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Monetary Control Procedures and Financial Reform: Approaches, Issues, and Recent Experiences in Developing Countries

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Abstract

Many countries have initiated reforms in their monetary control procedures by relaxing direct controls and increasing the role of market processes. The changed approach is often inevitable when countries reform their financial systems in support of growth and adjustment. This is because reform of those procedures increases the scope of monetary policy for stabilization purposes and allows for more flexible arrangements for setting interest rates and allocating credit that are necessary elements in improving resource mobilization and the efficiency of investment. This paper discusses the approaches to reforming monetary instruments, the issues in implementation, and experiences in developing countries.

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Summary

The reform of monetary control procedures is under way in an increasing number of developing countries. These reforms have been motivated by emerging problems with traditional procedures, which have relied heavily on administered interest rates and credit allocation. The effectiveness of these direct regulations has eroded over time, once weakening monetary control, while the regulations have also discouraged financial saving and created distortions in investment allocation. A more indirect, market-based approach to monetary control is desirable as it can increase the scope for macroeconomic control while allowing for a deregulation of interest rates and the allocation of credit.

The implementation of a more market-based approach raises questions regarding the design of monetary control instruments, implementation techniques and procedures, the phasing of various measures, and the promotion of market forces in the financial system. In the absence of developed markets, the use of primary issues of government or central bank securities supplemented by reformed central bank rediscount facilities has become the major instrument of monetary control. However, the precise techniques used to sell securities and to manage the short-term liquidity of the financial system vary substantially among countries.

A phased approach to reform is often necessary to avoid loss of monetary control and to accommodate the essential complementary development of competitive market processes. On the one hand, the reform of monetary instruments has to be supported by more general institutional and economic reforms; on the other, the changed approach to monetary control can be a catalyst for broader economic and institutional liberalization.

The reforms undertaken in the nine developing countries surveyed show broad similarities in their approaches. All countries have substantially reduced or abolished the use of direct controls on interest rates and credit. Most of the countries have made use of regularly held sales of treasury bills or central bank paper for monetary control purposes and have developed instruments that would allow them to conduct effective control over money market interest rates or reserve money growth. However, the effectiveness of the instruments has been constrained in some countries by the inadequate development of markets and expertise, and in others by the government's continuing large domestic financing needs and the subservience of monetary policy to fiscal considerations. This underlines the importance of broader economic and institutional restructuring to complement financial reform.

1. Introduction

In recent years a number of developing countries have reformed their monetary control systems, and placed a greater emphasis on market-based instruments rather than direct controls. The changed approach is often viewed as not only desirable but also inevitable when countries begin to reform their financial systems, since it increases the scope of monetary policy for stabilization purposes, while facilitating a deregulation of interest rates and a removal of direct credit controls. The introduction of these more flexible arrangements for setting interest rates and allocating credit are important elements in improving resource allocation, the efficiency of investment, and savings mobilization, that can help attain adequate rates of economic growth.

In regulated financial systems, involving extensive interest rate and credit controls and subsidies, markets are typically underdeveloped and uncompetitive, with a financial structure dominated by a few large banks or a bankers' cartel. Financial reform generally aims at developing institutions and competitive markets. However, usually the development of monetary control instruments cannot wait for this to occur, and new instruments have to be introduced against the background of underdeveloped financial markets. In the absence of secondary markets in securities and interbank markets, the main market-oriented instrument used has been primary issues of government or central bank papers, repurchase transactions using these papers, and discount window policy. These instruments are sometimes referred to as "open-market-type operations" to distinguish them from traditional open market operations in developed secondary markets. As well as providing a framework for effective monetary control, open-market-type instruments can help foster the development of money and interbank markets and act as a catalyst to bring about institutional reform and a change in attitude toward interest rate determination, credit control and competition in the financial system.

This paper examines the background to the development of market-based instruments of monetary control and reviews recent experiences with these instruments in a selection of developing countries. The outline of the rest of the paper is as follows: Section 2 examines reasons for the reform of monetary control instruments; Section 3 examines the framework for financial reform; Section 4 reviews instruments of monetary control in industrial countries; Section 5 examines procedures for developing market-based systems of monetary control in financial systems that are initially underdeveloped; Section 6 describes specific market-based monetary control techniques that are used or are being developed in a sample of nine developing countries; Section 7 assesses experiences in these countries with their techniques; and Section 8 provides some conclusions.

2. The case for reforming monetary control instruments

The system of monetary control in most developing countries has typically involved some if not all of the following elements: direct controls on interest rates (including preferential rates for certain loan categories); aggregate and individual bank credit ceilings; selective credit controls and preferential central bank refinance facilities to direct credit to priority sectors; and high reserve and liquid asset requirements, designed both to absorb liquidity and to provide government deficit finance. 1/

When properly implemented and monitored, direct instruments of monetary control can be useful in achieving narrowly defined targets such as maintaining a particular interest rate at a certain level, or keeping a bank's overall credit expansion below a certain ceiling. However, the macroeconomic impact of the controls may be unpredictable because of the scope for evasion and avoidance, while the controls also distort the allocation of resources. In addition, direct controls are difficult and costly to design and implement efficiently and effectively over a prolonged period of time, and are administratively cumbersome.

Credit ceilings and other direct controls operate by forcing banks into portfolio positions which they would not otherwise voluntarily accept. Hence, banks have incentives to avoid the direct controls. For example, effective credit ceilings normally involve a buildup of excess liquidity, which discourages deposit-taking by regulated institutions, and in turn inhibits savings mobilization or causes disintermediation. In either case, the effectiveness of monetary control is diminished. In the former case, i.e., when savings mobilization is inhibited, because a given level of bank credit is associated with higher consumption, and in the latter case, when disintermediation occurs, because recorded bank credit underestimates the total credit available in the economy through both regulated and unregulated financial institutions.

Under binding credit ceilings, savings mobilization may not be promoted simply by mandating positive real deposit rates at regulated institutions. When subject to credit ceilings, regulated institutions may either turn away depositors or find ways of paying lower effective deposit rates, e.g., by increasing fees or tightening conditions on withdrawal of funds. It is generally not possible to control both the cost and quantity of credit, although in practice this is often attempted using direct controls. When credit is restricted by ceilings, the effective returns on loans may be raised by imposing fees, commissions,

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1/ Such systems are usually associated, to a greater or lesser extent, with substantial direct government intervention in other aspects of the economy through, for example, state ownership, price controls, or subsidies. The monetary control framework is usually part of a broader interlocking system of economic controls, the extreme case being that practiced in centrally planned economies where credit is allocated to support production plans, with no role for market processes.

or requiring borrowers to hold nonremunerative compensating balances. The real cost of credit may rise and the returns on deposits fall through the use of various non-interest rate factors. This defeats the purpose of direct interest rate controls, but at the same time, may involve a number of inefficiencies. Selective credit controls are often circumvented as it may be very difficult to ensure that credit is used for the purposes intended. 1/

With the emergence of various fees and charges, the opportunity costs of financial instruments may not be fully transparent either to the banks or their customers. Banks may maintain profits through various cross-subsidies such as widening commissions on foreign exchange transactions or by raising the high interest rates on nonpriority loans not subject to interest rate ceilings. This leads to distortions between prices, services and risks. Interest rates will fail to reflect correctly risks and expected returns or to adjust to the portfolio preferences of borrowers and investors. As a result, there may be a misallocation of resources; financial resources may not be directed into those activities expected to yield the highest returns and less productive activities may be supported to the detriment of economic growth. Quite often the direct controls inhibit competition and encourage collusive behavior among the banks in setting commissions.

The allocation of individual banks' overall credit ceilings may become a political matter, and it is difficult to design procedures which do not penalize more efficient institutions. The support of inefficient institutions may lead to higher average transaction margins and lending spreads. A concern about the quality of banks' portfolios is often lacking when interest rates and credit are subject to direct regulation, resulting in underprovisioning for bad debts. High liquid asset ratios also usually create captive markets for government securities and an inappropriate pricing of credit. The implicit tax imposed on commercial banks, and thus their borrowers and depositors, by credit ceilings, interest rate controls and high noninterest-bearing reserve ratio requirements, encourage the emergence of other, unregulated, financial intermediaries and instruments which compete with the regulated ones. This weakens monetary control by eroding the effectiveness of the direct controls and may require that the authorities bear down even harder on regulated financial institutions to achieve a given restrictive policy stance. Unregulated institutions are by their nature less supervised and more prone to solvency and liquidity problems than regulated institutions and may therefore pose a threat to the financial system's stability. This can also complicate financial management since the authorities may have to intervene to support these institutions to avoid a loss of confidence in the financial system.

The dependence on direct controls to regulate interest rates and credit often means that little attention is paid to developing money

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1/ An example is where corporate entities purchase farms simply to avail themselves of access to preferential agricultural credits.

and capital markets that are central to the efficient allocation of resources. Within a regulated system, the existence of such markets could undermine the credit and interest rate controls by providing alternative outlets and sources of funds outside the administered system. The lack of official securities markets usually has meant that commercial banks have been the primary source of private credit in the official sector, while parallel credit markets develop. Commercial bank credit has normally been of a short-term revolving nature and not suited for financing longer-term investment projects. Also, it usually involves floating rate debt rather than fixed interest bonds or equity finance, which may increase the vulnerability of enterprises to changes in financial conditions. On the other hand, credit from the parallel market usually carries high and variable interest rates. Commercial bank credit has often been supplemented with loans from development finance institutions (DFIs), but DFIs have frequently failed to fill the financing gap and have not replaced the need for capital markets. The lack of an effective investment channel outside the banking system means that only those investment projects which satisfy the criteria set by bankers, or the authorities through their preferential lending policies, may be able to obtain finance at reasonable interest rates. The lack of a range of financial instruments differentiated by maturity, risk, etc. reduces private savings or results in higher average lending rates which discourage investment.

To sum up, direct instruments of monetary control often inhibit efficiency in the financial system, as well as in credit allocation, and they tend to be eroded over time and hence become less effective in achieving their targets.

3. Framework for financial reform

Financial reform involves questions about the desirable structure of the financial system, the appropriate framework for monetary control, and the process--or phasing--of reform.

a. General considerations

The main objectives of financial reform are usually to develop a financial system that promotes savings and a more efficient allocation of resources while also providing a framework that allows for the implementation of effective monetary control. These characteristics are normally associated with well-functioning markets and a competitive financial structure. However, if the underlying structure of prices is distorted or if enterprises face "soft" budget constraints and do not respond to price signals, well-functioning markets may not provide an optimum

allocation of resources. 1/ Hence, financial sector reform has to be seen as part of a broader economic restructuring. 2/

There is no guarantee that a market-based system would be competitive. Lack of competition between financial institutions could result in wide transaction margins and inhibit the development of new instruments and markets. There is a risk that the inefficiencies associated with direct controls would be replaced by the inefficiencies of a monopolistic structure. While a monopolistic structure may not necessarily interfere with monetary control, it could result in a sluggish response of deposit and lending rates to monetary policy initiatives. 3/ Where banking cartels exist which include state-owned banks, these banks may have to be instructed to compete to weaken the cartels. Monopolistic agreements on interest rates and transaction margins may have to be challenged by the central bank if they run contrary to the law. The removal of direct controls can itself reduce incentives for monopolistic pricing arrangements by increasing the areas where competition is possible.

For interest rates to have the appropriate impact on resource allocation, borrowers have to be responsive to market prices. A high incidence of credit indiscipline and loan delinquency, or arrangements where borrowers or banks expect to have their loans covered by the government, may render interest rates meaningless in the allocation of credit. In some countries, direct credit controls have encouraged loan delinquency and a lack of attention to the quality of bank balance sheets. The strengthening of bankruptcy laws, the legal procedures for loan recovery, and policies to promote the profit motivation of managers may have to accompany the financial reforms.

In a liberal and competitive system, interest rates would be differentiated to reflect the riskiness of borrowers and the maturities of instruments, and credit would flow into those activities which yield the highest expected rates of return. When the system is competitive, transaction margins in the financial sector usually fall and new financial instruments are created to reflect the preferences of investors and borrowers, including active secondary markets which provide increased liquidity to financial instruments.

b. Monetary control framework

The framework for monetary control in a liberal financial system varies between countries. The distinction between operational variables, intermediate targets, and ultimate objectives is one that is in common

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1/ See, for example, Korani (1986) for a discussion of soft budget constraints.

2/ For a discussion of the phasing of economic reform, see Edwards (1984).

3/ For a discussion of the implications of financial structure on the effectiveness of different monetary control instruments, see Johnston (1986).

use. The intermediate targets are variables, such as monetary or credit aggregates, which are related in a stable manner to ultimate policy objectives--real GDP, inflation, the balance of payments. Variables, such as money market interest rates or the level of money market liquidity, which are directly under the control of the monetary authorities, and which are related to the path of the intermediate target variables in a predictable manner, are the operational variables for monetary policy. 1/ The authorities manage the operational variables and leave market mechanisms to determine the detailed structure of deposit and lending rates and the allocation of credit. In a liberal system, the main instrument of monetary control would be the central bank's control over interest rates in the money market through its ability to manage the stock of reserve money (cash and balances with the central bank). Money market rates, in turn, affect other lending and deposit rates. Such a system does not rely on high or even compulsory reserve or liquid asset requirements, but only on the central bank's ability to manage its own balance sheet and to control the terms at which it is willing to provide assistance to cover reserve shortages.

Financial reform may raise basic questions about the selection of appropriate target variables. Relationships between money and credit and final objectives that existed during the pre-reform phase are likely to be less reliable following financial reform. The introduction of new instruments may shift the interest sensitivity of money demand. For example, a liberalization of interest rates on bank deposits may result in broad money becoming less sensitive to changes in the general level of interest rates. The removal of credit ceilings that constrain portfolio allocation can result in portfolio shifts, including a demand to hold larger money balances at any given level of interest rates and income. 2/ Money multipliers may also change with reform, for example, when there is reintermediation to the banking system leading to reduced cash holdings by the nonbank public. Not to allow for the portfolio adjustments in policy formulation could lead to serious policy errors and loss of monetary control.

Not only can the relationships shift, but the controllability of different aggregates may change following financial reform. As higher interest rates may lead initially to distressed borrowing, credit growth may thus be difficult to control in the short run through changes in interest rates. Once credit ceilings are removed, the impact of a change in interest rates on broad money and credit may become uncertain, since in a liberal environment it will depend on the response of financial institutions in adjusting their rates to a change in indicative market rates. This may suggest reformulating target variables in terms

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1/ It is not necessary for all countries to have intermediate targets and the distinction between operational and intermediate targets may be blurred, e.g., when the target is interest rates or the monetary base.

2/ See, for example, Johnston (1985) for an examination of the impact of the liberalization of credit availability on the demand for financial assets in the United Kingdom.

of non-interest-bearing monetary aggregates, which have a more predictable response to changes in the general level of interest rates.

Following financial reform, a good deal of judgment may be needed for a time in formulating and implementing monetary policy. Judgment could be based on the examination of a range of indicators of financial conditions including the exchange rate, inflation, asset prices, as well as various monetary and credit aggregates. It obviously becomes more difficult to formulate precise monetary and credit targets that can act as benchmarks in macroeconomic adjustment programs when structural changes are occurring in the financial system. Nevertheless, quantitative monetary or credit targets often remain a central element in macroeconomic policy formulation. 1/

c. Phasing of the reform

Important questions for financial reform are raised by the appropriate phasing of the reform process. 2/ The move to more flexible interest rate arrangements based on indirect management of interest rates and money and credit aggregates usually requires the adaptation or development of the instruments for monetary control; the promotion of financial markets and competition in the financial sector; the buildup of expertise with regard to operating in a market environment; and a change in attitudes toward the market determination of interest rates and their use for macroeconomic policy. This process of market orientation takes time as experience with and confidence in the new system has to be gained by the central bank and the private sector, and new institutional arrangements may have to be established to ensure effective monetary control and competitive market mechanisms. A phased approach to reform is therefore often necessary. However, if the initial financial system is highly regulated, with each regulation supporting the other, it may be difficult to implement a gradual, effective reform. In such cases, a major one-step change in the operational system may be unavoidable.

