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The Instruments and Operating Procedures for Conducting  
Monetary Policy in the Group of Five Countries

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Abstract

This paper examines and compares the instruments and procedures currently employed by the central banks of France, Germany, Japan, the United Kingdom, and the United States for implementing monetary policy in the short run. The analysis indicates that the monetary authorities of these five countries focus on influencing certain short-term interest rates in implementing monetary policy. Thus, to the extent that interest rate developments affect the behavior of exchange rates, this analysis facilitates ascertaining changes in monetary policies in the G-5 countries and their exchange rate implications

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### Summary

With the integration of the world's financial markets, developments in these markets are exerting more influence on exchange rate movements. Consequently, an understanding of the operation of these markets and the factors determining interest rates is essential for analyzing the behavior of exchange rates. Moreover, monetary policies in the major industrial countries have a significant impact on developments in financial markets. Identifying actions that reflect current monetary policies is important in interpreting the exchange rate ramifications of these actions.

This paper contributes to the understanding of financial and exchange market developments by examining the procedures currently employed by the central banks of the Group of Five countries for implementing monetary policy in the short run. These procedures are analyzed, using a consistent theoretical framework, to ascertain how the implementation of policy influences the stock of bank reserves and money market interest rates in these countries. This analysis includes a description of the time period within which monetary policy is implemented, an enumeration of the instruments employed and an explanation of how they are used, together with a discussion of those variables that signal policy changes. Such an investigation of the mechanics of how monetary policy is implemented helps distinguish movements in variables that reflect changes in monetary policy from those that do not and thereby provides a better understanding of monetary policy actions and their links to foreign exchange market developments.

## I. Introduction

As the world's financial markets have become increasingly more integrated, developments in financial markets have become important factors influencing exchange rate movements. Indeed, interest rates have usually been included as one of the primary explanatory variables in models of exchange-rate determination. <sup>1/</sup> Consequently, an understanding of the operation of financial markets in general, and the factors determining interest rates in particular, is essential for analyzing the behavior of exchange rates. Furthermore, developments in financial markets are greatly influenced by the policy stance of the monetary authorities in the major industrial countries. It is thus important to be able to identify monetary actions that reflect the current stance of the monetary authorities in order to interpret the ensuing exchange market ramifications of these actions. This paper aims at contributing to the understanding and interpretation of financial and exchange market developments by examining and comparing the instruments and procedures currently employed by the central banks of the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States) for implementing monetary policy in the short run. Such an investigation of the mechanics of the manner in which monetary policy is implemented will facilitate distinguishing movements in variables that reflect changes in the current stance of monetary policy from those that do not, and thereby provide a better understanding of monetary policy actions and their links to exchange market developments.

The implementation of monetary policy is undertaken to achieve the ultimate goals of the monetary authorities, which tend to focus on output and inflation objectives. However, these variables are not directly controllable by the central banks. Furthermore, the lack of timely and accurate information on output and prices, together with the recognition that monetary policy actions affect prices and output with a lag, have generally led to the use by monetary authorities of intermediate target variables which are closely related to output and prices, but which are more controllable by the central bank and for which more timely information is available. Since the mid-1970s, a number of central banks have attempted to achieve their ultimate monetary policy objectives by aiming at the growth of a monetary aggregate as an intermediate target. However, as the relationship between monetary aggregates and economic activity has become less predictable, especially in the 1980s, and hence, as monetary aggregates have become less reliable indicators of monetary conditions, greater attention has focused on short-term interest rates and exchange rates, with less emphasis placed on monetary aggregates as intermediate targets. The role of exchange rates in influencing monetary policy is clearly evident in the exchange rate mechanism of the European Monetary System; the commitment of the participants in this mechanism to

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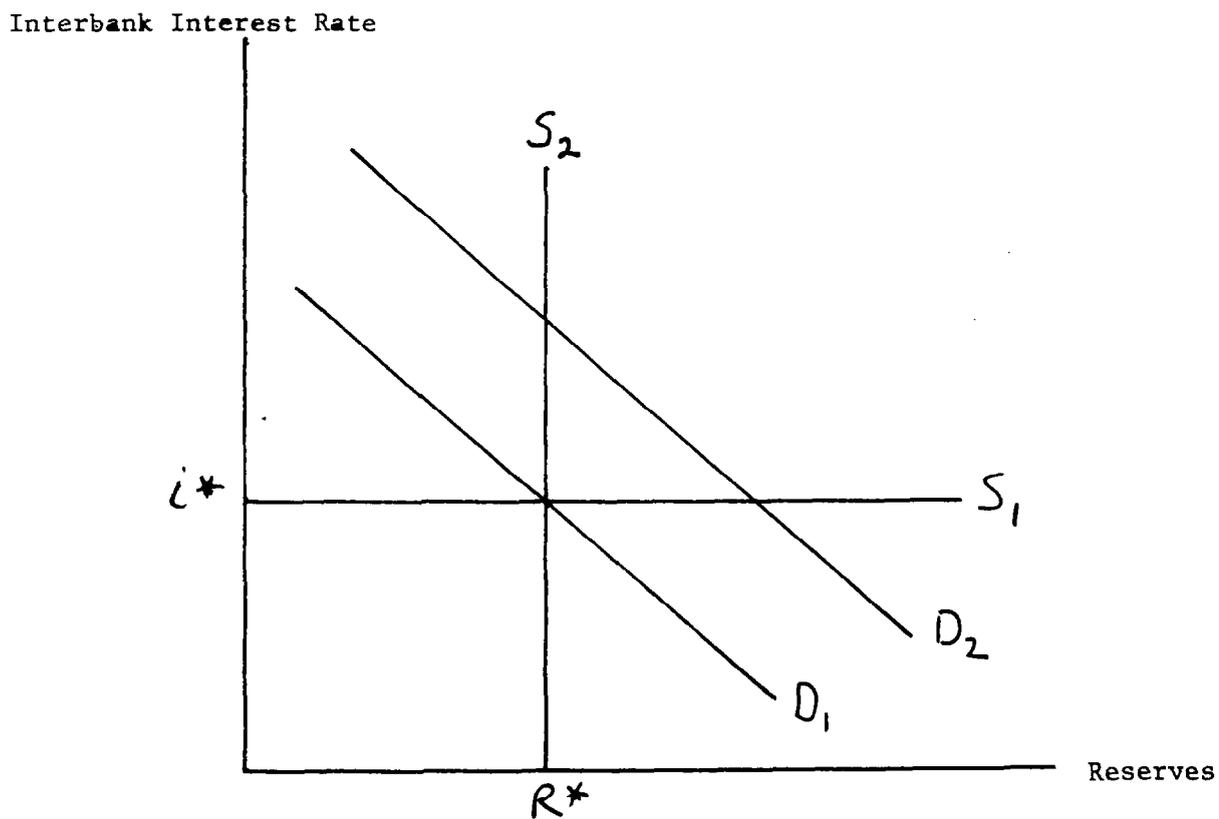
<sup>1/</sup> See, for example, Isard (1988) for a discussion and references.

maintain their exchange rates within agreed limits has often required that policy actions be directed toward exchange rate objectives. Furthermore, the intensified economic policy coordination among the G-7 countries, initiated by the Plaza Agreement in September 1985, has elevated the role of exchange rates as a guide for policy in all of the major industrial countries. Thus, the monetary policy actions and procedures described below may indeed be undertaken in order to achieve particular exchange rate objectives.

Whichever intermediate target is chosen by a central bank, it must implement an operating procedure that enables it to achieve the desired level of the targeted variable. For the central banks of the G-5 countries, it is useful to focus on the control of the reserves of the banking system as the central component of their operating procedures, both because bank reserves are a liability item in a central bank's balance sheet and hence can be easily and precisely controlled, and because changes in bank reserves influence their ability to extend credit and hence affect both short-term interest rates and growth in the monetary aggregates. An operating procedure using bank reserves can be characterized, at opposite ends of the spectrum, as setting either the price, i.e., interest rate, or the quantity of reserves so as to achieve the intermediate target. In particular, given banks' demand for reserves (determined primarily by the economy's demand for credit and for money balances held both for transaction and saving purposes), a central bank can, at one extreme, choose to supply whatever amount of reserves demanded by banks (usually through the sale or purchase of securities) at an interest rate deemed to be consistent with its intermediate and ultimate objectives. In this case the short-run supply of reserves would be infinitely elastic, as indicated by  $S_1$  in Figure 1, at the desired interest rate shown by  $i^*$  in Figure 1; the quantity of reserves provided to the banking system would depend entirely on the position of the demand for reserves, shown by  $D_1$  in Figure 1. Alternatively, at the other extreme a central bank could supply the particular quantity of reserves thought to be consistent with its policy objectives and allow the short-run interest rate to be determined by the banks' demand for reserves. As a result, the short-run supply of reserves would be completely inelastic, as indicated by  $S_2$  in Figure 1, at the desired level of reserves,  $R^*$ , and the interest rate prevailing in the interbank market would depend entirely on the demand for reserves.

Whether the management of reserves should be directed toward maintaining a particular quantity or a particular interest rate depends importantly on the nature of the shocks which affect the demand for

Figure 1. Operating Procedures and the Market for Bank Reserves





reserves. 1/ On the one hand, if a rise to  $D_2$  in Figure 1 in the level of reserves that banks wish to hold reflects an unanticipated increase in economic growth which is above that desired or anticipated by the central bank, then accommodating this enlarged demand by supplying reserves along  $S_1$  will tend to involve some acceleration in the growth of monetary aggregates, which could ultimately place upward pressure on prices and jeopardize the inflation objective of the central bank. If, however, the monetary authority does not accommodate this increased demand and instead supplies only  $R^*$  of reserves, i.e., the supply curve is  $S_2$ , interest rates will rise, thereby dampening the tendency toward faster economic growth and greater inflation pressures and helping to keep the economy on the growth and inflation paths desired by the central bank. On the other hand, if the increased demand for reserves is generated by an unanticipated increase in the demand for money associated with a concomitant decrease in demand for other financial assets, including those denominated in foreign currencies, and this larger demand is accommodated by supplying reserves along  $S_1$ , then sufficient reserves will become available to support the higher desired level of the money stock, and domestic output and inflation will be unaffected. However, if the increased reserve demand is not accommodated and only  $R^*$  reserves are supplied, then interest rates will rise and output and employment will decline below the levels desired by the central bank. To summarize, central banks can more easily achieve their ultimate objectives regarding output, employment, and inflation by maintaining a relatively inelastic supply of bank reserves when shocks to reserves reflect predominantly economic growth, whereas if shocks are primarily to the demand for money, they can more easily achieve their objectives by maintaining a relatively elastic supply of reserves. 2/

To the extent that shocks to the demand for money have become more prevalent in the 1980s, operating procedures have tended to focus more on dampening fluctuations in short-run interest rates. 3/ While moderating large fluctuations in short-term interest rates is a common element in the operating procedures of the monetary authorities in the G-5 countries, these procedures do not attempt to regulate or rigidly

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1/ The demand and supply curves for reserves are continuously subjected to small, day-to-day, frequently offsetting shocks which the monetary authorities in the G-5 countries typically accommodate. The following analysis involves shocks that are large enough and are sustained long enough that they may affect the monetary authority's ability to achieve its objectives.

2/ See Sellon and Teigen (1981) and Poole (1970) for a more complete and rigorous discussion.

3/ For a discussion of how financial innovation during the 1980s has generated increased shocks to the demand for money, see Bank for International Settlements (1984).

control interest rates, but rather to influence what are primarily market-determined variables.

Moreover, it is important to note that even though the procedures employed by the G-5 countries for implementing monetary policy have become more similar, their evolution has been quite dissimilar. In the United Kingdom and the United States, where capital markets are already well-developed and open market operations have been the major instrument of monetary policy, changes in operating procedures over the past decade or so have not involved major modifications to existing techniques of monetary control. In the United Kingdom, use of the minimum lending rate was discontinued and the role of open market operations was intensified in the early 1980s in order to provide additional interest-rate flexibility so that financial markets could respond to shocks in a more timely manner. Since these changes were introduced, however, little adjustment has been made to the operating procedures even though several different intermediate targets have been used since the early 1980s. In the United States, the only significant change in the implementation of policy during the past decade has involved the variable which is the primary focus of the implementation procedures. After conducting open market operations to maintain the federal funds rate--the overnight interbank rate--within relatively narrow bands during most of the 1970s, the Federal Reserve switched in 1979 to a nonborrowed reserves operating target and placed greater emphasis on monetary aggregates as intermediate targets primarily in order to enhance its ability to reduce the rate of inflation. As the financial innovation and deregulation of the early 1980s rendered this approach less effective and as inflation subsided, the operating objective was changed to borrowing by banks from the Federal Reserve, a procedure that involves greater smoothing of short-term interest rate fluctuations and hence is very similar to targeting the federal funds rate.

In contrast to the changes in the United Kingdom and the United States, the adjustments to operating procedures during the last decade in Germany, France, and Japan have been much more far-reaching. Prior to the 1980s the Bundesbank controlled the reserves of the banking system primarily through the provision of central bank credit and changes in the minimum reserve ratios. During the 1980s, however, the scope for further increases in rediscount quotas became more limited, there was virtually no room for a reduction in minimum reserve ratios, and the Lombard window was being used excessively and was losing its role as a last-resort source of reserves. Consequently, the Bundesbank began to employ open market operations--particularly, security-based repurchase agreements--as the major instrument for reserve management. In addition, in 1985 it raised, and has maintained, the Lombard rate so that it exceeded short-term market rates and thereby effectively became a penalty rate.

In France and Japan, the substantial liberalization that occurred in each country's financial markets necessitated major changes in the implementation of monetary policy. Before 1985, financial markets in France were highly segmented and monetary policy was implemented primarily through quantitative credit allocations. This system, which imposed extremely high financial intermediation costs on the French economy, resulted in a loss in international competitiveness as French financial institutions were increasingly unable to meet the needs of a domestic economy faced with growing international competition. In part to alleviate this problem, the French financial system was significantly restructured--financial markets were consolidated and liberalized--and open market operations replaced credit allocation as the primary instrument of monetary policy. Similar, though less dramatic, changes occurred in Japan. In the early to mid-1970s, corporations did not have direct access to credit markets and hence were almost completely dependent for financing on banks, especially the large, dominant city banks. Within this environment, the Bank of Japan conducted monetary policy by allocating credit through its discount window. As corporations gained direct access to capital markets during the late 1970s and restrictions on international capital flows were reduced in 1980, corporations became less dependent on bank credit. In response, the Bank of Japan reduced the role of quantitative credit allocation and placed more emphasis on influencing short-term interest rates through interbank market operations as the main channel for implementing monetary policy. These operations are conducted in the interbank market because the secondary market for short-term government securities is still very underdeveloped in Japan.

