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Implications of a Surge in Capital Inflows: Available Tools and
Consequences for the Conduct of Monetary Policy

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Abstract

This paper seeks to extend discussion of monetary policy instruments to the situation of a country faced with major capital inflows when the process of domestic financial liberalization is incomplete. It briefly summarizes the recent usage of traditional monetary instruments, discusses the practical limits to classic sterilization measures as well as the pros and cons of using other supplementary measures including tax-based controls on capital inflows. It also examines the efficacy of such measures in Chile, Colombia, Indonesia, Korea, Spain, and Thailand. The conclusion is that, for a time and as a transitional measure, a country may find it opportune to supplement the traditional instruments with certain "belt and braces" measures including, in some instances, indirect (tax-based) capital controls.

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Summary

As many developing countries have discovered in recent years, the monetary authorities are not always well prepared to deal with potentially destabilizing capital inflows. This paper seeks to extend the discussion of monetary policy instruments by considering the case of a country facing major capital inflows when its domestic financial liberalization is incomplete.

The paper argues that sterilization policy can be temporarily effective but that there are practical limits to its use. The scope for classic open-market operations, for example, can be severely restricted by the underdeveloped state of financial markets and by the fiscal costs that these operations entail. A country may find it opportune to supplement traditional monetary instruments with other sterilization instruments or less traditional measures, including judicious use of direct controls on capital inflows. Altering access to the central bank's refinance facility, recycling government deposits between commercial banks and the central bank, and using foreign currency swap operations are examples of such supplementary sterilization measures. Less traditional measures include a wider-band exchange rate policy, forward exchange market intervention, and forms of exchange controls such as variable deposit requirements (VDRs) and an interest equalization tax (IET) on foreign borrowings. This paper discusses the pros and cons of using these supplementary measures and examines their efficacy in Chile, Colombia, Indonesia, Korea, Spain, and Thailand.

The conclusion is that supplementary measures do serve to some extent to mitigate the side effects of capital inflows. Exchange controls appear also to have some merit, particularly when such measures are imposed in the less distorting form of a tax rather than as an outright quantitative restriction. Some of their value appears to lie in their increasing the scope for sterilizing the effects of inflows on the rate of domestic monetary expansion and in their offsetting some of the quasi-fiscal cost of other, large-scale sterilization operations. Thus, even in the absence of a significant quantitative impact on capital movements, use of such instruments may be warranted.

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I. Introduction

As witnessed by many developing countries in recent years, one of the most welcome and yet most worrisome macroeconomic developments has been the surge in capital inflows. While potentially contributing to higher investment and economic growth through an easing of the external financing constraint, the typical adverse side effects of the capital inflows--often exacerbated by unexpected timing and magnitude--include an incipient tendency for the local currency to appreciate, inflationary pressure emanating from the build-up of the central bank's foreign exchange reserves and associated expansion of the monetary base, heightened speculative activity on local asset markets, and possible disruption associated with sudden reversal of inflows. In addition, these inflows typically burden the monetary authorities with difficult choices over conflicting policy objectives and an equally challenging task of maintaining monetary control in a new, liberalized environment.

The monetary authorities in developing countries are not always well prepared to deal with the side effects of destabilizing capital inflows. All too often, the central banks in these financially semi-open economies are neither independent enough to initiate the most appropriate policy response, nor do they have adequate policy instruments to use in the pursuit of their goals. For example, a large surplus in the overall balance of payments--due primarily to capital account transactions--can induce a conflict between the need to maintain a stable exchange rate for reasons of promoting export competitiveness and the need to allow some exchange appreciation for reasons of promoting domestic price stability. In the event that the conflict is resolved in favor of preserving export competitiveness, the central bank may be poorly equipped to effect the sterilization of the capital flows that would be needed to preserve its inflation objective. However, even in situations where price stability prevails as the primary policy objective of monetary policy, a dilemma can be faced by the central bank since the traditional tools of direct monetary control can become ineffective in a liberalizing environment, and it cannot yet exercise or fully employ advanced instruments of indirect monetary control such as open-market operations, because various supporting institutional modalities are unfulfilled. 1/

While the appropriate policy response to a surge in capital inflows has been extensively discussed and analyzed, the subject of operational implementation has received less attention. 2/ Moreover, there has been relatively little focus on the implementation of monetary policy in the specific context of the "second best" world described in the preceding paragraph. In this latter regard, analysis has focused largely on the situation of a domestic financial sector liberalization in which capital

1/ See Alexander, Baliño, and Enoch (1995).

2/ On the appropriate policy response, see Schadler, Carkovic, Bennett, and Kahn (1993). For a discussion of some of the technical aspects of sterilizing capital inflows, see Marston (1995).

inflows are not treated as a primary complicating factor. In such circumstances, a combination of direct controls and indirect instruments of monetary policy, a so-called belts and braces strategy is considered to be both feasible and desirable. 1/ Although such a strategy would presume the intention to move progressively to a point where there could be exclusive reliance on (first best) indirect instruments of monetary policy, it explicitly recognizes that there may be a transitional period when the use of (some) direct controls can be effective.

The present paper seeks to extend discussion of monetary policy instruments to the situation of a country faced with major capital inflows when the process of domestic financial liberalization is incomplete. It abstracts from the question of the need to adjust policies other than monetary policy (for instance, fiscal, exchange rate, and trade policies), 2/ and assumes that the authorities have decided to sterilize the capital inflows or seek ways to turn them aside. 3/ This raises three important questions for the monetary authorities: Is sterilization a viable strategy? If so, what are the practical limits to its use? Can the scope for sterilization be expanded or its costs reduced through new or unconventional instruments? The paper seeks to answer these questions.

Broadly speaking, an affirmative response can be given to all questions: there is evidence that sterilization can be effective for a time, there are practical limits to its use, and new instruments can be designed to supplement conventional sterilization techniques. Analogous to the "belts and braces" prescription in the context of domestic financial sector liberalization and consistent with it, the thrust of this paper is that, for a time and as a transitional measure, a country may find it opportune to supplement traditional monetary instruments with less traditional measures, including in some instances direct controls on capital inflows. It argues that, particularly when such measures are imposed in the less distorting form of a tax rather than as an outright quantitative restriction, there is evidence that they do serve to some extent to mitigate capital inflows. That said, some of their value appears to lie in increasing the scope for sterilizing the effects of inflows on the rate of domestic monetary expansion and in offsetting some of the quasi-fiscal cost of other, large-scale sterilization operations. Thus, even in the absence of a significant quantitative impact on capital movements, use of such instruments may be warranted.

1/ See Alexander, Baliño, and Enoch (1995) for details.

2/ See Schadler et. al. (1993) for a discussion.

3/ Regardless of whether or not other policy settings ultimately are adjusted, the usual initial response is to use sterilization to "buy time" for at least as long as it takes to identify and assess the nature of the inflows.

The next section of the paper presents an overview of the experience of six countries which have had to deal with large and sustained capital inflows (Chile, Columbia, Indonesia, Korea, Spain, and Thailand). Drawing on this experience, Section III discusses the practical limits to sterilization policy, noting in particular its effect in raising domestic interest rates and the high quasi-fiscal costs which sterilization typically entails. Section IV then discusses the use of supplementary sterilization techniques, including foreign currency swaps and the shifting of government deposits between the commercial banks and the central bank, as well as certain "belts and braces" measures including indirect capital controls such as the variable deposit requirement (VDR) and the interest equalization tax (IET), the scope for direct forward market intervention, and the introduction of wider fluctuation bands in the spot foreign exchange market. Section V presents empirical evidence on the effectiveness of both sterilization broadly defined and on particular controls on capital inflows. A final section offers concluding remarks.

II. An Overview of Country Experience

It is useful to summarize some of the major aspects of the recent surges in capital inflows to developing countries. 1/ By examining the experiences of five countries, it is revealed that in most cases the timing of the surge in inflows coincided with an acceleration in the pace of financial liberalization and market opening that either allowed foreign ownership of domestic assets (Korea and Spain), or, if the capital account was already open, reduced taxes on some forms of investments by nonresidents (Thailand). In some cases, there also was a tightening of domestic monetary or credit policies before the onset of the episode, which led to a wide national interest rate differential in favor of domestic capital markets (Chile, Colombia and Thailand). 2/ In such cases, the variation of the magnitude of the capital flows followed, albeit with a lag, fairly close to movements of the interest rate differential. (See individual country charts of the time-series plots in Appendix I.) It should also be mentioned that, in several cases, an expectation of exchange rate appreciation or at least a stable exchange rate on the horizon, especially in countries with a less-than-fully floating exchange rate system, served to reduce the forward

1/ See Appendix I for a detailed case study discussion of such experiences in Chile, Colombia, Indonesia, Korea, Spain, and Thailand.

2/ In addition, the external factors, particularly a decline in interest rates in the United States in the early 1990s, played an important role behind the capital inflows. See Calvo, Leiderman and Reinhart (1993) for detailed discussion.

discount. 1/ This increased the covered interest differential for a given level of domestic and overseas interest rates, and contributed further to the increase in foreign capital inflows (Chile, Korea, Malaysia and Thailand). 2/ In retrospect, therefore, it appears that all of these countries were faced with shocks whose effects were likely to be both large and durable.

With regard to policy responses, these had to be taken before the non-temporary nature of the shock could be determined. The monetary authorities of all six countries initially resorted to some form of sterilized intervention, which was based primarily on open-market-type operations in domestic bond markets (e.g., government securities or central bank papers). Also, open-market sales were in some instances accompanied by increases in reserve requirements or tightened access to the central bank refinancing facility (Colombia and Korea).

Whether these instruments were completely or for long effective in sterilizing the sharp increase in foreign exchange reserves is debatable. Even when effective, the instruments could not be applied continuously as the outstanding stock of open-market bills rose sharply in most countries during the inflow episode. 3/ Moreover, the size of the open-market sales for sterilization purposes was limited by the absorptive capacity of the domestic economy and especially by the stage of development of local securities markets. Where such markets were thin and illiquid, open-market operations could not be continuously relied on as the main instrument of monetary policy. Besides, the operations proved to be extremely costly for the central banks in terms of the loss in operating incomes, as well as frustrating as their use resulted in higher domestic interest rates which attracted additional capital inflows. Thus, most of the countries gradually stopped using open-market sales in their sterilization operations. 4/

1/ The forward discount is defined as:

$$d = (F - S) / S$$

where F and S denote forward and spot market exchange rates, respectively, expressed in local currency price of a unit of foreign currency. Using this term, the covered interest differential (CID) can be expressed as:

$$CID = R_d - (R_f + d)$$

where R_d and R_f denote domestic and overseas interest rates.

2/ The reason for this exchange rate expectation reflected the prevailing rigidity in exchange rate policy, that is, the value of domestic currencies had either been repressed or, even when allowed to reflect market forces, had been allowed to appreciate only marginally on a sustained basis, thus providing one-way bets for speculators.

3/ In some cases, placement of open-market bills became quite heavy: for example, it amounted to 85-95 percent of the monetary base in Chile. For additional details, see also IMF (1995c).

