Treasury exchange equalisation accounts. Increases appear in the government accounts as an accumulation of assets which has to be financed by issues of securities in Canada and Japan (though the Bank of Japan takes up all the relevant earmarked bills) or as a negative form of government financing in the United Kingdom.

<sup>6</sup> Excluding changes in central bank claims on the Government coming about as a result of refinancing or open market operations. For Italy, creation of monetary base by the Treasury.

<sup>7</sup> For Germany, excludes transfers of public authority deposits to the banks, which are treated as a policy instrument.

<sup>8</sup> For France, net of movement in Treasury deposits; for Belgium, including central bank lending to the Security Market Stabilisation Fund.

<sup>9</sup> For Italy, non-bank public's use of the monetary base (including some deposits).

<sup>10</sup> Includes, in the case of Sweden, large amounts of investment and other earmarked central bank accounts of non-banks, and, in that of Switzerland, movements in the Government's accounts with the National Bank.

<sup>11</sup> For Germany, lombard loans only (the discount ceilings and the unutilised portion are shown separately in the Bundesbank's presentation); for Italy, creation of monetary base by refinancing transactions, including ordinary credit lines opened for banks; for Switzerland, net of issues of sterilisation paper by the National Bank.

<sup>12</sup> Sales based on existing central bank claims on the Government in Germany and Japan and total sales in the United Kingdom.

<sup>13</sup> For the United Kingdom, operational deposits only.

<sup>14</sup> For Italy, banks' use of the monetary base (including unused discount quotas).

## Selected References

### Belgium

Acx, R. [and others]: *Le marché monétaire belge dans dix ans*, Brussels, Institut de Réécompte et de Garantie, 1986.

Bex, M. [and others]: "De Belgische geldmarkt over tien jaar: een uitdaging voor het Herdiscontering- en Waarborginstituut", *Bank en Financieuzen/Revue de la Banque*, Vol. 50, No. 4/5, May 1986, pp. 7-40.

*L'Emploi des instruments de la politique monétaire en Belgique*, Brussels, Association Belge des Banques, 1980, 29 p.

Mercier, P.: "Le marché du call money garanti", *Bank- en Financieuzen/Revue de la Banque*, Cahier 24, November/December 1983, 64 p.

Banque Nationale de Belgique: *Annual Reports*.

"Le nouveau mode de fixation des taux officiels de la Banque", *Bulletin de la Banque Nationale de Belgique*, July-August 1985, pp. 3-28.

Petit, P.: "Le recours du secteur public à la Banque Nationale de Belgique: 1950-1980", *Bulletin de Documentation*, Ministère des finances, Brussels, March 1984, pp. 5-46.

"Réforme du système des plafonds de réécompte", *Bulletin de la Banque Nationale de Belgique*, September 1977, pp. 21-25.

Vanes, F. and Verheirstraeten, A.: *De geld- en kapitaalmarkt*, Acco, Leuven, 1978.

### Canada

Bank of Canada: *Annual Reports*.

"Cash reserve management", *Bank of Canada Review*, June 1975, pp. 3-12.

Clinton, K. and Lynch, K.: *Monetary base and money stock in Canada*, Bank of Canada, Technical Report No. 16, July 1979, 57 p.

"The corporate short-term paper market", *Bank of Canada Review*, September 1976, pp. 3-17.

Dingle, J.F., Sparks, G.R. and Walker, M.A.: "Monetary policy and the adjustment of chartered bank assets", *Canadian Journal of Economics*, Vol. 5, No. 4, November 1972, pp. 494-514.

Dingle, J.F.: "Technical note: introduction of retroactive settlement for the daily clearing of cheques and other payment items", *Bank of Canada Review*, August 1986, pp. 3-7.

Freedman, C.: "Some theoretical aspects of base control", in *The Canadian balance of payments*, edited by D. Purvis, Montreal, Institute for Research on Public Policy, 1983, pp. 19-44.