The analytical framework presented above is used to describe and analyze the operating procedures currently employed by each of the G-5 countries. That is, the implementation procedures are examined from the point of view of how they influence the stock of banks' reserves and how they influence money market interest rates. This analysis includes a description of the time frame within which monetary policy is implemented, an enumeration of the instruments employed and a description of how they are used, and which variables can be construed as signals of a change in the policy stance of central banks. The paper concludes with a section that draws comparisons and identifies contrasts among the operating procedures across the five countries.

A brief overview of the key variables is given in Tables 1-3, which present the salient features of each country's operating procedures. Table 1 contains the official and/or key money market interest rates that are integral to the implementation of monetary policy. As market operations are the major instrument of policy in each of the G-5 countries, Table 2 presents the types of instruments

Table 1. Official and Key Money Market Interest Rates

Country	Rate	Description
France	Intervention rate	The interest rate established for official repurchase agreements, offered at the discretion of the Bank of France. This rate typically serves as the lower bound for short-term market rates.
	Rate on 5- to 10-day repurchase agreements	The interest rate set by the Bank of France for 5- to 10-day repurchase agreements available as emergency funding at the discretion of financial institutions. This rate is typically above short-term market rates and generally serves as an upper bound.
Germany	Discount rate	The interest rate charged by the Bundesbank for rediscounting eligible assets of financial institutions. This rate is typically the lower bound for short-term market rates.
	Lombard rate	The interest rate charged by the Bundesbank for collateralized short-term loans to financial institutions designed to bridge temporary reserve shortages. This rate is typically higher than short-term market interest rates and generally serves as an upper bound.
	Repurchase rate	The interest rate set by the Bundesbank on its periodic securities repurchase agreements.
Japan	Official discount rate	The interest rate charged by the Bank of Japan on its lending to financial institutions.
	Call money rates	Interest rates charged on short-term loans in the interbank market. Maturities range from overnight to one week on collateralized call loans, and from overnight to six months on uncollateralized call loans.

Table 1 (concluded). Official and Key Money Market Interest Rates

Country	Rate	Description
	Bill discount rates	Interest rates charged in the interbank market for rediscounting private bills with maturities ranging from 7 to 180 days.
United Kingdom	Bank of England dealing rates	The interest rates at which the Bank of England either rediscounts bills of different maturities or lends to discount houses.
United States	Discount rate	The interest rate charged by the Federal Reserve on its short-term lending to depository institutions.
	Federal funds rate	The interest rate charged in the interbank market where depository institutions with reserve deficiencies borrow from institutions with excess reserves.

Table 2. Types of Financial Instruments Used in Central Bank Market Operations

Operation	France	Germany	Japan	United Kingdom	United States
Outright purchase	GS	GS <u>1/</u>	GS, CD, PB <u>3/</u>	GS, CP <u>2/</u>	GS
Outright sale	GS	GS <u>1/</u> , CBB	GS, CBB	GS, CP <u>2/</u>	GS
Repurchase	GS, CD BA, CP <u>4/</u>	GS	GS	GS, CP <u>2/</u>	GS
Matched sale/purchase	GS, CD, BA, CP <u>4/</u>	--	--	--	GS
Foreign exchange <u>5/</u>	FXS	FXS	--	--	--

Legend: GS - Government securities  
 CD - Certificates of deposit  
 BA - Bankers' acceptances  
 CP - Commercial paper  
 CBB - Bills issued by central bank  
 PB - Private bills  
 FXS - Foreign exchange swaps

1/ Includes securities issued by government-owned enterprises.

2/ Consists of bills accepted by banks whose acceptances are eligible for discount at the Bank of England.

3/ Includes inter alia commercial and industrial bills, promissory notes, and export and import bills.

4/ May also include short-term credits to private enterprises with a maturity of two years or less.

5/ Foreign exchange operations designed to manage the reserves of the banking system, not to influence the exchange rate.

Table 3. Reserve Requirement Ratios <sup>1/</sup>

(In percent)

Liabilities	France	Germany	Japan	United Kingdom	United States <sup>2/</sup>
Demand	5.0	12.1 <sup>3/</sup>	2.5 <sup>4/</sup>	--	12 <sup>5/</sup>
Time deposits	2.5	4.95 <sup>6/</sup>	1.75 <sup>7/</sup>	--	3 <sup>8/</sup>
Other	--	--	<sup>9/</sup>	5 <sup>10/</sup>	3 <sup>11/</sup>
Computation period	Last day of calendar month	16th of month to 15th of following month	Calendar month	Calendar month	Two-week period beginning on a Tuesday and ending two Mondays later.
Maintenance period	16th of month to 15th of month following computation period	Calendar month within which computation period ends	16th of month to 15th of month following computation period	Same calendar month as computation period	Two-week period beginning the first Thursday of the computation period and ending two Wednesdays later.

<sup>1/</sup> Requirements expressed as percent of reservable liability.

<sup>2/</sup> The first \$3.2 million of reservable liabilities at each depository institution is not subject to reserve requirements.

<sup>3/</sup> Maximum requirement on demand deposits exceeding DM 100 million; requirements are lower for smaller demand deposit totals.

<sup>4/</sup> Maximum requirement on demand deposits exceeding ¥ 1.2 trillion; requirements are lower on smaller demand deposit totals.

<sup>5/</sup> Maximum requirement in 1988 on demand deposits exceeding \$40.5 million. Critical amount changed annually. On deposits equal to or less than \$40.5 million, requirement is 3 percent.

<sup>6/</sup> On time deposits; on savings deposits the ratio is 4.15 percent.

<sup>7/</sup> Maximum requirement on time deposits exceeding ¥ 2.5 trillion; requirements are lower on smaller time deposit totals.

<sup>8/</sup> Requirement on non-personal time deposits with less than 1-1/2 year original maturity. No requirement on personal time and saving deposits or on non-personal time deposits with more than 1-1/2 year original maturity.

<sup>9/</sup> Small requirements (0.5 percent or less) on foreign currency liabilities to non-residents and on certain trusts.

<sup>10/</sup> Requirement applies to monetary sector's eligible liabilities.

<sup>11/</sup> On eurocurrency liabilities.

exchanged in these operations and the type of transactions made. <sup>1/</sup> Table 3 contains reserve requirements and maintenance periods. While limited use is now made of changes in reserve requirements to manage reserves, these requirements still play an important technical role in the daily implementation of policy. Furthermore, since interbank market interest rates frequently behave differently around the end of a reserve maintenance period, knowledge of these periods is required to avoid misconstruing interest rate behavior associated with the end of a maintenance period as a change in policy.

## II. Implementing Monetary Policy in France

### 1. Background

In January 1987, the French monetary authorities replaced the previous mechanism of monetary policy implementation that was based on credit restrictions, quantitative allocations, and administered interest rates with a more market-oriented approach based on instruments aimed at influencing the level of interest rates and on a wider use of reserve requirements. This reform in the implementation procedures of monetary policy reflected the desire of the authorities to complement the gradual trend toward financial deregulation of the preceding few years with a move toward allowing market forces to play a greater role in the determination of interest rate levels and overall credit conditions. <sup>2/</sup>

Prior to the reform of 1987, the French financial system was characterized by a rigid segmentation according predominantly to the maturity of credit instruments and the type of participants. Strict regulations and barriers divided the financial market into three major segments; namely, the money market (short term), the capital market (long term), and the mortgage market, with each segment regulated by a different authority and with access to each segment restricted to well-defined participants. For example, private nonfinancial firms were not allowed to raise funds or sell debt instruments in the money market, which was accessible only by credit institutions. This market segmentation prevented the transmission of central bank operations that

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<sup>1/</sup> Market operations are primarily open market operations (i.e., conducted in markets with varied participants and various financial instruments) in the United States, Germany, France, and the United Kingdom. In contrast, market operations in Japan are conducted largely in the interbank market, i.e., only between banks.

<sup>2/</sup> For further discussion of these reforms, see Bruneel (1986) and Truquet (1986).

affected reserves in the interbank market to other financial sectors via interest rate movements. Monetary policy had to be implemented through quantitative credit allocations in order to control liquidity, as measures to influence interest rates would not be fully effective and, in particular, would not have the same impact in the different segments of the financial system.

The need for reform and modernization of the French financial market was expressed as early as 1969 in a report commissioned by the government, which pointed out explicitly the inefficiency of the French financial system in allocating financial resources to all sectors of the economy as well as the significant distortions resulting from the fragmentation of the market. More recently, the extensive liberalization of financial markets and relaxation of capital controls in major industrialized countries, and the resulting increase in the efficiency with which private firms could fund themselves internationally, accentuated the imperfections of the French financial system in coping with the needs of the domestic economy faced with increasing international competition. More specifically, the emergence and rapid development of alternative sources of domestic finance outside or at the margin of "traditional" forms of credit conventionally channeled through commercial banks, as well as the increased opportunities of credit transactions with nonresident financial agents and/or in the international capital market, resulted in a substantial reduction in credit intermediation. <sup>1/</sup> This in turn weakened the efficiency of direct monetary control instruments and rendered a system based on quantitative credit allocation more or less obsolete. <sup>2/</sup>

Finally, the implementation of the European Monetary System in 1979 and the subsequent commitment of the French authorities to enhance the stability of the French franc within the joint floating system further accentuated the necessity of providing the monetary authorities with adequate tools for effective and flexible short-run control of domestic liquidity. While the participation in the EMS undoubtedly became an important factor for the formulation of the monetary policy, it also affected the mechanism of implementation as it underscored the inadequacy of quantitative credit controls in reacting promptly to fluctuations in the foreign exchange value of the French franc.

The French authorities responded to these developments by implementing in late 1985 substantial structural changes in the

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<sup>1/</sup> In the 1970s, financial intermediaries in France provided more than 80 percent of the funds raised by domestic nonfinancial sectors. In 1986, this amount declined to less than 40 percent.

<sup>2/</sup> For a more detailed description of these developments in France as well as other major industrialized countries, see Raymond (1987).

financial system that culminated in 1987 with the adoption of a monetary policy mechanism based on indirect instruments, such as intervention in the interbank market, aimed primarily at influencing the level of interest rates. The first step was the development of a single, consolidated financial market which included all maturities, from overnight to long-term, and which was open to all economic agents. In December 1985 new financial instruments were introduced, including Treasury bills, certificates of deposit, and commercial paper, in order to increase competition and liquidity in the short-term end of the market. Nonbanking financial institutions were excluded from the very short-term money market, which became an authentic interbank market fully sensitive to the interest rate policy of the monetary authorities. Credit allocation and quantitative controls were abandoned as of January 1, 1987 and were replaced by a new mechanism for the implementation of monetary policy that operated through the interest rate in the interbank market. <sup>1/</sup>

## 2. Formulation, objectives, and intermediate targets

The broad course of monetary policy is established by the Bank of France in concert with the Ministry of Finance as part of the overall budgetary process, with the general goal of fostering growth while maintaining domestic and external balance through price stability and balance of payments equilibrium. While rapid changes have taken place in the last few years in French financial markets and in the mechanism for the implementation of monetary policy, the authorities have continued to pursue this broad objective by employing monetary aggregates as intermediate targets of monetary policy. Following the reform in 1987, the French Government restated their view that the pursuit of a policy based on targets for the growth in the monetary aggregates remains desirable as a necessary point of reference and guideline for all economic agents.

Targets for monetary growth have been set in France since 1977, although in 1986 several statistical changes were made in order to reflect the changes in the financial market and, in particular, to include the new financial instruments. For 1989, a target range was established for one single aggregate, M2 <sup>2/</sup>; however, the monetary authorities continue to monitor other aggregates, such as M3, without setting specific target ranges. This choice reflects the view that M2 is largely unaffected by financial innovations, is relatively immune from shifts determined by portfolio choices, and, in particular, is more closely related to the pace of economic activity, as the assets in

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<sup>1/</sup> The new procedure is described in Bank of France (1986).

<sup>2/</sup> M2 consists of currency, checking accounts, and savings accounts available at sight. M3 consists of M2 plus nonnegotiable time deposits and foreign currency deposits.

M2 can be readily converted into means of payment and thus can directly influence domestic expenditures.

The adoption of an implementation mechanism of monetary policy based on interest rates and the participation in the exchange rate mechanism of the EMS, however, have accentuated difficulties in achieving simultaneously domestic and external targets, as the monetary authorities have one instrument to achieve two objectives, namely, the targeted growth in the monetary aggregate and exchange rate stability. In addition, the recent relaxation of capital controls has meant that changes in domestic interest rates can have a substantial, and at times destabilizing, impact on the foreign exchange value of the French franc. The previous system of quantitative credit allocation and capital controls allowed the monetary authorities to maintain administered interest rates at relatively low or stable levels in accordance with the real economy and the external condition, with little impact on the foreign exchange value of the French franc. Currently, however, an increase in official interest rates designed, for example, to curb domestic credit expansion could prove to be counterproductive in the short run as it could trigger capital inflows with an undesirable impact on monetary conditions if these inflows were not fully sterilized. The potential exchange rate effect of changes in domestic interest rates has at times resulted in monetary policy being directed less at domestic monetary conditions and more at maintaining the parity of the French franc against the other currencies participating in the EMS. For example, even though growth in M2 was below its target range in November 1987, the Bank of France increased both of its key official interest rates in November 1987. This action was reportedly aimed at alleviating the downward pressure being felt by the French franc vis-à-vis the deutsche mark at that time.

### 3. Instruments and implementation of monetary policy

Once the objectives of monetary policy have been determined, the conduct and implementation of monetary policy in the short run is carried out at the Bank of France. Normally, daily informal meetings are conducted by the Governor of the Bank of France with one or two Deputy Governors and the Director Generals of the Domestic Capital Markets Department, the Foreign Exchange Market Department, and the Research Department. This group assesses the reserve position of the banking system and evaluates whether current market interest rates, especially the interbank rate, are consistent with the current stance of monetary policy and foreign exchange rates. Instructions are then given to the money market trading room at the Bank of France to intervene in the interbank market in accordance with the conclusions drawn from the evaluation of money market and general macroeconomic conditions. The intervention may simply entail smoothing operations, and as such may not indicate any change in policy. However, conditions may warrant a shift in policy which typically implies a change in one

(or at times both) of the two key official interest rates: the interest rate on repurchase tenders (Taux des Appels d'Offres), commonly referred to as the "intervention rate," and the 5- to 10-day repurchase rate (Taux des Pensions a 5-10 Jours).