4/ The Chilean authorities, however, have continued to sell significant amounts of central bank paper following the first episode of capital inflow (1990).

Subsequently, the authorities in these countries began to supplement their initial response with changes in underlying policies, such as fiscal adjustment (Thailand), an easing of restrictions on capital outflows (Chile, Colombia, and Spain), an acceleration of trade liberalization (Colombia and Korea), and a more flexible exchange rate policy that allowed for nominal appreciation (Chile, and Spain). 1/ Some countries introduced more novel sterilization measures, such as swap operations in the foreign exchange market (Indonesia) or adjustment of government deposits (Thailand). Many sought to combine the (first-best) indirect instruments of monetary policy with some direct controls on capital inflows, although some controls were more in indirect forms. The variable deposit requirement (VDR) imposed on certain categories of foreign borrowings was the most common form of such controls (Chile, Colombia, and Spain), while other countries used an interest rate equalization tax (IET) to influence the relative rate of return on inward investment (Brazil).

III. The Practical Limits to Sterilization

The foregoing section strongly suggests that there are factors which limit the use of sterilization procedures, particularly when they are conducted through classic open-market operations. 2/ It would be desirable, therefore, to seek techniques and instruments which could expand the scope of effective sterilization operations. In order to do so, it is helpful to consider the principal factors which do limit the effective range of open-market operations. These can then be taken into account in the design and selection of supplementary instruments and techniques.

There are four key limitations on the use of open-market sales for sterilization purposes. First, the ability to sterilize capital inflows is inversely related to the degree of international capital mobility. When capital is highly mobile internationally, sterilization becomes an essentially futile exercise because the sterilization efforts are quickly overwhelmed by continuing inflows. 3/ In the limit when capital is perfectly mobile, sterilization is completely ineffective. The extent of capital mobility is, however, an empirical question and, based on the evidence provided below, most developing countries appear to have at least some scope for effective sterilization operations. 4/ The authorities need to have a clear idea of the extent to which a particular sterilization operation will be "offset," prior to commencing operations, in order to set realistic objectives for the exercise.

1/ See Schadler, et. al. (1993), for detailed discussion of the these policy responses.

2/ See also Marston (1995).

3/ See Calvo (1991), Calvo, Leiderman, Reinhart (1993) and Reisen (1993).

4/ See section VI for the empirical evidence on the "offset coefficients".

Second, sterilization policy fundamentally cannot work for long when shocks are durable because sterilization seeks to deal with effect rather than with underlying cause of the shocks. As shown in the country case studies, unless the underlying cause is treated, the capital flows will eventually exceed the sterilization capacity of the authorities. In these circumstances, sterilization can still be useful as a temporary measure to be employed until the primary cause of the inflows can be identified and more fundamental policy measures can be implemented.

Third, particularly for developing countries engaged in a process of financial sector reform, the scope for classical open-market operations can be severely restricted by the underdeveloped state of financial markets and by the fiscal costs which these operations entail:

- The sterilization instruments (e.g., treasury bills, central bank paper) may be an imperfect substitute for the financial assets which (foreign) investors wish to hold (e.g., stocks, bonds). This implies that, if the degree of substitutability is low, sterilization efforts will push up interest rates on the sterilization instrument, while prices of the preferred asset (which is in limited supply) will continue to rise, altering the total return more in favor of domestic assets. 1/ The result is that further capital inflows are encouraged as more domestic firms are induced to borrow abroad and as yield-seeking nonresident inflows accelerate in response to the perceived increase in total returns. In addition, the fiscal costs of sterilization operations are further exacerbated, particularly when the outstanding stock of government debt is mostly short-term or indexed to the short-term market rate of interest;

- The authorities' sterilization capacity is often limited by inadequate supply of the marketable instruments, particularly in those countries where prudent fiscal policies were pursued in the past. Also, in countries where the sterilization instruments have only short-term maturities, the open-market sales of longer-term instruments cannot be effectively used (Colombia); 2/ and

- The scale of open-market sales can be limited by the inadequate conditions of the local money/capital markets, i.e., by thin and segmented markets. 3/ In particular, those developing countries which already had engaged in a series of open-market sales before the onset of the inflow episode may find it extremely difficult to place additional open-market securities at a reasonable cost, simply because the capacity of the local financial markets has been exhausted.

1/ Domestic interest rates may also rise as sterilization raises domestic bond holdings relative to money holdings in the private sector's portfolio.

2/ In these circumstances, the authorities need to roll over the maturing stocks of the short-term instruments.

3/ Even when the financial markets are deep and active, the authorities may not be able to sterilize the capital inflows on a sustained basis.

Finally, heavy fiscal costs may eventually curtail sterilization operations:

- A large stock of outstanding bills, which results from extended heavy placement of bills, often places a heavy debt-service burden on the government or the central bank, leading to a deterioration in the fiscal or quasi-fiscal position (Chile and Colombia). 1/ The negative implications of the fiscal cost also stem from the fact that the rate of return on the portfolio taken over by the authorities--to be invested in foreign assets that command prevailing world market interest rates--is normally lower than those on the portfolio sold to the public; and

- These costs may also lead to operating losses at the central bank, which could force the central bank to compromise its independence in monetary policy, or when accumulated, may require the recapitalization of the central bank.

Finally, the heavy placement of open-market securities, by building up the central bank's (or treasury's) balance sheet, may expose the authorities to a larger credit risk and thus make them more vulnerable to the capital flow reversal. This possibility becomes more distinct when the capital inflows are composed primarily of short-term portfolio investment, because they are more reversible than foreign direct investment. 2/

IV. Supplementary Measures

The discussion so far suggests that it may be necessary to use open-market operations in combination with other sterilization measures or some more direct controls on capital inflows, when there are persistently large capital inflows. 3/ This section will first discuss various forms of supplementary sterilization measures as potentially useful means to achieve the sterilization goals under the condition of an open capital account. Then, the discussion of other less traditional measures will follow.

1. Supplementary sterilization measures

In a situation where the use of open-market operations has not been fully developed as the principal instrument of monetary control, a central

1/ The deterioration in the quasi-fiscal position of the central bank was most notable in the case of Colombia, where the position changed from near equilibrium to a deficit of about 0.8 percent of GDP in 1991.

2/ The use of short-term bonds for sterilization purposes increases the vulnerability to the risk of sudden reversals of capital flows.

3/ It is worth repeating that this paper assumes that the authorities have decided (rightly or wrongly) to seek to sterilize the inflows. It abstracts from the more fundamental problem of deciding when a change in underlying policy is required.

bank necessarily employs other instruments to expand and contract the monetary base. Typically, achievement of a particular rate of monetary expansion will be programmed to rely on the growth of a number of different components of its balance sheet. In this case, rather than using open-market sales of market instruments to effect the sterilization, the authorities can achieve the same effect by cutting back on the programmed increases in some of these other components of its balance sheet.

The possibility of avoiding a high interest rate volatility provides another justification for the use of other sterilization instruments. An appropriate mix of indirect instruments, by allowing the interest cost of sterilization to be spread over several markets, enables the authorities to achieve the desired reserve effect without causing a sharp increase in domestic interest rates and the resultant capital inflows. The stable interest rates can also contribute to the overall development of financial markets. Therefore, even when the use of open market operations has been fully developed, the central bank often needs other supplementary instruments for efficient implementation of policy.

a. Discount policy and directed lending

As a supplementary means to contract the monetary base, the central bank could curtail programmed lending to commercial banks, either directly by restricting access, or indirectly by increasing the cost of central bank credit.

However, unlike advanced industrial countries, the discount windows of central banks in many developing countries which have not completed the transition to indirect methods of monetary control cannot be expected to play a prominent role as a flexible policy instrument. In many cases, most of the rediscounts and loans granted by the central banks are mere automatic rediscount of priority loans extended by commercial banks, often specialized banks, to enterprises in certain target sectors. In this case, the rediscount ratio--the ratio of the central bank's rediscount to the face value of eligible securities (e.g., commercial bills issued by eligible enterprises)--can be adjusted, but it cannot be adjusted often, because the result would be contrary to the intent of the instrument, namely to supply credits to the commercial banks against their participation in priority loans. The limited scope for using the rediscount facilities as a policy instrument stems also from the implicit subsidies contained in the artificially-set low levels of rediscount rates. These, too, can be adjusted, but, unless these subsidy components are fully eliminated, the

rediscount facilities cannot be relied on as a flexible instrument. 1/ In some countries where interest rates are not fully liberalized, the central bank can be loathe to adjust the rediscount rates aggressively, because the interest rate elasticity of the demand for credit by the private sector is low. Thus, they are often reluctant to implement the sharp increase in the discount rate which would be required to generate an appreciable monetary effect. 2/

There are other important advantages and disadvantages to the use of a restrictive discount policy as a supplementary means to sterilize the monetary impact of capital inflows:

- As compared to the open market operations, the restrictive discount policy involves a smaller fiscal cost, mainly because the interest rate on refinance standing facilities in most developing countries is lower than the market interest rates. 3/ Also, the reduction in the volume of rediscount may improve the fiscal or quasi-fiscal position of the central bank to the extent that the subsidized portion of the directed credit is reduced; 4/

1/ The rigidity of the refinancing facilities can best be exemplified by the Korean experience. The Bank of Korea has supplied credits to commercial banks either by rediscounting commercial bills issued by eligible enterprises or by extending loans to the banks against their participation in a few types of "policy loans," i.e., loans to small- and medium-sized firms and equipment loans to export industries. These rediscounts and loans were granted at below market rates, with the spread between the discount rate and the money market rate often reaching in the range of 5-7 percentage points per annum. When Korea saw the large build-up of official reserves through current account surplus in 1988, the Bank of Korea reluctantly raised the rediscount rates from 7 to 8 percent, but only for the trade bills and commercial bills. Despite the consensus among some policy makers on the urgent need to neutralize the monetary impact of the rapidly increasing current account surplus, all the other rediscount rates were left unchanged, because the subsidy aspect of the rediscount facilities was more emphasized.

2/ Also in some countries, the link between short-term lending rates of financial institutions and official discount rate is weak, and the authorities tend to influence lending rates through money market operations rather than changing the official discount rate (e.g., Japan).

3/ However, central banks in most industrial countries use other channels to allocate the central bank credit, such as an overdraft facility or a credit auction. In such cases, a market interest rate or a penalty rate is charged, and the reduction in the volume of rediscount would entail a bigger fiscal cost.

4/ Indonesia, for example, made the 60 percent of subsidized "liquidity" credit (the central bank refinancing) ineligible for renewal in 1983.