Hossfeld, T.: "The interbank deposit market in Canada", *Bank of Canada Review*, February 1986, pp. 3-12.

Merrett, D.: "The evolution of bankers' acceptances in Canada", *Bank of Canada Review*, October 1981, pp. 3-12.

"Overnight financing in Canada: special call loans", *Bank of Canada Review*, May 1983, pp. 3-13.

"Revision to the reserves regulations: introducing weighted averaging", *Bank of Canada Review*, September 1983, pp. 17-20.

Shearer, R.A., Chant, J. and Bond, D.: *The economics of the Canadian financial system*, Scarborough, Ont., Prentice-Hall Canada, 1984.

"Technical note on temporary Bank of Canada - Exchange Fund swaps", *Bank of Canada Review*, July 1977, pp. 15-20.

Watts, G.S.: "The Bank of Canada in 1953 and 1954: a further stage in the evolution of central banking in Canada", *Bank of Canada Review*, January 1976, pp. 3-14.

White, W.R. and Poloz, S.S.: "Monetary policy and chartered bank demand functions for excess cash reserves", *Canadian Journal of Economics*, Vol. 13, No. 2, May 1980, pp. 189-205.

#### France

Banque de France: *Annual Reports*.

David, J.H.: *La monnaie et la politique monétaire*, 2nd ed., Paris, Economica, 1986.

Icard, A.: "Initiatives de la Banque de France sur le marché monétaire", *Banque*, No. 485, July-August 1988, pp. 806-808.

Icard, A.: "Les instruments de la politique des taux", *Banque*, No. 474, July-August 1987, pp. 698-702.

Icard, A.: "La nouvelle présentation de la situation hebdomadaire de la Banque de France", *Banque*, No. 483, May 1988, pp. 570-577, 569.

Joffre, Ch., and Roubine, S.: "Le fonctionnement du marché monétaire", *Cahiers Economiques et Monétaires*, Banque de France, No. 8, 1979, pp. 25-39.

Lagayette, P.: "La réforme du fonctionnement du marché interbancaire et des modalités d'intervention de la Banque", *Bulletin Trimestriel*, Banque de France, December 1986-January 1987, pp. 45-48.

Luñel-Jurgensen, A.: "Variabilité des taux sur le marché interbancaire au jour le jour", *Bulletin Trimestriel*, Banque de France, December 1987-January 1988, pp. 55-60.

*Le marché monétaire*, Note d'information No. 73, Banque de France, November 1987.

"Le nouveau régime des réserves obligatoires", *Bulletin Trimestriel*, Banque de France, March 1985, pp. 29-33.

Patat, J.P.: "Du bon usage des réserves obligatoires", *Revue d'économie financière*, No. 3, December 1987, pp. 47-58.

Patat, J.P.: *Monnaie, institutions financières et politique monétaire*, 4me éd., Paris, Economica, 1987.

Groupe de travail sur les instruments et techniques du marché monétaire, présidé par A. Icard: "Rapport de synthèse", *Bulletin Trimestriel*, Banque de France, June-July 1988, pp. 47-67.

*Le système des réserves obligatoires*, Note d'information No. 77(1), Banque de France, April 1988.

Truquet, J.: "Le développement des interventions de la Banque de France sur le marché monétaire", *Cahiers Economiques et Monétaires*, Banque de France, No. 25, Vol. 2, 1985, pp. 295-304.

### Germany

Bockelmann, H.: "Die Zinsbildung am Geldmarkt", *Kredit und Kapital*, Vol. 13, No. 3, 1980, pp. 339-348.

"The Bundesbank's transactions in securities under repurchase agreements", *Monthly Report of the Deutsche Bundesbank*, Vol. 35, No. 5, May 1983, pp. 23-30.

"Central bank money requirements of banks and liquidity policy measures of the Bundesbank", *Monthly Report of the Deutsche Bundesbank*, Vol. 34, No. 4, April 1982, pp. 20-25.