Some of the distortions due to direct controls could be minimized by freeing up commercial bank lending and deposit rates from official interference, by promoting competition and by removing credit subceilings. However, overall credit ceilings on individual banks could still inhibit

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1/ It is worth recalling that the stability of money demand has never been the sole reason for the selection of a particular target variable. Questions of controllability, interest sensitivity, the link of the monetary aggregates to other policy variables, and the ease with which the targets can be explained to the general public have also been important in this choice. There was, for example, much debate about the stability of the M1 aggregate in the United States long before its deemphasis in 1982; and the lack of evidence on the stability of the M3 aggregate did not prevent the U.K. authorities from using this as the only announced monetary target until 1982.

2/ For a discussion of issues in phasing, see the volume edited by Choksi and Papageorgiou (1986).

competition in the financial system and would still impose an implicit tax on regulated financial institutions and thus create incentives for avoidance. Hence, partial liberalizations may not be possible or desirable. Still, during the early phases of reform the maintenance of credit ceilings is often essential as a temporary measure.

Under a phased approach, interest rates could be set free in stages, for example, by gradually widening the permissible ranges for deposit and lending rates, or by steadily adjusting minimum deposit rates and maximum lending rates. The traditional instruments--reserve requirements and rediscount windows--could be deployed initially to manage bank reserves and thereby the credit-creating capacity of the banking system, while phasing out credit ceilings on banks.

The eventual elimination of credit ceilings on banks requires that macromonetary management would be exercised through the indirect management of the aggregate supply of money and credit which calls for adaptation in the instruments of monetary policy. Thus, market-based instruments of monetary policy have to be introduced as the reforms proceed to manage interest rates and credit. The objectives of efficient resource mobilization and allocation would also be helped by promoting flexibility in the determination of interest rates and the allocation of credit.

The next phase would involve the development of money markets and the promotion of a more competitive financial system in order to strengthen the monetary control and interest rate mechanisms. The development of market-based instruments of monetary control can be regarded as the initial step in this process. This phase of the reform may require institution and market building.

The particular phasing of reforms would depend upon the institutional circumstances. For example, the use of uniform reserve requirements to constrain credit expansion in the early phases of reform may be difficult when the distribution of excess bank reserves is uneven, reflecting the structure of the banking markets. Moreover, it would be undesirable to raise reserve requirements if they are already at high levels and are nonremunerative since this may encourage disintermediation. Therefore, it may be necessary to develop market-based instruments of greater flexibility at an early stage in the reform process.

4. Monetary control procedures in industrial countries 1/

It is interesting to consider the evolving procedures for market-based instruments of monetary control in developing countries against the background of monetary control instruments in the industrial countries.

1/ A detailed description of recent developments in monetary control procedures in G-10 countries can be found in Bank for International Settlements (1989).

The following provides an overview of techniques in the Group of Ten (G-10) countries plus Switzerland. 1/

The regulation of bank reserves and short-term interest rates have for several years been the main instruments for conducting monetary policy in industrial countries with developed money markets. However, money market policy has assumed a larger role in recent years. In some countries this has reflected reduced reliance on direct controls on interest rates and credit; in other countries, money market policy has aimed at increasing the flexibility with which monetary policy can be implemented. Generally, the reforms have involved the redesign of central bank lending facilities, market operations, and reserve requirements. Table 1 provides an overview of the main features of the monetary control instruments in G-10 countries.

Central bank lending facilities have often been used to provide extended credit, including specialized lending facilities intended to promote lending to priority sectors, to meet technical reserve needs such as clearing short-term payments imbalances, and to provide lender-of-last-resort credit. The supply of bank reserves through central bank lending has tended to be demand determined at the discretion of commercial banks (or other eligible institutions) with central bank loans extended at a posted interest rate. These procedures have been viewed as cumbersome as the alteration in rates could be subject to political difficulties, which could prevent a prompt adjustment in interest rates. Hence, the trend has been toward curbing automatic access to central bank lending through the introduction of bank-specific ceilings or by introducing penalty rates on extended credit. Also, the range of special credit facilities has been reduced in favor of a generalized, lender-of-last-resort window based on secured loans. In some countries the loan window has been replaced by market-based operations undertaken at the discretion of the central bank.

Market operations have come to play an increasingly important role in the conduct of monetary policy in G-10 countries. These include outright transactions in bills and other securities, various types of reversed transactions, such as repurchase agreements, and transfers of government deposits between the central bank and commercial banks Such operations have been used both to supply the financial system with its longer-term liquidity needs and to undertake shorter-term, fine-tuning operations. Outright transactions in securities in secondary markets, often seen as the standard type of open market operation, have until recently played a limited role in countries other than the United States. More important havebanks been different types of reversed transactions in securities and in foreign exchange. Such transactions consist of a purchase or sale of a security (or foreign exchange) combined with an agreement for its repurchase or resale at a specified

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1/ The Group of Ten countries are Belgium-Luxembourg, Canada, France, Italy, Japan, the Netherlands, Sweden, the United Kingdom, the United States, and West Germany.

Table 1. Summary Characteristics of Monetary Policy Instruments in G-10 Countries

	BE	CA	FR	DE	IT	JP	NL	SE	CH	GB	US
Central Bank Lending Facilities											
Ordinary discount facility available	x			x	x	x	x		x		x
Loan or advance facility available	x	x	x	x	x	x	x	x	x	x	x
Access subject to quotas or ceilings	x	x		x	x	x	x	x			x
Penalty for frequent recourse	x	x			x	x	x				
Key official rate above market rates	x	x	x	x	x				x	x	
Official rate set in relation to treasury bill rate	x	x									
Market Operations											
Outright market transactions											
Purchases of government securities		x		x	x	x	x		x	x	x
Sales of government securities		x			x		x			x	x
Purchases of treasury bills		x	x		x			x		x	x
Sales of treasury bills	x	x	x	x	x	x		x		x	x
Purchases of private bills						x				x	
Sales of private bills						x			x		
Sales of bills issued by the central bank				x		x			x		
Reversed transactions											
Purchase and resale operations in government securities		x	x	x	x	x		x		x	x
Sale and repurchase operations in government securities		x	x		x						x
Purchase and resale operations in private bills			x	x						x	
Sale and repurchase operations in private bills			x								
Foreign currency operations				x			x		x	x	
Transfer of government deposits		x		x					x		
Reserve Requirements											
Cash reserve requirements in force		x	x	x	x	x	x	x	x	x	x
Averaging provisions for reserve holding		x	x	x		x			x		x
Carry-over allowed for reserve surplus/deficits			x								x
Contemporaneous (C), lagged (L) or semi-lagged (SL)		L	SL	SL	L	SL	L	L	L	L	SL
Length of reserve holding period (in days)		15	30	30	30	30	30	30	30	180	14
Highest reserve ratio for demand deposits		10	5	12.1	22.5	2.5	...	4	2.5	0.5	12
Highest reserve ratio for term and saving deposits		1	1	4.95	22.5	1.75	...	4	2.5	0.5	3
Penalty for reserve deficiencies (% above discount rate)			3	3		3.75	4				

Source: Bank for International Settlements (1989).

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

price and at a given future date. A main attraction of this instrument is its flexibility in supplying or absorbing reserves at the central bank's initiative, giving the central bank substantial scope for setting the price, amount, and maturity. In the United States, the Federal Reserve has been able to use an already existing private market in repurchase agreements; in other countries, special arrangements have been set up by the central bank. Generally, reversed security transactions are made through tenders or auction procedures. Transfers of government deposits between the central bank and commercial banks are conceptually one of the simplest procedures for managing bank reserves. However, it also raises practical questions--such as the distribution between banks, remuneration, and collateral requirements. It has long been the major instrument for shorter-term monetary management in Canada, and has recently gained importance in other industrial countries, including Germany.

In recent years, variations in reserve requirements have lost importance in the conduct of monetary policy, being replaced to a large extent by the instruments described above. However, the need to meet legal reserve requirements has remained the fulcrum of monetary policy. There has been a general tendency toward lower reserve requirements, reflecting concern that high non-interest-bearing reserve requirements can encourage disintermediation, and evidence that high reserve ratios are not necessary for effective monetary control. In order to smooth the functioning of the reserve requirement system, several countries have adopted averaging procedures for meeting reserve requirements, designed to give banks more flexibility in their reserve management, and to avoid unintended short-term swings in interest rates. 1/ All G-10 countries have a lagged or semi-lagged system, where the reserve requirement is based fully or partly on the level of the reserve base (usually some concept of bank liabilities) in a previous period, reflecting the operational advantages such a system has over a system with contemporaneous reserve accounting.

In summary, G-10 countries have adopted a more market-based approach to monetary control in recent years. Different types of money market operations, especially reversed transactions, have emerged as the main instruments of monetary control, supported by changes in central bank lending facilities and with less dependence on reserve requirements. The particular choice of instruments has been influenced by institutional characteristics of each country's financial system.

1/ One or two countries also have carry-over provisions for reserve surplus or deficiencies from one reserve holding period to another.

5. Procedures for a market-based system of monetary control with underdeveloped financial markets

a. The role of primary bill markets as monetary control instruments

The starting point for developing market-based monetary control in developing countries is the existing institutional structure. Because commercial banks are often already required to hold treasury bills to meet liquid asset requirements or have built up excess reserves with the central bank, a first step in developing market-based instruments has often been primary issues of treasury bills and/or central bank bills, supported by a restructuring of central bank rediscount windows to allow for a greater role for market forces. There is no necessary reason why treasury or central bank bill issues have to be the first step, and in some countries the catalyst has been markets in longer-term government securities. 1/ Issues of central bank paper have been considered useful because of the potentially greater freedom for the central bank to tailor issues of its own papers to achieve monetary objectives without direct interference from government budgetary considerations. However, the net budgetary and monetary impact from using central bank rather than treasury paper would be similar--for example, government budget finance would be affected pari passu with the net cost of issues of central bank bills through reduced central bank profits available for appropriation by the government. Hence, the difference may be largely presentational.

The role of security issues as instruments of monetary control can be illustrated using basic financial flow and balance sheet equations. This section illustrates the relationship between the treasury bill issue and control of the reserves of the banking system; a similar relationship can be derived for central bank bill issues or other debt issues by the government. The derivation is based on sectoral financial flows and institutional balance sheets during a planning period.

The basic financial flow and balance sheet equations are:

the government's current financing requirement, dG,

$$dG = E_G - R_G = dT + dS - dF_G \qquad (1)$$

the external current account surplus, CA,

$$CA = dF_G + dF_{CB} + dF_{NB} + dF_B \qquad (2)$$

the flow balance sheet of the central bank

$$dC_B + dC_{NB} = dL_B + dL_{NB} + dT_{CB} + dS_{CB} + dF_{CB} \qquad (3)$$

1/ The bond repurchase market in Thailand, discussed in subsequent sections, is a case in point.

the flow balance sheet of commercial banks

$$dD + dL_B = dC_B + dT_B + dS_B + dA + dF_B \qquad (4)$$

and the change in net financial wealth of the nonbank private sector, dW,

$$dW = dD + dT_{NB} + dS_{NB} + dF_{NB} + dC_{NB} - dA - dL_{NB} \qquad (5)$$

where the subscripts G, CB, NB and S refer, respectively, to the government, central bank, nonbank private sector and commercial banks; dT is the treasury bill issue; dS is other government domestic borrowing; dF is the change in net holdings of foreign assets; dC is the change in holdings of cash and reserves with the central bank; dL is the change in net loans by the central bank; dA is the change in loans by commercial banks to the nonbank private sector; and dD are deposits of the nonbank private sector with commercial banks. In addition, the total issues of treasury bills and other government domestic debt are purchased by nonbanks, banks and the central bank.

$$dT = dT_{NB} + dT_B + dT_{CB} \qquad (6)$$

and

$$dS = dS_{NB} + dS_B + dS_{CB} \ . \qquad (7)$$

Furthermore, the financial flows identity requires that private sector net wealth changes through surpluses with other sectors--the government and the foreign sector

$$dW = dG + CA \qquad (8)$$

Equation (3) shows that the private sector's (bank and nonbank) holding of reserves is influenced by the central bank's net lending to the private sector, plus its uptake of government debt (treasury bills and other debt) plus its net purchase of foreign assets through intervention in the foreign exchange market. The change in reserve holdings of commercial banks, dC_B, can be derived in terms of the domestic financing of the government's current deficit, central bank net intervention in the foreign exchange market, sales of treasury bills and other government debt outside the central bank, central bank net lending to banks and nonbanks, and the change in cash holdings of the nonbank private sector

$$dC_B = [E_G - R_G + dF_G] + dF_{CB} - dT_B - dT_{NB}$$
$$- dS_B - dS_{NB} + dL_{NB} + dL_B - dC_{NB} \qquad (9)$$

This equation can be derived either by substituting equations (1) and (2) into (8) and using equations (4) and (5) or by substituting equations (6) and (7) into (3).

Equation (9) provides the framework for using the treasury bill issue (or other central bank or government security issues) to control the reserves of the banking system. The procedure would be to develop forecasts for the relevant reserve holding period of the government's net domestic financing requirement ($E_G - R_G + dF_G$), net foreign exchange market intervention by the central bank, dF_{CB}, other domestic borrowing by the government from banks and nonbanks ($dB_{NB} + dB_B$), net lending by the central bank to the banks and nonbanks ($dL_{NB} + dL_B$), and the change in currency holdings by the nonbank private sector, dC_{NB}. Using equation (9) a forecast can be made of the change in the supply of bank reserves before a new net issue/net redemption of treasury bills to the private sector ($dT_B + dT_{NB} = 0$)

$$dC_B^S = [E_G - R_G + dF_G]^* + dF_{CB}^* - dS_B^* - dS_{NB}^* + dL_{NB}^* + dL_B^* - dC_{NB}^* \qquad (10)$$

where * indicates a forecast and dC_B^S is the forecast supply of new bank reserves before a new net issue of treasury bills.

The change in the desired demand for reserves by the banking system is given by

$$dC_B^D = (\alpha + \beta)dD^* \qquad (11)$$

where α is the compulsory cash reserve ratio on bank deposits, β is the estimated precautionary reserve holding ratio of banks and dD* is the change in deposits for the relevant reserve holding period. 1/ With lagged reserve accounting, required reserves would be based on deposits in a previous time period and may be known before deciding on the amount of treasury bills to be issued. With contemporaneous or leading reserve accounting dD* would be a forecast.

The demand for precautionary reserves may depend on the rules and procedures for reserve holding and interbank clearing, the efficiency of the interbank market, and the volatility in the reserves of banks due to seasonal and other factors, such as the extent to which the central bank stands ready to smooth the reserves of the banking system. For example, automated access by banks to a loan or rediscount window could reduce precautionary reserve holdings to a low level. However, even if it is known that the central bank will always remove reserve shortages, uncertainty may remain about the level of interest rates charged by the central bank, which might still lead to precautionary reserve holdings by banks.

1/ This assumes a uniform reserve ratio is applicable to all bank deposits.