- The use of this instrument may have smaller impact on market interest rates, because, unlike the open market operations, the use of the rediscount facilities can be reduced without going through local money/capital markets, at least in the short run. Interestingly, the weak link between the official discount rate and the short-term bank lending rates, which is often observed in some countries, can be viewed as an advantage because it means that the sterilization objective can be achieved without raising domestic interest rates and, thus, without inviting additional inflows; and

- The scale of the sterilization operations through the use of this instrument is limited by the size of the planned increase in this particular item in the central bank's balance sheet.

b. Reserve requirements

It is well known that an increase in the statutory reserve requirement on commercial banks' deposits reduces the money multiplier and thereby limits the credit expansion caused by monetary injections deriving from capital inflows. Indeed, some countries have raised reserve requirements on bank deposits sharply in order to sterilize the monetary impact of the capital inflows (Colombia and Malaysia). ^{1/}

Basically, there are two types of reserve requirement: (i) remunerated reserve requirement; and (ii) unremunerated reserve requirement.

The *remunerated* reserve requirement can be adopted in a situation where the authorities' primary concern is to avoid the disintermediation that would occur as a result of the high interest rate spread charged by commercial banks. In terms of its monetary impact, an increase in remunerated reserve requirement works in the same way as an open-market sale of sterilization bonds. The substantive difference is that the target of the reserve requirement policy is more directed at a subset of economic agents, i.e., the commercial banks which are subject to the reserve requirement, and their participation is involuntary. In terms of the cost of operations, both instruments have the same negative implications for the fiscal or quasi-fiscal position of the central bank.

The use of the *unremunerated* reserve requirement, on the other hand, can increase central bank profits by increasing noninterest-bearing liabilities. Thus, when combined with open-market operations, an increase in the unremunerated reserve requirement can help offset the quasi-fiscal cost of the sterilization operations. This instrument, however, should be

^{1/} The Colombian authorities introduced a 100 percent marginal reserve requirement on all new deposits with the financial system, when the country experienced a sharp increase in international reserves in 1991.

employed cautiously, because banks may pass on the burden of the implicit tax to their customer in the form of high lending rates and further increase inflows in the form of offshore borrowing. 1/

In practice, the use of reserve requirements has the following limitations. First, a change in the reserve requirement ratio is less binding when banks already hold reserve assets in excess of the statutory reserve requirement. 2/ Second, the extent to which it can be relied on may be further limited by the presence of "weak" problem banks in the banking system, as is often the case with many developing countries. Beside the typical operational inefficiencies, the low profitability of commercial banks in these countries is often exacerbated by the central bank's unwillingness to pay interest on required reserves. 3/ Third, raising the reserve requirement ratios may not be a feasible option if the existing required reserve ratios are already at a fairly high level, possibly on account of the previous sterilization efforts (Colombia and Korea). In this case, increasing the reserve requirements would certainly lead to financial disintermediation. 4/ Fourth, the central bank may have only limited capacity to monitor banks' compliance and to control supply of eligible reserve assets. Thus, it may be difficult to enforce high and frequently changing reserve requirements. Fifth, even when the central banks have the necessary capacity, the reserve requirement is unlikely to be a convenient tool for short-term liquidity management, as frequent changes in the reserve requirement can disrupt banks' efficient management of their portfolios. 5/

Finally, it sends the wrong signal regarding the authorities' reform intentions. Indeed, in most developing countries that are engaged in the

1/ If the banks choose to lower their deposit rates, the inflows could be discouraged. However, there is little empirical evidence to support this argument. See IMF (1995b) for details.

2/ When the level of bank liquidity is high and rising, as in times of the rapidly increasing balance-of-payments surplus, the secondary liquidity asset ratio (LAR) could be increased as an alternative instrument of monetary policy: this could be used to create an "artificial" demand for "permissible" securities (e.g., treasury bills), which would help reduce the quasi-fiscal cost of open market operations. However, the use of a LAR for monetary policy purpose has serious side-effects, such as a distortion in interest rate structure and a lower profit of the financial sector. See Gulde (1995) for detailed discussion.

3/ Also, banks in these countries often hold large excess reserves for structural or precautionary reasons, as offset to an inefficient clearing and settlement arrangement, for example.

4/ On the other hand, the high reserve requirements would become costly to the central banks, if the authorities decide to pay interest on the required reserves (Colombia).

5/ See Alexander, Baliño, and Enoch (1995) for the discussions on other disadvantages of reserve requirement.

process of financial sector reform, changes in reserve requirements have not played a prominent role as a monetary instrument, mainly because the use of the compulsory reserve requirements is regarded as somewhat inconsistent with their intention to move progressively towards a "liberal" system of monetary control (Argentina and Mexico). Moreover, the authorities have increasingly recognized that unremunerated reserve requirements (or remunerated, but at below market rates) are a tax on the banking system, causing financial disintermediation. They thereby eventually weaken monetary control as the share of deposits not controlled by the central bank will rise. 1/

c. Government deposits

It is also well known that the "recycling" of government deposits between commercial banks and the central bank can give the central bank important leverage over bank reserves. 2/ For example, the shifting of public sector deposits (or pension funds) from the banking system to the central bank absorbs liquidity in the banking system. Indeed, this action generates an effect which is similar to that of liquidity-draining open-market operations. 3/ Several developing countries have used this instrument, 4/ and where such deposits account for a significant portion of the banking system's total deposit base, the instrument has proved to be an effective sterilization device to deal with capital inflows (Malaysia and Thailand).

One of the main attractions of this instrument is that, to the extent that the central bank does not pay a market rate of interest on the government deposits, there are smaller fiscal or quasi-fiscal costs associated with the classic sterilization operations. Another important advantage is that it enables the authorities to spread the interest cost of sterilization over two markets--both the T-bill market and the interbank market (for the government deposit auctions)--and thereby limits the potentially adverse effect of sterilization on short-term interest rates and the resultant additional capital inflows. 5/ Another important advantage

1/ See Marston (1995) for detailed discussion.

2/ See Carling (1994) for detailed discussion.

3/ The action can also be regarded as equivalent to imposing a marginal reserve requirement on government deposits. For example, when the government deposits are counted as part of the money stock, the shifting of the deposits to the central bank is equivalent to an imposition of 100 percent reserve requirement on the deposit. See the IMF (1995b) for detailed discussion.

4/ It is also the principal instrument of indirect monetary control used by the Bank of Canada.

5/ The effect on market rates of switching government deposits would depend upon whether the switch is auction-based or formula-based. In principle, the impact on short-term interest rates would be more immediate when the switch is based on auction.

is that, unless the government deposits at the central bank are remunerated at a rate that is higher than the rate of interest paid on government deposits by the commercial banks, there are no fiscal or quasi-fiscal costs associated with the classic sterilization operations.

Despite these advantages, the use of this instrument requires some caution. Like the use of reserve requirement policy, frequent and unpredictable changes in the allocation of the government deposits between the central bank and commercial banks may introduce greater uncertainty in the banks' management of the reserve position, and thereby make it difficult for the banks to obtain an efficient portfolio.

In addition, the use of this technique may be limited by the availability of the government deposits already held in commercial banks. In some countries, the government deposits must always be held in the central bank by law. And in others, some of the deposits are not government deposits in nature. ^{1/}

d. Foreign exchange swap facility

Foreign exchange swaps can be used by central banks as a standard instrument of monetary policy similar to an open-market operation in domestic markets. ^{2/} The mechanism through which a contractionary swap operation decreases the monetary base is as follows: a central bank sells foreign exchange against domestic currency and simultaneously agrees to buy the same amount at a certain date in the future at the forward exchange rate; if the counterparty is a bank, the bank's reserves are debited by the domestic currency equivalent of the foreign exchange transaction, and the bank's foreign assets increase. Thus, reserve money decreases. If banks then make foreign currency loans to residents, the principal effect is a reduction in the monetary base. However, banks may well choose to invest the funds abroad or to make foreign currency loans to nonresidents, in which case a capital outflow is generated. Moreover, the swap facility can be designed to provide an incentive for domestic banks to "export" funds abroad. This can be achieved by setting the price of the swap in such a way

^{1/} For example, Employee Provident Fund (EPF) in Malaysia is not strictly a public sector deposit.

^{2/} See Hooyman (1994) for detailed discussions on how the swap operations by central banks work as a money market tool. See also World Bank (1995) for the formal classification of swap operations as an instrument of monetary policy.

that the difference between the forward exchange and spot exchange rates (swap margin) is bigger than the prevailing interest rate differential between domestic and foreign markets. 1/

Another important advantage is that, unlike some indirect instruments that have an automatic lending feature (e.g., rediscount facility), swap operations can be controlled flexibly and implemented solely at the initiative of the authorities. If the foreign exchange swap market is well developed, swaps can be conducted at the prevailing market rate, analogously to the way in which an open-market sale of securities would be conducted. However, depending on the prevailing differential between the domestic and foreign interest rates and the expectation of future exchange rate changes, the authorities can flexibly change (i) the swap margin (or forward premium), 2/ and (ii) the length of the swap contract period. At the market rate, the swap margin would include a return (forward discount) for the covering of the exchange rate risk. However, the authorities may choose to set the swap margin more favorably to increase the size of foreign-reserve drainage from the banking system, by offering the swap facility to the commercial banks at par, i.e., free of charge, or even with a forward rate at a premium over the spot rate. 3/ In doing so, however, the authorities should be aware of the potential problem that the provision of the swap facility by the central bank must not constitute a "multiple currency practice," which would be illegal under the jurisdiction of the Fund (in light of the obligations under Article VIII, Section 3). In addition, the length of the swap contract can be varied to reflect the authorities' expectations regarding the duration of the capital inflows and the perceived need to offset the inflows. In the normal case, the maturity of the swap contract would be relatively short, but it can usually be renewed at the maturity. The short-term maturity and frequent "roll-over" feature would enable the central bank to adjust flexibly the optimal time horizon for the swap contract and thus for the capital outflows. 4/ 5/

1/ The German Bundesbank used swap operations exactly for this purpose, i.e., to counterbalance external sector disequilibrium: the central bank's provision of a more favorable swap margin to domestic banks in 1958 helped the banks to invest abroad in the form of portfolio investment, which led to a significant reduction in the level of the German banks' short-term external liability. See Deutsche Bundesbank (1982) for details.

2/ The swap margin is the difference between the spot and forward exchange rate at which the swap contract is agreed upon.

3/ For example, the German Bundesbank waived its right to charge the cost of covering the exchange risk by providing the swap rate at par in late 1959, and then went further to guarantee a forward premium on the swap transactions in late 1960.

4/ It also can facilitate reinvestment of the net return on the foreign portfolio investment.

In addition, the swap operation has other important advantages. First, its use does not require the existence of a sufficient amount of short-term government securities in the central bank's portfolio, which is often missing in countries that do not usually run budget deficits, 1/ or which may already have been exhausted by open-market sales. Second, in order to prevent the foreign exchange holdings of the banking system from rising again at the maturity of the swap contract, the principal and net returns on foreign portfolio investments can be encouraged to be reinvested in foreign markets. 2/ Third, in countries with a liquid secondary market for the sterilization instrument (e.g., treasury bills), the swap may be more effective than an open-market sale in reducing the liquidity in the system because it does not involve the supply of domestic securities. 3/ Often, the effect of an open-market operation is to replace base money with another form of highly liquid domestic currency-denominated financial instrument. 4/

Notwithstanding these practical advantages, the use of the swap facility has been relatively little used as a means of sterilizing the impact of the large capital inflows. 5/ This suggests that currency swaps also have certain drawbacks. First, like open-market operations, the swap facility may have a negative effect on the profits of the central bank, especially if the central bank guarantees a favorable swap margin to the banks. In some cases, however, the short-term costs of providing a favorable swap margin may well be offset by the long-term valuation gains on

5/ (...continued)

5/ The type of overseas investment financed by the swap funds can also be prescribed by the central bank. For example, when the Bundesbank resumed its forward cover operations at reduced cost in March 1964, it restricted the purpose of the forward cover to the acquisition of U.S. money market papers so that the swap operation would not provide additional encouragement to the Euro-money market. However, requiring the swap funds to be used only for some specific purposes would unduly limit the opportunities for the financial institutions to realize the highest possible return on the investment.