Deppe, H.D.: "Geldmarkt und Geldmarktkonzepte", *Kredit und Kapital*, Vol. 13, No. 3, 1980, pp. 289-322.

Deutsche Bundesbank: *Annual Reports*.

*The Deutsche Bundesbank: its monetary policy instruments and functions*, Deutsche Bundesbank Special Series No. 7, Frankfurt/M., 1982.

*Die Deutsche Bundesbank: Geldpolitische Aufgaben und Instrumente*, 4th ed., Sonderdrucke der Deutschen Bundesbank, No.7, Frankfurt/M., 1987.

"The Euro-DM market", *Monthly Report of the Deutsche Bundesbank*, Vol. 35, No. 1, January 1983, pp. 26-36.

Dudler, H.J.: "Instrumente und quantitative Hilfsmittel der kurzfristigen Geldmengenkontrolle", in *Geld- und Währungsordnung*, edited by W. Ehrlicher and R. Richter, Berlin, Duncker & Humblot, 1983, pp. 39-84.

Dudler, H.J.: *Geldpolitik und ihre theoretischen Grundlagen*, Frankfurt/M., Knapp, 1984.

Dudler, H.J.: "Domestic monetary control in EC countries under different exchange rate regimes: national concerns and Community options", in *Europe's Money*, edited by R.S. Masera and R. Triffin, Oxford, Clarendon Press, 1984.

"Forty years of the Deutsche Mark", *Monthly Report of the Deutsche Bundesbank*, Vol. 40, No. 5, May 1988, pp. 13-23.

*Herausforderungen der Wirtschaftspolitik: Festschrift für Claus Koehler*, edited by W. Filc, L. Huebl and R. Pohl, Berlin, Duncker & Humblot, 1988.

Neumann, M.J.M.: *Implementation of monetary policy in Germany*, paper presented at a conference on "Monetary Aggregates and Financial Sector Behavior in

Interdependent Economies", Board of Governors of the Federal Reserve System, Washington, May 1988.

"Recent developments with respect to the Bundesbank's securities repurchase agreements", *Monthly Report of the Deutsche Bundesbank*, Vol. 37, No. 10, October 1985, pp. 18-24.

*Wandlungen des geldpolitischen Instrumentariums der Deutsche Bundesbank*, edited by W. Ehrlicher und D. Simmert, Beihefte zu Kredit und Kapital, Heft 10, Berlin, Duncker & Humblot, 1988.

### Italy

Banca d'Italia: *Annual Reports*.

*La Banca d'Italia e i problemi del governo della moneta*, edited by A. Finocchiaro and A. Contessa, Rome, Banca d'Italia, 1986.

Comana, M.: *Il sistema bancario italiano: aspetti istituzionali e caratteristiche operative*, Milan, ICEB, 1984.

Cotula, F.: "Financial innovation and monetary control in Italy", *Banca Nazionale del Lavoro Quarterly Review*, No. 150, September 1984, pp. 219-256.

Bisoni, C.: *Il mercato monetario Italiano*, Università "L. Bocconi": Economia e politica delle aziende di credito, Milan, Giuffrè, 1983.

La mobilitazione della riserva obbligatoria: motivazioni e implicazioni, Rome, Banca d'Italia, 1988.

Monti, E. and Onado, M.: *Il mercato monetario e finanziario in Italia*, new ed., Bologna, Il Mulino, 1985.

Rossi, E. and Stolfa, F.: "Recent developments in the instruments for the control of bank liquidity", *Review of Economic Conditions in Italy*, 1985, No. 2, pp. 273-286.

Salinetti, M.: *Monetary policy and its impact on banking in 1984*, Banca Nazionale del Lavoro Research Papers, No. 4, August 1985.

### Japan

*Banking system in Japan*, 9th ed., Tokyo, Federation of Bankers Associations of Japan, 1984.