Equations (10) and (11) in combination provide a forecast of the banking system's reserve deficiency (if $dC_B^D > dC_B^S$) or excess (if $dC_B^D < dC_B^S$) compared with desired holdings before net new issue of treasury bills. 1/

Given these forecasts, the net new issue of treasury bills can be set to achieve monetary objectives. The transmission mechanism for monetary policy could be described by the following relationships:

$$dr_m = F_1(dC_B^D - dC_B^S + dT_B + dT_{NB});\ F_1'(.) > 0,\ F_1(0) = 0 \qquad (12)$$

$$r_d = F_2(r_m,.)\ F'_{2r_m} > 0 \qquad (13)$$

$$r = F_3(r_m,\ r_d,.)\ F'_{3r_m},\ F'_{3r_d} > 0 \qquad (14)$$

$$M = g(r_m,\ r_d,\ r_L,.)\ g'_{r_m},\ g'_{r_L}\ g'_{r_d} > 0 \qquad (15)$$

where r_m is the money market interest rate, r_d and r_L are average deposit and loan rates, and M is the intermediate target variable (e.g., the stock of money or credit) which is responsive to interest rates.

A neutral monetary policy stance--i.e., one which would leave money market rates unchanged--would involve removing the excess reserves of the banking system by selling a volume of treasury bills to the private sector equal to the difference between the forecast of the supply of reserves to the banking system and the estimate of the banking system's demand for reserves (or relieving a forecast reserve shortage by not rolling over maturing bills). A restrictive policy stance designed to raise interest rates would involve the creation of a reserve shortage by selling a volume of bills in excess of the forecast reserve surplus. In this case, and assuming the forecasts are accurate, banks would find themselves short of reserves and interbank rates would tend to rise. If the sale of treasury bills reduced the aggregate supply of reserves below reserve requirements, banks would have to seek marginal accommodation from the central bank and the interest rate at which the central bank provides the assistance would become the key determinant of the overall level of interest rates. 2/ An expansionary stance would involve selling fewer bills than the forecast cash surplus. In this case banks would have excess cash reserves which would push interest rates down.

1/ The following analysis is in terms of the deficiency in desired holdings rather than required holdings. Since desired holdings include a precautionary reserve, the implications for interest rates, etc. are likely to be different when $dC_B^D > dC_B^S > \alpha dD^*$ and $dC_B^S < \alpha dD^*$. We have not distinguished these circumstances in the text, which is intended only as a stylistic treatment.

2/ The need to resort to the central bank for marginal accommodation may occur before aggregate shortages emerge in reserves if the interbank system is weak.

Interbank rates would fall, and there would be repayments of the central bank credit. In this framework, the design of rediscount windows is an integral element of reserve and interest rate management (see section 5.d). 1/

b. Implications of liquid asset requirements

The preceding analysis assumes that banks have to meet only reserve ratios. However, in practice many developing countries also impose statutory liquid asset requirements and treasury/central bank bills and reserves are generally the main instruments available to satisfy such requirements. 2/ Liquid asset requirements are generally used to allocate a proportion of bank credit to the government in the form of purchases of treasury bills, and can also support the introduction of more market-oriented control techniques. However, under a system of bank reserve management as described above, liquid asset requirements can also complicate monetary management during periods of reserve shortages.

The liquid asset requirement could be written as

$$T_B + C_B - \alpha D = \delta D \qquad (16)$$

where it is assumed that excess reserves are counted as liquid assets and δ is the liquid asset ratio. If banks are initially meeting their liquid asset requirements, i.e., equation (16) is satisfied, then the requirement will continue to be satisfied when there is a reserve surplus and the central bank sells treasury bills to meet targets for reserves of the banking system. Such sales alter the composition of liquid assets but not the overall total. However, during periods of reserve shortages, when commercial banks hold limited liquid assets in excess of the requirement, a purchase of treasury bills by the central bank to relieve the reserve shortage could create a shortage of liquid assets: the liquid asset requirement could become a binding constraint.

To avoid this potential complication, the monetary authorities could reduce the liquid asset requirement. As liquid assets held to meet requirements are by definition not liquid, there are advantages for liquidity management from replacing the ratio with a more flexible procedure such as a "liquidity norm," determined by prudential considerations, that should be met on average over a sufficiently long time period, but which should not form a binding constraint at any given point in

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1/ Sometimes a distinction is made between "defensive" central bank operations, which are designed to offset the impact of autonomous influences on the supply of reserves, and "dynamic" operations, which are designed to bring about changes in the supply of reserves.

2/ Many countries also include net or gross interbank positions, but these can have serious disadvantages. The use of gross interbank positions allows for considerable slippage in the liquid asset ratio since such positions can be easily created; while the use of net positions can inhibit interbank borrowing and development of the interbank market.

accompanied by official concerns about "excess liquidity" and the underutilization of commercial bank resources. 1/

Even if banks could be assured of meeting their legal reserve ratios, a high degree of money market interest rate volatility may be undesirable because of implications for exchange rates, or because it may obscure the underlying trend in interest rates. Also, interest rate volatility may threaten the solvency of financial intermediaries that have traditionally operated in an environment of stable interest rates. Nevertheless, some day-to-day flexibility in money market rates is necessary to provide profitable speculative and arbitrage opportunities that encourage secondary markets and market makers.

The aim of achieving interest rate flexibility while avoiding excessive volatility often calls for day-to-day intervention by the central bank. This can take a number of forms, with different implications for financial market development. A common technique is for the central bank to preannounce its willingness to buy or sell bills at interest rates close to those determined on the last primary issue. However, providing banks with unlimited and automatic access to central bank facilities at market rates--be they sales and purchases of treasury bills, repurchase agreements, foreign currency swaps or rediscounts--may have drawbacks for financial market development. As such facilities allow banks to employ (relieve) temporary surpluses (shortages) of funds at little cost, there are limited incentives for the development of secondary bill or interbank markets.

To encourage secondary market activity, some central banks have widened the margins between their buy and sell rates for bills, and/or set penal interest rates (discount or Bank rate) at which they are willing to lend to commercial banks, usually against collateral. 2/ 3/ The wide margins/penal loan rate provide incentives for banks that are short of funds to seek them initially from other banks, and banks with surplus funds to seek outlets for these funds in the interbank market, and therefore encourages interbank market development.

A loan window has the drawback that it operates asymmetrically, providing a facility only to eliminate reserve shortages, and could thus

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1/ For a theoretical treatment of the optimal holding of precautionary balances in the face of uncertainty, see Sprenkle and Miller (1980), and for an application to banks' holdings of excess reserves, see Johnston (1984).

2/ This loan rate could be determined as the latest rate at the primary issue plus a margin.

3/ Penalties associated with borrowing from the central bank may reflect quotas that restrict access, rather than specifically posted penal rates.

still permit substantial interest rate volatility, 1/ although there is also a risk that the loan window rate would be viewed as the indicative rate for all interest rates, inhibiting their market determination. These concerns can be mitigated by providing graduated access to the loan window at progressively higher penal rates, and special interest-bearing accounts with the central bank for excess reserves, or by paying interest on all cash reserves deposited with the central bank. 2/ Graduated access could be provided in a number of ways including the use of quotas and credit tranches for accommodation from the central bank.

The above procedures are based on preannounced interest rates, and leave the initiative to obtain or dispose of bank reserves entirely to the commercial banks. The alternative is for the central bank to take the initiative as regards the quantity of intervention and leave the interest rates to be market determined. For example, the central bank could conduct auctions of its money market intervention instruments, including outright sales and purchases of specified securities, repurchase agreements, foreign exchange swaps, and rediscounts. 3/ When shortages are indicated, the central bank would announce its willingness to buy bills up to a certain amount, and ask for competitive offers; when surpluses are indicated the central bank could announce its willingness to sell a certain volume of bills, and ask for competitive bids. By restricting these auctions to a few key money market participants, they could be more flexibly implemented than the general auctions of primary bills.

The identification of the need for such auctions and the daily shortages or surpluses in the money market could be based on: (1) a monitoring of interbank rates throughout the day; (2) the amount of assistance provided through the loan window (if such a facility existed); (3) the *ex post* monitoring of developments in the central bank balance sheet components, relative to the forecast used to determine the size of the primary bill issue; and (4) a daily monitoring of commercial banks' progress in meeting their cash reserve requirements.

e. Supporting policy and institutional reform

The development of market-based instruments of monetary control needs to be supported by changes in the overall policy and institutional framework.

1/ Whenever there is a persistent cash shortage, interbank rates would rise to the penal loan window rate and when there is a persistent cash surplus, interbank rates would fall toward zero.

2/ This would, anyway, be a step toward removing the tax imposed by non-interest-bearing reserve requirements, which widen interest margins and cause disintermediation.

3/ In principle, direct intervention in the unsecured interbank market, or auctioning of deposit placements, or other similar devices are possible for day-to-day control. The choice would depend upon the institutional circumstances.

The extent to which the interest rates determined through primary bill issues lead to an appropriate interest rate structure depends on institutional circumstances. As noted, the liberalization of interest rates on government securities could be inhibited by the captive markets created by high liquid asset requirements or other portfolio restrictions that may therefore need to be relaxed. When substantial resources are mobilized through public sector financial institutions (savings banks and provident funds) which traditionally buy government securities, these institutions may need to have their securities allotted outside the auctions, so that auction rates can reflect the preferences of noncaptive investors. Institutional reforms may be necessary to ensure that auction rates are reflected in banks' deposit and lending rates. For example, differential cash requirements influence the competitiveness of financial institutions in raising deposits and granting loans, and may have to be unified. 1/

As a result of interest rate liberalization, interest rates on government debt may rise, with budgetary implications. Similarly, parastatals and other borrowers, which had access to bank loans at preferential rates, may experience an increase in borrowing costs. As a result, certain activities may no longer be viable and productive sector restructuring has to take place.

For the central bank to implement the changes in the monetary control system described, it may be necessary to establish a new monetary policy operating framework. A monetary programming procedure would hve to be established in order to carry out projections of the main elements in equations (10) and (11) (page 14), and thus determine the volume of bills to be sold to achieve the monetary objectives. The operational framework that may need to be developed for the purposes of determining the regular auction amounts, and the volume of money market intervention to be undertaken by the central bank between auctions, are illustrated in Table 2.

The greater freedom given to banks as part of financial reforms can bring to the fore weaknesses in bank solvency and in the supervisory arrangements. A policy of allocating resources through directed credit often limits consideration of the quality of banks' portfolios. When direct controls on interest rates and credit are relaxed, some borrowers that previously had access to directed credit may no longer be viable, and loans will have to be provisioned and written off. Moreover, a policy of interest rate regulation has in some countries led to excessive interest rate mismatching that is only revealed when interest rates are freed. Broad structural reforms can also bring about large changes in relative prices which can have widespread effects on the viability of borrowers. Hence, in a liberal framework, greater emphasis may have to be placed on prudential controls to safeguard the stability of the financial system.

1/ See Leite and Sundararajan (1988).

Table 2. Framework for Regular Forecasting and Daily Monitoring of Cash Positions

		Regular Forecast for Auction	Daily Monitoring for Money-Market Intervention	Action Necessary
1.	Commercial banks required cash balances	Based on projected growth of monetary aggregates developed by central bank as part of macroeconomic policy framework and analysis of seasonal pattern in deposits of commercial banks.	Based on framework for monitoring progress under the cash ratio requirements.	Central bank to prepare quarterly forecast of monetary aggregates and analysis of seasonal pattern in deposit data. Monitoring unit to prepare assessment of progress under the cash reserve ratios and discuss with banks the level of their desired precautionary cash balances.
2.	Foreign exchange	Based on quarterly projections of the balance of payments developed by the central bank and analysis of seasonal pattern in payment flows and intervention by the central bank.	Actual intervention by the central bank to be communicated daily to the monitoring unit. Forecast based on 2-day delay in valuing international transactions.	Central bank to prepare quarterly projection of the balance of payments and analysis of the seasonal pattern of payment flows.
3.	Currency outside banks	As in 1. with reference to currency holdings	The currency issue to be notified daily to the monitoring unit.	Central bank to prepare quarterly forecast of currency holdings and an analysis of the seasonal pattern in data.
4.	Government accounts	Forecasts of regular receipts and payments, for example, customs duties, wage and social security payments, etc., to be prepared by the relevant government departments. Accountant General to notify large irregular payments expected during forecast period. List of securities outstanding with amounts and maturity dates and notification of new issues with dates and amounts to be sold to the public.	Actual receipts and payments through government accounts to be notified to the monitoring unit.	Request forecasts and information from government departments.
5.	Maturing central bank bonds and assistance	Lists of bonds and assistance outstanding with amounts and maturity dates.	Actual repayments to be notified to the monitoring unit.	--
6.	Central bank current transactions	Central bank staff to prepare weekly forecasts.	Actual payments and receipts to be communicated to the monitoring unit.	--
7.	Other central bank current accounts	--	Actual balances in accounts to be communicated to the monitoring unit.	--

In addition to reforming the central banks' money market intervention facilities, the development of secondary markets may need to be encouraged through promoting market makers. The initial turnover in the markets may not make market making profitable, and transactions margins could as a result be excessively wide. Incentives for market makers would include restricting bidders at the auctions to the market makers and commercial banks; requiring purchases of treasury bills by other entities to be directed through the market makers; and by providing market makers temporary access to the central bank's lender-of-last-resort facility. In return, the market makers could be required to provide buy and sell quotations for bills in the secondary market for various maturities, and to underwrite the primary bill issues.

6. The use of market-based instruments of monetary control in nine developing countries

a. Overview

This section reviews the uses of market-based instruments of monetary control in a sample of developing countries: Argentina, Brazil, Indonesia, Kenya, Malaysia, Mexico, Philippines, Sri Lanka and Thailand. The financial markets in these countries are at varying stages of development and the countries have faced different macroeconomic challenges in recent years. Nevertheless, all have reduced or abolished the use of direct controls in monetary policy, in particular controls on interest rates and credit, and have moved toward more market-based systems of monetary control. Some countries (Argentina, Brazil) have for a number of years operated market-based instruments of monetary control, although direct regulations on interest rates and credit have to a certain degree been retained or reintroduced. Other countries have undertaken quite determined reductions in direct controls in the last few years (notably Indonesia, the Philippines and, to a lesser extent, Malaysia, Sri Lanka and Thailand).

All the countries surveyed--except for the Philippines--have operated some form of exchange rate peg in recent years (Table 3). However, all countries have allowed a certain amount of exchange rate flexibility, and in most countries exchange controls have limited capital movements. Thus, some scope for independent monetary policy has remained, at least in the short run. Reflecting this, most countries have used monetary aggregates as intermediate targets and have also sought to achieve interest rate objectives for certain periods. Countries which have taken the most determined steps from a regulated toward a market-based monetary control system have adapted their intermediate targets. Following its financial reform, Indonesia changed from targeting domestic credit of the banking system to targeting base money and broad money. In Malaysia and Sri Lanka, the focus shifted from interest rates to broader monetary aggregates. Also, the Philippines shifted from targeting net domestic assets to targeting base money following the move to a floating exchange rate in late 1984.