1/ For this reason, Switzerland is the only country where foreign exchange swaps are the main instrument for the management of bank reserves. See Hooyma (1994) for the details.

2/ It is similar to the case of a domestic open market operation, when the securities issued are arranged to roll over at the maturity. However, in this case, the interest payments on the domestic debt instruments (treasury bills or central bank paper) will be added to the reserve money.

3/ However, the effectiveness of the swap also depends on the substitutability between domestic currency liquidity and foreign currency liquidity, and might tend to be of limited usefulness in a highly dollarized economy, for example.

4/ This point, of course, is based on the assumption that the foreign exchange swap market is not as liquid as the treasury bill market.

5/ Interestingly, neither Marston (1995) nor IMF (1995b) make any reference to the possibility of using swaps for sterilization purposes.

the central bank's holdings of foreign assets. 1/ Second, there is a risk that the foreign exchange sold to the banks through the central bank's swap operation could be covertly sold back against the local currency, thereby nullifying the intent of the swap. This type of "opposite transaction" will likely be a popular money game when there exists an active swap market in the private sector and the swap margins offered by the central bank are more favorable than the prevailing margins in the market. However, this problem can be partially addressed by a strengthening of monitoring and supervision on banking activities to ensure compliance; and by introducing restrictions on the use of the swap proceeds. 2/

2. Other measures

Discussions so far have identified some major forms of supplementary sterilization measures which can be employed in an open, liberal environment. Many authorities of the developing countries, however, have recognized that their ability to sterilize foreign monetary flows on an extended basis depends on the characteristics of their financial markets, the magnitude of the capital inflows, and the degree of capital mobility. Some developing countries, after exhausting the menu of supplementary sterilization measures in the face of the persistently large inflows, have responded by allowing the nominal exchange rate to appreciate through, for example, a "wider band policy," while other countries have resorted to official intervention in the forward exchange market to influence the exchange rate or its expectation. In a more threatening situation where the authorities found it impossible to sterilize the inflows, they eventually decided to impose a mild form of indirect capital controls: a variable deposit requirement (VDR) on foreign borrowings or an interest equalization tax (IET) on certain capital transactions. Behind such decision was the authorities' belief that most of the side-effects of the sterilized intervention policies could be reduced by imposing capital controls: under conditions of imperfect capital mobility, the authorities' initial attempt to sterilize the effects of inflows would not be thwarted by additional capital inflows attracted by the wider interest differential that the sterilization operations would inevitably generate. Also, they turned to this type of capital control because they were perceived to be less distortionary and more transparent than other quantitative controls. The discussions in this section will focus on these four measures.

1/ However, this does not seem likely when the capital inflows are the response to an undervalued exchange rate, and thus reflect the public's expectation of an exchange rate appreciation.

2/ For example, during the 1960s the German Bundesbank limited the use of the swap funds strictly for portfolio investment in certain foreign markets (e.g., U.S. treasury bills market) and closely monitored compliance. However, the inefficiency and the administrative cost associated with this new layer of restriction may be substantial, and difficult to enforce, in practice.

a. Wider exchange rate band

An exchange rate band system is usually adopted by a country which is committed to defend its currency value within a predefined bound. The idea is to allow a degree of flexibility (and monetary autonomy) and, at the same time, to reduce the possibility of destabilizing speculation by providing an anchor to the public's expectation of exchange rate movements. Such a band system generally served policy purposes fairly well in the face of external shocks (Chile, Israel). ^{1/} More recently, however, authorities in several developing countries have recognized that, in the face of large and persistent capital inflows, the band system lacked the required flexibility, and have widened the exchange rate band (Chile, Colombia, and Korea).

The adoption of a "wider-band" policy has a number of merits. First, by allowing more room for the nominal exchange rate to appreciate in the face of the capital inflows, it can serve the policy objective of limiting inflation through a reduction of import prices and by reducing the need to sterilize all inflows. Second, the increased flexibility in exchange rate policy, by raising the perceived risk of short-term exchange rate fluctuations, may discourage the speculative component of capital flows. Third, if the underlying cause of the inflows is an undervalued exchange rate, the rapid appreciation made possible by the wider band can also contribute to the reduction of incentives for the endogenous inflows. Fourth, from a policy point of view, the wide band system allows for more flexible central bank intervention in the foreign exchange market. In the event of a reversal in inflows which necessitates a quick offsetting policy response, for example, it can be a relatively simple matter to change the exchange rate within the band, without having to formally adjust the parity. ^{2/}

On the other hand, there are costs associated with the "wider-band" approach. For example, the fact that the exchange rate can be used more flexibly as a policy instrument can itself be disruptive to the economy. In most cases, such exchange rate changes are anticipated, provoking large outflows or inflows of capital. ^{3/} Also, the widened band may lead the public to perceive the possibility of devaluation (associated with competitiveness-oriented intervention) rather than appreciation (aimed at an anti-inflationary objective). More importantly, it would be difficult to send out clear and credible signals to private agents about prospects for inflation, especially when the "nominal anchor" approach has been adopted in their exchange rate policy.

Overall, as a policy response to deal with destabilizing effects of capital inflows, allowing some nominal, hopefully temporary appreciation (or

^{1/} See Carrasquilla (1995) for detailed discussion.

^{2/} See Schadler, et. al. (1993), for detailed discussion.

^{3/} See Argy (1990) for detailed discussion.

modification in the exchange rate band system) can be a superior option than to wait for the intense demand pressure to push up prices and generate the real appreciation. 1/

b. Forward exchange market intervention

That the authorities' intervention in forward exchange can be an important instrument of monetary policy is an old idea. 2/ A variant of such intervention is the swap operation, which was discussed in the previous section. The discussion in this section will, instead, focus on "outright" forward market transactions conducted by the central bank.

An outright forward facility is an arrangement by which the central bank directly guarantees a certain level of forward exchange rate to local residents. The main idea is to allow "hedging" behavior on the part of private wealth-holders who would like to invest the funds abroad, so that capital outflows will balance inflows as local residents adjust their portfolio holdings. The first-best solution would be to develop a forward market. 3/ However, it takes time and efforts to develop a well-functioning forward market. 4/ Therefore, the central bank's outright forward facility can be an alternative means to be employed in the short run until the forward market can be further developed.

Unlike spot market intervention, official intervention in the forward exchange market has no immediate effect on the level of foreign reserves so that the level of domestic money supply can remain unchanged. Thus, the outright forward facility can be an appealing device for the central bank to exert its influence on the exchange rate without disturbing the domestic money market.

It is also noteworthy that forward market intervention and sterilized spot market intervention (i.e., the combination of spot exchange market intervention and open market sales of domestic bonds) do represent different policy instruments. In an idealistic world with perfectly efficient financial markets where the interest rate parity condition always holds, both operations may yield the same effects on macroeconomic variables, because a private wealth-holder would be indifferent about becoming a counterparty of the central bank's sterilized spot market intervention or that of the forward market intervention, and thus would not alter his

1/ See Schadler, et. al. (1993), for detailed discussion.

2/ See Keynes (1930) and Sohmen (1969).

3/ Note, however, that a forward exchange market can be a double-edged sword, in that it provides a vehicle for hedging both inflows and outflows. As a result, capital inflows also may increase.

4/ See Tseng (1993) for details.

portfolio choice. 1/ However, in a less than perfect world with various forms of transaction costs, which drive a wedge between the interest differential and the forward discount prevailing in the market, the two types of exchange market intervention may elicit significantly different responses from private agents. 2/

Notwithstanding these advantages, the outright forward facility can be a highly risky operation, because it can subject the central bank to huge capital losses. Also, it has fiscal costs, for exactly the same reason why the currency swap operation that provides a favorable swap margin lowers central bank profits. Hence, authorities should refrain from engaging in aggressive forward market activities which offer excessively favorable forward premium as compared to the existing interest differentials. 3/

More importantly, authorities should exercise extreme caution so that the use of this facility may not constitute an exchange restriction subject

1/ Namely, the private agent with holdings of foreign exchange (FX) can either sell foreign exchange to the central bank at the spot exchange rate (S) against the domestic securities bearing the prevailing domestic interest rate (R), or choose to be a counterparty of the forward market intervention. If he chooses the latter, he can transfer abroad foreign exchange assets to an overseas bank which guarantees him the prevailing foreign interest rate (R^*), and at the same time enter into a forward contract with the central bank so that he can convert those investment proceeds back into domestic currency at the forward exchange rate (F) at maturity. Then, it can be easily shown that, if the interest parity condition holds, i.e.,

$$(R - R^*) / (1 + R^*) = (F - S) / S$$

the earnings from the participation in the sterilized spot market intervention, $FX \cdot S(1 + R)$, is exactly equal to those from his participation in the forward market intervention, $FX(1 + R^*)/F$.

2/ For example, if high withholding taxes are imposed on the private agents' interest income from domestic bonds, private agents will not respond to the central bank's *sterilized spot market intervention*. The reason is that they could get a better return by becoming a counterparty to the *forward market intervention* and simultaneously investing the foreign exchange in foreign financial markets. In this situation, the only effective policy instrument that can deal with the monetary impact of the capital inflows would be forward market intervention, because any issuances/sales of domestic debt instruments will not be bought by domestic investors at prevailing interest rates.