Dotsey, M.: "Japanese monetary policy, a comparative analysis", *Monetary and Economic Studies*, Bank of Japan, Vol. 4, No. 2, October 1986, pp. 105-127.

Emery, R.F.: *The Japanese money market*, Lexington, Lexington Books, 1984.

Fukui, T.: *Recent developments of the short-term money market in Japan and changes in monetary control techniques and procedures by the Bank of Japan*, Bank of Japan special paper, No. 130, January 1986.

*The Japanese financial system*, Toyko, Bank of Japan, 1978.

Suzuki, Y. on *Monetary control mechanism in Japan*, paper presented at the conference "Monetary Aggregates and Financial Sector Behavior in Interdependent Economies", Board of Governors of the Federal Reserve System, Washington, May 1988.

Suzuki, Y.: *Money and banking in contemporary Japan*, New Haven, Yale University Press, 1980.

Suzuki, Y.: *Money, finance, and macroeconomic performance in Japan*, New Haven, Yale University Press, 1986.

Yasuda, T.: *Supply of legal reserves and the short-term money market rates: a theoretical framework*, Bank of Japan, Discussion paper series, No. 6, June 1981.

Yasuda, T.: *A theoretical interpretation of the window guidance: a game-theoretic approach*, Bank of Japan, Discussion paper series, No. 4, February 1981.

### The Netherlands

den Dunnen, E.: *Instruments of money market and foreign exchange market policy in the Netherlands*, Nederlandsche Bank, Monetary monographs, No. 3, Dordrecht, Nijhoff, 1985.

Fase, M.M.G. and den Butter, F.: *The endogeneity of monetary policy in the Netherlands*, Nederlandsche Bank, Reprint No. 38, 1978.

Lindeboom, P.: *Geldmarkt en banken in Nederland*, NIBE-Publikatiereeks nr. 44, Amsterdam/Deventer, Kluwer, 1982.

De Nederlandsche Bank: *Annual Reports*.

Timmerman, P.C.: *The intervention policy of the Netherlands Bank in the money market*, Nederlandsche Bank, Reprint No. 33, 1977.

Timmerman, P.C.: *The Netherlands Bank's narrow monetary policy*, Nederlandsche Bank, Reprint No. 83, 1982, pp. 176-186.

*Zoeklicht op beleid*, edited by E. den Dunnen, M.M.G. Fase and A. Szasz, Leiden/Antwerp, Stenfert Kroese, 1981.

### Sweden

Englund, P., Hörngren, L. and Viotti, S.: "The Swedish money market: a model analysis", *Quarterly Review*, Sveriges Riksbank, 1985, No. 2, pp. 13-28.

Myhrman, J. and Sundberg, J.: "The credit market in transformation", *Skandinaviska Enskilda Banken Quarterly Review*, 1986, No. 2, pp. 30-38.

Norgren, C.: "Bank borrowing from the Riksbank", *Quarterly Review*, Sveriges Riksbank, 1986, No. 3, pp. 15-26.

Wissen, P.: *The birth of a new market: the case of the Swedish money market*, paper presented at a SUERF Colloquium, Cambridge, March 1985.

### Switzerland

Béguelin, J.P.: *Demand for bank reserves and monetary policy*, mimeo, 1985.

Birchler, U.W.: "Neue Liquiditätsvorschriften und Geldpolitik", *Geld, Währung und Konjunktur*, 1988, No. 1, pp. 75-81.

Felder, K.R.: *Die Schweizerische Nationalbank: Auftrag und Instrumentarium*, Zurich, Buchverlag Neue Zürcher Zeitung, 1976.

Hanselmann, G.: *The money market operations of the Swiss banks*, UBS

Publications on Business, Banking and Monetary Topics, No. 84, Zurich, 1983.

Kohli, U. and Rich, G.: "Monetary control: the Swiss experience", *Cato Journal*, Vol. 5, No. 3, 1986, pp. 911-926.