The Bank of France uses two types of instruments--official repurchase facilities and open market operations--to implement monetary policy. 1/ Reserve requirements are also utilized to affect banks' reserve positions, although on a limited scale. Official repurchase facilities, comprised of periodic repurchase tender offers (Operations sur Appel d'Offres) made by the Bank of France and a standing 5- to 10-day repurchase agreement (Pensions a 5-10 Jours) facility, are the primary vehicles through which the Bank of France manages reserves in the French banking system. Repurchase tenders are invited solely at the discretion of the Bank of France; that is, the decision to acquire liquidity through this instrument does not rest with the banks. Table 4 summarizes the operations carried out through this facility during 1988. By contrast, the 5- to 10-day repurchase agreement is always available to the banks but at a rate of approximately 50-75 basis points higher than the current intervention rate. 2/

The repurchase tender offer is the primary instrument of monetary policy and is the instrument most frequently used by the Bank of France to affect the supply of bank reserves and to influence interbank market interest rates. When deemed necessary, early in the morning the Bank of France will invite accredited financial institutions or primary market operators (Operateurs Principaux du Marché, OPM) to submit bids specifying the amount of securities and the interest rate at which they are willing to sell. 3/ The invitation specifies also the maturity of the securities acceptable for the tender, the date on which the proceeds of the tender will be credited to the account of the bidding institution, and the time period during which the Bank of France will accept bids. After aggregating all of the bids received, the Bank of France normally announces between 1:30 p.m. and 4:00 p.m. the interest rate it has accepted (intervention rate) and the amount allocated to each participant in the tender offer. The following example illustrates a simplified version of bids and the subsequent allocation

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1/ See Icard (1987a and 1987b) for further discussion of the new procedures and instruments.

2/ The 5- to 10-day repurchase agreement is similar to the Lombard facility in Germany.

3/ On average, repurchase tenders are invited each week. They need not, however, result in the net addition of reserves to the banking system as the allocation in the new tender may be insufficient to offset the drainage of reserves caused by the expiration of previous repurchase agreements.

Table 4. Bank of France Official Tender Offers

Value date	Maturity date	Rate (percent)	Amount (Billions of French francs)
<u>1988</u>			
Jan. 6	Jan. 19	7.5	66.3
Jan. 12	Jan. 26	7.5	71.2
Jan. 19	Feb. 2	7.5	38.7
Jan. 26	Feb. 9	7.25	52.1
Feb. 2	Feb. 17	7.25	33.5
Feb. 9	Feb. 24	7.25	49.4
Feb. 17	Mar. 4	7.25	37.5
Feb. 24	Mar. 11	7.25	46.1
Mar. 4	Mar. 23	7.25	32.7
Mar. 11	Apr. 1	7.25	53.4
Mar. 23	Apr. 12	7.25	17.6
Apr. 1	Apr. 12	7.25	17.6
Apr. 1	Apr. 20	7.25	34.8
Apr. 12	Apr. 29	7.25	24.7
Apr. 20	May 10	7.25	30.3
Apr. 26	Apr. 29	7.25	21.9
Apr. 29	May 20	7.25	57.9
May 17	June 1	7.25	13.6
May 20	June 1	7.25	19.8
May 20	June 10	7.25	34.4
May 27	June 10	7	8.1
June 1	June 22	7	32.1
June 10	July 1	7	22.6
June 22	July 11	7	60.6
July 1	July 19	7	43.8
July 11	July 29	6.75	64.4
July 19	Aug. 9	6.75	36.5
July 29	Aug. 17	6.75	64.3
Aug. 9	Aug. 26	6.75	20.4
Aug. 17	Sept. 5	6.75	65.6
Aug. 26	Sept. 13	7	17.0

of reserves to the banking system by the Bank of France through the repurchase tender offers:

Illustrative Example of Bids Received Under  
Repurchase Tender Offers

Interest rate (percent)	from Bank A	from Bank B	Total	Cumulative
8	F 100	F 300	F 400	F 400
7 3/4	300	1,400	1,700	2,100
7 1/2	1,400	500	1,900	4,000
7 3/8	500	600	1,100	5,100
7 1/4	600	700	1,300	6,400

Assume that the Bank of France, after reviewing these bids, decides to set an interest rate of 7 1/2 percent and to allocate F 2,000 of reserves, which is equivalent to 50 percent of the bids received at a rate of 7 1/2 percent and above. Accordingly, it will allocate to Bank A, 50 percent of the its bid at 7 1/2 percent and above, or F 900, i.e., F 1,800 x 0.5, and to Bank B, 50 percent of its bid at 7 1/2 percent and above, or F 1,100, i.e., F 2,200 x 0.5. These reserves will be credited to these banks on the predetermined date after verification by the Bank of France of the eligibility of the securities offered as collateral in the repurchase transaction.

The average maturity of the repurchase agreement is about three weeks. The securities that the OPM can offer as collateral are Treasury bills, certificates of deposit, bankers' acceptances, commercial paper, and short-term credits to private enterprises with a maturity not exceeding two years. Certificates of deposit must be rated by a specialized agency, while commercial paper and short-term credits are subject to evaluation by the Bank of France of the issuing corporation and debtor, respectively. These instruments must be owned by the OPM and recorded on its books.

While reserves obtained through repurchase tender offers are provided at the discretion of the Bank of France, the 5- to 10-day repurchase agreement facility is the marginal source of funds for banks

and is available every business day with no limit on the amount transacted; that is, the decision to borrow rests entirely with the banks with no limit or constraint imposed by the central bank. The request is usually conveyed by telephone to the money market room at the Bank of France, specifying the amount and the type of security offered as collateral. Authorized financial institutions and banks always have access to this facility as long as they have an eligible instrument, similar to those eligible for the official tenders, to offer as a collateral. In practice, this facility is utilized by the banks only when the rate in the interbank market is above the rate on the 5- to 10-day repurchase agreement. In this case, the excess demand for reserves in the interbank market, which generates the increase in the interbank rate, will be satisfied through this facility. Consequently, the reserves supplied through this facility will tend to alleviate the upward pressure on the interbank rate which, in turn, will tend to return to the rate on 5- to 10-day repurchase agreements. It should be noted, however, that interbank market participants may still wish to fund themselves in the interbank market even when the interbank rate exceeds the rate on 5- to 10-day repurchase agreements if they expect that the higher interbank rate is only a temporary phenomenon and will last less than the maturity of the repurchase agreement. If this is the case, acquiring reserves via the 5- to 10-day repurchase agreement would result in a higher effective rate, given the longer maturity of the official repurchase agreement.

The Bank of France may also utilize compulsory reserve requirements to affect banks' reserve positions in special circumstances. Prior to the reform of 1987, changes in reserve requirements were rarely employed as a direct instrument of monetary policy except in exceptional circumstances when the French monetary authorities deemed that other tools would not be sufficient to correct liquidity imbalances of an exogenous nature. In addition, the relatively small size of the interbank market resulting from the rigid segmentation of the financial market offered little scope for the monetary authorities to utilize compulsory reserve requirements as an instrument to influence short-term liquidity levels. The volume of reserves was in fact considered insufficient to absorb unexpected fluctuations in the liquidity of the banking system. Following the reform, however, the volume of required reserves was gradually increased in order to facilitate the Bank of France's management of reserve positions and influence over money market rates. Currently, depository institutions are required to hold 5 percent of their sight deposits and 2.5 percent of their time deposits with an initial maturity of more than two years in reserve accounts at the Bank of France. 1/ As of January 1, 1987

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1/ See Table 3. The reserve requirement ratios are changed infrequently; for example, during the last two years, they were changed in January and July of 1987 and in May of 1988.

compulsory reserves on bank lending were completely removed, although the monetary authorities have specified that they retain the right to reintroduce this requirement in case of exceptional circumstances.

The Bank of France frequently conducts open market operations that are aimed primarily at dampening daily fluctuations in short-term rates; these are by their nature smoothing operations that are not indicative of changes in the underlying policy stance of the Bank of France. These open market operations typically entail a repurchase agreement with a very short maturity (24 to 48 hours), or the outright purchase or sale of Treasury bills.

Very short-term repurchase operations of this kind can be carried out with a restricted number of financial institutions if the amounts are small and/or if the monetary authorities do not wish to reveal that the operation has taken place. Alternatively, they may be made public when the amounts transacted are substantial and/or when the Bank of France purposely intends to reveal its objective and its monetary policy stance to the market. According to market sources in France, when these actions become known to the market, they are considered to be extremely efficient in stabilizing market rates, as most market transactions are then carried out at or close to the same rate utilized by the Bank of France in its intervention. In contrast to repurchase transactions, open market operations in Treasury bills are always made public in order to differentiate them from the management of the Treasury bill portfolio of the Bank of France. However, given the limited size of the French Treasury bill market and the modest effect of these operations on other markets, this instrument is utilized infrequently by the Bank of France.

In conclusion, it would appear that the interpretation of intervention by the Bank of France in the interbank market is fairly straightforward. A change in one or both of the official rates--the intervention rate or the 5- to 10-day repurchase agreement rate--will generally indicate a significant shift in the underlying stance of monetary policy. Conversely, the announcement of an official tender offer carried out at an unchanged intervention rate or, more commonly, open market operations structured as short-term repurchase agreements or outright sales or purchases of Treasury securities, will underscore the intention of the monetary authority to maintain the interest rate structure and to leave unchanged the stance of monetary policy.

### III. Implementing Monetary Policy in Germany

#### 1. Objectives and intermediate targets

The Bundesbank Act of 1957 stipulates that the fundamental task of the central bank is to safeguard the currency by regulating "the amount of money in circulation and of credit supplied to the economy," which has been considered a principal prerequisite for the maintenance of a high level of employment and adequate economic growth over the medium term. Since 1974, this broad objective has been pursued within a framework of monetary targeting in which the growth of key monetary aggregates has been regulated in accordance with a target set for each year. 1/ Until recently, the intermediate target was established in terms of the central bank money stock 2/ in view of its closer relationship with developments in nominal income and its limited responsiveness to cyclical movements in short-term interest rates, compared with more narrowly-defined monetary aggregates. In early 1988, however, the central bank money stock was replaced by M3 as the intermediate target variable, mainly because of unexpected shifts in currency demand in response to changes in interest rates which had not been experienced by M3. 3/

In the Bundesbank's view, interest rates are also an important monetary indicator but they are not subject to any specific targets because of their uncertain relationships with nominal income and the limited extent to which they can be controlled, especially given Germany's highly open economy. Nevertheless, the maintenance of some short-run stability in interest rates has been a major objective of the Bundesbank. Over the longer term, however, interest rates are subject to constant review in light of developments in the monetary aggregates and exchange rates, and actions are taken to guide them to an appropriate level consistent with the overall monetary policy objectives. 4/

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1/ For a more detailed discussion of monetary targeting, see Bundesbank (1987), pp. 79-104.

2/ The central bank money stock is defined as currency in circulation and banks' minimum required reserves on their domestic liabilities. The central bank money stock differs from the monetary base in that it is computed on the basis of constant January 1974 required reserve ratios and excludes the minimum required reserves on nonresident deposits and banks' excess reserves.

3/ The reasons for the shift from the central bank money stock to M3 are discussed in detail in Bundesbank (1987). M3 comprises currency in circulation plus sight deposits, time deposits for less than four years, and savings deposits at statutory notice.

4/ See Bundesbank (1987), especially p. 81 and p. 102.

The Central Bank Council of the Bundesbank establishes an annual target for the growth of M3 for each year which is announced in December of the preceding year. 1/ Key economic factors taken into consideration in determining the annual target are the economy's growth potential and expected "unavoidable" (or exogenous) increases in prices. Added to these medium-term macroeconomic considerations have been short-term factors such as possible changes in capacity utilization, developments in the foreign exchange value of the deutsche mark, and the velocity of circulation; the latter is perceived to represent changes in the demand for money reflecting both cyclical factors and structural changes in the financial sector. 2/ The monetary target is reviewed by the Central Bank Council in the middle of each year in light of macroeconomic developments during the first half of the year. 3/ Monetary developments and the conduct of monetary policy are also reviewed biweekly by the Central Bank Council. At these meetings the members review the latest economic and financial developments, reexamine the appropriateness of the current monetary policy stance, and adjust the short-run policy stance if necessary. If the Council adopts any major policy changes, these changes are announced at a press conference which is held immediately following a Council meeting.

## 2. Instruments and operating procedures

The Bundesbank has a variety of policy instruments it can use at its discretion to achieve its intermediate monetary target. These consist for the most part of indirect control measures which are designed to manage banks' reserve positions and are classified by the Bundesbank into two categories: interest rate or liquidity policy instruments, depending on whether their primary objective is to influence interest rates directly or indirectly through changing the availability of bank reserves. Prior to the early 1980s, the banks' longer-term reserve demands were regulated primarily through adjustments in the terms of refinancing at the Bundesbank (changes in the access limit to refinancing at the Bundesbank's discount window as

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1/ The Central Bank Council consists of the President and Vice-President of the Bundesbank, the members of the Directorate, and the Presidents of the Land Central Banks (regional offices of the Bundesbank).

2/ On these points, see Bundesbank (1987), especially pp. 93-97.

3/ In an earlier period of monetary targeting, the review generally resulted in narrowing the target range for the remainder of each year to half of the original target range (either the top half or the bottom half), even if no revision was made to the overall annual target. On this point, see Bundesbank (1987), p. 97.

well as the discount rate) 1/, minimum reserve requirements 2/, and open market transactions in long-term government bonds. These measures were supplemented by short-term policy actions, especially adjustments in the access limit to the Lombard facility, which functioned as a "safety valve" to meet banks' temporary reserve demands on a daily basis. 3/

Since the early 1980s, however, open market operations under securities repurchase agreements have become the principal vehicle for short-term reserve management. Consequently, the Lombard facility has become a marginal source of reserves through which the Bundesbank acts as a lender of last resort. 4/ These open market operations involve the purchase by the Bundesbank of eligible securities from banks for a specified period, with an understanding that the banks will repurchase

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1/ Adjustment of the discount rate is generally aimed at signaling changes in the stance of monetary policy rather than at controlling borrowing at the discount window to a desired level; the latter objective is achieved by adjusting the access limit to the discount window.