3/ One way to reduce the degree of risk on the central bank's book is to do "a front-to-back" exchange, where the exchange rate used at the start of the forward contract is the same as the exchange rate used at maturity and make the coupon on the swap subject to negotiation. Of course, when negotiating the coupon interest rate, the authorities should be careful not to give the counterparties a pure arbitrage opportunity.

to the IMF jurisdiction. For example, the direct form of forward exchange rate guarantee offered by the central bank, besides being distortionary in economic effect, would constitute a multiple currency practice subject to the Fund jurisdiction under Article VIII, and hence needs to be approved by the Board. 1/

In the long run, a more desirable solution would be to develop and enhance the efficiency of the forward market. It can be achieved by encouraging private sector's demand for forward transactions. For example, the underlying documentation requirement on certain forward transactions (real demand principle) can be relaxed (Korea, 1994). Also, the ceilings on forward transactions can be expanded progressively in line with the volume of international transactions.

c. Easing of restrictions on outflows

In some cases, countries have sought to counterbalance capital inflows by relaxing controls on private capital outflows (Chile, Colombia), or by further liberalizing the trade system to raise imports (Colombia, Korea). The first category includes measures such as easing surrender requirements on foreign exchange earnings, permitting domestic institutional investors to make portfolio investments abroad, and allowing international organizations to issue local-currency denominated bonds in the local capital market. Acceleration of trade reform, particularly tariff reform and reduction, and liberalization of tightly restricted trade credit (e.g., deferred payments for imports) are examples of measures that are included in the latter category. 2/

Of course, easing restrictions on outflows will be effective only if the measures have been effective in the past and are actually a binding restraint on outflows. 3/ Assuming that they are binding, these measures have other advantages in addition to encouraging the capital outflows. For example:

- they can enhance the overall efficiency of investment by allowing the international diversification of institutional portfolios. As well, domestic investors can benefit from the opportunities to build the technical skills in portfolio investments;

- exporters, when allowed to retain their exports and other foreign exchange proceeds abroad, can manage their foreign assets more efficiently in their payment and settlement process;

1/ These forward facilities are usually given to a certain targeted sector (e.g., strategic export sector) in order to provide hedging opportunities for the exporters and importers or just to subsidize certain economic activities that involve foreign exchange transactions.

2/ See Schadler, et. al. (1993), for details.

3/ See IMF (1995b), pp. 101-103, for a discussion of this point.

- they may facilitate reform in the domestic financial sector as more foreign borrowers are allowed to issue financial instruments in domestic financial markets, increasing competition in the local markets;

- simplifying the process for profits and income remittance may send a positive signal about future ability to move capital out of the country, and thus contributes to the lowering of the risk-premium on the country's financial assets;

However, against these benefits is the potentially problematic response of capital inflows to the signal sent off by the liberalization of the exchange controls: simplifying the process for repatriating profits and capital can restore confidence in the new exchange system and thus might attract additional inflows from abroad. ^{1/} Also, there is a threat that a large and prolonged current account deficit would weaken the country's external position, particularly for those countries which had accumulated large external debts in the past.

d. Variable deposit requirement

Formally, VDR is a tax on foreign borrowing in the form of a nonremunerated reserve requirement, which is denominated and paid in foreign currency; it is usually viewed as a form of capital control. ^{2/} However, it can also be viewed as a sterilization instrument, since it directly sterilizes a fraction of capital inflows, and thus can offset the high cost of other sterilization measures. Moreover, unlike open-market operations, the use of VDR does not have a direct impact on domestic interest rates and hence does not directly risk perpetuating the inflows. As a form of capital control, the VDR is superior to a direct prohibition (e.g., embargo) or other quantitative and administrative measures, because it is a yield-affecting or cost-affecting control, and thus tends to be market-oriented.

This instrument requires that a certain percentage of foreign liabilities incurred by domestic residents be placed with the central bank in interest-free, non-assignable deposits for a certain fixed period of time. The percentage is set by the authorities, but is changeable. Typically, the ratio is to be applied to new flows, and may be adjusted frequently in response to a rapidly changing environment and the needs of monetary policy. ^{3/} The deposit holding period (the minimum time period for the required deposit held by the central bank) is also flexible. As

^{1/} Egypt, for example, saw a large increase in the repatriated capital inflows after the exchange system reform in 1993.

^{2/} See IMF (1995c) for the classification of capital controls.

^{3/} However, the reserve ratio is normally set above the required reserve ratio for the banks' liabilities to domestic residents because its primary purpose is to discourage overseas borrowings by domestic residents (either banks or nonbank enterprises).

such, one of the key advantages of the VDR is that it can be applied flexibly and intermittently to counter unanticipated fluctuations in capital inflows.

Another major advantage is that the VDR scheme has a built-in feature that penalizes foreign borrowings of shorter-term maturity more severely, and thereby influences what is normally considered to be the principal form of destabilizing speculative capital movements. ^{1/} The reason is that, once the deposit holding period is fixed, the effective cost of borrowed funds rises as the borrowing period is shortened. (See Table 1 in Appendix IV which illustrates how the effective cost of funds are raised by smaller amounts as the borrowing period gets extended). This means that the VDR can be modified so that its disincentives are targeted more precisely at "hot-money" inflows seeking short-term gains: the authorities can either place a higher reserve requirement ratio on shorter-term loans than on longer-term loans, or lengthen the deposit holding period to lift the effective interest cost.

A third advantage of the VDR is that the *nonremunerated* feature of the VDR deposits can help offset, at least partially, the central bank's operating losses from other sterilization operations. This could be a critical point of consideration when the initial sterilization policy generates losses and thus jeopardizes the sustainability of the anti-inflationary effort. ^{2/}

Finally and most importantly, the imposition of the VDR on foreign borrowings can serve the role of an automatic sterilization device, as it can temporarily lock up a significant portion of the capital inflow, thereby obviating to a degree the need for other costly sterilization measures.

Despite these advantages, the VDR does have all the potential difficulties and limitations germane to any other form of capital controls. Thus, the effectiveness of the control may be eroded as the targeted

^{1/} Note also that in their proposal to "throw sand in the wheels of international finance," Eichengreen and Wyplosz (1993) proposes that a VDR be used to impose a tax on all foreign exchange market transactions. In their case, a transaction would trigger a one year deposit of an equivalent sum in the central bank. See also Garber and Taylor (1995) for detailed discussion of the effects of compulsory central bank deposits. (See Spahn (1995).)

^{2/} Chile is a good example where the quasi-fiscal losses of the central bank were partly offset by the imposition of nonremunerated reserve requirements on foreign borrowings in 1991. Primarily as a result of this, the central bank losses declined from 2.3 percent of GDP in 1990 to 0.9 percent in 1991.

borrowers may seek to circumvent the control imposition through various "loopholes." 1/ As well, it raises the cost of capital and may result in a misallocation of resources. For example:

- an across-the-board imposition of VDR may prevent some borrowers from refinancing their loans at more favorable terms: the borrowers under this scheme would be denied an option to take advantage of changing interest rate levels in international financial markets, because all funds borrowed abroad would be for a fixed term and the deposits would be held for a specified minimum length of time;

- the VDR scheme may exert uneven impact on availability of low-cost funds between those firms engaged in international trade and those that are not, the former possessing the ability to finance their imports by utilizing foreign suppliers' credits, a standard practice in international commerce; 2/

- there is a criticism that the VDR scheme allows only very limited discrimination between "speculative" financial inflows and those which result from "genuine" direct investment decisions taken before the control was activated. In other words, though it has an automatic feature that penalizes borrowings of shorter-term maturity more severely, the VDR may exert a possible adverse impact on corporate financing and investment activity through increased uncertainty of financing investment projects.

It is germane to note, however, that set against these potential difficulties is the market-oriented nature of the VDR, which reduces its distorting impact and raises its transparency as compared to other types of capital controls that take the form of a direct quantitative restriction.

Whether the VDR can be effective in discouraging capital inflows and, if yes, for how long, are controversial subjects. However, as will be discussed in the next section of this paper, the empirical studies focusing on the use of these instruments reveal that, in some countries, the controls turned out to be partially effective in discouraging capital inflows. 3/ In other countries, however, their effects appear to be short-lived (Spain). Overall, the experience suggests that countries which

1/ The best known examples are the use of "inter-company accounts" or "intra-company accounts" of multinational companies, through which their foreign branches or subsidiaries can switch out of short-term overseas loans to seek long-term inter-company loans and even substitute equity finance, both of which are normally not subject to the VDR imposition (Australia in 1972 and Spain in 1991).

2/ This problem arises because the borrowings to finance the trade transactions on *normal credit terms* (so-called deferred payment imports) are normally exempted from the application of the VDR.

3/ See section V for the empirical evidence on the effectiveness of the controls.

are poorly equipped with monetary control instruments may be able to gain time by employing this instrument as a supplementary monetary control measure (i.e., breathing space), until the authorities can determine whether the inflows are likely to be transitory or not, at which point they can resort to more fundamental policy adjustments.

e. Interest equalization tax

Unlike the VDR, the interest equalization tax (IET) is capable of impacting on either capital inflows or outflows. For example, when imposed on *outward-bound* capital transactions, the IET takes the form of a tax levied on the acquisition of foreign securities by domestic residents. In such a situation, the IET can be designed to equalize the yield of foreign issues with that of domestic issues and thus diminish the attractiveness of foreign debt issues. Of course, it can also be imposed, for *capital inflow* control purposes, on the acquisition by nonresidents of equity and debt instruments of domestic issuers. This can be called a "Capital Import Tax." From the viewpoint of foreign investors who are subject to the IET, the imposition of the tax implies a lower effective rate of return on the assets they hold. For residents who can borrow at lower levels of interest rates in foreign capital markets, the existence of an IET would effectively increase the cost of capital raised overseas and bring it more in alignment with costs prevailing in domestic markets. In this case it is similar to a VDR, except that the tax (deposit) is not returned to the borrower after a period of time.

Theoretical literature focuses on the role of the IET in enhancing monetary policy effectiveness, the main thrust of which being that the IET can be used as a monetary policy instrument in a setting where a shock to the uncovered interest rate parity (UIP) condition needs to be neutralized. ^{1/} If a shock (ϵ) drives the national interest rate differential and expected change in the exchange rate in such a way that the following deviation from the UIP condition is observed by the monetary authorities

$$(R-R^*)/(1+R^*) = E_t[S_{t+1}] - S_t + \epsilon \text{ (positive shock)} \quad (1)$$

where $E_t [S_{t+1}]$ denotes the expectation at time (t) of the spot exchange rate S_t that would prevail at time ($t+1$), then the UIP condition can be restored by imposing an interest-equalization tax (t^*) on a nonresident's acquisition of domestic assets, thereby lowering the effective rate of return on domestic assets held by nonresidents. In other words, the interest differential is now reduced to $R-R^*-t^*$ in the left-hand side of the UIP condition. Thus, the main advantage of the IET is that it enables the policymaker to influence the exchange rate by means other than an adjustment

^{1/} See Benavie and Froyen (1991), Dornbusch (1986), and Pomp (1974) for references.

of the domestic interest rate or direct intervention in the exchange market. To a certain extent, this releases the policymaker from the constraint imposed by the UIP condition. 1/

There could arise many economic issues relating to the actual design and operation of the IET. First, the IET can be designed to influence international capital flows exclusively by exempting those financial transactions that do not involve currency conversion. However, the tax on currency conversion may not always fall on cross-border capital flows. In some cases, transactions between residents could be affected. Second, another issue arising in the design of the IET is whether it is desirable to tax short-term transactions more heavily. However, as in the VDR scheme, short-term transactions would automatically be more heavily taxed in terms of an effective tax rate, if a uniform ad valorem rate is applied for all financial assets regardless of their maturities. Third, another important issue is whether public debt should be exempt. If the main policy objective is to discourage foreign borrowings by the private sector, the public debt could be exempt from the IET. However, the exemption would not be desirable in situations where other forms of preferential treatment of government debt are already hampering the overall efficiency of the financial markets.