Rich, G.: "Swiss and United States monetary policy: has monetarism failed?", *Economic Review*, Federal Reserve Bank of Richmond May/June 1987, pp. 3-16.

Rich, G.: "Auswirkungen der neuen Liquiditätsvorschriften auf den Geldmarkt und die Nationalbankpolitik", in Schuster, L. (ed.): *Neue Liquiditätsvorschriften und Cash Management im Schweizerischen Bankwesen*, Münsingen, Bancomedia, 1988, pp. 31-36.

Rich, G. and Béguelin, J.P.: "Swiss monetary policy in the 1970s and 1980s: an experiment in pragmatic monetarism", in *Monetary policy and monetary regimes*, edited by K. Brunner, Center Symposium Series C-17, Rochester, N.Y.: Center for Research in Government Policy and Business, University of Rochester, 1985.

Schweizerische Nationalbank: *Annual Reports*.

*Schweizerische Nationalbank: Functions, Instruments, Organisation*, Zurich, Swiss National Bank, 1983.

Vital, C.: Das elektronische Interbank-Zahlungsverkehrssystem SIC: Konzept und vorläufige Ergebnisse, *Wirtschaft und Recht*, Vol. 40, 1988, No. 1, pp. 9-30.

#### United Kingdom

"Bank of England operations in the sterling money market: the extension of the Bank of England's dealing relationships in the sterling money market: draft proposals", *Bank of England Quarterly Bulletin*, August 1988, pp. 391-409.

*The development and operation of monetary policy 1960-1983: a selection of material from the Quarterly Bulletin of the Bank of England*, Oxford, Clarendon Press, 1984.

Goodhart, C.A.E.: *Monetary theory and practice: the UK experience*, London, Macmillan, 1984.

Hall, M.J.B.: *Money market management in the U.K.*, SUERF Series, No. 51A, Tilburg, 1986.

Leigh-Pemberton, R.: "The instruments of monetary policy", 7th Mais Lecture, May 1987, *Bank of England Quarterly Bulletin*, August 1987, pp. 365-370.

Llewellyn, D. and Tew, B.: "The sterling money market and the determination of interest rates", *National Westminster Bank Quarterly Review*, May 1988, pp. 25-37.

"The role of the Bank of England in the money market", *Bank of England Quarterly Bulletin*, March 1982, pp. 86-94.

United Kingdom, Treasury: *Monetary control*, text presented to Parliament... March 1980, London: HMSO, 1980. Reprinted in *The Monetary base approach to monetary control*, BIS, Basle, 1980, pp. 171-204.

United Kingdom, Treasury and Civil Service Committee, *Memoranda on monetary policy*, London, HMSO, 1980.

Perry, F.E.: *The elements of banking*, 4th ed., London, Methuen, 1984.

- Shaw, E.R.: *The London money market*, 3rd ed., London, Heinemann, 1981.
- Wilson, J.S.G.: "Recent changes in London's money market arrangements", *Banca Nazionale del Lavoro Quarterly Review*, No. 144, March 1983, pp. 81-102.

#### United States

Board of Governors of the Federal Reserve System, *The Federal Reserve system: purposes and functions*, 7th ed., Washington, 1984.

Campbell, J.Y.: "Money announcements, the demand for bank reserves, and the behavior of the federal funds rate within the statement week", *Journal of Money, Credit, and Banking*, Vol. 19, No. 1, February 1987, pp. 56-67.

Cook, T. and Hahn, T.: *The information content of discount rate announcements and their effect on market interest rates*, Federal Reserve Bank of Richmond, Working Paper 86-5, September 1986.

*Instruments of the money market*, 2nd ed., edited by T. Cook and T. Rowe, Richmond, Va, Federal Reserve Bank of Richmond, 1986.

Friedman, M.: "Monetary policy: theory and practice", *Journal of Money, Credit and Banking*, Vol. 14, No. 1, February 1982, pp. 98-118.