Table 3. The Policy Framework for Monetary Control in a Sample of Nine Developing Countries

Country	Exchange rate arrangement	Intermediate targets	Operating targets
Argentina	Austral. Introduced in June 1985, has in some periods been fixed vis-a-vis the U.S. dollar, in other periods adjusted on a continuous basis.	Monetary aggregates.	Interest rates on central bank bills, debt sales
Brazil	Cruzado. Frequent adjustments vis-a-vis the U.S. dollar, in line with relative inflation. Temporarily fixed against the U.S. dollar under the Cruzado Plan Feb.-Oct., 1986.	Monetary aggregates, real interest rates.	Base money, overnight interest rates
Indonesia	Rupiah. Managed float, basket of currencies used as indicator.	Monetary aggregates and monetary base. Domestic credit before October 1984.	Exchange rate, interest rates.
Kenya	Shilling. Adjustable peg to a basket of currencies. Managed flexibly with the aim of obtaining a suitable real effective exchange rate.	Money plus quasi-money (M2), real interest rates.	Bank credit, interest rates.
Malaysia	Ringgit. Determined on the basis of a basket of currencies.	Broad monetary aggregates.	Exchange rate, long-term interbank rates, recently overnight interbank rates.
Mexico	Peso. Two-tier system, with a free and controlled foreign exchange market. The rate in the controlled market depre ciated daily, by predetermined amounts.	Monetary aggregates.	Interest rates, debt sales
Philippines	Peso. Floating. (Linked to U.S. dollar until October 1984.)	Base Money. (Until October 1984 net domestic assets of Central Bank.)	Sales and interest rates on treasury bills.
Sri Lanka	Rupee. Crawling peg, nominal rate adjusted for inflation differential with major trading partners.	Broad and narrow money	Net domestic assets of central bank. (Interest rates until early 1988.)
Thailand	Baht. Determined on the basis of a basket of currencies.	Multiple monetary targets are used as a guide for policy	Reserve money, but loosely implemented.

Nearly all of the countries surveyed have made use of regular auctions--either for central bank or treasury bills--for monetary control purposes (Table 4). 1/ Under these auctions, the public submits bids containing the volume demanded and a bid price to the central bank for treasury/central bank bills on auction, and the central bank accepts or rejects bids on the basis of a cut-off yield determined to be consistent with their desired operating target for monetary policy. The most widely used operating target has been short-term interest rates; other operating targets have included various liquidity measures (Argentina, Brazil, Mexico) and net domestic assets of the central bank (Sri Lanka). Some countries (Mexico, Philippines) have instituted formal limitations on the cut-off yield in the auctions, in order to promote orderly bidding and avoid large, short-run fluctuations in interest rates .

The type of instrument used and the frequency of the auction have varied between the countries. Typically, the papers used for monetary control through auctions have been short-term, with maturities from 7 days to 12 months. In some cases, an inflationary environment has put downward pressure on maturities (Argentina, Mexico, Philippines). Most countries have made use of some form of central bank securities, but the use of government papers has also been quite widespread. Auctions have normally been held weekly, although the frequency has varied and even daily auctions have been held in one country (Indonesia). Mexico has also held weekly auctions of central bank offers to place or accept deposits to supplement the auctions of treasury bills.

In some countries, participation in the auctions has been formally restricted to financial institutions (Indonesia) or appointed dealers in the papers in question (Mexico, Philippines). Appointed dealers have sometimes been obliged to make secondary markets in these papers (Philippines).

The day-to-day operating procedures and the design of other supporting instruments have varied among countries. Some countries (such as Sri Lanka) have operated a secondary window for the purchase and sale of treasury bills at the latest auction rate with small margins between buy and sell rates; several countries operate a loan or rediscount window carrying varying degrees of penalty (for example, Kenya); and some countries have used foreign exchange swaps (Argentina, Philippines), and repurchase/reverse repurchase schemes for public sector papers (Argentina, Indonesia, Sri Lanka, Malaysia, Thailand) to manage money market conditions from day to day. Interest rates on most of these facilities are determined by the central bank. Some countries (most notably Indonesia and Philippines) have also reformed the central bank's refinance facilities for priority sector borrowing, inter alia, in order to restrict the financial institutions' access to central bank credit and to rationalize rediscount facilities. Despite the reforms, however,

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1/ The exceptions are Malaysia and Thailand. These countries have auctioned treasury bills, but have not varied the auction amount to influence monetary conditions.

Table 4. Instruments for Monetary Control in a Sample of Nine Developing Countries

Country	Primary issues of securities	Instruments of daily money market management	Other market-based instruments	Refinance facilities	Direct controls	Reserve requirements
Argentina	Weekly auctions of participations in government papers in the form of central bank bills.	Repurchase/reverse repurchases, foreign exchange swaps.	--	Several, including subsidized facilities.	Interest rate regulations. Quotas on nonregulated rate deposits, acceptances and swaps.	Actively varied.
Brazil	Weekly auctions of central bank bills (and treasury bills, but mainly for budgetary finance).	Repurchases/reverse repurchases, and outright sales.	--	Several, including subsidized facilities.	Selective credit controls.	Not actively varied.
Indonesia	Auctions of central bank bills. The frequency of auctions has varied between daily and weekly.	Repurchase agreements and daily auctions of central bank bills.	--	Several, including subsidized facilities.	Interest rate and credit controls lifted as part of financial reform.	Not actively varied.
Kenya	Weekly auctions of treasury bills.	Discount window.	--	Several including discount window and O/D facility.	Maximum lending rates, minimum deposit rates, credit ceilings actively used.	Not actively varied for monetary control purposes.

(Continued)

Table 4 (concluded). Instruments for Monetary Control in a Sample of Nine Developing Countries

Country	Primary issues of securities	Instruments of daily money market management	Other market-based instruments	Refinance facilities	Direct controls	Reserve requirements
Malaysia	Weekly auctions of treasury bills solely for government finance purposes.	Discount window, outright sales and purchases of government securities, repurchase/reverse repurchases, foreign exchange swaps, recycling of government deposits.	--	Several, including subsidized facilities.	Interest rates liberalized, selective credit controls remain in effect.	Not actively varied.
Mexico	Weekly auctions of treasury certificates.	Outright sales and purchases and repurchase/reverse repurchases.	Weekly auctions of fixed deposits and placements from the central bank.	...	Credit ceilings.	Actively varied.
Philippines	Weekly auctions of treasury bills.	Repurchase/reverse repurchases, foreign exchange swaps.	--	Single facility covering an array of purposes. Interest rate charged is linked to market interest rates.	Interest rates have been liberalized.	Actively varied.
Sri Lanka	Weekly or more frequent auctions of treasury bills.	Repurchase/reverse repurchases, foreign exchange swaps. Secondary window for sale and purchase of treasury bills.	--	Several, including subsidized facilities.	Interest rates liberalized. Some credit controls remain but are not strictly enforced.	Actively varied.
Thailand	Weekly auctions of treasury bills. (Mainly to satisfy demands for liquid assets; of limited importance for monetary management).	Repurchase/reverse repurchases; discount window.	Central bank bond issue.	Several, including subsidized facilities.	Interest rate ceilings, direct controls on credit last used in 1984.	Not actively varied.

substantial elements of credit subsidization have remained in several countries. Moreover, reserve requirements have continued to be used, although less actively, in most of the countries; liquid asset ratios tend to be relatively high and banking competition is in general still weak. 1/

b. Countries' detailed operating procedures

(1) Argentina

Prior to July 1985, government paper was sold by the Central Bank of Argentina through public offering at predetermined interest rates. The central Bank also operated a repurchase facility for government paper for commercial banks at a preannounced interest rate set by the Central Bank. Repurchases were available for periods of 7 to 28 days for minimum amounts of 25 million pesos. In July 1985 as part of the anti-inflation austral plan, the Central Bank began auctioning central bank bills issued against the Central Bank's holdings of government paper; these bills have been coined "participations" in the bank's holdings of government papers. Bidders at the auction had to bid both a price and quantity and the Central Bank decided the cut-off volume so as to achieve its monetary objectives. These objectives involved a target for the volume of sales, but it appears that when the achievement of the quantity objective would have resulted in an excessive movement in interest rates, the authorities would override the volume target so as to stabilize interest rates. The Central Bank provided a repurchase facility for the "participations" at interest rates set by the Central Bank, which was used to manage short-term fluctuations in liquidity between auctions.

(2) Brazil

In Brazil, details of instruments and operating procedures have undergone a number of changes in recent years, although the basic framework has remained broadly unchanged, including primary auctions of treasury or Central Bank bills and intervention by the Central Bank to determine interest rates in the interbank market. Up to 1986, the Central Bank intervened in the auctions when the treasury bill rate determined by the bids would have been unacceptable. Its intervention in the money market included outright sales and purchases of assets from its portfolio, and overnight repurchases at interest rates set by the Central Bank.

Following the introduction of the anti-inflation cruzado plan in February 1986, the authorities changed their monetary instruments to make them consistent with an anticipated low inflationary environment. Between May 1986 and December 1987, a central bank bill (the LBC) was issued in maturities of up to one year, at weekly auctions. This bill

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1/ Indonesia has reduced its reserve ratios substantially and Malaysia has reduced and unified reserve and liquid asset ratios.

paid a coupon equal to the average interest rate in the overnight money market in the holding period of the bill, and was sold at a discount determined by competitive bidding at the auction. The amount of bills to be auctioned was preannounced, with the major objective of controlling the trend in the volume of money market liquidity. The overnight rate in the interbank market reflected, inter alia, the daily repurchase operations of the Central Bank. The Central Bank set its repurchase rate to keep real interest rates in the money market close to zero on average over a month, with the interest rate adjusted to the rate of consumer price inflation recorded in the previous month. The Central Bank's repurchase operations were thus the key influence on overnight rates and, except for the initial discount on new issues at the auctions (which was normally small), also on the yield on LBCs.

In January 1988, a new instrument, the LFT, a treasury liability with the same maturity and yield characteristics as the LBC, was introduced to replace the LBC. LFTs have also been auctioned weekly, but unlike the LBCs, primary issues of the LFT have been largely based on budgetary rather than monetary considerations. The Central Bank has, however, continued to set interest rates and to exercise monetary control through its repurchases and also through outright sales of LFTs from its own portfolio and purchases of new issues of LFTs at the auction. LFTs and LCBs are traded in secondary markets organized around about 20 money brokers. Repurchases are normally confined to transactions between the commercial banks and the Central Bank. There are no restrictions on access to the auctions of securities.

(3) Indonesia

In 1983, as part of a broader adjustment effort, Indonesia initiated a comprehensive reform of its monetary control system. 1/ The first stage of the reform included a removal of the remaining direct controls on interest rates and credit and a curtailment of the central bank's funding of state banks. 2/ In the second stage, new money market instruments--central bank (SBI) and private (SBPU) papers--and an auction system for the SBIs were introduced, and the central bank's refinancing facilities were further restructured. With the initiation of the reform, a shift was made from using domestic credit to using interest rates as the target. 3/ Reflecting a high degree of capital mobility, interest rates on monetary control instruments were, however, adjusted occasionally in line with exchange rate considerations. In mid-1987, following a deterioration in the external sector, policy shifted to protecting the exchange rate, and interest rates became more flexible.

1/ Discussions of financial reform in Indonesia are given in Binhadi and Meek (1988) and Sundararajan and Molho (1988).

2/ These banks had accounted for the bulk of commercial banks' assets and deposits.

3/ Intermediate targets for monetary aggregates and for base money have also been employed.

Auctions of SBIs were introduced in March 1984. Initially, SBI maturities were for 30 and 90 days, but bills with 7-day maturity were introduced later. 1/ The frequency of auctions has varied, and auctions have been held on a daily basis, three times a week, and weekly. Only banks and nonbank financial institutions are allowed to participate, but other entities may acquire SBIs in the secondary market. The cut-off yield in the auctions has been set by the central bank.

A state-run securities house (FICORINVEST) was named to facilitate trading in SBIs and SBPUs. Initially, FICORINVEST stood ready to buy and sell SBPUs at posted bid and offer prices, and could automatically rediscount them with the central bank at a profit. Also, it would discount SBIs at the interest rate of the original SBI issue without regard to its remaining maturity, and could automatically rediscount them at the central bank, also at the original issue price. The cut-off rate in the auctions and the posted interest rates through FICORINVEST were initially changed infrequently. The increased flexibility of interest rates, adopted to protect the exchange rate in 1987, was supported by a change in the central bank's money market operating procedures. In July 1987, the central bank phased out the automatic rediscounting of SBIs and SBPUs, hence discontinuing its passive accommodation at posted interest rates. The main instruments have since been daily auctions of 7-day SBIs, and of 7-day repurchase agreements in SBPUs carried out daily at interest rates set by the central bank, based on bids or offers received. 2/

(4) Kenya

The Kenyan authorities have begun to move toward a market-oriented system of monetary control, to be based on open market operations. Controls remain over the maximum lending rates of banks and nonbank financial institutions, and over the minimum savings deposit rates of banks. However, interest rates have generally been significantly positive in real terms since 1984, and the controls are being progressively relaxed. The authorities also relaxed their direct credit controls in 1986 and 1987; however, concern about the risk of an excessive credit expansion led them to reimpose ceilings on the growth of bank lending to the nongovernment sector in late 1987.

The tendering of treasury bills began in 1985 and of treasury bonds in 1986. The authorities have determined the cut-off interest rate for issues of bills and bonds at the tender. The authorities are committed to strengthening the auction system, which has not been fully competitive. The central bank has recently reopened its discount window, which is available to any holder of eligible securities. Initially, access to this window was at a nonpenal rate, with the rediscount rate set at only

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1/ Bills of 15-day maturity were also issued for a brief period in 1984-85.

2/ These auctions--telephone go-arounds--are conducted through FICORINVEST.

one eighth of one percent above the treasury bill rate. However, the discount rate has since been raised to the treasury bill rate plus 1.5 percent. There is also a lending facility through which advances secured over government papers bear the same rate as the discount window. A Monetary Policy Committee has been established to assist coordination between the central bank and the Treasury on various aspects of monetary policy.

(5) Malaysia 1/

Deficits on the balance of payments in Malaysia made the maintenance of an appropriate exchange rate (a managed float) a main target for monetary policy in recent years. The turnaround in the external sector in 1987 prompted a shift toward interbank interest rates as the main operational target. 2/ Concurrently, broad money aggregates (M2 and M3) have been used as intermediate targets.

The central bank of Malaysia operates auctions of treasury bills but solely for government finance purposes. 3/ In contrast to most of the other countries surveyed, Malaysia has not made specific use of the auction system for monetary control. Instead, control of intermediate targets over longer periods has been exercised by way of changes in liquidity and reserve requirements. A number of instruments have been used for shorter-term monetary correction: a discount window; 4/ outright sales and purchases of government paper from the central bank's portfolio; foreign exchange swaps; "recycling" of government deposits

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1/ Bank Negara Malaysia (1984) describes the financial system and monetary policy in Malaysia.

2/ Traditionally, long-term interbank rates were used as the operating target; more recently overnight interbank rates have also been taken into account.

3/ The auctions, which were introduced in 1973, have been conducted on a weekly basis, with 91-day bills offered every week, 182-day bills every second week, and 364-day bills every four weeks. The amounts and maturities to be offered are announced in advance of the auction; results regarding, inter alia, amounts tendered, accepted and rejected, and yields are announced after the auction. Given the captive holding requirements, the treasury bill yields do not properly reflect money market conditions.

4/ Commercial banks, finance companies and some other financial institutions have access to the regular discount window, and may rediscount treasury bills and other eligible short-term papers--such as 3-month commercial papers and 6-month promissory notes issued to finance agriculture--at the discount rate. Under the export refinance facility, to which only commercial banks have access, credit is extended for periods of up to three months at preferential interest rates. In addition, an automatic overnight discount window is established to facilitate the day-1 clearing introduced in February 1987, and funds are lent against the collateral of government securities at the average of overnight interbank rates during the day.