In considering the use of the IET, the implication of the taxes for the Fund's approval jurisdiction on multiple currency practices under Article VIII needs to be addressed. Formally, the Executive Board of the Fund has not yet endorsed the staff's view that multiple currency practices applying exclusively to *capital transactions* are subject to Article VIII, Section 3. 2/ Thus, even if the taxes are deemed to give rise to multiple currency practices, they would not be subject to the Fund's approval jurisdiction. However, member countries are expected to provide the Fund with full information on the taxes and any other measures even if they are applied solely to capital transactions, so as to enable the staff to identify whether or not they constitute multiple currency practices and to assess their economic consequences. In addition, care needs to be taken to assume that foreign exchange restrictions do not arise in the context of certain payments for services, such as interest payments or authorization, or this could constitute a violation under Article VIII.

In practice, the United States and Brazil are among the few countries that actually imposed an interest equalization tax (IET) on the transfer of financial assets between residents and nonresidents. A slightly different approach as used by Thailand: they intermittently used a 10 percent *withholding tax* on interest payments to nonresidents. Another slightly different form of discriminatory tax treatment is the "Thin Capitalization

1/ For a favorable view on the viability of an IET, see Dornbusch (1986), pp. 53-54.

2/ On the other hand, the Fund has the jurisdiction on *foreign exchange restriction* only when those restrictions are applied to payments and transfers of foreign exchange.

Provision" adopted by Australia in 1987. The provision penalized offshore borrowings by prohibiting the tax deductibility of the interest payment when the value of foreign loans exceeded a certain stipulated percentage of capital. 1/

In the United States in the 1960s, the IET was used as a policy instrument to stem the outflow of U.S. dollars: when the higher returns on foreign stocks and bonds had attracted unprecedented amounts (over \$1 billion) of domestic savings during the period July-December 1963, the government imposed the IET on the acquisition by a U.S. person of bonds or stock issued in the U.S. by a foreign issuer. 2/ The application of the IET was limited to the area of long-term investment. 3/ No tax was initially imposed on commercial bank loans. However, as bank loans soon became a substitute channel for securities purchases, the authorities decided to tax them also later in 1964. The estimated effect of these tax rates on the interest cost was to raise a foreigner's cost of raising capital in the U.S. by approximately 1 percent a year, the prevailing interest gap between Europe and U.S. that time. Although the tax was intended to be only a temporary measure, it has been repeatedly extended until its expiration in 1974. This partly reflected the authorities' belief in the IET's success in reducing residents' foreign investment as well as the continued balance-of-payments deficit experienced by the United States. However the increased circumvention and the erosion of the effectiveness of the control also necessitated the continual amendment of the tax provisions.

In Brazil, on the other hand, the principal concern in 1993 was the excessive capital inflow driven by a surge in portfolio investment in domestic mutual funds and stocks. The response was to impose a small tax on foreign sector operations which was intended mainly to discourage intense placements of bonds on international markets issued by Brazilian enterprises

1/ For example, the maximum allowable ratio of foreign loans to capital is 6 to 1 for financial institutions, and 3 to 1 for other companies.

2/ The U.S. authorities had several alternatives in dealing with the immediate dollar drain. First, they could restrict the growth of domestic credit to induce higher domestic interest rates. Such an alternative seemed somewhat appropriate, at least to the extent that the 1963 capital outflow was spurred by the earlier counter-cyclical monetary policies designed to end the recession of 1961-62. However, the tight monetary policy was rejected as politically unfeasible at a time when the unemployment rate stood already at 5.7 percent. Second, they could abandon the fixed exchange rate system in favor of floating rates, but this was also ruled out as economically too disruptive. The third alternative, and the policy pursued with the IET, was indirect capital control.

3/ Hence, it did not levy any tax on securities of maturity of less than three years, and the tax on foreign bonds was graduated according to their maturity from a minimum of 2.75 percent on a three-year bond to a maximum of 15 percent on a 28.5 year bond. On foreign equities, the IET levied a tax rate of 15 percent.

and financial institutions. 1/ In the measures adopted in November 1993 nonresident investment in the newly created Foreign Capital Fixed-Income Fund (FRF-CE) was subject to a financial transaction tax (IOF) of 5 percent, payable at the time the capital enters the country. Also, the proceeds of foreign borrowings through the placement of bonds, notes, and commercial paper, when converted into domestic currency, were made subject to a financial transaction tax (IOF) of 3 percent. In addition, a uniform 15 percent withholding tax on profits, dividends and bonuses was established for all foreign capital (December 1993). The effects were immediately visible: bond issues, which had risen from US\$3.7 billion in 1992 to US\$6.7 billion in 1993, declined from US\$2.1 billion in the fourth quarter of 1993 to US\$1 billion in the first quarter of 1994.

In summary, the IET can be proposed as a measure to deal with destabilizing capital movements. The U.S. experience shows, however, that it is best regarded as a temporary measure because its effectiveness is likely to erode as additional means are found to circumvent it. Like all forms of capital control, moreover, there is an associated administrative burden and, when effective, it can raise the cost of capital and distort resource allocation. For these reasons, the IET should be carefully designed, preferably with some special features that can minimize such side-effects. 2/

V. Empirical Evidence

Numerous studies have examined and empirically tested the determinants and the effectiveness of capital controls (Edwards and Khan (1985), Haque and Montiel (1990), Faruque (1991), and Johnston and Ryan (1994)). The first three papers, however, measure and evaluate the effectiveness indirectly--i.e., by looking at national interest rate differentials and by

1/ On account of the high domestic real interest rates and reawakened interest of international investors in emerging market securities, the bonds issued abroad by Brazilian borrowers rose from US\$1.8 billion in 1991 to US\$6.7 billion (1.5 percent of GDP) in 1993. This put enormous expansionary pressure on the monetary base.

2/ For example exemptions could be provided for certain types of transactions. First, direct investments through which foreign investors actively participate in the management of the domestic corporation can be exempted from the tax, because decisions to make such investments are largely concerned with long-run profitability rather than interest differentials. Second, if import financing is attributable to the transfer of a debt obligation between residents and nonresidents, it could be exempt from the tax, mainly because such transactions occur as a result of normal commercial trade. Also, promotion of imports is regarded as one of the best ways of reducing the surplus in the recipient country's balance of payments. Third, securities issued by a certain country can be exempted from the tax. (Canada was exempted from the IET, because the country was historically heavily dependent on U.S. long-term portfolio capital).

examining whether there are unexploited arbitrage opportunities in the differentials. The general conclusion of these studies is that capital controls were relatively ineffective in protecting countries against short-term capital movements. 1/

By contrast, Johnston and Ryan (1994) examined directly the impact of controls on the capital accounts of countries' balance of payments. As an explanatory variable, they focus on the structural "shift" in the capital control regime, and find significant evidence that, at least for a subsample of *industrial* countries, the control regime changes (i.e., from restricted to liberalized regime) have some impact in deteriorating the countries' net capital accounts. For *developing* countries, however, the study does not find any statistics to be significant for any of the different measures of net private capital flows. This estimation result implies that capital controls adopted by *developing* countries do not seem to have had a significant influence on the structure of capital flows. Concerning the effects of partial liberalizations in developing countries, they also find that the partial liberalizations of outflows were not associated with a significant weakening of net capital flows, while the liberalizations of inflows were associated with a significant improvement in net capital flows. This could be interpreted to mean that controls imposed on *outward-bound* capital flows do not effectively prevent the capital outflows from developing countries, while those imposed on *inward-bound* flows are effective in reducing the flows. 2/

The present paper, while being close in spirit to Johnston and Ryan (1994), differs in the main focus as well as methodology: this paper focuses on the effectiveness of various types of sterilization measures (e.g., swap facility) and indirect capital controls (VDR, IET), in the context of an individual country's experience. The paper finds that all of the estimated coefficients on the dummy variables identifying the temporary imposition of the restrictive measures had the expected signs, and their effects on capital flows were statistically significant for three of the four sample countries. The paper also finds that for all of the four countries the changes in monetary policies were significantly offset by the capital movements, implying some degree of capital mobility, but that the

1/ Mathiesen and Rojas-Suarez (1993) also concludes that the controls afford little protection for monetary and interest rate policy.

2/ This is not too surprising in light of the poor institutional capacity of developing countries to implement effective controls as well as the widely-observed capital flights from developing countries even before the capital account liberalization. The sample period of the tests covers only up to 1992 and thus misses a significant portion of the recent inflow episodes.

offset coefficients were not large enough to prevent the authorities from using discretionary monetary policy in the face of capital inflows. 1/

The empirical estimation model in this paper utilizes Kouri and Porter's (1974) model based on the "monetary approach" to the balance of payments, which treats net capital flows (NC) basically as the mechanism by which a domestic excess demand for money is removed, i.e.,

$$NC = d(M^d(Y, R)) - d(NDA) - CAB \quad (2a) \text{ 2/}$$

where $d(M^d)$ and $d(NDA)$ denote the changes in money demand and net domestic assets, and Y , R , CAB denote the domestic income, interest rate, and the current account surplus, respectively. If we consider a more realistic version of the model which: (i) allows the relative return on domestic and foreign assets (adjusted for exchange rate changes) to enter the money demand function as an argument; and (ii) includes "other factors" that influence the capital flows, such as a dummy variable to represent the imposition of capital controls for a few periods, the capital flow equation can be written as:

1/ As possible explanations of the findings of low offset coefficients in these countries, Fry (1993) mentions "capital market imperfections, nonprice rationing of bank loans or exchange rate flexibility," in addition to the capital controls in these countries.

2/ This can be derived using the following equations:

$$M^S = M^d \quad (1)$$

as an equilibrium condition for base money;

$$M^S = NFA + NDA \quad (2)$$

as the money supply which is the sum of the domestic and foreign assets of the central bank;

$$d(NFA) = NC + CAB \quad (3)$$

as the net foreign assets (NFA) of the central bank which changes either through capital flows (NC) or through the current account (CAB);

$$M^d = M^d(Y, R) \quad (4)$$

as the demand for money which is a function of domestic income (Y) and the nominal interest rate (R). See Kouri and Porter (1974) for details.

$$NC = \alpha_0 + \alpha_1 D(Y) + \alpha_2 D(NDA) + \alpha_3 CAB + \alpha_4 D(R-R^*-\pi^e) + \alpha_5 (Dummy) \quad (2b)$$

where the change in covered interest differential is denoted by $D(R-R^*-\pi^e)$, and "other factors" are reflected in the Dummy variable. The anticipated signs of the coefficients are $\alpha_1, \alpha_4 > 0$; and $\alpha_2, \alpha_3 < 0$. The expected sign on α_5 can be either negative and positive, depending on the nature of the dummy variable. 1/

As frequently observed in many empirical studies on capital flows, there is a critical issue of how to measure net private capital flows, particularly for developing countries with the wide-spread problem of inaccurate, less reliable data. The data used here were taken from the International Financial Statistics (IFS), and net private capital flows were defined to include net errors and omissions on the assumption that they capture various types of unrecorded private capital movements, including those which may be associated with the circumvention of capital control measures. 2/ Indeed, estimation results revealed that the addition of errors and omissions to the dependent variable significantly increased the explanatory power of the estimation model.