Gavin, W.T. and Karamouzis, N.V.: "The reserve market and the information content of M1 announcements", *Economic Review*, Federal Reserve Bank of Cleveland, 1985, Quarter I, pp.11-28.

Goodfriend, M.: *Monetary policy in practice*, Federal Reserve Bank of Richmond, Richmond, Va, 1987.

Goodfriend, M. and Whelpley, W.: "Federal funds: instrument of Federal Reserve policy", *Economic Review*, Federal Reserve Bank of Richmond, September/October 1986, pp. 3-11.

Goodfriend, M. and King, R.G.: "Financial deregulation, monetary policy, and central banking", *Economic Review*, Federal Reserve Bank of Richmond, May/June 1988, pp. 3-22.

Hafer, R.W. and Haslag, J.H.: "The FOMC in 1987: The effects of a falling dollar and the stock market crash", *Review*, Federal Reserve Bank of St. Louis, March/April 1988, pp. 3-16.

Lindsey, D.E. [and others]: "Short-run monetary control: evidence under a non-borrowed reserve operating procedure", *Journal of Monetary Economics*, No.13, 1984, pp. 87-111.

Meek, P.: *U.S. monetary policy and financial markets*, New York, Federal Reserve Bank of New York, 1982.

Melton, W.C. and Roley, V.V.: *Federal Reserve behavior since 1980; a financial markets perspective*, Research Working Paper No. 88-02, Federal Reserve Bank of Kansas City, May 1988, 21 p.

Mengle, D.L.: "The discount window", *Economic Review*, Federal Reserve Bank of Richmond, May/June 1986, pp. 2-10.



"Monetary policy and open market operations", *Quarterly Review*, Federal Reserve Bank of New York, annual report in spring issue.

Meyer, S.A.: "Non-open-market monetary policy operations", *Business Review*, Federal Reserve Bank of Philadelphia, January/February 1988, pp. 3-15.

Partlan, J.C., Hamdani, K., and Camilli, K.M.: "Reserves forecasting for open market operations", *Quarterly Review*, Federal Reserve Bank of New York, spring 1986, pp. 19-33.

Roth, H.L.: "Federal Reserve open market techniques", *Economic Review*, Federal Reserve Bank of Kansas City, March 1986, pp. 3-15.

Sellon, G.: *The recent evolution of Federal Reserve operating procedures*, Research Paper No. 86-13, Federal Reserve Bank of Kansas City, December 1986, 25 p.

Spindt, P.A. and Hoffmeister, J.R.: *The micromechanics of the federal funds market: implications for day-of-the-week effects in funds rate variability*, Special studies paper, No. 214, Federal Reserve Board, March 1987.

Spindt, P.A. and Tahran, V.: "The Federal Reserve's new operating procedures: a post mortem", *Journal of Monetary Economics*, Vol. 19, 1987, pp. 107-123.

Stigum, M.: *The money market*, rev. ed., Homewood, Ill., Dow Jones-Irwin, 1983.

Thornton, D.L.: "The discount rate and market interest rates: theory and evidence", *Review*, Federal Reserve Bank of St. Louis, August/September 1986, pp. 5-21.

Thornton, D.L.: "The borrowed-reserves operating procedure: theory and evidence", *Review*, Federal Reserve Bank of St. Louis, January/February 1988, pp. 30-54.

VanHoose, D.: *Discount rate policy and alternative Federal Reserve operating procedures in a rational expectations setting*, Finance and Economics Discussion Series, No 12, Federal Reserve Board, February 1988.

Wallich, H.C.: "Recent techniques of monetary policy", *Economic Review*, Federal Reserve Bank of Kansas City, May 1984, pp. 21-30.

Wallich, H.C. and Keir, P.M.: "The role of operating guides in U.S. monetary policy: a historical review", *Federal Reserve Bulletin*, September 1979, pp. 679-691.

#### General and writings covering several countries

Bank for International Settlements: *Annual Reports*.