(i.e., transfers of such deposits between the central bank and commercial banks, combined with guidelines for the banks' use of these funds), repurchase and reverse repurchase operations in government papers; and occasional issues of central bank securities. Until 1987, the main instruments were foreign exchange swaps and "recycling" of government deposits. During 1987, these instruments were gradually phased out, and sales and purchases of government securities, including repurchase agreements, and of central bank securities became increasingly important. Previously, the central bank issued, on a regular basis, a "price list" (or yield curve) indicating the rates at which it would sell and buy government papers or bankers' acceptances of different maturities, in effect exerting a direct influence on the entire maturity structure of interest rates. In 1987 this practice was discontinued, and the central bank has since been accepting bids and offers with more discretion, and with a view toward market yields.

The central bank of Malaysia has traditionally made use of several forms of direct regulations and preferential refinance facilities, but these have been adapted in support of a more market-oriented monetary policy. General credit ceilings for individual banks and financial companies have not been used, but "guidelines" on the distribution of credit have remained in place. While control on bank deposit and loan rates had been fully removed by the early 1980s, moral suasion by the central bank on the interest rate structure has been exercised from time to time.

(6) Mexico

Since 1978, the central bank of Mexico has operated weekly auctions of treasury certificates (CETES); from 1982 to 1985 auction amounts were predetermined and interest rates were determined without official interference at the auction, and hence allowed to reflect market conditions. This system was temporarily suspended and replaced with a fixed price tender system in late 1985, because of concern about a high level of interest rates; the market-based auction system was reintroduced in July 1986. 1/

CETES have been issued in fixed denominations, with maturities between 7 and 182 days. Participation in the auctions has been restricted to a group of licensed CETES dealers, but others may acquire CETES by purchasing them from these dealers. The interest rate on CETES is freely determined, although the central bank has bought CETES in the auction for subsequent use in its money market operations, aimed at moderating transitory swings in interest rates and in money market liquidity. These operations have included outright sales and repurchase/reverse repurchase agreements.

1/ An overview of open market-type operations in Mexico is found in Leite (1985).

The amount of CETES to be auctioned each week was in principle to be determined by the financing needs of the Treasury and monetary policy considerations. However, because of concerns about the budgetary impact of interest costs, the weekly auctions of treasury bills have been supplemented by offers from the central bank to place or accept fixed deposits with the commercial banks ("subastas de depósitos"). The deposits have typical maturities of 14 and 91 days, and are also auctioned weekly. Only banks are allowed access to these auctions.

Mexico has continued to make active use of direct controls on credit and on longer-term interest rates, and reserve requirements have also been used actively for monetary control purposes; marginal requirements were increased in mid-1987.

(7) Philippines

In October 1984, the Philippines authorities reformed their monetary policy framework. The peso was floated, and the domestic monetary target was changed from the net domestic assets of the monetary authorities to base money. 1/ Interest rates had been gradually deregulated in the 1980-83 period, and have since been freely determined.

The main instrument of short-term monetary control in the Philippines has been a weekly auction, initially of central bank bills (with maturities ranging from 30 to 90 days) and beginning in late 1986, of treasury bills (issued at maturities of 91, 182, and 364 days). 2/ By end-1987, treasury bill issues had virtually replaced the issues of central bank bills. A proportion of the proceeds from the sales of treasury bills is held by the Government in special fixed deposits with the Central Bank for the explicit purpose of sterilizing liquidity. The regular auctions of short-term paper have been supplemented by auctions of 3-year treasury bills. Participation in the auctions has been limited to a group of commercial banks, which have been given status as primary dealers based on their financial soundness; bills are to a large extent sold on to nonbanks. The primary dealers are obliged to participate in the auctions, to have bids regularly accepted, to undertake secondary trading in government securities, to post reasonable two-way prices for these securities, and to submit certain market information to the Central Bank. An Auction Committee, which includes the top-ranking officials of the Ministry of Finance and the Central Bank, conducts the auction; an Open Market Committee decides the tender amounts, based on the Treasury's financing needs and the monetary policy stance adopted. The cut-off price in the auction has been linked to the price range accepted in the previous auction, normally so that it deviates by less than 20-30 basis points from that auction. At times, this constraint has led to the rejection of all bids. There is also some noncompetitive bidding, limited to 20 percent of the total tender.

1/ Base money is defined as reserve money plus banks' holdings of reserve eligible securities and reserve deficiencies.

2/ See Ealdama (1986) for a description of the auction system.

For shorter-term monetary control, the auctions have been supplemented by repurchase and reverse repurchase agreements using the bills held in the Central Banks's own portfolio. The Central Bank had made extensive use of foreign exchange swaps until late 1984, when it ceased providing new swap agreements, although existing agreements have been rolled over. As a result of the depreciating peso, the Central Bank has suffered substantial operating losses on its foreign exchange swaps.

The Central Bank has restructured its refinance facilities, with the aim of reducing their use and rationalizing their function. By late 1985, the number of refinance facilities had been reduced from five to one single facility, covering a range of purposes. 1/ The interest rate charged under the single facility has been market based, and is adjusted in line with market rates. The Philippines has continued to use reserve requirements as a monetary control instrument.

(8) Sri Lanka

Since 1985, the nominal exchange rate for the Sri Lankan rupee has been adjusted regularly to counteract inflation differentials between Sri Lanka and its main trading partners. Within the constraint set by the exchange rate arrangement, the interest rate previously played a major role as the operational target. Since early 1988, the main operational target has been the net domestic assets of the Central Bank, derived from intermediate targets for monetary and credit aggregates.

Sri Lanka has undertaken several changes in its monetary control system in recent years. Interest rates were liberalized in 1977 and a weekly auction system for treasury bills was introduced in early 1987. Beginning in 1986, a number of direct credit controls were removed, and the Central Bank refrained from strict enforcement of the remaining ceilings. Reserve requirements have continued to be used for monetary control; an important simplification was introduced with the unification of reserve requirements in 1987. The Central Bank has continued to operate several preferential refinance facilities. The operation of a general discount facility was discontinued in 1984.

The Central Bank began auctioning its own securities in 1984 and such issues were a main instrument used to manage money market liquidity during 1985 and 1986. Auctions of central bank securities were held about once a month until 1987. Recently, efforts have concentrated on developing the treasury bill market, and the weekly auction of treasury bills has become the main monetary control instrument. The auctions have in principle been open to all. Since late 1987, the amount to be auctioned has been determined by a forecasting committee, consisting of central bank and treasury officials, but has been largely based on the amount of bills maturing. The cut-off yield has been determined by a Tendering Committee, chaired by the Senior Deputy Governor of the Central Bank. Since early 1988 the yield has been set with a view toward the

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1/ Most outstanding credits have been for export refinancing.

Central Bank's net domestic assets, which has consequently become the main operating target for short-term monetary control. The Central Bank has been operating a secondary window, for the purchase and sale of treasury bills. The prices at this secondary window are linked to those in the most recent auction of treasury bills with a penalty element that has been varied over time.

(9) Thailand

The central bank has used multiple monetary targets as a guide for the conduct of monetary policy, including a monthly monetary base (or reserve money) target as an operational target. Money market liquidity is influenced by the central bank's lending through its loan window, its refinancing of credits to priority sectors, its operations in the government bond repurchase market, its sales of central bank bonds, and its intervention in the foreign exchange market. However, in practice the central bank has not attempted short-term management of the monetary base and the central bank has also been relatively passive in its day-to-day management of money market interest rates.

The authorities have been concerned that interest rates should be high enough to induce saving, but not so high as to depress investment and production activity and that they should be in line with foreign interest rates given the open nature of the Thai economy.

The central bank has set maximum interest rates on bank deposits and has used moral suasion to encourage commercial banks to adjust their interest rates but has increasingly left interest rates to be determined by market forces. From time to time the central bank has resorted to direct credit controls most recently in 1984. The authorities have sought to influence the direction of credit through preferential rediscounting, by imposing lending quotas, and by exempting lending to priority sectors from risk/asset ratios. 1/

A government bond repurchase market was established in April 1979. Government bonds (which are issued for maturities of 5, 10, or 15 years on fixed interest rates) are otherwise illiquid. The central bank acts as a principal of the repurchase transactions; however, until about May 1986, the central bank's activity largely involved matching the demand and supply of repurchases with limited intervention on its own account. With the emergence of a high level of liquidity in the banking system in 1986, central bank intervention became more active and in May 1987, the central bank introduced a longer-term repurchase contract, with maturities up to six months. Also in May 1987, the central bank made the first issue of its own bonds (six-month maturity with the interest rate fixed at 6 percent) to increase its flexibility in managing liquidity since there was a potential shortage of government bonds in the central

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1/ The major priority sectors are exports, agriculture, crop financing and price support, and agribusiness.

bank's portfolio for repurchase transactions. The treasury bill market is limited and has not been used for active monetary management. 1/

7. Experiences

a. Approach and limitations

Our ability to assess experiences with the market-based instruments is constrained by a number of factors. First, while certain effects on interest rates and monetary aggregates might be expected a priori following financial reforms--for example, the use of interest rates rather than direct credit controls for macro monetary management could require an increase in the average level of real interest rates--there were many influences on financial markets and the broader economy that were in some countries more important than the particular reform measures under consideration here. Indeed, a major problem is to distinguish the impact of the new procedures per se from larger influences operating on the economy. This difficulty is particularly acute given the relatively short period of time since the new procedures were implemented in several countries. 2/

Second, the position prior to the introduction of the new procedures and the targets of monetary policy varied greatly between countries; therefore, similar experiences are not to be expected. In some countries, market interest rates were already free to vary and the active management of money market liquidity aimed at a stabilization of money market rates; in other countries, the liberalization of rates meant increased interest rate volatility. In some countries the operational target was the money market interest rate, which as a result followed a smoother path than in the countries which used the volume of debt sales or reserve money as the operational target.

Third, many aspects of financial reform, such as the authorities' willingness to accept an adequate degree of interest rate flexibility, the development of active markets with wide participation, and--related to this--the building of institutions, technical infrastructure and human skills in the area of financial intermediation, are very difficult to assess. The experiences therefore have to be analyzed from a somewhat narrower perspective.

The majority of the countries surveyed have faced adverse external conditions in the 1980s, linked both to cyclical developments in the

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1/ Bills are auctioned on a weekly basis and are purchased mainly by financial institutions, to satisfy statutory requirements. Between auctions the central bank usually stands ready to sell bills from its portfolio and has occasionally purchased bills before maturity.

2/ The time elapsed may have been too short for market participants to have fully adjusted to the new environment; moreover, markets may have been buffeted by changing inflationary expectations, fiscal uncertainties, and external conditions during this time.

world economy and to weak terms of trade as well as problems in the conduct of economic policies domestically. These conditions have required changes in economic policies in order to contain domestic demand and, at the same time, to provide for sustainable economic growth. Several of the countries have implemented adjustment programs supported by Fund resources, involving a tightening of monetary and fiscal policies aimed at improving their balance of payments and reducing inflation. Related to these adjustment programs, and the subsequent improvements in external positions in some countries, there have been marked shifts in nominal and real interest rates. Short-term interest rates increased abruptly in Brazil in late 1984 and again in 1986, in the Philippines in 1984 and 1985, and in Indonesia in 1984. In some cases (Indonesia, the Philippines) this coincided with the implementation of new monetary control techniques. On the other hand, interest rates have fallen in Thailand and Malaysia in response to improved external positions.

In subsection b. below, the role of monetary policy and the operational role of market-oriented instruments in achieving monetary policy objectives are examined within a more general macroeconomic policy context. This section presents tables showing the counterparts to the change in reserve money along the lines of the reserve money identity developed in section 4a. The main counterparts are the governments' domestic financing requirements less sales of government debt outside the central bank, including auctions of treasury bills where appropriate; the increase (on a transactions basis) of the central bank's net holdings of foreign assets; autonomous net lending by the central bank related to preferential rediscount and special liquidity support measures; and the central bank's discretionary use of money market instruments such as repurchases, foreign exchange swaps, central bank bills, etc. for money management purposes. Market-oriented instruments of monetary control would be represented both by the central bank's use of these discretionary instruments and the line for treasury bill sales (where appropriate). Given this information on the quantitative use of market-oriented instruments, subsection c. focuses on the results for short-term interest rates and monetary aggregates following the introduction of new operating procedures.

b. Reserve money developments and counterparts

In Argentina and Brazil, monetary instruments have been developed against the background of large government domestic financing needs (Appendix Tables 1 and 2). Despite the change in monetary instruments in Argentina in 1985 and Brazil in 1986, the authorities did not use the new instruments to exert additional control over the growth of reserve money. In Brazil the Central Bank increased its uptake of government debt at the same time as it began issuing central bank bills. It appears that the austral and cruzado plans, which relied to a large extent on de-indexation of financial assets and wages, lacked sustained or substantive support from fiscal and monetary policies. Real interest rates in Argentina and Brazil remained generally negative on average in the period after the plans were introduced and in Brazil reserve money growth continued at a rapid pace.

In Indonesia nominal and real interest rates increased significantly following the financial liberalization in 1983 and as part of their concerted adjustment efforts (Chart 1). The major monetary disturbances have been associated with instability in the balance of payments and domestic financing of the government budget deficit (Appendix Table 3). Up until 1987, the reserve money effects of the changes in foreign exchange reserves were largely offset by the central bank's net purchases of government debt; however, increasing use was also made of open-market-type operations, especially in 1986 and 1987. As the liquidity situation tightened in late 1986 and early 1987, the central bank supplied liquidity through central bank bills. Subsequently, the central bank allowed interest rates to increase, and in the year to March 1988, capital reflows contributed to an increase in reserve money, which was partly offset by central bank operations.

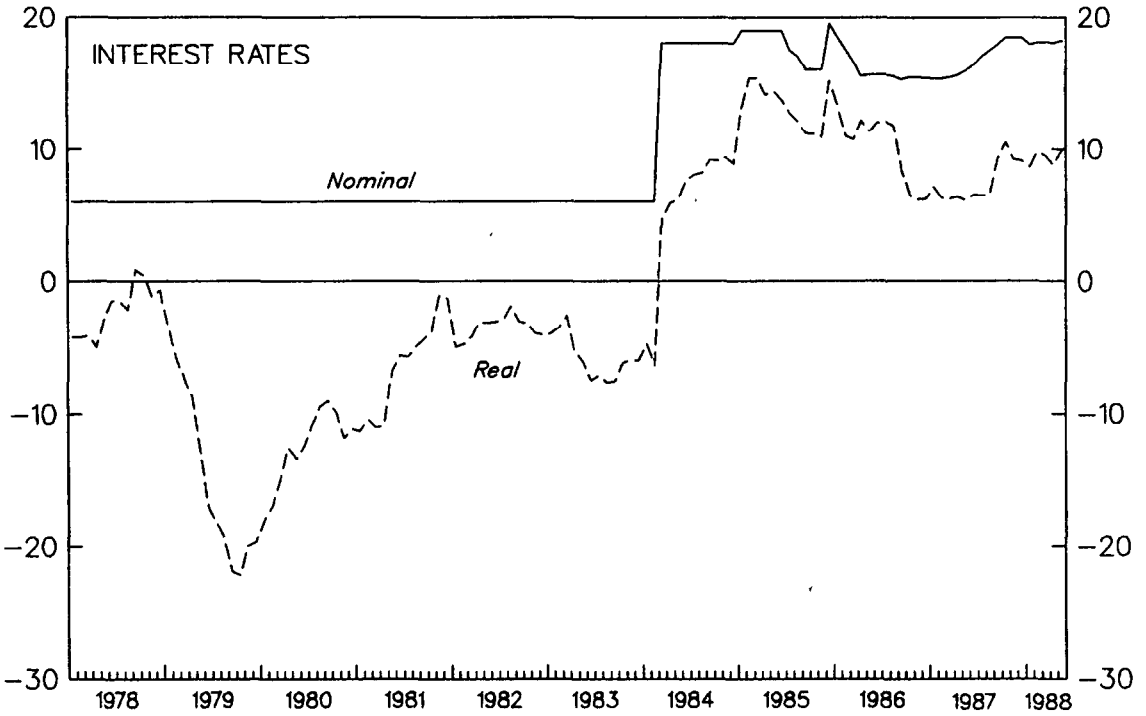
In Kenya, the impact of the domestic financing needs of the Government on reserve money has been moderated through the domestic sale of treasury bills and bonds outside the Central Bank (Appendix Table 4). However, monetary policy has not been active. Nominal interest rates have been maintained at a stable level while real interest rates have fluctuated. In 1984, the authorities did not sterilize the external surpluses and reserve money growth increased sharply. In 1987, a substantially greater proportion of the larger government domestic financing requirement was financed by the Central Bank, and, as a result, reserve money grew very rapidly.