2/ Minimum reserve requirements are applicable to both resident and nonresident bank deposits. The minimum requirement rate is differentiated according to the type of deposits (sight deposits, time deposits, and savings deposits), the amount of deposits (less than DM 10 million, DM 10 million to DM 100 million, over DM 100 million), and the origin of deposits. See Table 3.

3/ The Bundesbank's Lombard facility provides short-term loans to banks against the collateral of certain Government and public sector securities.

4/ The increased recourse to securities repurchase operations was attributable primarily to the marked shift in the balance of payments to sizeable deficits during the late 1970s and the early 1980s and the consequent growing need to meet banks' reserve demands through central bank credit. Under these circumstances, the Bundesbank initially tried to meet such demand through a reduction in required minimum reserves, an expansion in the rediscount quota, and other traditional measures. However, the supply of central bank credit to the banking system through these channels was constrained by the already low required reserve ratios, the limited scope for a further substantial expansion in the rediscount quota because of a relatively small amount of bills held by commercial banks for rediscount, and the excessive use of the Lombard facility which was designed to meet only temporary liquidity needs as a fine-tuning measure. These developments led the Bundesbank to rely more extensively on open market operations, buying and selling a diverse range of securities which the banks held in large quantity. The historical evolution of securities repurchase operations and their basic modality are discussed in more detail in Bundesbank (1983), Bundesbank (1985), and Dudler (1986).

these securities at the end of the period. 1/ The timing and frequency of such operations, the duration of the repurchase period, the amount of funds to be provided to the banking system, and the rate of interest charged on the funds are decided according to liquidity considerations and policy guidelines set by the Central Bank Council. The decision is generally based on the Bundesbank's estimates of banks' reserve positions over the next several months, given its current policy stance.

Open market operations under securities repurchase agreements were conducted at approximately monthly intervals from 1983 to 1985, but these operations have become more frequent since then, mainly reflecting their increased importance as a short-term intervention instrument as well as changes in the policy stance of the Bundesbank. In 1987, for example, these operations took place three times a month except for January and November, when they were limited to once and twice a month, respectively. The maturity of repurchase agreements has generally been 28 and 35 days, but it has been as short as 4 days (late November 1988) or as long as 63 days (September 1988). A securities repurchase agreement is typically offered one day before a preceding repurchase agreement expires.

Because securities repurchase operations take place under a tender system, the amount of additional reserves provided to the banking system can be easily measured. 2/ There are three types of tender schemes, namely, a volume tender, an interest rate tender, and a combination tender composed of both a volume and an interest rate tender (a two-tranche tender scheme). For a volume tender, the Bundesbank sets the rate of interest ("the repurchase rate") for the repurchase agreements; banks are then asked to bid for the amount of securities that they wish to sell to the Bundesbank. The total amount of funds provided by the Bundesbank is generally a portion of the total bids made by the banks (generally below 50 percent); the exact ratio of actual purchases to total bids differs for each securities repurchase

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1/ Eligible securities comprise fixed interest securities (both domestic and foreign) which are officially quoted on the German stock exchange and are accepted as collateral for Lombard loans, medium-term notes issued by the Federal Government, the Federal Railways, the Federal Post Office and the Land Governments, and Treasury discount paper with a remaining maturity of less than one year.

2/ The tender system was introduced in March 1980. Banks are requested to submit their bids by 3:00 p.m. on the day for which a tender is set and funds are credited to their accounts at the Bundesbank the next day. Banks participating in securities repurchase agreements are required to maintain special open security deposit accounts ("disposition accounts") at the Land Central Banks to facilitate the smooth transfer of ownership of securities.

agreement in accordance with the Bundesbank's policy stance at the time. Funds are allocated to individual banks on the basis of a uniform allocation ratio, with each individual bank's bid being reduced in proportion to the overall actual purchase/bid ratio.

For an interest rate tender, the banks are requested to submit bids containing both the amount of securities they wish to sell and the repurchase rate. Prior to September 1988, for each interest rate tender, a minimum repurchase rate was quoted by the Bundesbank, and banks were allowed to make several bids with different repurchase rates. Funds were allocated at a uniform repurchase rate equal to the rate at which the marginal bid was accepted (Dutch auction method). All bids above the uniform rate were fully met, while those at the uniform rate were reduced if required. The interest rate tender scheme was revised in two respects in September 1988. Under the new interest rate tender, the quotation of a minimum repurchase rate by the Bundesbank has been suspended and the allocation of funds is now made on the basis of the different repurchase rates bid by banks instead of a uniform repurchase rate; this is tantamount to the adoption of the American auction method. These revisions were aimed at alleviating a general upward bias in repurchase rates under the Dutch auction method, as banks, especially small banks, tended to bid more aggressively to ensure a sufficient allocation of funds to them.

It is important to note that the amount of reserves provided to the banking system under securities repurchase agreements is ultimately decided at the Bundesbank's discretion irrespective of the type of the tender scheme employed. However, volume tenders generally provide the Bundesbank with a more direct mechanism for guiding short-term interest rates to the particular level it wishes to achieve and in signalling its policy stance to the market. The choice between the two alternative tender schemes thus depends partly on the extent to which the Bundesbank directly seeks to achieve a specific interest rate. <sup>1/</sup> From January to October 1987, both tender schemes were used to the same extent, but the volume tender became the sole vehicle for securities repurchase agreements from October 1987 to the middle of 1988 when the Bundesbank maintained interest rates at a fairly low level following the October 1987 stock market crash. In September 1988, the Bundesbank re-introduced a two-tranche tender with two different maturities at the time of a gradual tightening of monetary policy: a shorter maturity tranche (34 days) was offered under a volume tender and a longer

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<sup>1/</sup> However, the extent to which this objective is achieved also depends on appropriate fine-tuning measures being taken along with securities repurchase agreements. See the discussion below.

maturity tranche (62 days) was offered under the new interest rate tender. 1/

Repurchase rates, especially those set under an interest rate tender, have been closely related to prevailing money market rates and are typically between the Bundesbank's two official interest rates--the discount rate at the bottom and the Lombard rate at the top. This contrasts markedly with the period prior to early 1985 when repurchase rates had typically been higher than both the discount and the Lombard rates. In general, the Lombard rate is now set at a level which is usually two percentage points above the discount rate and is typically higher than short-term interbank rates to ensure that the Lombard facility will be used only for exceptional liquidity shortages. Consequently, repurchase rates have replaced the Lombard rate as the key indicator of the Bundesbank's policy stance. Moreover, repurchase rates are also an important barometer (both to the market and to the Bundesbank) of money market conditions and hence serve as an anchor for key money market rates. Reflecting this close relationship with the repurchase rate, key money market rates, especially the call rate and the three-month interbank rate 2/, which are usually slightly higher than the repurchase rate, are also typically within the band set by the discount and the Lombard rates.

While open market operations under securities repurchase agreements contribute significantly to satisfying banks' short-term reserve demands, they do not necessarily completely smooth out daily fluctuations in banks' reserve positions and interest rates. This is partly because the allotment of reserves to the banking system under each security repurchase agreement typically occurs no more frequently than weekly and is decided on the basis of the Bundesbank's expectations of future demand and supply conditions. In order to avoid excessive daily fluctuations in interest rates, the Bundesbank's repurchase operations are supplemented by a number of other reversible fine-tuning measures. These measures include (i) the sale of short-term Treasury bills, (ii) open market operations under foreign exchange swap/repurchase agreements, (iii) the shift of public authorities' central bank deposits to the banking system, and (iv) provision of Lombard loans.

The Bundesbank's decision to use these policy instruments is heavily influenced by the sources and types of disturbances facing the money market. The sale of Treasury bills with short maturities (normally three days) is designed to absorb excess liquidity and

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1/ See Table 5 for details of the Bundesbank's repurchase transactions in 1988.

2/ The call rate is the interest rate charged in the interbank market for the overnight loan of reserves between banks.

Table 5. Bundesbank's Repurchase Transactions in 1988

Day of credit advice	Bids by banks		Purchases by the Bundesbank						Running for days
	Number of bidders	Amount	Number	Amount	Volume tenders		Interest-rate tenders		
		DM million		DM million	Fixed rate	Minimum rate	Allotment rate		
				% p.a.					
1988 Jan. 5		318	39,046	318	6,296	3.25			15
Jan. 13		328	38,217	328	8,068	3.25			28
Jan. 20		301	28,246	301	4,858	3.25			14
Feb. 3		285	33,527	285	9,757	3.25			28
Feb. 10		324	40,351	324	12,945	3.25			28
Feb. 24		311	35,962	311	11,896	3.25			28
March 2		278	30,806	278	7,123	3.25			35
March 9		332	45,305	332	14,533	3.25			35
March 23		338	35,644	338	14,650	3.25			28
April 6		280	28,457	280	8,568	3.25			28
April 13		340	29,524	340	11,254	3.25			28
April 20		317	26,993	317	9,483	3.25			35
May 4		305	37,646	305	8,701	3.25			28
May 11		391	46,882	391	7,570	3.25			34
May 25		393	41,775	393	9,669	3.25			28
June 1		365	49,044	365	15,737	3.25			35
1988 June 14		427	48,283	427	13,090	3.25			29
June 22		477	54,899	477	12,149	3.50			28
July 4		488	52,266	488	19,909	3.75			30
July 13		650	69,432	650	18,840	3.75			28
July 20		738	67,141	738	16,234	4.00			35
Aug. 3		755	82,992	755	24,174	4.25			29
Aug. 10		782	79,859	782	17,695	4.25			28
Aug. 17		747	63,466	747	4,073	4.25			28
Aug. 24		891	81,520	891	18,089	4.25			28
Sep. 1		877	71,867	877	14,564	4.25			34
Sep. 1		428	17,282	263	12,131			1 5.15—4.50	62
Sep. 7		908	78,858	908	18,312	4.25			35
Sep. 14		890	68,906	890	12,583	4.25			35
Sep. 21		964	65,570	964	12,040	4.25			35
Sep. 21		327	13,939	237	8,674			1 5.00—4.45	63
Oct. 5		1,011	74,185	1,011	14,327	4.25			28
Oct. 12		1,025	78,775	1,025	15,985	4.25			28
Oct. 19		1,005	76,208	1,005	11,678	4.25			27
Oct. 26		910	45,333	431	11,065			1 4.75—4.35	28
Nov. 2		807	46,196	616	13,599			1 4.75—4.35	30
Nov. 2		474	15,761	280	11,628			1 4.85—4.50	63
Nov. 9		933	53,132	554	13,728			1 4.75—4.40	28
Nov. 15		863	32,300	497	8,875			1 4.80—4.40	29
Nov. 23		826	38,763	734	17,996			1 4.55—4.35	28
Dec. 2		649	32,507	252	16,193			1 5.00—4.65	33
Dec. 2		368	16,968	139	5,057			1 5.00—4.65	61
Dec. 7		737	35,806	471	13,466			1 4.95—4.70	35
Dec. 14		736	29,436	408	15,078			1 5.50—5.00	35
Dec. 21		757	37,458	757	16,563	5.00			35

\* Purchases of bonds eligible as collateral for lombard loans; since July 11, 1983 also of Treasury discount paper with a remaining period to maturity of up to one

year; first such transaction on June 21, 1979. Excluding quick tenders; first such transaction on

November 28, 1988. — 1 Allotment at individual bidding rates within the spread. — p Provisional.

prevent an abrupt fall in short-term rates (especially the call money rate); these Treasury bills are sold at a rate of about 1/4 percentage point below repurchase rates. Open market operations under foreign exchange swap agreements also have been frequently used to neutralize an excessive expansion in domestic reserves, especially that resulting from international capital inflows. These operations are conducted in a manner similar to that for securities repurchase agreements except that they involve U.S. dollars rather than domestic securities. The spot and forward exchange rates that are used for these operations follow prevailing market rates at the time of the transactions. The typical maturity is three months, and the amount of the transactions is determined by the Bundesbank. The shift of public authorities' central bank deposits to the banking system has generally been aimed at offsetting temporary reserve shortages in the banking system, particularly those associated with large tax payments; ongoing market interest rates are charged on those deposits shifted to the banking system. Finally, the Lombard facility continues to be available for the short-term provision of borrowed reserves, although at a penalty interest rate.

### 3. Identifying policy changes

In the pursuit of policy objectives, the particular use of these instruments is continually adjusted in response to exogenous economic and financial shocks. The process of policy adjustment to altered economic conditions generally varies depending on the type and degree of these shocks. 1/ A key feature of the adjustment process is that the Bundesbank's policy action is generally aimed at influencing both interest rates and the availability of bank reserves. Policy adjustments are made essentially through a process which requires the gradual adjustment of not only interest rates but also the amount of reserves in order to generate desired monetary conditions. Any adjustments of the key intervention rates (the discount rate, the Lombard rate, and the repurchase rate) provide important information concerning policy changes undertaken by the Bundesbank. At the same time, the amount of reserves provided to the banking system under repurchase agreements constitutes another important signal concerning the Bundesbank's policy stance. In general, therefore, the overall direction of the policy stance can be judged from both the action taken with regard to the key intervention rates and the availability of reserves.

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1/ An interesting attempt is made to analyze the policy implementation process and its transmission mechanism by Neumann (1988).

#### IV. Implementing Monetary Policy in Japan

##### 1. Intermediate targets and instruments

The Bank of Japan Law states that "The Bank of Japan has for its object the regulation of the currency, the control and facilitation of credit and finance, . . . , in order that the general economic activities of the nation might adequately be enhanced." The primary objectives of monetary policy pursued by the Bank of Japan in accordance with the Bank of Japan Law have evolved considerably in the period since the early 1970s. Prior to the 1970s, monetary policy was primarily directed at supporting the rapid growth in output and productivity and maintaining the yen at a fixed exchange rate consistent with an acceptable rate of inflation and manageable balance of payments position. With the move to floating exchange rates and the inflationary consequences of the first oil price shock in the early 1970s, high priority has been accorded to price and exchange rate stability, although the maintenance of economic growth and low unemployment have remained important objectives. 1/

Since the late 1970s, Japanese monetary policy evolved from a system fundamentally reliant on credit control at regulated interest rates to a system geared more toward monetary control with flexible interest rates fostered by extensive financial and foreign exchange liberalization. 2/ As part of this evolution, the intermediate target of monetary policy employed by the Bank of Japan was shifted in mid-1978 from lending by financial institutions to the nonbank sector

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1/ See Shimamoto (1982) and Ito (1988).