Bingham, T.R.G.: *Banking and monetary policy*, Paris OECD, 1985.

*Central bank views on monetary targeting*, edited by P. Meek, New York, Federal Reserve Bank of New York, 1983.

*Changes in money-market instruments and procedures: objectives and implications*, BIS, Basle, 1986.

"Evolution de la valeur opérationnelle des taux officiels dans trois pays étrangers", *Bulletin de la Banque Nationale de Belgique*, November 1985, pp. 5-20.

*Exchange-market intervention and monetary policy*, BIS, Basle, 1988.

*International finance handbook, Vol. I*, edited by A.M. George and I.H. Giddy, New York, Wiley, 1983.

Kemp, L.J.: *A guide to world money and capital markets*, London, McGraw-Hill, 1981.

McAfee, R.P., and McMillan, J.: "Auctions and bidding", *Journal of Economic Literature*, Vol. 25, June 1987, pp. 699-738.

*Monetary policy in twelve industrial countries*, edited by K. Holbik, Boston, Federal Reserve Bank of Boston, 1973.

Niehans, J.: *The theory of money*, Baltimore, Johns Hopkins University Press, 1978.

Patat, J.P.: *Les banques centrales*, Paris, Sirey, 1972.

Sargent, T.J. and Wallace, N.: "Interest on reserves", *Journal of Monetary Economics*, Vol. 15, 1985, pp. 279-290.

## BIS ECONOMIC PAPERS

- No. 1 Credit and liquidity creation in the international banking sector, by Helmut Mayer, November 1979.
- No. 2 US monetary aggregates, income velocity and the Euro-dollar market, by W.D. McClam, April 1980.
- No. 3\* "Rules versus discretion": an essay on monetary policy in an inflationary environment, by Alexandre Lamfalussy, April 1981.
- No. 4 Theories of the growth of the Euro-currency market: a review of the Euro-currency deposit multiplier, by R.B. Johnston, May 1981.
- No. 5 The theory and practice of floating exchange rates and the rôle of official exchange-market intervention, by Helmut Mayer, February 1982.
- No. 6 Official intervention in the exchange markets: stabilising or destabilising?, by Helmut Mayer and Hiroo Taguchi, March 1983.
- No. 7 Monetary aggregates and economic activity: evidence from five industrial countries, by Geoffrey E.J. Dennis, June 1983.
- No. 8\* The international interbank market: a descriptive study, July 1983.
- No. 9 Financial innovations and their implications for monetary policy: an international perspective, by M.A. Akhtar, December 1983.
- No. 10 Adjustment performance of open economies: some international comparisons, by W.D. McClam and P.S. Andersen, December 1983.
- No. 11 Inflation, recession and recovery: a nominal income analysis of the process of global disinflation, by J.A. Bispham, February 1984.

- No. 12 Interest rate futures: an innovation in financial techniques for the management of risk, by A.B. Frankel, September 1984.
- No. 13 International interest rate relationships: policy choices and constraints, by J.T. Kneeshaw and P. Van den Bergh, January 1985.
- No. 14 The stability of money demand functions: an alternative approach, by Palle S. Andersen, April 1985.
- No. 15 Interaction between the Euro-currency markets and the exchange markets, by Helmut W. Mayer, May 1985.
- No. 16 Private ECUs potential macro-economic policy dimensions, by Helmut W. Mayer, April 1986.
- No. 17 Portfolio behaviour of the non-financial private sectors in the major economies, by E.P. Davis, September 1986.
- No. 18 The evolution of reserve currency diversification, by Akinari Horii, December 1986.
- No. 19 Financial market supervision: some conceptual issues, by Jeffrey C. Marquardt, April 1987.
- No. 20 Rising sectoral debt/income ratios: a cause for concern?, by E.P. Davis, June 1987.
- No. 21 Financial market activity of life insurance companies and pension funds, by E.P. Davis, January 1988.
- No. 22 Reserves and international liquidity, June 1988.

\* Also available in French