Market-oriented monetary instruments have been increasingly utilized in Malaysia. In 1986 and 1987 such instruments were used largely to offset the accumulation of foreign exchange by the central bank and to moderate downward pressure on interest rates (Chart 2). The central bank has also been able to maintain a fairly stable reserve money growth (Appendix Table 5). The main instruments of money market management have been foreign exchange swaps, "recycling" of government deposits, secondary transactions in government securities, and, beginning in 1987, issues of central bank bills. The central bank has been able to restrict its domestic financing of the Government, although these financing needs have been increasing; the Government has met its domestic financing requirement largely through sales of securities.

As in Argentina and Brazil, monetary policy in Mexico has been implemented against the background of large government domestic financing needs and instability in the external position. The auctions of CETES have financed only a small percentage of the Government's domestic financing needs and a substantial percentage of government domestic borrowing has been provided through the central bank (Appendix Table 6). Auctions of deposits with the central bank have reduced financial sector liquidity, but have been insufficient to prevent increases in the growth rate of reserve money.

In the Philippines, market-oriented monetary instruments have been used actively in macroeconomic management. In 1984, nominal interest rates were increased sharply (see Chart 3), influenced by sales of

CHART 1
INDONESIA
DEVELOPMENTS IN INTEREST RATES AND MONETARY AGGREGATES
(In percent)



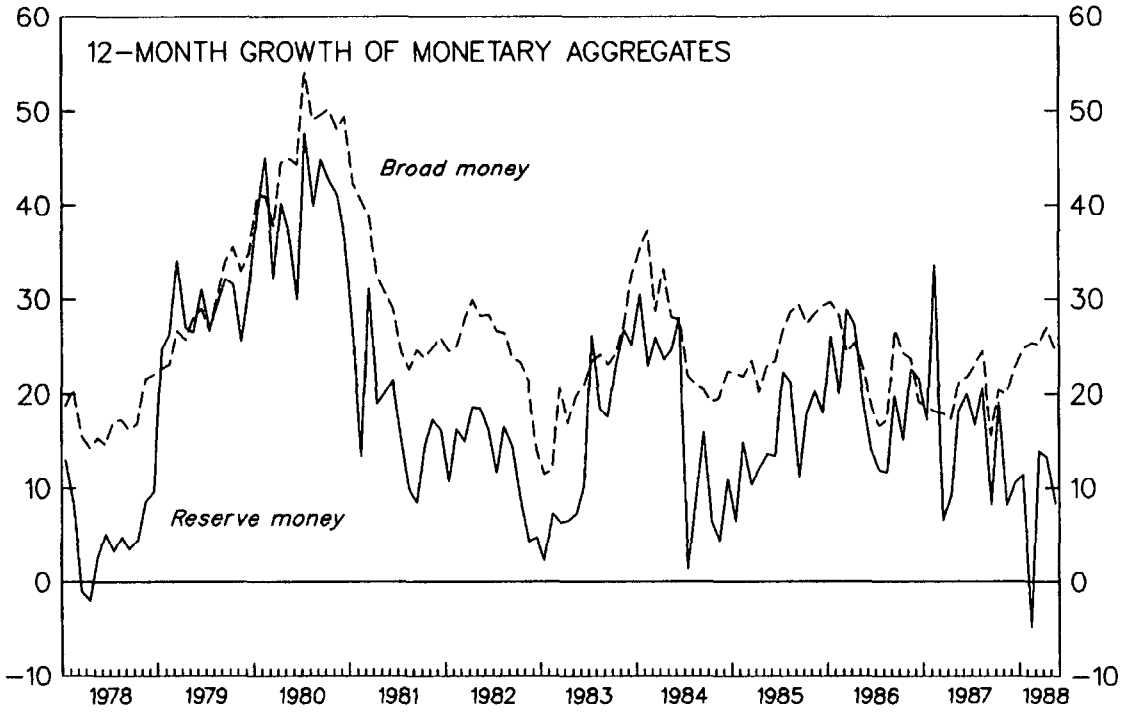


CHART 2
MALAYSIA
DEVELOPMENTS IN INTEREST RATES AND MONETARY AGGREGATES
(In percent)

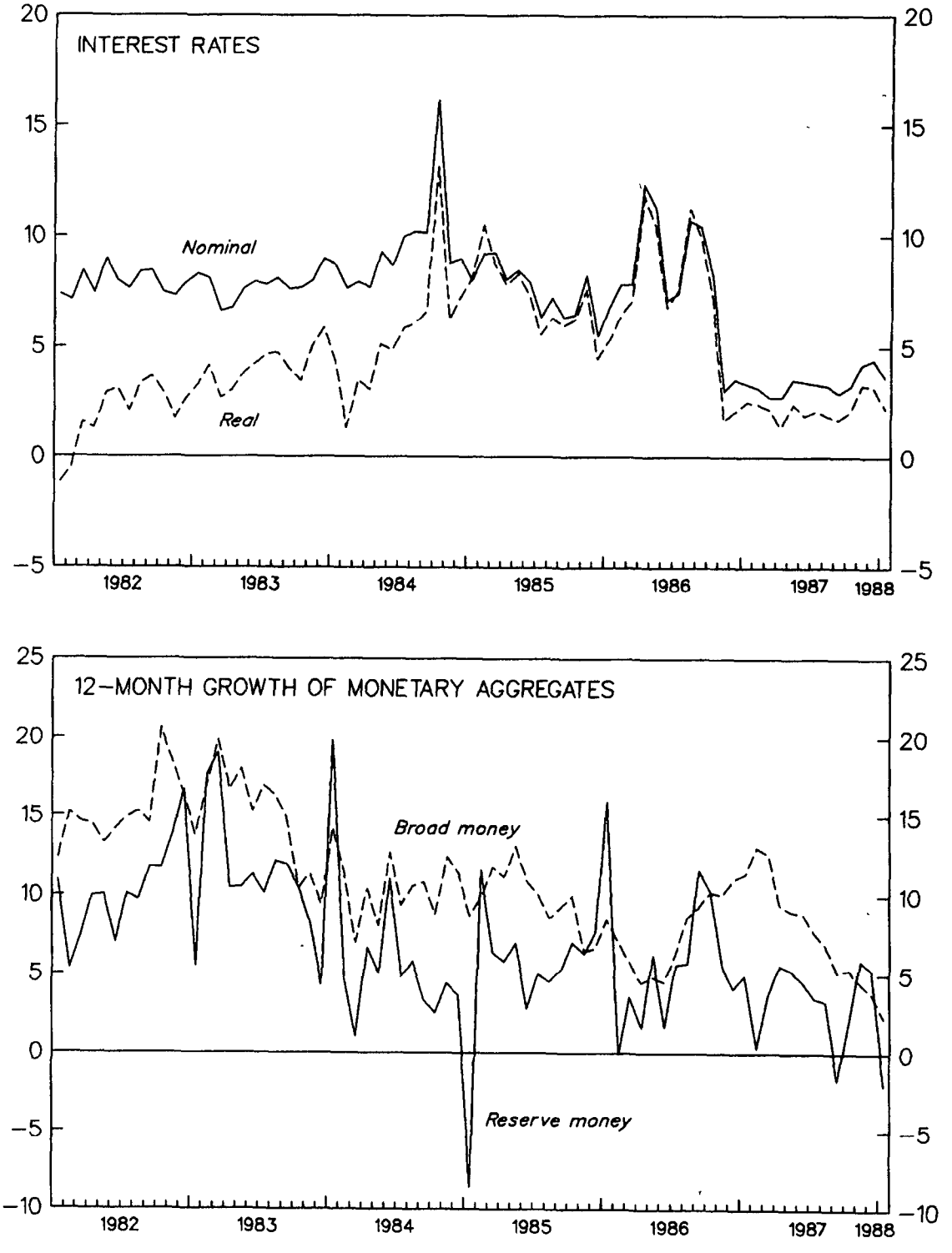
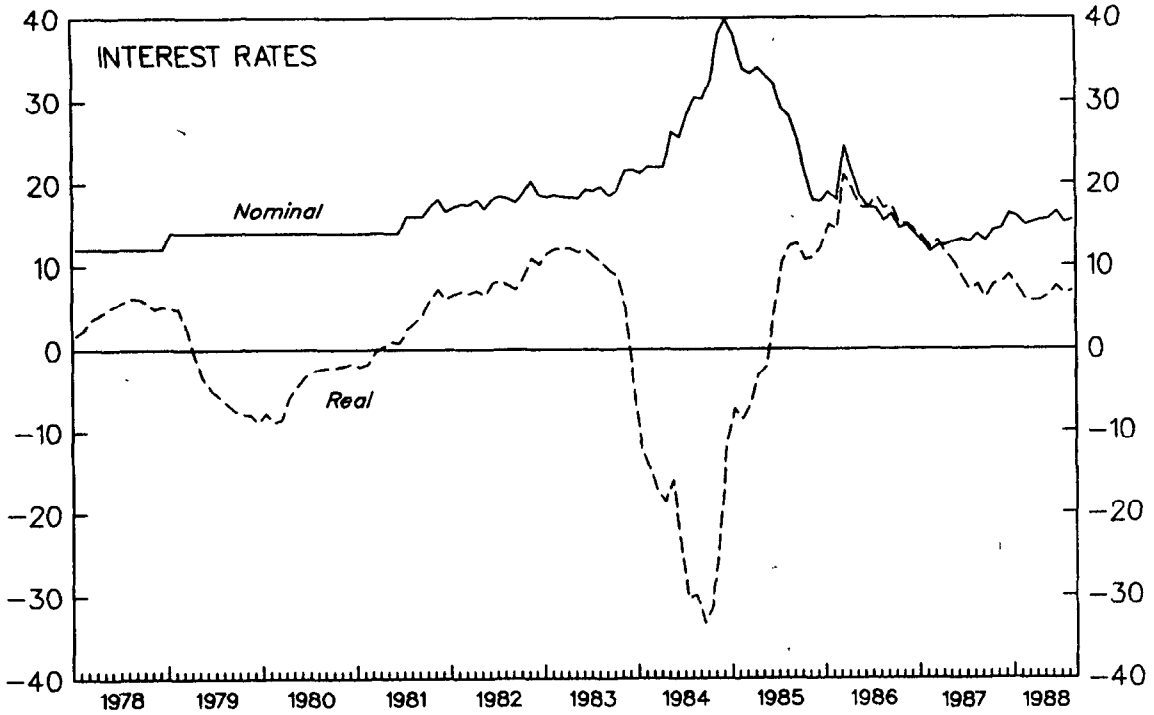
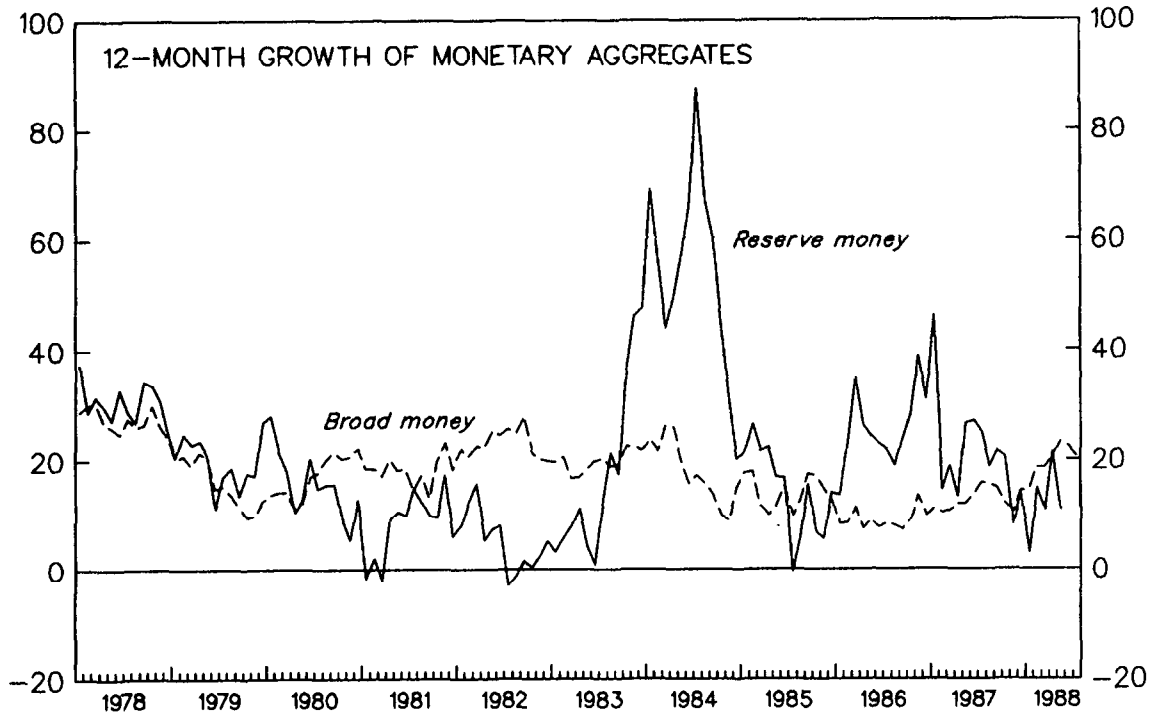


CHART 3
PHILIPPINES
DEVELOPMENTS IN INTEREST RATES AND MONETARY AGGREGATES
(In percent)





central bank bills aimed at moderating the expansion of reserve money (Appendix Table 7). Slippages occurred in 1986 and there was a substantial loss of foreign exchange reserves; however, in 1987 monetary instruments, especially the weekly auctioning of treasury bills and the associated increase of government deposits at the Central Bank in special sterilized accounts were used actively to constrain the growth of reserve money. The treasury bill sales and the sterilization of proceeds more than offset the maturing of central bank bills which were being phased out as a monetary instrument.

There has been a deterioration in economic conditions in Sri Lanka since 1984, with a loss of foreign exchange reserves and widening government domestic financing needs (Appendix Table 8). Sales of central bank bills were used in 1984-86 to offset the increase in financial sector liquidity associated with the accumulation of foreign assets in 1984 and the uptake of domestic debt by the Central Bank in 1985 and 1986. In 1987, the maturing of central bank bills offset the impact of the loss of foreign exchange reserves on the growth of reserve money; thus, monetary policy was geared toward lowering interest rates, and real interest rates became negative. The adoption of the net domestic assets target required increased interest rate flexibility and a less accommodating stance for monetary policy. In early 1988 interest rates in the treasury bill auction were allowed to increase.