2/ The extensive financial and foreign exchange liberalization occurred against the background of fundamental changes in the structure of the Japanese economy during the 1970s. Until the first oil crisis, the Japanese domestic financial system had been predominantly characterized by the channelling of funds from the household sector, with a high saving ratio, through the banking system to the corporate sector which demanded investment funds. For this reason, the banks' asset portfolios had consisted largely of loans to corporations. However, in the wake of the first oil price shock, two fundamental changes emerged in the structure of Japanese economy and its flow of funds. First, the Japanese Government began to run large deficits in its operations in 1975 in an effort to counteract the recession that year, financing them with large issues of government bonds. Second, the growth of the Japanese economy sharply decelerated, as did the investment activity by the corporate sector, reducing its once predominant demand for domestic saving. As a result, the proportion of indirect financing was drastically reduced, and the government and foreign sectors began to absorb larger shares of domestic saving.

(mainly to the corporate sector) to a broadly defined money stock. 1/ This change in the intermediate target reflected in part a declining share of corporate sector lending in the portfolios of financial institutions and a commensurate sharp increase in claims on the public sector and nonresidents, which resulted in a weakening of the link between bank lending to the corporate sector and the ultimate objective of monetary policy. At the same time, greater emphasis was given to interbank money market interest rates, in particular the call and bill discount rates, as primary instruments for money market operations to achieve the desired monetary aggregate objective. 2/ Previously, money market operations by the Bank of Japan had depended mainly on "window guidance" or moral suasion to regulate the volume of bank credit as well as the control of major lending and deposit rates. This instrument has become less important since lending by financial institutions was replaced by monetary aggregates as intermediate targets.

The decision to give greater emphasis to the call and bill discount rates as the instruments for money market operations was coincident with a policy shift aimed at promoting the development of more liberal interbank and open money markets. Markets for certificates of deposit and Gensaki transactions 3/ were developed and expanded in the late 1970s. The euro-yen market was liberalized and expanded and interest rate arbitrage between the domestic and euro-markets became very active in the period since 1980 when the New Foreign Exchange and Trade Control Law was enacted. Consequently, changes in the interbank market rates came to be highly correlated with changes in the open market rates and euro-yen market rates. 4/ The new environment provided an effective mechanism to transmit initial policy actions on the call and bill discount rates to the rest of the money markets and the monetary aggregates.

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1/ Broadly defined money consists of M2 (currency plus demand, savings, and time deposits) plus certificates of deposit. Since the third quarter of 1978, the Bank of Japan has announced its quarterly projections of the average outstanding M2 plus certificates of deposit for the next quarter in terms of year-over-year growth rates. Hutchison (1986) and Ito (1988) have questioned whether these projections are in fact targets, but instead would be viewed as forecasts that reflect the current level of economic activity, not policy goals of the Bank of Japan.

2/ The call rate is an interest rate in the short-term interbank money market. The bill discount rates are discount rates on various bills of short maturities traded in the interbank money market.

3/ Gensaki transactions are repurchase agreements usually involving government securities.

4/ See Fukui (1986), for example.

Thus, the Bank of Japan came to designate the call and bill discount rates as the key operating variables in its conduct of monetary policy since the late 1970s. Furthermore, the Bank began to influence those rates indirectly through controlling the supply of reserves to the banking system, rather than directly regulating those rates in the quotation system as in the past. 1/ In order to control the supply of reserves, the Bank adjusts its direct lending to banks or intervenes in the interbank money markets (bill discount operations) and in certain of the open money markets. These operations are designed to either offset or complement the net cash inflow (or outflow) into the banking system from the rest of the economy such that the total supply of reserves is brought to a desired level. The Bank of Japan employs an operating strategy that involves the use of the "reserve progress ratio" to guide the call and bill discount rates by means of control of reserves. 2/

Money market interest rates appear to have a relatively robust relationship with broadly defined money and the economy, mainly through the following three channels. 3/ First and most important, a change in interbank rates induces a corresponding change in other interest rates, which in turn influence the level of aggregate spending and thereby affect the demand for credit and ultimately the demand for money. Second, changes in interbank rates affect the profitability of bank loans as the loan rates are less flexible due to the fact they are tied to the prime lending rates which are, in turn, based on regulated deposit rates. Third, changes in market rates relative to deposit rates may generate disintermediation or re-intermediation which affects the reserve positions of banks and hence, their ability to provide credit. The relative importance of these latter two channels should diminish as liberalization of deposit rates proceeds and their relative inflexibility is reduced. 4/

In more recent years, the structure of the Japanese financial market and its relationship with the international financial centers has undergone further change as the process of financial liberalization has continued in the domestic market and the offshore yen markets have expanded sharply both in Europe and in Tokyo. These developments contributed to reducing the degree of controllability of short-term interest rates, thus weakening the link between the intermediate target and the ultimate objectives of monetary policy. For example, the rate

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1/ The quotation system in which the Bank of Japan had been setting the rates was discontinued in 1978.

2/ See below for a description of this ratio.

3/ See Hutchison (1986) and Suzuki (1988) for an empirical analysis of the relationship between interest rates and the monetary aggregates.

4/ See Cargill (1986) for a discussion of the impact of financial market liberalization on the implementation of monetary policy.

of growth of the monetary aggregate has substantially and consistently exceeded the targeted rate in the last two years, with no apparent pressures building in domestic prices. In addition, the two-month bill discount rate in the domestic interbank market, the rate the Bank of Japan influences directly, diverged considerably from comparable rates in the open markets, especially in the summer of 1988 when the euro-yen rates rose.

In an effort to counter these developments, the Bank of Japan introduced some important measures to reform the domestic money markets and to alter the procedures for money market intervention, effective November 1988. 1/ A key measure was to replace market operations intended to influence the bill discount rates in the maturity range of one to three months with operations in the markets for bills of shorter maturities, namely one to three weeks. As a result, the two-month bill discount rate came to be determined by the supply of and the demand for reserves, rising to a level roughly consistent with comparable free market rates. While the daily variation in the two-month bill discount rate prior to the November reform was very small, presumably reflecting the smoothing operations by the Bank of Japan designed to regulate the supply of reserves to stabilize money market interest rates in the short run, this rate has shown larger fluctuations following the November reform. Furthermore, the two-month bill discount rate had been regarded as the second official discount rate, an important indicator of the policy stance of the Bank of Japan and as such, was considered to be more important than the official discount rate itself, which has been changed very infrequently. 2/ This status is presumably now accorded to the one- to three-week bill discount rate. The

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1/ In November 1988, some changes were introduced in the maturity structure of the interbank money markets in order to encourage increased interest rate arbitrage between the interbank and open money markets and to maintain the effectiveness of monetary control by the Bank of Japan. The maturities of collateralized commercial bills were extended on the short end to one week; thus their maturities now range from one week to six months, compared with one to six months previously. The maturities of collateralized call trading have been limited to overnight to one week, compared with slightly longer previous maturities of overnight to three weeks. On the other hand, the maturities of uncollateralized call trading have been lengthened to a range of overnight to six months. These changes were intended to enable the Bank of Japan to intervene in the interbank money markets through purchasing operations of commercial bills mainly in the maturity range of one to three weeks, compared with the range of one to three months previously.

2/ The official discount rate was reduced to a post-war low in February 1987 and was increased in May 1989.

November reform also included the intent to use the official discount rate more frequently and flexibly.

The November reform marked a turning point in the conduct of monetary policy in Japan. The reform was intended to permit the Bank of Japan to maintain the controllability of short-term interest rates and at the same time to enhance the functioning of interest rate arbitrage between the domestic and offshore markets as well as between the interbank and open money markets. It would appear that the Bank of Japan is increasingly focusing on influencing the short-term interest rates and directly influencing the general economy rather than conducting monetary policy through the strict application of monetary targeting. This new approach is expected to enhance the effectiveness of Japanese monetary policy to the extent that officially-induced changes in the shorter-term interest rates impart appropriate signals to the banking system and the rest of the economy.

## 2. Formulation and implementation of policy

The Bank of Japan Law authorizes the Policy Board for the Bank of Japan to formulate, direct, and supervise monetary policy. This Board consists of the Governor of the Bank of Japan, a representative of the Ministry of Finance, and four representatives of the private sector with experience in banking, industry, commerce, and agriculture. While this Board retains an advisory role, monetary policy is effectively conducted by the Bank of Japan. The Governor, the Deputy Governor, and several Executive Directors meet four times each week to review current economic and financial conditions and to evaluate the current stance of monetary policy. The Bank's senior staff from the operations department meets daily with the Governor to advise on recent developments and also to receive operational directives.

The Bank of Japan implements monetary policy by influencing the reserve position of the banking system. It adjusts the total supply of reserves in the banking system to desired levels by altering its direct lending to financial institutions and by intervening in the interbank and open money markets. The scale and direction of such operations are determined so as to either counteract or complement the estimated net cash flow into the banking system from the public sector, the corporate and household sectors, and the net official intervention in foreign exchange markets. The net cash flow is projected as the sum of changes in currency in circulation and in government deposits with the Bank of Japan, less changes in net foreign reserves. <sup>1/</sup> In smoothing operations, the Bank of Japan offsets the net cash flow into, or out of, the banking system. When a fundamental change in the call and bill

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<sup>1/</sup> This relationship can be derived by rearranging the balance sheet of the Bank of Japan.

discount rates is deemed necessary, the Bank of Japan either counteracts or complements the net cash flow so that either more relaxed or more stringent conditions are generated in the money market, thereby placing pressure on these rates so that they move in the desired direction. 1/

The basic strategy employed by the Bank of Japan in its management of reserves involves the use of the reserve progress ratio. Banks are required to maintain reserve deposits at the Bank of Japan. At the end of each reserve maintenance period, the average of each institution's deposits during that period must be at least equal to the legal requirements calculated for the preceding calendar month. The reserve progress ratio is defined as the ratio of the reserve deposits accumulated up to the current date within the maintenance period to the total reserve deposits required for the preceding calendar month. While the Bank of Japan neutralizes any shortage or surplus of reserves over the entire reserve period, it adjusts the reserve progress ratio within the period in order to convey its policy intentions to the banking system. 2/ For example, if banks maintain their daily reserve balances at the average daily requirements, the reserve progress ratio would rise by 3.3 percent each day. 3/ If the Bank of Japan wished to raise the call and bill discount rates, it would not supply sufficient reserves to enable the reserve progress ratio to rise by 3.3 percent each day. As financial institutions turned to the interbank market to acquire the reserves necessary to meet their reserve requirements, the call and bill discount rates would rise.

The Bank of Japan uses a variety of methods to provide or absorb reserves in the daily implementation of monetary policy. Regardless of the type of operation employed, the terms and volume of the market operation affect interest rates (particularly, the call and bill discount rates) and consequently provide indications of the current stance of monetary policy. Direct lending through the discount window to financial institutions, mainly city banks, is the most flexible instrument employed by the Bank of Japan and hence is typically used to smooth daily fluctuations in the banking system's reserve position. Since the official discount rate, the interest charged by the Bank for

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1/ This formulation of monetary policy provides a link between foreign exchange intervention and money market intervention; it in effect implies automatic sterilization of the reserves either generated or eliminated through official foreign exchange intervention.

2/ See Fukui (1986).

3/ The reserve progress ratio is usually measured as the deviation from the average because individual banks judge their actual reserve position in relation to the average daily requirement as a standard. For a fuller explanation of the reserve progress ratio, see Kanzaki (1988).

lending to financial institutions, is usually below the call and bill discount rates, lending is effected under a rationing procedure. Furthermore, lending by the Bank of Japan may be withdrawn at any time at the Bank's option and the interest charged on lending is calculated on the period of the loan plus one day so that the effective interest rate exceeds the discount rate and may even be a penalty rate for very short loans. 1/ To accommodate seasonal fluctuations or to influence banks' reserve positions, the Bank customarily operates in the money markets, dealing mainly in bills of corporations with high credit ratings, 2/ bills drawn on banks with bills of corporations as collateral, in short-term government bills, 3/ or, beginning in 1986, in certificates of deposit. The Bank of Japan also accommodates the long-term demand for reserves generated by secular changes in the demand for money associated with economic growth by dealing outside of the interbank market in long-term government bonds.

The Bank of Japan may also employ changes in the official discount rate. Changes in the official discount rate, however, are effective primarily to the extent that they "announce" a change in the Bank of Japan's policy stance and hence influence expectations on the part of market participants, as the official discount rate ordinarily remains below market rates. However, the impact on market expectations is quite strong, as changes in the official discount rate are usually followed by reinforcing operations in the money market by the Bank of Japan.

### 3. Identifying changes in policy

The policy stance of the Bank of Japan generally manifests itself in changes in the call and bill discount rates. These rates, in the maturity range where the Bank of Japan intervenes, usually exhibit very little changes in the very short run mainly due to smoothing operations of the Bank of Japan. The call and bill discount rates, however, show much more variability in the monthly data over the medium term, exhibiting large swings. The latest episode of monetary restraint occurred in the last quarter of 1985, immediately following the Plaza Accord, when the Bank of Japan attempted to reverse the declining trend in the foreign exchange value of the Japanese yen. The Bank of Japan

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1/ In early 1989, for example, with the current discount rate of 2.5 percent and the call rate of around 3.70 percent, the effective interest rate on loans for two days or less exceeded the call money rate.

2/ These bills include commercial and industrial bills, trade bills, promissory notes, export and import bills, bills of exchange, etc.

3/ The Bank of Japan began operations in short-term government bills in 1981, but the market is not yet deep enough to permit large purchase operations in this instrument.

sharply curtailed its direct lending to banks and its bill discount operations, thereby putting pressure on the banks to obtain reserves in the interbank money markets. As a result, the two-month bill discount rate rose sharply and other short-term rates, particularly the call rate, soon followed due to active interest rate arbitrage across the call and bill discount markets. There is generally a minimal unexploited arbitrage opportunity across the two markets; consequently, the call and bill discount rates are closely correlated. 1/

These developments clearly suggest that the stance of Japanese monetary policy does not change on a daily basis, but rather goes through phases of at least several months in duration. The limited daily variance of the two-month bill discount rate prior to November 1988 is a reflection of the basic feature of the short-term money market operations by the Bank of Japan which was designed to eliminate seasonal fluctuations and other short-term aberrations. Thus, it would appear that both the call and bill discount rates can be considered important indicators of the stance of Japanese monetary policy. However, because of the money market reform introduced in November last year, more attention should now be paid to the movements of one- to three-week bill discount rates, rather than the two-month rate, to assess the stance of intervention by the Bank of Japan in the money markets, and, more generally, the stance of monetary policy in Japan.