Equation (2b) was estimated for four sample countries: three developing countries (Indonesia, Korea, and Thailand) and one industrial

1/ The sign on α_1 is expected to be positive, because the changes in national income are positively correlated with those in money demand. The coefficient α_4 is also expected to be positive, because net capital inflows are assumed to be responsive to the interest differential (due to international arbitrage transactions). The coefficients α_2 and α_3 , sometimes referred to as "offset coefficients" because they measure the extent to which monetary policy measures and current account surplus are offset by capital flows, are expected to be negative.

2/ Net private capital flows were defined as the sum of direct investment (77bad), portfolio investment (77bbd), other capital (77gd) excluding the resident official sector (77gad) and net errors and omissions (77ed).

country (Spain). 1/ 2/ Also, in most countries, it was rather difficult to construct the data on covered interest differentials because the forward exchange rate data did not exist. In this case, realized spot rates were used as a proxy for expected changes in exchange rates.

Finally, to test the effectiveness of a specific capital controls in each country's context, a dummy variable technique was used. 3/ To this end, the exact timing of the introduction and lifting of various types of control measures and supplementary sterilization instruments was carefully examined.

The estimated parameters are reported in Table 1.

The major findings from this empirical study for four sample countries (Indonesia, Korea, Thailand, and Spain) are as follows:

- As shown by the R-square statistics, the explanatory power of the estimation equation is in line with what other studies of capital flows have obtained, suggesting that the model specification along the monetary and portfolio approach was fairly successful.

- The offset coefficient that measures the extent to which domestic monetary measures are offset by capital flows (α_2) was statistically significant in all cases. This implies that, for these countries, the degree of capital mobility is less than perfect. In three countries, the magnitude of the offset coefficients was found to be small (below 0.5),

1/ For Spain, an extra explanatory variable, announced foreign currency reserve level in the last month of the preceding quarter, was added to capture speculative pressures in the foreign exchange market. This speculative proxy was added because, under the adjustable peg exchange regime, a significant portion of capital flows were suspected to be speculative in nature driven largely by fears of devaluation, which in turn is often linked to the depletion of the foreign reserves. For the evidence that speculative factors had a significant influence on the probability of devaluation in Spain, see Ötoker and Pazarbaşıoğlu (1994).

Now, the new estimation model for Spain can be expressed as:

$$NC = \alpha_0 + \alpha_1 D(Y) + \alpha_2 D(NDA) + \alpha_3 CAB + \alpha_4 D(R-R^* - \pi^e) + \alpha_5 (Dummy) + \alpha_6 (SPEC) \quad (2c)$$

where SPEC denotes the variable for the speculative forces.

2/ Although Chile's and Colombia's experiences were extensively discussed in the paper, they were dropped out of the sample because of unavailability of quarterly data.

3/ Namely, it took a value 1 in certain periods when specified restrictions on capital flows were applied to identify the statistical relevancy of such capital controls. See notes to Table 1 for details.

Table 1. Estimation Results of Private Capital Flow Equations

Parameter	Indonesia		Korea		Thailand		Spain	
	Estimate	T-statistics	Estimate	T-statistics	Estimate	T-statistics	Estimate	T-Statistics
α_0 (constant)	193.99	1.54	-5E+8	1.75	321.33	1.45	1679.	3.02
α_1 (GNP)	-0.08341	2.47	-0.03092	0.97	0.2779	2.42	-0.0079	3.65
α_2 (NDA)	-0.3056	2.82	-0.16097	1.49	-0.9423	4.02	-0.3505	4.17
α_3 (curr a/c)	-0.4895	2.12	-0.39139	2.18	-0.1041	0.29	-0.9320	3.28
α_4 (CID)	23.2822	1.56	2E+8	4.28	34.80	0.61	37.68	0.23
α_5 (Dummy)	1563.22 <u>1/</u>	2.10	-2E+9 <u>2/</u>	2.18	663.48 <u>3/</u>	0.69	-7289 <u>4/</u>	2.43
α_6 (SPEC)	... -1563.22	...	...	...	...	...	0.5957	3.50
R^2	0.4065		0.5306		0.5032		0.4953	
Sample period	1982:II-1992:IV		1983:II-1993:IV		1982:I-1991:III		1983:II-1991:IV	

1/ The dummy variable for the 4th quarter of 1990 represents the central bank's provision of currency swap facility under forward cover at a premium aimed at encouraging inflows.

2/ The dummy variable represents the reduction of swap facilities for foreign banks and the temporary reversal of interest rate deregulation during the 4th quarter of 1989-1st quarter of 1990.

3/ The dummy variable for 2nd quarter of 1988- 1st quarter 1990 represents the suspension of 10 percent withholding tax on interest payments on long-term foreign loans aimed at encouraging inflows.

4/ The dummy variable represents the imposition of reserve requirements on nonresidents' Spanish bank accounts in the first quarter of 1987, and also a 30 percent nonremunerated reserve requirement on new foreign loans in the first quarter of 1989.

magnitude of the offset coefficients was found to be small (below 0.5), implying that the authorities in these countries have substantial scope for sterilizing capital movements. 1/

- The estimated coefficients on the dummy variable representing various types of sterilization measures and capital controls (α_5) have the expected signs in all cases, and a statistically significant for three countries at the 95 percent significance level. 2/ These were Indonesia for the use of foreign exchange swaps during the fourth quarter of 1990; Spain for the use of VDR during the first quarter of 1987 and again the first quarter of 1989; Korea for the reduction of the central bank's swaps facilities for foreign bank branches and the temporary reversal of interest rate deregulation during the fourth quarter of 1989 and the first quarter of 1990.

- The measured effects of interest rate differentials (adjusted for exchange rate movements) on the capital flows were found to be large, but statistically insignificant for three of the sample countries at the 95 percent significance level. 3/

- The estimated coefficient on the proxy variable representing speculative forces (α_6), which is measured by the announced level of net international reserves at the last month of the preceding quarter, turned out to be significant in Spain. This seem to indicate that fears of a depreciation of the local currency, which is assumed to depend on the depletion of the official international reserves, has some influence on capital flows in an adjustable peg exchange rate system.

1/ There is a possibility that even the low offset coefficients in these countries are biased, because, if the authorities have routinely sterilized the capital flows during the estimation period, the existence of a potential causation from the change in the net foreign asset (NFA) to that in the net domestic asset (NDA) would make the ordinary least square estimates of the offset coefficient an upwardly biased one. See also Obstfeld (1982) for detailed discussion. Also, see Schadler, et al. (1993) for detailed estimation results of the offset coefficients for six countries. Fry (1993) also studies the offset coefficients for six East Asian economies.

2/ In the case of Indonesia and Thailand, the estimated coefficients on the dummy variables have positive signs because they represent the temporary use of the swap facility at a forward premium and the suspension of the withholding tax on interest payments on foreign loans, respectively, both of which are designed to encourage capital inflows in times of excessive capital outflows.

3/ The large values of the estimated coefficient are attributable in part to the unit of measure of the variable. However, the suspected low degree of substitutability between domestic and foreign assets in these countries could be the explanation for the reported low levels of statistical significance for the estimated coefficient.

Overall, the results of the empirical studies suggest that there still remains some scope for an independent monetary policy during the process of capital account liberalization and that in conducting such policies, the use of the supplementary sterilization measures and certain forms of indirect capital controls can be effective in limiting the capital inflows, at least for a few periods.

VI. Conclusions

The recent experiences of many developing countries reveal that the monetary authorities often lack suitable instruments that can sterilize, fully or for long, persistently large capital inflows. In the context of a liberalizing environment, their traditional tools of monetary control typically lose effectiveness; at the same time, they cannot fully rely on more advanced instruments of market-based monetary control because various elements of the supporting institutional infrastructure have yet fully to be developed. If indirect instruments of monetary control are used exclusively, it appears that their scope of application often is too limited to contain the effects of capital inflows of the order of magnitude which many countries have faced recently.

The evidence considered in this paper shows that the mobility of capital to these countries, while rising, is not yet so high as to preclude attempts to sterilize the inflows. The use of open-market operations in domestic securities is clearly the most efficient sterilization response. However, there are a number of practical limits to the use of this instrument, including thin and segmented local financial markets with limited capacity to absorb open-market sales, a low degree of substitutability between sterilization bonds (treasury papers or central bank bills) and other financial assets which puts upward pressure on local interest rates, and substantial fiscal costs.

In these circumstances, the scope for sterilizing capital inflows can be extended through the use of supplementary techniques, in particular central bank discount policy, reserve requirements, the switching of government deposits, and foreign currency swaps. While some of these measures are widely used, others (notably foreign currency swaps and switching government deposits between commercial banks and the central bank) have been hardly used at all. Although not without their drawbacks, supplementary sterilization measures have potentially beneficial side effects, including a positive effect on central bank profits and an absence of a direct effect on domestic interest rates.

Beyond the use of sterilization techniques, it may be possible to resort to measures which seek to turn aside or forestall additional capital inflows. The specific measures considered in this paper include the introduction of wider exchange rate fluctuation bands, direct intervention in forward exchange markets, the variable deposit requirement (VDR) and the interest equalization tax (IET).

Both the VDR and the IET can be viewed as a form of capital control. As such, their use is not without the limitations germane to any other form of control including administration costs, susceptibility to circumvention and potentially distorting effects on resource allocation. They are best seen as a temporary "belts and braces" measure which may be used to smooth the transition to the "first best" world of full financial market liberalization and development, and capital account convertibility.

That said, their market-oriented nature does make them less distortionary and more transparent than other capital controls in the form of a direct quantitative restriction. Moreover, the empirical results presented in this paper, while based on a small sample and therefore hardly conclusive, suggest that these measures can have at least some temporary effect in reducing inflows. Nor does their use incur the heavy fiscal costs or upward pressure on local interest rates that would be associated with exclusive use of open-market operations.

In summary, developing countries that are engaged in the process of domestic financial sector reform and capital account liberalization may need additional instruments in their policy arsenal to deal effectively with destabilizing capital movements when they arise. Classic open-market operations may need to be accompanied by other supplementary sterilization measures or other measures to turn the flows aside. While the long-term objective must be to achieve a fully market-based system of policy management, there is a case for making capital controls a part of second best policy-making during the transition. This is likely to be the case particularly in a small open economy where adverse spill-overs from unsynchronized macroeconomic policies pursued by bigger economies are often felt to be uncontrollable.