Until 1986, the monetary authorities in Thailand did not pursue an active policy with regard to managing money market liquidity. However, following the substantial improvement in the external balance beginning in 1986 and an associated build-up in financial sector liquidity, the authorities actively drained liquidity through government bond repurchases and issues of central bank bonds (Appendix Table 9). These operations have not been sufficient, however, to prevent a sharp increase in the growth of reserve money in 1987 and a fall in interest rates (Chart 4).

c. Implications for interest rates and monetary aggregates

To examine the impact of the new operating procedures on interest rates and monetary aggregates, we first specified for each country a date for the introduction of the new operating procedures (see Table 5, footnote 1c). These dates were selected on the basis of our judgment about when a substantive shift occurred in operating procedures, rather than necessarily the date on which reforms were initiated. For the pre- and post-reform periods, we conducted simple statistical tests, comparing monthly data on nominal and real interest rates, and on twelve-month growth rates of reserve money and broad money. The tests include a comparison of means and variances of the data series and the residuals from autoregressive regressions for nominal and real interest rates in

Table 5. Financial Reform and Structural Changes in Interest Rate Determination 1/

	Nominal Interest Rate				Real Interest Rate			
	Pre-Reform	Post-Reform	Change	Test Statistics 2/	Pre-Reform	Post-Reform	Change	Test Statistics 2/
Indonesia								
Mean (percent)	6.00	15.56	+	t=17.51**	-7.57	7.27	+	t=13.30**
Standard deviation	--	4.23	+	**4/	6.02	6.43	+	F=1.19
RSS 3/	--	2.8	+	**4/	2.6	3.7	+	F=1.45
Malaysia								
Mean (percent)	8.07	3.35	-	t=16.03**	5.29	2.21	-	t=7.66**
Standard deviation	1.95	0.53	-	F=13.54**	2.86	0.55	-	F=5.20**
RSS 3/	3.6	0.2	-	F=17.76**	4.2	0.54	-	F=10.30**
Philippines								
Mean (percent)	16.55	20.18	+	t=2.82**	-0.02	7.42	+	t=3.96**
Standard deviation	4.18	8.24	+	F=3.89**	9.99	10.38	+	F=1.08
RSS 3/	0.87	4.0	+	F=5.71**	4.5	7.9	+	F=1.76*
Thailand								
Mean (percent)	13.58	6.43	-	t=19.02**	6.50	2.75	-	t=3.99**
Standard deviation	2.53	0.96	-	F=6.95**	5.75	3.48	-	F=2.73**
RSS 3/	1.2	0.8	-	F=1.46	2.4	0.8	-	F=2.93**

Sources: IFS, data provided by the authorities, and staff estimates.

1/ Note on methodology:

a. Data. Monthly money market interest rates [IFS, line 60b, except for Philippines (60c)]; deflated by change in CPI [IFS, line 64] over previous 12-month period.

b. Tests. Standard t and F tests are carried out to check whether there have been significant changes in interest rate levels and variability, respectively, following monetary control "reform." Regressions of the form $X_t = aX_{t-1}$ (X_t is interest rate in period t) are run for pre- and post-reform periods, and F-tests are used to gauge whether there have been structural changes in interest rate determination.

c. The nature and time of reform, and pre- and post-reform periods for each country were:

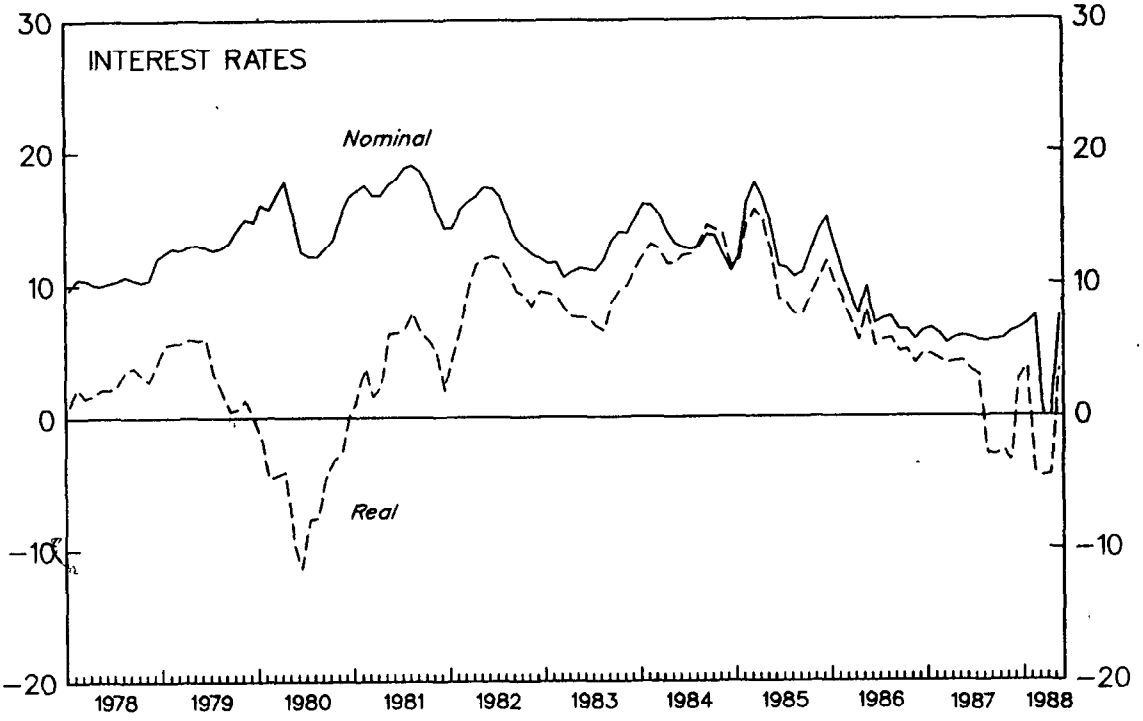
Country	Reform measure(s)	Time	Sample periods Pre-Reform	Sample periods Post-Reform
Indonesia	Comprehensive financial reform initiated	June 1983	78:1-83:5	83:6-88:5
Malaysia	Freer money market interest rate determination	February 1987	82:2-87:1	87:2-88:1
Philippines	Floating of currency	October 1984	78:1-84:9	84:10-88:8
Thailand	More active use of repurchase transactions initiated	May 1986	78:1-86:4	86:5-88:2

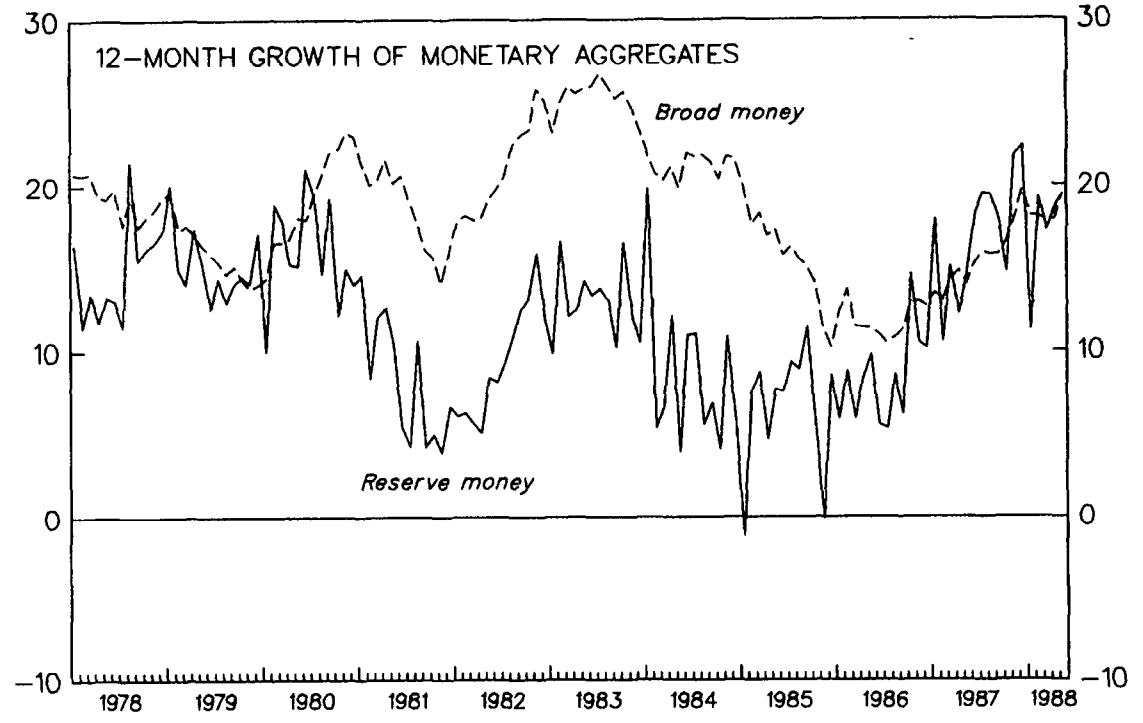
2/ One asterisk indicates that the change has been significant on the 5 percent level, two asterisks on the 1 percent level.

3/ Residual Sum of Squares in the regression, divided by the degree of freedom.

4/ Nominal interest rate was unchanged during the whole pre-reform period.

CHART 4
THAILAND
DEVELOPMENTS IN INTEREST RATES AND MONETARY AGGREGATES
(In percent)





the sample sub-periods. 1/ Data availability has restricted this quantitative analysis to only four countries: Indonesia, Malaysia, Philippines and Thailand. 2/

(1) Interest rates

In the Philippines and Indonesia, where it appears that market-based instruments of monetary control have played the most active role in macroeconomic adjustment in the sample of countries, there were significant increases in both the level and variability of interest rates following the reform of their monetary management operating procedures (Table 5). In both countries, real interest rates also became significantly positive after the monetary reform. These results conform most closely with a simple a priori expectation about what should happen following a move to liberalize interest rates from direct controls and to use interest rates rather than direct credit controls to constrain monetary expansion.

In the other two countries--Malaysia and Thailand--the new monetary policy operating procedures were associated with a significant reduction in the level of interest rates and their variability. In both countries, interest rates had not previously been tightly controlled, as evidenced by the larger regression residuals in the nominal interest rate equations in the pre-reform period for these countries compared to Indonesia and the Philippines. (Compare also Charts 1 and 3 with Charts 2 and 4.) Moreover, the change in operating procedures occurred following a significant improvement in these countries' balance of payments, which resulted in reserve accumulations, expansion of domestic liquidity, and downward pressure on interest rates. In both countries, market-oriented instruments were used to drain liquidity from their financial systems to prevent an excessive easing in monetary conditions and further falls in interest rates. The results of lower average interest rates and reduced interest rate variability, following the introduction of the new operating procedures, would therefore appear to reflect two factors: (i) the general downward pressure on interest rates associated with the improved external conditions and (ii) the previous variability in interest rates, which money market intervention acted to reduce. These two countries illustrate the stabilizing effect of money market operations. However, in Thailand there was no significant difference in the autoregressive models before and after the introduction of greater money market intervention, which may suggest that this policy was not especially active (see also below).

1/ These latter regressions are motivated by the efficient markets hypothesis of interest rates, which suggests that short-term interest rates would tend to follow random walks; see, for example, Fama (1970).

2/ For Argentina and Sri Lanka, there is a lack of a consistent time series for interest rates; for Brazil, a reorganization of the monetary authorities led to a break in the time series on reserve money; and in the cases of Kenya and Mexico, there are no decisive reform measures which would represent a clear shift in operating procedures.

(2) Monetary aggregates

As regards the likely outcome for monetary aggregates, we would anticipate, ceteris paribus, an inverse relationship between nominal interest rates and the growth of non-interest-bearing reserve money. This expectation is supported in the results for three of the countries (Table 6). The relationship between interest rates and broad money is a priori complicated since a part of broad money is interest bearing and could expand with a general rise in interest rates; the relevant interest rate term for broad money demand is therefore the differential between the own rate on money and the interest rate on nonmonetary assets. In addition to interest rates, the demand for reserve and broad money would be affected by developments in income or wealth; however, high frequency data on these variables are not available and have not been taken into account.

In Indonesia and the Philippines, the significant increases in interest rates and their variability after the introduction of monetary reforms were associated with significant reductions in the variability of the growth of reserve money and reductions in its average rate of growth, but the latter tests were insignificant at a 5 percent confidence level. This could suggest that other factors, such as developments in income, are important in addition to the level of interest rates in determining the trend in reserve money growth. Following the financial reforms, there were significant reductions in the variability and rate of growth of broad money in Indonesia. In the Philippines the average rate of growth of broad money fell significantly following the introduction of the new monetary policy operating procedures.

In Thailand, there was also an inverse relationship between interest rates and reserve money. The average rate of growth and the variability of the growth rate of reserve money increased while average interest rates and their variability declined following the introduction of the more active money market policy of the central bank. However, the effects on the variability of reserve money growth were not significant, which may again suggest that the change in Thai operating procedures was not particularly active. There is also other evidence to suggest that this was the case, such as the fact that the Thai authorities placed limits on the volume of their money market intervention. In contrast, the growth rate and the variability of the growth rate of broad money fell significantly in the post-reform period.

Despite the reduction in interest rates and their variability in the post-reform period in Malaysia, both the growth rate and the variability of the growth rate of reserve money fell significantly--results which are anomalous to the simple inverse relationship hypothesis between interest rates and the growth of reserve money. However, the Malaysian post-reform data period, which begins in February 1987, is the shortest in our sample. These results also highlight the importance of taking into account factors other than interest rates in the determination of the path of reserve money and the complexity of the response of monetary variables to interest rates.

Table 6. Financial Reform and the Growth Rates of Monetary Aggretates 1/

	Reserve Money				Broad Money			
	Pre-Reform	Post-Reform	Change	Test Statistics 2/	Pre-Reform	Post-Reform	Change	Test Statistics 2/
Indonesia								
Mean (percent)	19.7	16.7	-	t=1.56	28.5	24.0	-	t=3.07*
Standard deviation	13.3	7.7	-	F=2.98**	10.8	4.6	-	F=5.51**
Malaysia								
Mean (percent)	7.6	3.0	-	t=4.49**	11.6	7.4	-	t=3.21**
Standard deviation	4.9	2.8	-	F=3.06*	3.8	3.4	-	F=1.25
Philippines								
Mean (percent)	21.2	20.3	-	t=0.36	20.1	13.1	-	t=8.63**
Standard deviation	18.5	10.0	-	F=3.42**	4.8	4.2	-	F=1.31
Thailand								
Mean (percent)	11.3	13.9	+	t=2.16**	19.2	14.4	-	t=6.96**
Standard deviation	4.7	5.2	+	F=1.22	3.8	2.7	-	F=1.98*

Sources: IFS and staff estimates.

1/ Twelve-month growth rates. Note on methodology:

a. Data. Monetary observations: Reserve money as reported in IFS (line 14); broad money the sum of money and quasi-money in IFS (lines 34 + 35).

b. Tests. Standard t and F tests are carried out to check whether there have been significant shift in money growth and variability, respectively.

c. The nature and time of reform (see footnote 1c, Table 5).

2/ One asterisk indicates that the change has been significant on the 5 percent level, two asterisks on the 1 percent level.

8. Conclusions

An increasing number of developing countries have begun to operate market-based instruments of monetary policy and to use these indirect instruments more actively to achieve macroeconomic policy objectives. The decision to introduce more market-based instruments reflects a number of factors, including the desire by many countries to liberalize their markets more generally and to free them from administrative controls which have tended to inhibit the efficient allocation of resources; the ineffectiveness of direct interest rate and credit controls for macroeconomic management in the face of financial innovations and disintermediation; and the inhibiting effect of direct controls on market development and hence on savings mobilization and investment.