#### V. Implementing Monetary Policy in the United Kingdom

##### 1. Institutional background and intermediate targets

The principal objective of U.K. monetary policy is to influence the growth of nominal GDP over the medium term as a means of achieving price stability. 2/ From the mid-1970s until quite recently, the Bank of England has pursued this objective by employing monetary aggregates as intermediate targets. However, as in a number of other countries, the relationships between the targeted monetary aggregates and economic activity have been found to be generally unstable and unpredictable, especially in the 1980s. Consequently, the targeting of a broad monetary aggregate (£M3 3/) was suspended in March 1987. Moreover, while the authorities still place some importance on limiting the

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1/ See Takagi (1986) for a discussion of this point.

2/ This view of the principal objective of monetary policy was conveyed by Bank of England officials in an interview in July 1988.

3/ £M3 comprises notes and coin in circulation with the public plus all sterling deposits (including certificates of deposit) held by the U.K. private sector with U.K. banks.

growth of the narrowest monetary aggregate (M0 1/) to an indicative target range, the openness of the U.K. economy and the extremely large volume of flows into and out of the London capital market, along with the increased uncertainty surrounding the link between the monetary aggregates and economic performance, have led to a more broadly-based approach to the implementation of monetary policy. In particular, a range of indicators other than monetary aggregates, such as the exchange rate, estimates of real interest rates, the behavior of certain financial markets, and the current course of nominal GDP, have been used more recently as guides for the stance of monetary policy. 2/

Before describing the manner in which the Bank of England implements monetary policy, it is necessary to make a few general comments about the important intermediary role played by the London Discount Market Association, an association which has no close parallel in other major countries. In the United Kingdom, banks are not required to keep reserve balances at the central bank and they do not normally go first to the Bank of England either when they are in urgent temporary need of liquid funds or when they wish to deposit surplus liquid funds. In such circumstances, banks would generally first try to smooth out temporary reserve imbalances with the London Discount Market Association. This association groups together a number of "discount houses;" these are private companies that are engaged primarily in discounting Treasury or commercial bills and, in so doing, act as a buffer or a transmission agency between the Bank of England and the commercial banks. The commercial banks are required to deposit an average of 5 percent and a minimum of 2.5 percent of their eligible liabilities 3/ with the discount houses. They can deposit more funds on call or at a short maturity in times of surplus liquidity and, in times of a shortage of funds, they can draw down their balances with the discount houses or, if necessary, borrow extra funds from them or sell bills to them. The discount houses, therefore, constitute the principal mechanism through which temporary surpluses and deficits of reserves are smoothed out within the banking system.

Another important role of the discount houses is to underwrite the Bank of England's weekly Treasury bill auction by tendering for all the bills on offer, with the minimum proportion of each issue tendered by an individual discount house agreed with the Bank of England. Finally,

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1/ M0 is defined as all notes and coin in circulation with the public plus banks' till money and banks' operational balances with the Bank of England. The annual average target growth range for FY 1989 has been set at 1-5 percent.

2/ See Coleby (1986).

3/ These are liabilities that the Bank of England deems eligible for rediscounting; they are described in more detail below.

all discount houses act as market makers for Treasury bills and other bills, standing ready to buy and sell them in a secondary market. 1/

2. Operating procedures and instruments

The Bank of England seeks to maintain, through open market operations, both the level of reserves in the banking system and the general level of interest rates within ranges that are consistent with the overall stance of monetary policy formulated by the Chancellor of the Exchequer in concert with the Bank. Each morning the Bank estimates the reserve position of the banking system, involving most importantly forecasts of government transactions with the rest of the economy. The magnitude of these transactions is typically very large and often involves wide fluctuations; hence, they often have a substantial impact on the reserve position of the banking system. As the Government's accounts are held at the Bank of England, a net flow of funds to the Government necessarily involves a decline in the balances of commercial banks; that is, reserves are reduced absent any offsetting action by the Bank of England. Conversely, a net flow from the Government would result in an increase in reserves. In its money market operations, the Bank of England aims to offset these net flows, and the terms on which it does so are likely to have general implications for interest rates and to provide indications of the current stance of monetary policy.

The first assessment of the likely shortage or surplus of funds that the banks will experience--rounded to the nearest £50 million--is announced at about 9:45 a.m. with, if necessary, a second assessment at noon that incorporates the Bank of England's observation of morning trading activity and consultations with representatives of the discount houses and major commercial banks. Any shortage of funds, due primarily to a flow of funds from the commercial banks to government accounts at the Bank of England, is likely to become evident early in the day, since banks tend to withdraw needed funds from the discount houses before noon. Any surplus may not become apparent until later as banks deposit short-term surplus liquidity with the discount houses right up to the close of the business day.

If the Bank of England concludes that there is likely to be a shortage of funds, it informs the discount houses that it is willing to consider purchasing bills outright or, more precisely, to rediscount bills that they have already discounted on behalf of one of a list of

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1/ For a description of the role of the discount houses, see Bank of England (1988).

banks or licensed deposit takers that is "eligible" <sup>1/</sup> to have its bills discounted in this way. Generally, the transactions involve eligible commercial bills, local authority bills, and Treasury bills. The Bank does not usually specify which type or maturity of bill it is prepared to buy, although it can do so. The Bank deals in four maturity bands: 0-14 days, 15-33 days, 34-63 days, and 64-91 days; it does not usually purchase bills with a maturity greater than 91 days or eligible bank bills within seven days of their date of acceptance.

In response to the Bank's invitation, the discount houses communicate to the Bank the value of the bills they are prepared to sell, the type of bill involved, the maturity band of the bills, and the discount rate they are prepared to accept. The Bank considers the offers and generally buys an amount equivalent to the estimated shortage for the day at the lowest price on offer, that is, at the highest discount quoted. The lowest rate of discount, i.e., the highest interest rate, at which the Bank is prepared to buy bills is known as the "stop rate," which may differ for different maturity bonds and for different types of bills. The level at which the stop rate, or dealing rate, is set can provide a signal to the market of the Bank of England's view on the level of interest rates. A significant rise or fall in the dealing rates can lead to a corresponding increase or fall in the base lending rates of commercial banks. The rates at which the Bank of England deals with the discount houses are published ex post in the financial press.

In some circumstances, when for technical reasons an unexpected shortage of funds in the market becomes apparent late in the trading day, the Bank may relieve a shortage by making straightforward loans against collateral to the discount houses at or near market rates. More importantly, the Bank of England may also adopt this procedure when it wishes to see a rapid upward or downward adjustment in interest rates. On such occasions it may refuse to provide funds to the market at the rates on bills offered by the discount houses, thereby obliging the discount houses to borrow the money they require at the interest rate level desired by the Bank. This invitation to borrow is issued at 2:30 p.m. and hence the subsequent lending is termed "2:30 p.m. lending." If this lending rate is significantly higher or lower than the most recent dealing rates on eligible bills, a clear signal is thereby given to the commercial banks of the Bank of England's view as

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<sup>1/</sup> The Bank of England judges applications for eligibility according to three basic criteria: first, the bank must maintain a broadly based and substantial acceptance business in the United Kingdom; second, its acceptances must command the finest rates in the market for bills that are not considered "eligible;" and third, in the case of foreign-owned banks, British banks must enjoy reciprocal opportunities in the foreign owners' domestic market.

to the appropriate level of their lending rates and a corresponding change in bank base lending rates generally follows. 1/

The discount houses are also entitled to offer eligible bills for sale to the Bank of England at any time and not just on invitation. This does not occur frequently and when it does, it is the Bank of England that specifies the discount rate at which it is prepared to deal. If, for example, the Bank believes that in purchasing the bills it would inject more liquidity into the banking system than it felt appropriate, it could set the discount rate at a penalty level.

Most of the Bank of England's open market operations are conducted with the discount houses, but it can on occasion deal directly with the commercial banks. The Bank does not invite bill offers from the banks, but it will consider any offers of Treasury bills or local authority bills that the banks submit at the same time and in the same way as the discount houses in their response to a Bank of England offer. The commercial banks can also offer such bills after the Bank of England has concluded its normal bill dealing operations, which is generally by

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1/ If the Bank were to decide to increase recourse to straight-forward lending, it could reestablish the minimum lending rate, which served as the benchmark interest rate for several years before the procedural changes of 1981. Before then, the Bank of England generally auctioned relatively large amounts of Treasury bills--usually £500-600 million worth each week. Whenever it proved necessary to inject liquidity into the system, the Bank would buy these bills back at a rate that was set by formula in relation to the average auction rate. When the Bank of England decided not to meet the demand for liquidity in this way, the discount houses would be forced to borrow from the Bank of England at the more costly "minimum lending rate." This rate served as the key benchmark interest rate and changing it had major political as well as economic implications. In 1981, the U.K. authorities switched to what was seen as a system that would be more sensitive to market mechanisms and overcome the "bias to delay" in adjusting interest rates that was inherent in the existing system (Coleby 1986). The weekly allocation of Treasury bills was cut back to about £100 million and the Bank of England increased the amount of other commercial and local authority bills that it would purchase as well as Treasury bills to relieve shortages. It was provided that when the discount rates offered by the discount houses for these bills fell outside an unpublished band of rates that were deemed consistent with the Bank's monetary policy objectives, those discount houses would have to borrow from the Bank at a rate that was only determined on the day of the borrowing. The Bank of England, however, explicitly retained the possibility of reintroducing a fixed minimum lending rate, and indeed it did so on January 1985 for a short period in an effort to bring some stability to rather volatile market conditions.

2:30 p.m., but before 3:00 p.m., in which case the Bank will generally offer a lower price than that at which it purchased similar bills earlier in the day.

The Bank of England sometimes extends to the discount houses an offer to buy paper with an agreement that it will be repurchased after a given period. Such repurchase agreements tend to be offered when there are very large shortages to be accommodated and when the Bank of England does not wish to run down too drastically the supply of bills held by the discount houses. The rate of discount used in repurchase agreements is set by the Bank of England and will not normally be lower than the dealing rate set in its latest outright purchases of eligible bills. The Bank will set the terminal date of the repurchase agreement for a day when it expects there to be a surplus of liquidity in the money market or only a small shortage. In addition, during periods of acute cash shortages, for example during the main tax-paying periods, the Bank of England may offer the banks repurchase agreements in long-term government paper (gilt-edged stock) and in certain other assets, such as promissory notes in relation to holdings of sterling export credit and shipbuilding paper guaranteed, respectively, by the Export Credits Guarantee Department and the Department of Trade and Industry.

On occasions when there is surplus liquidity in the market, the Bank of England can absorb this excess essentially by reversing the operations used for relieving a shortage. Surpluses are generally taken out in afternoon trading by which time institutions facing shortages will have had time to acquire the funds they need. On such occasions the Bank of England will invite both discount houses and commercial banks to bid for Treasury bills of one or more maturities, which it will provide to the highest bidders. By insisting on same day settlement, the Bank of England draws surplus liquidity out of the money market.

As explained above, the U.K. authorities do not now use the weekly issue of three-month Treasury bills as an important instrument in the implementation of their monetary policy. A modest weekly issue is continued mainly to keep the Treasury bill mechanism and market intact. The authorities do, however, monitor closely the yield on these Treasury bills both in the primary and secondary markets. Although the discount houses underwrite each auction by tendering for all the bills on offer, any institution may tender for the bills in a minimum amount of £50,000. The Bank of England sells the bills at the prices bid by the highest bidders. The Bank of England may also attempt to smooth out future expected money market shortages by setting a special tender of Treasury bills of less than three months maturity, due to mature just before the period of expected shortage.

### 3. Identifying changes in policy

In interpreting the Bank of England's interventions in the money markets, the strongest signal of the Bank's intention to change its stance is provided on those days when it fails to accommodate a money-market shortage through open market transactions and obliges the discount houses to borrow from it at a specific interest rate. If this rate is higher than the effective interest rate at which the Bank had been rediscounting bills, there is a clear indication that the Bank is tightening its monetary policy. A lower rate would correspondingly indicate a relaxation of the monetary stance. The signal is all the stronger if, as in January 1985, the Bank reintroduces a fixed "minimum lending rate;" in other words, if it tells the market that it will lend only at this rate until market conditions have stabilized at interest rates considered by the Bank to be appropriate. Significant discrete changes in the Bank of England's dealing rates--either the rate at which it rediscounts bills or its lending rate--are generally followed by a corresponding movement in the base lending rates of the commercial banks. While base lending rates are set at or close to the Bank of England's dealing rates, interest rates on bank loans are generally set at a negotiated level above the base. In consequence, an upward or downward movement in the Bank of England's dealing rates generally feeds through quickly into the wider economy and indicates a change in the stance of policy.

## VI. Implementing Monetary Policy in the United States

### 1. Intermediate targets and instruments

Since the mid-1970s, monetary aggregates have been the intermediate targets of Federal Reserve policy. Targeting the growth in monetary aggregates implicitly assumes that the relationship between changes in growth in the monetary aggregates and economic activity is sufficiently reliable that the ultimate goals or objectives of monetary policy can be achieved by using monetary aggregates as intermediate targets. The Federal Reserve generally has established target ranges for the growth rates of M1, M2, and M3 during the calendar year. <sup>1/</sup> With the Full Employment and Balanced Growth Act of 1978, Congress

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<sup>1/</sup> M1 consists of currency, travelers checks, demand deposits, and other checkable deposits. M2 is M1 plus savings accounts, money market deposit accounts, general purpose and broker/dealer money market mutual funds, small (less than \$100,000) time deposits, overnight repurchase agreements, and overnight eurodollars issued to U.S. residents by foreign branches of U.S. banks. M3 is M2 plus large time deposits, institution-only money market mutual funds, term repurchase agreements, and term eurodollars issued to U.S. residents.

mandated that the Federal Reserve set annual target ranges for growth in monetary and credit aggregates and report these targets to Congress twice each year.

During the 1980s, however, the relationship between monetary aggregates and economic activity became less stable and less predictable, especially in the short-run. 1/ In light of the increased uncertainty surrounding the link between money and economic activity, the Federal Reserve has not set a target range for M1 since 1986 and widened the ranges for both M2 and M3 for 1988. Furthermore, the Federal Reserve has broadened the scope of the variables that it monitors in formulating and evaluating policy to include a wide range of what it considers to be leading indicators of the course of the economy and inflation, such as commodity prices, exchange rates, the yield curve, and indicators of incipient pressures in the real economy. 2/ That these indicators have played a relatively important role in the formulation of monetary policy can be inferred, for example, from the Federal Reserve's actions during the first five months of 1988. As noted in its July 1988 report to Congress, the Federal Reserve eased its monetary policy stance from late January to late March, and then became progressively less accommodative through late May. 3/ As these changes in policy stance occurred while the targeted aggregates (M2 and M3) were within their target ranges, it seems reasonable to infer that these policy changes were in response to movements in variables other than M2 and M3.

In response to signals relating to the future course of output and prices, the Federal Reserve can choose among several instruments to influence monetary and credit conditions. The two instruments discussed below are those currently employed most frequently. 4/

The primary instrument of monetary policy is open market operations in which the Federal Reserve buys or sells securities,

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1/ See Axilrod (1985), Heller (1988), and Wenninger (1986). While this relationship has been called into question, it appears that the Federal Reserve continues to have confidence in the longer-term relationship between growth in the monetary aggregates and the rate of inflation. See, for example, Heller (1988), p. 422.

2/ These indicators are enumerated in Heller (1988) and in Johnson (1988a).

3/ Board of Governors of the Federal Reserve System, Monetary Report to Congress (July 13, 1988), p. 13.

4/ Reserve requirements are also in principle an instrument of policy. While changes in reserve requirements do release or absorb reserves, and hence, could be used to affect the reserve positions of depository institutions, only limited use is now made of reserve requirements in the short-run implementation of monetary policy.

thereby adding reserves to, or draining reserves from, the banking system. While the Federal Reserve is authorized to conduct open market operations in a variety of securities, it has chosen to conduct most transactions in U.S. Treasury securities because the Treasury security market is extremely broad and deep, and therefore substantial purchases or sales of these securities will not have a significant impact on their yield. Most open market operations typically are not outright purchases or sales that permanently influence bank reserves, but rather take the form of repurchase or matched sale-purchase agreements which affect the level of reserves only temporarily. 1/ The Federal Reserve typically makes only 6 to 10 outright purchases or sales each year. It uses repurchase or matched sale agreements more frequently because it considers most of its open market operations to be defensive, i.e., to offset temporary fluctuations in reserves. These agreements typically last for only one day, rarely for more than 7 days, and never exceed 15 days. 2/

Of secondary importance is the use made by depository institutions of the discount window at each Federal Reserve bank in acquiring reserves at their own initiative. Discount window credit is available upon request by a depository institution, but is subject to approval by the Federal Reserve Bank within the district in which the borrower is located. Depository institutions are not entitled to a specific quota of discount window credit to be used at their complete discretion; rather, the discount window is regarded by the Federal Reserve as a marginal source of funds that is to be used sparingly when other sources are not readily available. The Federal Reserve generally sets its discount rate (the rate it charges depository institutions for short-term loans) below short-term market rates. Hence, borrowed reserves obtained through discount window credit are rationed by administrative guidelines, as well as by price. As future access to the discount window is reduced for those institutions that use this source of credit too frequently, such reduced availability constitutes an additional implicit cost of using the discount window. Nonetheless, institutions generally become more willing to incur this cost as the spread between market interest rates and the discount rate widens, so that the demand for borrowed reserves is a positive function of the

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1/ Matched sale-purchase transactions are conducted only in Treasury bills, while repurchase agreements may be conducted in the entire range of Treasury securities.

2/ See Kneeshaw and Van den Bergh (1988) and Madigan and Trepeta (1986).

spread between short-term market rates (particularly the federal funds rate) and the discount rate. <sup>1/</sup>

There are three types of discount window credit. Adjustment credit consists of short-term loans extended by Federal Reserve banks to depository institutions to help them meet temporary reserve needs. Most institutions repay these loans within a few days; the largest banks are required to repay this credit the next business day. Seasonal credit consists of longer-term loans to smaller depository institutions that have relatively strong seasonal patterns in their deposits or loan demand. These two types of borrowing are affected by changes in the spread between the federal funds rate and the discount rate, rising when the spread widens and falling when the spread narrows. The third type of discount window credit is extended credit; it is longer-term credit extended to institutions experiencing such severe financial problems that they face prolonged difficulties in obtaining funds from other sources. Extended credit borrowing is considered to be relatively insensitive to interest rates and is normally not included in the measure of borrowing by depository institutions that is used by the Federal Reserve in implementing monetary policy.

## 2. Policy formulation and operating procedures

Monetary policy is formulated and the directive for implementing it is issued by the Federal Open Market Committee (FOMC). The FOMC is composed of the seven Governors of the Federal Reserve Board, the *President of the Federal Reserve Bank of New York*, and four of the eleven presidents of the remaining Federal Reserve banks who serve on a rotating basis. The FOMC meets eight times a year (approximately every six weeks), evaluates current policy within the context of the state of the economy, and then decides on a short-run (i.e., until the next meeting) course for policy that is broadly consistent with its longer-term intermediate targets and policy goals, but which also reflects the current state of the economy. At two meetings a year, longer-term monetary growth targets are determined. The period covered by the targets is from the fourth quarter of one calendar year to the fourth quarter of the next calendar year. In late June or early July the FOMC re-evaluates the current year's targets and proposes provisional targets for the next year. In late January or early February of the next year, these provisional targets are reconsidered and final targets agreed on for the current year.

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<sup>1/</sup> The federal funds rate is the interest rate in the overnight interbank market on deposits at the Federal Reserve which depository institutions with reserve deficiencies borrow from institutions with excess reserves.

The intermeeting policy stance decided by the FOMC is embodied in a directive--a relatively specific set of instructions governing the implementation of policy during the intermeeting period. The directive is issued to the Federal Reserve Bank of New York which acts as the agent of the FOMC in conducting open market operations. The FOMC identifies a control variable which guides the day-to-day purchase and sale of securities, describes in general terms how the short-run path for the control variable is to be altered in light of unexpected economic developments, and defines the scope within which the Federal Reserve Bank of New York may operate without consulting the entire FOMC. 1/

Since the advent of targeting monetary aggregates, the FOMC has identified three different control variables in its directive and in effect has employed three somewhat different operating procedures to implement monetary policy. 2/ Prior to October 1979, the directive specified a relatively narrow range within which the federal funds rate was to be contained by open market operations. Whenever growth in the monetary aggregates was slower or faster than desired, the FOMC would adjust the acceptable range for the federal funds rate. As the control of inflation became increasingly more difficult with this approach for implementing monetary policy, the Federal Reserve adopted a new procedure in October 1979 designed to improve monetary control. This new procedure redirected attention away from controlling the federal funds rate to controlling the supply of nonborrowed reserves (i.e., the reserves of the banking system not supplied through the discount window). Specifically, the intermeeting target path for growth in the monetary aggregates was translated into a target path for nonborrowed reserves; the Federal Reserve Bank of New York then aimed open market operations at achieving this target path for nonborrowed reserves. This reserves-oriented procedure played an important role in the disinflationary process of the early 1980s. 3/

The nonborrowed reserves procedure depended critically on the existence of a predictable, reliable relationship between the monetary aggregates and economic activity. In particular, the operation of this procedure did not involve any accommodation of shifts that may have occurred in the demand for money. To the extent that such shifts did occur, they affected the real economy unless the short-run operating

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1/ The directive from each FOMC meeting is made public on the Friday following the succeeding FOMC meeting. The directives for 1988 are summarized in Table 6.

2/ See Axilrod (1985), Gilbert (1985), Heller (1988), Madigan and Trepeta (1986), and Wallich (1984).

3/ See Axilrod (1985) and Heller (1988) for a more complete discussion of the evolution toward, and an evaluation of, nonborrowed reserves targeting.

Table 6. Directives From the Federal Open Market Committee in 1988

Date of meeting	Degree of reserve pressure	Borrowing objective (\$millions)	Discount rate (percent)
Dec. 15-16 (1987)	Unchanged	\$300 (\$250 on 1/28)	6.0
Feb. 9-10	Maintain recently reduced pressure	\$250 (\$200 on 2/11)	6.0
Mar. 29	Increased	\$200 (\$300 on 3/30) (\$400 on 5/9)	6.0
May 17	Initially unchanged but anticipated need to increase pressure in weeks ahead	\$400 (\$500 on 5/25) (\$550 on 6/22)	6.0
June 29-30	Increased	\$550 (\$600 on 7/6)	6.0 (6.5 on 8/9)
Aug. 16	Unchanged	\$600	6.5
Sept. 20	Unchanged	\$600	6.5
Nov. 1	Unchanged	\$600 (\$400 on 11/22) <sup>1/</sup>	6.5
Dec. 13-14	Increased	\$400 (\$500 on 12/15)	6.5

<sup>1/</sup> A technical adjustment only due to a perceived shift in the relationship between borrowing and the spread between the federal funds and the discount rates.

Source: "Monetary Policy and Open Market Operations During 1988," Quarterly Review, Federal Reserve Bank of New York, Vol. 13, No.4/Vol. 14, No.1 (Winter-Spring 1989, pp. 83-102.)

target for nonborrowed reserves was explicitly altered to accommodate the demand shifts. Without such accommodation, shifts in money demand were transmitted directly to the real economy via interest rate changes. If money demand shifts were infrequent or relatively predictable, the nonborrowed reserves operating procedure would be appropriate.

Especially in the early 1980s, however, more frequent and less predictable money demand shifts were observed (at least ex post) due in large part to financial deregulation and innovation. Moreover, even after the adjustment to these changes had taken place, the demand for money (especially M1) was found to be significantly more interest sensitive than it had been before. 1/ Partly on account of these developments, the Federal Reserve moved in late 1982 to a less automatic, more judgmental approach that has continued to the present and which places primary emphasis on borrowed reserves. 2/ The increased use of discretion inherent in this procedure has enabled the Federal Reserve to be more responsive and accommodative to perceived changes in the demand for money. Reflecting the increased flexibility of the new procedure, the directive from the FOMC to the Federal Reserve Bank of New York is less specific than the directive under either of the previous two operating procedures. Particularly under the federal funds rate targeting procedure, the directive specified a relatively narrow range for the federal funds rate. Similarly, under the nonborrowed reserves procedure, the directive stipulated a reserve path consistent with specific growth rates for the monetary aggregates. By contrast, under the current borrowed reserves procedure, the directive indicates only the FOMC's desired degree of pressure to be maintained on reserve positions of depository institutions during the intermeeting period. For example, the directive from the August 16, 1988, meeting of the FOMC states that "the Committee seeks to maintain the existing degree of pressure on reserve positions."

The "pressure on reserve positions" generally refers to the level of adjustment plus seasonal borrowing from the discount window of the Federal Reserve. Specifically, the FOMC provides the Federal Reserve Bank of New York with a borrowed reserve objective which is considered to be consistent with the intermeeting path for monetary policy. This level of borrowed reserves is then subtracted from an estimate of the demand for total reserves 3/ (computed by the staffs of the Board of Governors and the Federal Reserve Bank of New York) to derive a path for nonborrowed reserves. The operating desk at the Federal Reserve

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1/ See, for example, Wenninger (1986).

2/ This rationale for this shift in operating procedure is provided in Heller (1988), p. 426.

3/ Total reserves equal borrowed plus nonborrowed reserves, or equivalently, required plus excess reserves.

Bank of New York assesses the market factors affecting nonborrowed reserve availability and then decides on appropriate open market operations. While this procedure may appear to be quite similar to the nonborrowed reserves procedure which preceded it, it is actually quite different. In particular, under the nonborrowed reserves procedure, any change in the demand for total reserves did not affect the specified nonborrowed reserve path, whereas under the current procedure, any such change in the demand for total reserves is accommodated by adjusting the nonborrowed reserve path in order to achieve the borrowed reserve objective. 1/

The functioning of the current operating procedure is most easily understood by examining the relationship between borrowing and the spread between the federal funds rate and the discount rate. For a given discount rate, there is a level of borrowing which is consistent with the federal funds rate determined by the Federal Reserve as necessary to achieve the desired rate of growth for the targeted monetary aggregate(s) in particular, and its desired monetary policy stance in general. The task of the operating desk at the Federal Reserve Bank of New York is to conduct open market operations so as to achieve this level of borrowing, which in effect then determines the federal funds rate. The current procedure is therefore very similar to targeting the federal funds rate, but with an element of additional flexibility. Empirical analysis has indicated that an increase of about 25 basis points in the spread between the federal funds rate and discount rate is associated with an additional \$100 million of borrowing. 2/

Under this procedure, a greater degree of reserve restraint, i.e., a tighter monetary policy stance corresponds to a higher borrowing objective. For a given discount rate, this would be accomplished through open market operations that would reduce nonborrowed reserves, force additional borrowing at the discount window, and thereby exert upward pressure on the federal funds rate, widening the spread between the federal funds rate and the discount rate. The higher federal funds rate then leads to a higher level of interest rates which is intended to slow growth in the monetary aggregates and the overall economy, thereby exerting some restraint on actual and potential inflationary

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1/ See Gilbert (1985) and Thornton (1988) for a discussion of this point.

2/ See Thornton (1986), pp. 9-12. However, the relationship between borrowing and the federal funds rate is not completely stable and has exhibited permanent shifts. When these were perceived to have occurred, frequently formal adjustments to the targeted level of borrowed reserves have been made. Most recently this occurred in late 1988. See footnote 1 on page 49.

pressures. 1/ Similarly, a lesser degree of reserve restraint, i.e., a more accommodative policy stance, corresponds to a lower borrowing objective, a lower federal funds rate, increased growth in the monetary aggregates and stimulus to the real economy.

### 3. Identifying policy changes

Given the features of the current operating procedure as described above, it is useful to ask under what conditions short-run (that is, daily or weekly) movements in variables that are integral elements of the procedure, viz., the federal funds rate, the discount rate, borrowed reserves, and nonborrowed reserves, indicate changes in the policy stance of the Federal Reserve. The interpretation of short-run changes in some of these variables depends on the stability of the relationship between borrowing and the spread between the federal funds rate and the discount rate. If this relationship is relatively stable, movements in some of these variables can indicate changes in the Federal Reserve's policy stance. If, however, this relationship is not very stable, it may be difficult to discern policy implications from movements in some of these variables.