The developing countries in the sample are in a transitional stage of monetary reform; direct controls have been substantially abandoned by most of them, but fully fledged open market systems of monetary control have not yet emerged. In some countries the markets, institutions and expertise do not yet exist in a form to allow a full open market system of monetary policy; in others, monetary policy has been inhibited by the government's continuing large domestic financing needs and the subservience of monetary policy to fiscal considerations; and still others have been slow to use active money market management as the central instrument of monetary control. Nevertheless, most countries have developed instruments which would allow them to conduct effective control over money market interest rates or reserve money growth either through primary treasury or central bank bill auctions supplemented with a discount or rediscount type facility or through repurchase markets.

In two countries where direct controls were removed and market-oriented instruments were used actively as part of economic adjustment programs, interest rates increased and became significantly more variable, while the average growth rate and the variability of the growth rate of reserve money fell in the post-reform period. These results conform to the simple a priori expectation of what should happen when interest rates are liberalized and monetary policy is directed toward controlling monetary aggregates. In two countries, where interest rates were already free to vary to a considerable extent, the introduction of new monetary policy operating procedures stabilized short-term interest rates. However, the relationship between interest rates and monetary variables tends to be complex.

The development of instruments to manage money market rates or reserve money is only one but a catalytic element of financial reform. Institutional and policy reform also has to accompany the change in money market operating procedures to achieve efficient resource allocation and effective macroeconomic control. These reforms include a review of the intermediate targets, institutional reform to free up the structure of interest rates and to promote competition, an increase in responsiveness of borrowers to financial variables, and the development of secondary and securities markets.

Table 1. Argentina: Factors Affecting Reserve Money

(In millions of australes)

The year to December	1983	1984	1985	1986	1987
Domestic financing of the government deficit	89	356	2,857	169	1,039
Treasury bills	--	--	--	--	...
Other securities	-3	-1	-38	-200	...
Other 1/	92	357	3,895		...
Uptake of government debt by the central bank	104	294	2,046	2,592	12,263
Change in net foreign assets of central bank	-66	-338	-423	-2,270	-17,582
Change in autonomous net domestic assets of the central bank 2/	117	888	2,428	1,413	11,877
Change in the use of money market policy instruments by the central bank 3/	--	16	45	54	18
(In percent of reserve money at beginning of period)	(--)	(8.1)	(4.3)	(1.0)	(--)
Change in reserve money	155	860	4,096	1,789	6,576
(In percent)	(360.5)	(434.3)	(387.1)	(34.7)	(94.7)
Memorandum item:					
Money market interest rates (percent)					
Nominal	407.8	558.0	520.3	61.2	...
Real	63.9	-68.7	-151.8	-28.9	...

Sources: IFS, data provided by the authorities; and staff estimates.

1/ Residual.
2/ Includes refinance and rediscount facilities, loans to private and public enterprises, and other items.
3/ Participations in the central bank's holdings of government papers, issued in the form of central bank bills.

Table 2. Brazil: Factors Affecting Reserve Money

(In billions of cruzados)

Year to December	1983	1984	1985	1986	1987
Domestic financing of the government deficit 1/	26.1	89.6	390.9	442.7	4,035.7
Treasury bills	-0.2	0.2	-0.3	0.9	-0.9
Other securities	3.6	29.0	142.7	68.2	949.7
Other 2/	22.7	60.4	248.5	373.6	3,086.9
Uptake of government debt by monetary authorities 3/	12.9	21.3	107.0	401.6	1,177.8
Change in net foreign assets of the monetary authorities 4/	-1.9	-13.5	-18.0	-72.4	70.0
Change in autonomous net domestic assets of the central bank 5/	-9.5	1.4	-56.3	6.7	...
Change in the use of money market instruments by the central bank	--	--	--	-202.5	...
(In percent of reserve money at beginning of period)	(--)	(--)	(--)	(-387.9)	(...)
Change in reserve money	1.5	9.2	32.7	133.4	324.6
(In percent)	(79.8)	(264.1)	(257.3)	(293.5)	(181.5)
Memorandum:					
Money market interest rates (percent) 6/					
Nominal	58.0	190.2	231.7	150.6	195.4
Real	-79.1	-4.8	6.8	-19.0	-27.1

Sources: IFS, data provided by the authorities, and staff estimates.

1/ Nonfinancial public sector.
2/ Residual.
3/ Includes operations in treasury bills for monetary control purposes.
4/ On a transaction basis; i.e., excluding valuation changes.
5/ Includes refinance and rediscount facilities, loans to private enterprises, and other items.
6/ Bank rate.

Table 3. Indonesia: Factors Affecting Reserve Money

(In billions of rupiahs)

Year to March	1984	1985	1986	1987	1988
Domestic financing of the government deficit	-1,775	-3,004	909	298	100
Uptake of government debt by the central bank	-1,475	-2,703	1,051	-102	...
Change in net foreign assets of central bank 1/	2,113	1,513	-1,266	-2,006	1,242
Change in autonomous net domestic assets of the central bank 2/	670	1,680	1,724	1,906	...
Of which: Liquidity credits	(157)	(2,502)	(954)	(1,175)	(...)
Change in the use of money market instruments by the central bank	-45	7	212	641	48
(In percent of reserve money at beginning of period)	(-1.1)	(0.1)	(3.6)	(8.5)	(0.6)
SBIs 3/ outstanding	-45	-198	-1,151	1,233	-649
SBIs 3/ rediscounted	--	--	946	-905	...
SBPUs 4/ rediscounted	--	205	417	313	...
Change in reserve money	1,263	497	1,721	439	1,115
(In percent)	(31.0)	(9.3)	(29.5)	(5.8)	(14.0)
Memorandum:					
Money market interest rates (percent)					
Nominal	6.0	16.0	18.0	16.0	16.8
Real	-5.8	5.5	13.3	10.2	7.5

Sources: Data provided by the authorities, and staff estimates.

1/ On a transactions basis; i.e., excluding valuation changes.
2/ Includes refinance and rediscount facilities, loans to private and public enterprises, and other items.
3/ Central bank certificates.
4/ Private sector money market papers.

Table 4. Kenya: Factors Affecting Reserve Money

(In millions of shillings)

Year to June	1983	1984	1985	1986	1987
Domestic financing of the government deficit	1,577	3,035	3,625	6,783	8,883
Treasury bills	...	1,922	2,544	6,310	2,471
Other securities	...	151	269	724	2,902
Other 1/	...	962	812	-251	3,510
Uptake of government debt by the central bank 2/	-784	699	943	955	4,122
Change in net foreign assets of central bank 3/	864	753	-721	-125	-176
Change in autonomous net domestic assets of the central bank 4/	204	-234	-44	246	-721
Change in the use of money market instruments by the central bank	--	--	--	--	--
(In percent of reserve money at beginning of period)	(--)	(--)	(--)	(--)	(--)
Change in reserve money	284	1,218	178	1,076	3,225
(In percent)	(6.6)	(26.4)	(3.1)	(17.9)	(45.6)
Memorandum:					
Money market interest rates (percent) 5/					
Nominal	15.8	14.4	14.0	14.0	14.0
Real	4.3	4.2	0.9	10.0	8.8

Sources: IFS, data provided by the authorities, and staff estimates.

1/ Residual.
2/ Including treasury certificates used for monetary control purposes.
3/ Including valuation changes.
4/ Includes refinance and discount facilities, loans to private and public enterprises, and other items.
5/ Treasury bill rate.

Table 5. Malaysia: Factors Affecting Reserve Money

(In billions of ringgit)

Year to December	1984	1985	1986	1987
Domestic financing of the government deficit	1.8	3.3	5.9	9.2
Treasury bills	--	--	0.2	1.0
Other securities	3.1	3.6	4.6	7.5
Other 1/	-1.3	-0.3	1.1	0.7
Uptake of government debt by the central bank 2/	0.9	-0.8	-0.3	-0.4
Change in net foreign assets of central bank 3/	0.3	3.3	4.3	2.9
Change in autonomous net domestic assets of the central bank 4/	...	-3.9	-2.3	2.7
(Of which: Refinance and rediscount facilities)	(...)	(0.1)	(-0.1)	(1.3)
Change in the use of money market instruments by the central bank	...	1.5	-1.2	-4.7
(In percent of reserve money at beginning of period)	(...)	(16.7)	(-12.4)	(-46.4)
Foreign exchange swaps	...	0.6	0.7	-2.2
Recycled government deposits	...	1.0	-2.6	-1.6
Government securities	...	-0.1	0.7	-0.1
Central bank certificates	...	--	--	-0.8
Change in reserve money	0.4	0.1	0.5	0.5
(In percent)	(3.7)	(7.6)	(4.2)	(5.2)
Memorandum:				
Money market interest rates (percent)				
Nominal	9.5	7.6	8.0	3.3
Real	5.6	7.2	7.3	2.2

Sources: Data provided by the authorities, and staff estimates.

1/ Residual.
2/ Includes recycled government deposits and government securities used for monetary control purposes.
3/ On a transaction basis, i.e., excluding valuation changes.
4/ Includes refinance and discount facilities, loans to private and public enterprises, and other items.

Table 6. Mexico: Factors Affecting Reserve Money

(In billions of Mexican pesos)

Year to December	1983	1984	1985	1986	1987
Domestic financing of the government deficit 1/	824	1,508	4,097	11,120	...
Treasury certificates (CETES)	...	137	1,530	5,749	...
Other securities	...	1,199	-595	-1,635	...
Other 2/	...	172	3,162	7,006	...
Uptake of government debt by the central bank 3/	755	757	1,900	4,176	...
Change in net foreign assets of central bank 4/	661	503	-874	-673	. .
Change in autonomous net domestic assets of the central bank 5/	-259	394	-199	-765	...
Change in the use of money market instruments by the central bank 6/	-951	-1,158	-135	-1,100	-1,173
(In percent of reserve money at beginning of period)	(-156.4)	(-142.3)	(-10.3)	(-54.9)	(32.2)
Change in reserve money	206	496	692	1,638	4,785
(In percent)	(33.9)	(60.9)	(52.8)	(81.8)	(131.5)
Memorandum:					
Money market interest rates (percent)					
Nominal	...	49.9	62.4	88.4	95.6
Real	...	-16.4	4.8	4.0	-33.3

Sources: IFS, data provided by the authorities, and staff estimates.

1/ Public sector.
2/ Residual.
3/ Includes CETES used for monetary control purposes.
4/ On a transaction basis, i.e., excluding valuation changes.
5/ Includes refinance and discount facilities, loans to private enterprises, and other items.
6/ Fixed deposits with or placements by the central bank.

Table 7. Philippines: Factors Affecting Reserve Money

(In billions of pesos)

Year to December	1983	1984	1985	1986	1987
Domestic financing of the government deficit (PSBR)	2.0	8.1	11.5	27.7	13.5
Treasury bills	...	...	...	...	50.5
Other securities	...	...	...	...	3.6
Other 1/	...	...	...	...	-41.3
Uptake of government debt by the central bank 2/	...	-1.1	5.4	0.3	-9.4
Change in net foreign assets of central bank 3/	4.7	-0.3	0.5	-18.8	-3.9
Change in autonomous net domestic assets of the central bank 4/	...	16.6	17.0	34.7	24.6
(Of which: Lending to financial institutions and rediscounting)	(...)	(1.6)	(2.7)	(-1.4)	(2.4)
Change in the use of money market instruments by the central bank 5/	...	-9.5	-18.3	-4.2	-4.7
(In percent of reserve money at beginning of period)	(...)	(-34.3)	(-54.8)	(-11.1)	(-8.8)
Change in reserve money	9.4	5.7	4.6	12.0	6.9
(In percent)	(47.6)	(20.5)	(13.8)	(31.6)	(13.8)
Memorandum:					
Money market interest rates (percent) 6/					
Nominal	19.2	28.2	28.6	17.5	13.3
Real	9.3	-21.7	3.8	16.8	9.5

Sources: Data provided by the authorities, and staff estimates.

1/ Residual.
2/ Including the government's fixed deposits with the central bank, associated with the issuance of treasury bills.
3/ On a transactions basis, i.e., excluding valuation changes.
4/ Includes refinance and rediscount facilities, loans to private and public enterprises, and other items.
5/ Repurchases/reverse repurchases, operations in central bank papers and treasury securities.
6/ Treasury bill rate.

Table 8. Sri Lanka: Factors Affecting Reserve Money

(In millions of rupiahs)

Year to December	1983	1984	1985	1986	1987
Domestic financing of the government deficit	6,534	3,991	8,569	9,143	11,355
Treasury bills	80	-2,540	7,420	3,893	3,677
Other securities 1/	3,121	3,053	6,369	3,693	6,673
Other 2/	3,333	3,478	-5,220	1,557	1,005
Uptake of government debt by the central bank 3/	577	-3,730	6,735	2,495	786
Change in net foreign assets of central bank 4/	367	7,228	-1,549	-1,067	-2,047
Change in autonomous net domestic assets of the central bank 5/	1,579	-1,013	-1,252	1,148	-81
Change in the use of money market instruments by the central bank 6/	--	-415	-750	-1,439	2,584
(In percent of reserve money at beginning of period)	(--)	(-1.2)	(-5.5)	(-8.5)	(14.3)
Change in reserve money	2,523	2,070	3,184	1,137	1,242
(In percent)	(27.7)	(17.8)	(23.3)	(6.7)	(6.9)
Memorandum:					
Money market interest rates 7/					
Nominal	12.4	13.1	13.4	10.5	7.3
Real	-1.5	-3.8	11.9	2.5	-0.4

Sources: Data provided by the authorities, and staff estimates.

1/ Net of debt sinking fund.
2/ Residual.
3/ Includes operations in treasury bills for monetary control purposes.
4/ On a transactions basis, i.e., excluding valuation changes.
5/ Includes refinance and discount facilities, loans to private and public enterprises, and other items.
6/ Central bank securities.
7/ Treasury bill rate.

Table 9. Thailand: Factors Affecting Reserve Money

(In billions of baht)

Year to December	1984	1985	1986	1987
Domestic financing of the government deficit 1/	26.0	39.2	40.0	29.0
Treasury bills	--	--	--	--
Central bank	(-4.3)	(-0.3)	(-0.3)	(-2.6)
Other	(4.3)	(0.3)	(0.3)	(2.6)
Other	26.0	39.2	40.0	29.0
Uptake of government debt by the central bank	-4.5	8.6	-9.3	-6.1
Change in net foreign assets of the central bank 2/	10.2	-7.0	24.9	31.6
Change in autonomous net domestic assets of the central bank 3/	-1.5	5.2	-3.9	4.9
Change in the use of money market instruments by the central bank	--	--	-1.9	-10.1
(In percent of reserve money at beginning of period)	(--)	(--)	(-2.2)	(-10.5)
Bank of Thailand bonds	--	--	--	-- 4/
Repurchase agreements in government bonds	--	--	-1.9	-10.1
Change in reserve money	4.2	6.8	9.8	20.3
(In percent)	(5.6)	(8.5)	(11.3)	(21.1)
Money market interest rates (percent)				
Nominal	13.6	13.5	8.1	5.9
Real	12.7	11.1	6.2	1.5

Sources: IFS, data provided by the authorities, and staff estimates.

1/ On a fiscal year basis, i.e., the year ending in September.
2/ On a transactions basis, i.e., excluding valuation changes.
3/ Includes refinance and rediscount facilities, loans to private and public enterprises, and other items.
4/ Outstanding amount was 2.0 billion baht in the period June-October 1987.

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