The federal funds rate is clearly the key variable for discerning changes in the Federal Reserve's monetary policy stance. Changes in the federal funds rate could in theory represent adjustments taken by the Federal Reserve to achieve an unchanged borrowed reserves objective in the face of a shift in the relationship between borrowing and the spread between the federal funds rate and the discount rate. However, the Federal Reserve has typically adjusted the borrowing objective when such shifts have been identified. 2/ Consequently, increases or decreases in the federal funds rate which deviate significantly from the range of recent movements can be identified and generally indicate changes in the Federal Reserve's policy stance. For example, market participants quickly noticed a slight and persistent upward movement in the federal funds rate in late March 1988 to around 6.75 percent after it had been fluctuating relatively narrowly around 6.50 percent for the preceding two months. This movement was accompanied by less active intervention by the Federal Reserve in the federal funds market. As this upward pressure on the federal funds rate continued into early April 1988, market participants concluded that the Federal Reserve had indeed tightened policy. This tightening action was confirmed by the Federal Reserve in its minutes of the FOMC meeting held on March 29, 1988, which were released on May 20, 1988.

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1/ Johnson (1988b) provides a Wicksellian interpretation, viz., that inflationary pressures will be moderated as market interest rates rise relative to the "natural" interest rate.

2/ See footnote 1 on the following page.

Observed changes in borrowing over and above normal fluctuations could signal policy changes, but they could also reflect a change in the borrowing relationship that the Federal Reserve had identified and hence, would indicate a new borrowing objective. 1/ Consequently, it is very difficult to discern policy changes from movements in borrowed reserves. Identifying policy changes from short-run movements in nonborrowed reserves under the current operating procedures is also quite difficult. As noted above, the Federal Reserve typically smooths short-term fluctuations in the federal funds rate by supplying or draining nonborrowed reserves as necessary. Consequently, short-term changes in nonborrowed reserves reflect these smoothing operations and do not contain information concerning the current stance of policy.

Adjustments in the discount rate under the current operating procedure are typically transmitted to market interest rates and consequently are nearly always indicative of policy changes. In particular, for a given borrowing target an increase in the discount rate feeds through directly to the federal funds market as some depository institutions are "forced" away from the discount window by the higher discount rate and bid for an unchanged supply of nonborrowed reserves. Consequently, the federal funds rate rises until the necessary spread is attained to achieve the unchanged borrowing objective. It is possible that a change in the discount rate could simply reflect an adjustment to a change in the borrowing relationship described above. Given the announcement effect associated with discount rate changes, however, it appears unlikely that the Federal Reserve would take such a visible action as a mechanical adjustment measure. 2/ Instead, the Federal Reserve generally signals a change in

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1/ In an addendum to the minutes of the FOMC meeting held on November 1, 1988 (released on December 16, 1988), it was noted that, subsequent to the FOMC meeting of November 1, depository institutions had reduced their demands on the discount window as adjustment plus seasonal borrowing had declined, falling significantly below the level anticipated at the November 1 meeting. The Federal Reserve Bank of New York, however, adjusted the reserve paths to incorporate a lower level of borrowing so that the federal funds rate would continue to trade in its previously established range. Such a combination of events may indicate that the Federal Reserve has begun to place less emphasis on the borrowed reserves objective and more on maintaining the federal funds rate at a particular level.

2/ Thornton (1986) and Batten and Thornton (1984) have found that discount rate changes, when they are announced, have a statistically significant impact on the federal funds rate, the three-month Treasury bill rate, and the trade-weighted index of the foreign exchange value of the dollar. Both studies concluded that this "announcement effect" indicated that market participants interpreted a discount rate change as signalling a change in the stance of monetary policy.

its policy stance when it changes the discount rate. <sup>1/</sup> It should be noted that while a discount rate change typically signals a change in Federal Reserve policy, the discount rate is not changed frequently enough to be considered a timely indicator of the Federal Reserve's current policy stance. Consequently, the federal funds rate is currently the primary, and certainly the most timely, indicator of the Federal Reserve's policy stance.

#### VII. Comparison and Contrasts

The procedures for implementing monetary policy in the five countries examined here exhibit numerous common features; the dissimilarities that do exist do not appear to be fundamental, but rather are attributable primarily to differences in institutional conditions. <sup>2/</sup> It should be noted, however, that this conclusion could not have been drawn if this paper had been written 10 years ago. Especially in France and Japan, the implementation of monetary policy has evolved considerably from primary reliance on quantitative credit controls to intervention in financial markets to influence the availability and the price of reserves of the banking system. While change has not been quite as dramatic in Germany and the United Kingdom, the convergence among the five to market-oriented procedures is nonetheless clear and marked.

The monetary authorities in the five countries use a monetary aggregate as an intermediate target of policy and have established target ranges for the growth of the chosen aggregate(s). The aggregates targeted vary from the very narrow (M0, the monetary base) in the United Kingdom to the very broad (M3) in Germany. With the exception of the United Kingdom, which has moved from targeting a very broad aggregate (£M3) to a very narrow one, the monetary authorities in the four other countries have tended to de-emphasize narrow aggregates as targets during the 1980s in favor of broader ones. This change in focus to broader aggregates has been motivated primarily by the increased uncertainty concerning the link between narrower monetary aggregates and the ultimate objectives of policy, typically real GNP and inflation, that has evolved during the 1980s. Moreover, most authorities have adopted a more eclectic approach in formulating monetary policy by expanding the range of variables that they monitor

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<sup>1/</sup> For example, in announcing the increase in the discount rate on August 9, 1988, the Federal Reserve stated that the action was taken to reduce inflationary pressures. Moreover, it is clear from the minutes of the FOMC meeting held August 16, 1988, that the Committee intended the discount rate increase to signal a tightening of policy.

<sup>2/</sup> Similar conclusions were drawn by Kneeshaw and Van den Bergh (1988).

to include economic indicators, especially the exchange rate, other than monetary aggregates. For example, the U.S. Federal Reserve has noted publicly that it places importance on indicators other than the monetary aggregates, and during the first half of 1988 it altered its policy stance several times even though growth of the aggregates remained within their established ranges. Similarly, the Bundesbank eased its policy stance in the fall of 1987 although the growth of its targeted aggregate was well above the established target band, and it tightened policy in early 1989 in response to downward pressure on the deutsche mark. Moreover, the Bundesbank tolerated growth in the targeted monetary aggregate in excess of the target band for the past two years. Also, the Bank of England has at times taken account of the deutsche mark/pound sterling exchange rate in the formulation of monetary policy, while France's membership in the European Monetary System (EMS) necessarily requires the Bank of France to direct policy on many occasions at maintaining the French franc/deutsche mark exchange rate within the EMS narrow band. Finally, the Bank of Japan has stated that even though it emphasizes the money supply, it is not "blind to other indicators." 1/

Regardless of which variables are important for the formulation of monetary policy, short-term interest rates play a major role in the operating procedure in each country. First, short-term interest rates are a major influence on the demand for money and therefore are very important in achieving the path desired for growth in the aggregates. Second, even if target ranges for growth in the monetary aggregates are regarded more as a guide than an objective, changes in short-term interest rates have a direct impact on economic activity. Thus, changes in interest rates generated by the central bank will ultimately be transmitted to the economy, either dampening or quickening the pace of economic activity. In other words, given the increased uncertainty regarding the link between monetary aggregates and economic activity, short-term interest rates have at times been considered intermediate targets as well as operating instruments.

While the monetary authorities in the G-5 countries tend to moderate excessive fluctuations in short-term interest rates, they do not aim at controlling interest rates inflexibly. On the contrary, the operating procedures in these countries generally allow short-term rates to be primarily market-determined while at the same time permit monetary authorities to influence the range within which these rates fall. Each monetary authority sees the need for interest rates to adjust expeditiously to reflect new economic developments but, at the same time, recognizes the importance of maintaining some discretionary control over interest rate movements to avoid excessive volatility. In this regard, it is clear from their actions that these five monetary

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1/ See Shimamoto (1982).

authorities generally attempt to accommodate, at least initially, changes in credit demand so as to prevent large movements in short-term interest rates. However, over the medium term they typically review such action and then guide interest rates to levels consistent with their overall monetary policy stance.

Given the prominent role played by interest rates in the short-run implementation of monetary policy in these countries, it should not be surprising that changes in policy stances are typically signalled by changes in short-term interest rates. These signals, however, cannot be identified with the same degree of precision in each country. The policy intentions of the monetary authorities in France, Germany, and the United Kingdom are readily discernible. In France, the intervention rate and the rate on 5-10 day repurchase agreements establish a range within which the market-determined call money rate tends to fluctuate. In Germany, the discount rate and the Lombard rate determine a similar range for the call money rate. Thus, any change in the stance of monetary policy in either France or Germany will be accompanied by a change in one or both of these interest rates that are set by the authorities. Changes in the intentions of the monetary authority in the United Kingdom are manifested somewhat differently but are equally transparent. The Bank of England typically supplies reserve shortages or absorbs reserve surpluses on a day-to-day basis at the prevailing interest rate. When the Bank of England alters its policy stance, it will adjust the dealing rate below which it is not prepared to buy bills, and if insufficient bills are offered at that rate, the discount houses are obliged to borrow from the Bank of England at an interest rate different from that currently prevailing in the interbank market.

In the United States and Japan, monetary policy changes are not as readily apparent. Each monetary authority administers a discount rate but changes it only infrequently. Instead, policy changes are reflected primarily by movements in largely market-determined rates--the call rate in Japan and the federal funds rate in the United States--which the monetary authority influences through market operations. These rates, however, also move in response to developments other than monetary policy changes and therefore the movements that are unrelated to policy changes must be filtered out from interest rate fluctuations in the United States and Japan before policy inferences can be drawn. However, the short-run behavior of these rates is not so volatile as to preclude the identification of increases or decreases that deviate significantly from the range of recent movements. Nonetheless, this requires some interpretation of interest rate movements; consequently, it may take market participants several days to ascertain policy changes in the United States and Japan, while changes are more easily identified in the other three countries.

The monetary authorities in these five countries implement monetary policy by regulating the supply of reserves to the banking system, which in turn indirectly influences short-term interest rates. Each authority employs either open market or interbank market operations as its major instrument in reserve management. Repurchase or matched sale/purchase agreements are used most frequently in market operations in France, Germany, and the United States. These reversed security transactions provide an effective mechanism for temporarily absorbing reserves from or supplying reserves to the banking system, thereby giving the monetary authority the ability to fine-tune the adjustment of bank reserves and interest rates and also the flexibility to respond quickly to unexpected developments affecting these variables.

While reversed security transactions are employed by monetary authorities in each country, their relative importance varies somewhat. The Federal Reserve considers most of its open market operations as defensive, i.e., as designed to offset temporary autonomous fluctuations in reserves; it therefore makes almost exclusive use of reversed security transactions which usually last for only one day and never for more than 15 days. Reversed security transactions are also the primary instrument for the implementation of monetary policy in Germany and France, but are used somewhat differently than in the United States. The Federal Reserve uses its relatively short maturity repurchase agreements both to smooth daily autonomous fluctuations in reserves and to regulate reserves in order to achieve its medium-term policy objectives. In contrast, the Bundesbank and the Bank of France direct their repurchase agreements, which are characteristically of longer maturity than in the United States (usually 10 to 20 days in France and 28 to 35 days in Germany), only at providing sufficient reserves to achieve their medium-term policy objectives, not to smooth daily fluctuations. Autonomous daily fluctuations in reserves are smoothed with other instruments, for example, foreign exchange swaps/repurchases or day-to-day repurchase agreements at prevailing market interest rates.

Reversed security transactions do not play a major role in the implementation of policy in either Japan or the United Kingdom. The Bank of Japan has only recently entered into repurchase agreements, and the Bank of England employs repurchase agreements primarily to meet peak seasonal reserve demands. Instead, both monetary authorities conduct market operations primarily by the outright purchase or sale of securities. Even though the Bank of England mostly purchases and sells outright, it prefers to conduct its operations in bills with maturities of only 7 to 33 days. Thus, these operations are quite similar to the longer maturity repurchase agreements employed by the Bundesbank and the Bank of France.

In general, the role of the discount window for short-term reserve management has declined during the 1980s as open or interbank market operations have become the major instrument used to influence the supply of reserves in the banking system. Discount window credit (or its equivalent) is now only a marginal source of funds. In Japan, while interbank market operations are the major policy instrument, the discount window plays a substantially more important role in the daily management of reserves than in the other four countries. As the discount rate is usually below market interest rates, the Bank of Japan must ration discount window credit. Furthermore, the Bank can recall discount window loans at its discretion. That is, the Bank can either extend or withdraw lending at its option. The Bank uses this extremely flexible facility to smooth daily fluctuations in the banking system's reserve position. The effective discount rates in Germany and France (the Lombard rate 1/ and the rate on 5- to 10-day repurchase agreements, respectively) are penalty rates. That is, these rates are kept above existing short-term market rates, thereby penalizing depository institutions which borrow from the central bank. Consequently, depository institutions in these two countries typically consider discount window credit only as a last resort. In the United States, the discount rate is typically below short-term market rates, and vigorous non-price rationing procedures are used to raise the effective cost of borrowing from the central bank and thereby limit the access of depository institutions. In the United Kingdom, the Bank of England does not maintain an official discount window. It does, however, lend occasionally to the discount houses, usually at rates different from those currently prevailing in the market in its daily operations; in doing so, it can signal its policy changes to financial markets. It should be noted that the diminished role of the discount window has not necessarily reduced the policy relevance of the discount rate. To the contrary, changes in the discount rate in each of these five countries are interpreted by market participants as indicating a change in the stance of monetary policy.

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1/ The rediscount facility in Germany provides a source of longer-term liquidity. However, because the discount rate is below market rates and the amount of rediscount credit available to banks is restricted by quotas, the rediscount facility is not typically used for short-term reserve management. See Dudler (1986).

In conclusion, the preceding analysis has shown that the monetary authorities of the G-5 countries attempt to influence short-term interest rate developments in their implementation of monetary policy. This paper has described the procedures employed by these monetary authorities so that changes in policy stances can be identified. As these changes are typically manifested in changes in key short-term interest rates and to the extent that interest rate developments affect the behavior of exchange rates, this analysis should facilitate ascertaining more readily and in a more timely manner changes in monetary policies across the G-5 countries and their exchange rate implications.

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