Survey of Country Experience

Although a high and unstable rate of capital inflow has been experienced by many countries, the experience of the following six countries is particularly noteworthy because the exceptional rate of inflow has diminished the effectiveness of the monetary control framework and threatened the general approach to economic management. The authorities also relied on an interesting monetary policy mix: various direct sterilization measures and capital controls combined with classic open-market operations. 1/

1. Korea

The surge in capital inflows in Korea has coincided with the accelerated pace of financial liberalization and market opening process since 1991. That year, when the authorities eased restrictions on capital inflows such as foreign bond issuances by domestic corporations, the capital account began to register a surplus of \$4.2 billion (up from \$0.8 billion in the previous year), of which \$3.1 billion consisted mainly of portfolio-type investment flows. The next year, the surplus rose sharply to \$8.3 billion, owing again mostly to the sharp increase in portfolio investments after Korean stock markets were opened directly to foreign investors for the first time. 2/ Another important factor behind the surge in capital inflows was the decline in world interest rates which raised the national interest rate differential vis-à-vis overseas in Korea's favor. Chart 1(a) shows a direct correlation between the movements in the interest rate differential and private capital flows. A larger amount of foreign capital continued to flow into the country in 1993. 3/ Foreign investors' confidence in the Korean economy greatly improved after the government's announcement of the comprehensive financial liberalization plan ("Blueprint"); its main contents included a further liberalization of foreign exchange and capital transactions.

Owing to capital inflows and the resulting enlarged pool of investable funds, Korea could finance its current account deficits and also afford high investment and rapid growth. To a certain degree, they also contributed to the sustainability of the financial liberalization program because the country could avoid the much-feared surge in domestic interest rates in the initial stages of interest rate deregulation. 4/ However, as the large

1/ For the experience of other capital-recipient countries, see IMF (1995c) and Schadler, Carkovic, Bennett, and Kahn (1993).

2/ Portfolio investments amounted to \$5.7 billion in 1992.

3/ In 1992 alone, foreigners invested some \$2.1 billion in Korean equities. By the end of 1993, foreigners' net investment into the stock market amounted to \$7.8 billion.

4/ During 1993, for example, the overall balance of payments registered a surplus of US\$7.4 billion, which was financed through a US\$10.4 billion capital account surplus and US\$3.0 billion current account deficit.

CHART 1
CAPITAL FLOWS AND COVERED INTEREST DIFFERENTIAL

capital account surplus persisted during 1994, together with a rapidly shrinking current account deficit, the disruptive effects of the excess capital inflows were easily noticeable everywhere. In 1993, for example, the Bank of Korea's net foreign assets increased by 44.5 percent, up from its average growth rate of 17.1 percent in the previous three years; this was due largely to the central bank's foreign exchange market intervention. Another important factor contributing to the rapid growth of the central bank's foreign assets was Korea's rather strict system of foreign exchange surrender requirement (so-called foreign exchange concentration system). All Korean companies' were required to sell their exchange earnings to designated foreign exchange banks, which then had to offer them for sale to the central bank. Accordingly, pressures from the foreign sector for monetary expansion intensified (see Table 2). Even the authorities' aggressive sterilization policies could not prevent the actual increase in broad money (M2) from exceeding the target range of 13-17 percent growth, which had traditionally been quite rigidly adhered to as a principal intermediate target. Inflationary pressures were also becoming evident: consumer price inflation rose sharply to 9.25 percent in 1991 and did not moderate until 1993, when economic activity slowed down significantly. In addition, there were re-emerging signs of speculative activities in the real estate market, which had already experienced price increases of over 25 percent during 1987-89.

From the policymaker's standpoint, another challenge was that large capital inflows combined with improving current account balances exerted significant upward pressure on the exchange rate. The authorities were concerned that currency appreciation could lead to a substantial erosion of the external competitiveness of the economy. Thus, they used sterilized intervention heavily as a means to mitigate the impact of large capital inflows on the rising value of the Korean won. Sterilization operations were conducted mainly through open-market sales of Monetary Stabilization Bonds (MSBs), central bank securities, and Foreign Exchange Stabilization Fund Bonds (FESFB), and government securities. ^{1/} To a certain extent, the sterilized intervention policy contributed to the small depreciation which actually occurred in the second half of 1992. However, the central bank's capacity to sterilize capital inflows over an extended period of time was limited by the relatively thin and illiquid domestic markets in government securities, as well as the rising cost of debt service. Other structural deficiencies that discouraged the holding of the securities by a wider body of investors included the authorities' practice of issuing MSBs

^{1/} At end-1992, the outstanding stock of MSB, FESFB, and treasury bills amounted to won 20.3 trillion, won 5.5 trillion, and won 1.6 trillion, respectively. The comparable amounts at end-1988 were won 7.2 trillion, zero, and 0.5 trillion, respectively.

Table 2. Korea: Sectoral Composition of Supply in Monetary Indexes 1/
From July 1992 to November 1993

(In billions of Won)

	Base Money					M2				
	Deposit Money					Loans to Private				
	Banks		Foreign Sector			Sector			Foreign Sector	
	Total	Value	Ratio	Value	Ratio	Total	Value	Ratio	Value	Ratio
<u>1992</u>										
July	15,151.1	13,970.3	92.2	12,014.3	79.3	87,312.2	94,348.7	108.1	9,652.7	11.1
September	16,115.2	17,044.3	105.8	11,927.8	74.0	89,345.8	97,058.7	108.6	10,363.9	11.6
December	18,107.3	16,405.6	90.6	13,529.7	74.7	96,258.6	97,352.7	101.1	12,142.0	12.6
January- December <u>2/</u>	1,785.6	3,446.3	193.0	3,094.9	173.3	12,512.7	12,067.0	96.4	4,066.2	32.5
<u>1993</u>										
January	17,264.1	16,592.5	96.1	14,073.7	81.5	96,590.9	98,560.4	102.0	12,060.6	12.5
April	17,787.6	15,082.7	84.8	14,888.7	83.7	99,312.9	100,692.3	101.4	13,779.9	13.9
July	18,691.4	15,634.4	83.6	15,131.0	81.0	102,285.8	128,684.8	125.8	14,736.8	14.4
October	20,372.6	16,174.8	79.4	16,157.9	79.3	108,949.0	131,790.8	121.0	16,415.9	15.1
November	20,105.8	16,644.1	82.8	17,392.6	86.5	108,948.4	132,830.7	121.9	17,165.8	15.8
January- November <u>2/</u>	1,998.5	238.5	11.9	3,862.9	193.3	12,689.8	35,478.0	279.6	5,023.8	39.6

Data: The Bank of Korea, Money and Finance, various issues.

1/ Based on outstandings.

2/ Based on increases.

at below-market interest rates and the inadequate broker/dealer network in the securities market, which in turn made the MSBs and FESFBs unattractive assets. ^{1/}

Other monetary instruments--a tighter rediscount facility and higher reserve requirements--could not be effectively used to help deal with the substantial inflow of foreign funds. Because of the authorities' historical inclination to use rediscount policy for industrial policy purposes rather than for monetary management purposes, rediscount rates charged on commercial banks' access to the refinancing facilities were generally very low, thereby subsidizing loans to priority sectors. Moreover, the rediscount ratio, which determines the upper limit on the proportion of bills that can be rediscounted at the Bank of Korea, could not be flexibly changed at the central bank's own initiative. In other words, due to the automatic feature of the central bank refinancing facility, the amount of rediscount credit that could be adjusted for liquidity control purpose was only a small portion of total rediscount. Only in a few cases did a tightening of rediscount policy occur through changes in the rediscount ratios, rather than interest rates. For example, during the period 1988-89, when Korea's current account recorded a large surplus, the central bank could not resort to a large contraction of rediscounting of foreign trade loans, which had occupied a major portion of the central bank's refinancing facilities. Also, raising the required reserve ratio on bank deposits, which had been frequently done in the past, was not a feasible option either, because the ratio had already been increased several times to a fairly high level on account of earlier sterilization efforts during the 1987-89 record-high current account surplus.

Therefore, the monetary authorities were not properly equipped with reliable instruments to deal with the monetary impact of the rapid increase in foreign reserves. Fearful of the potential credibility loss associated with the reversal of financial reform, they could not resort to more traditional means of direct credit control (e.g., bank-specific credit ceilings), which would have made the transition to a market-based monetary control framework more difficult. As an alternative policy response, the authorities could have taken further steps to liberalize capital outflows in order to counterbalance the capital inflows. In fact, they repaid the external public debt ahead of payment schedule and eased restrictions for overseas portfolio investments by certain institutional investors. However, these policy initiatives were not effective either, mainly because in situations of high domestic interest rates and stable exchange rates such foreign investments did not look attractive compared to local investments.

Being seriously deprived of proper instruments, the Korean monetary authorities finally developed several new policy instruments called

^{1/} The issue rate for MSBs was liberalized in late-1993, and the previous practice of mandatory allocation of MSBs was replaced by on-tap selling at market-related rates.

"indirect exchange controls," although to date, these have yet to be used. Instead, they have been added to the arsenal of policy weapons as part of the "safeguard measures" for future against the full convertibility in capital account if such a course seems necessary. These include variable deposit requirements (VDR) on foreign borrowings and the central bank's swap facility.

In part, these measures resulted from the recognition that the two incompatible objectives of monetary policy, i.e., maintaining a competitive exchange rate and, at the same time, a reasonable rate of reserve money growth that can manage domestic demand, can only be reconciled through some form of exchange controls. A more important consideration, however, was the *indirect* or *market-oriented* nature of the exchange controls. Such controls do not place an absolute embargo on foreign borrowings; instead, they only make them less attractive by affecting the terms at which such transactions are agreed.

2. Chile

The first wave of capital inflows arrived in Chile in 1990, when the central bank sought to reduce the level of aggregate demand by raising interest rates sharply. 1/ The wider interest rate differential caused a marked increase in short-term capital inflows, which resulted in a surging capital account surplus to over US\$3.0 billion, up from \$1.3 billion in the previous year (see Chart 1(b)). The authorities' effort to limit currency appreciation followed, but the central bank's purchases of foreign exchange led to a sizable build-up of foreign reserves. 2/

In order to contain the monetary effect of the increase in foreign reserves associated with the foreign exchange market interventions, the authorities sought to sterilize a portion of them. This was reflected in the substantial contraction in net domestic assets of the central bank in 1990. 3/ This contraction was accomplished mainly through a placement of the central bank's promissory notes with the rest of the financial system. This aggressive sterilization, however, did not appear to have pushed domestic interest rates up at least until early 1991. This was due to the tightening of fiscal policies which had a restraining effect on inflation expectations and interest rates. Another reason why the covered interest differential (the differential adjusted for forward exchange rate

1/ The central bank's reference rate increased by about 2 percentage points to 8.7 percent in January 1990, pushing the commercial bank lending rate to a peak of 16.5 percent.

2/ The net international reserves of the central bank increased from US\$ 2,425 million at end-1989 to US\$ 4,819 million at end-1990 (a 99 percent increase), and to US\$12,893 million at end-1994 (a 432 percent increase).

3/ This decrease in net domestic assets amounted to -414 percentage points change with respect to the central bank's liabilities to the private sector at the beginning of the period.

premia) remained quite stable throughout the inflow period was that the exchange rate was depreciating on a sustained basis, fostering expectations of a peso depreciation. 1/ This permitted the negative effect of the anticipated exchange rate changes to offset the positive effect of the rising interest rate on the covered interest differential (see Chart 1(b)). 2/ However, the adjusted interest rate differential subsequently rose again in March 1991 as a result of aggressive open market operations, which led to higher domestic interest rates, and thus attracted additional capital inflows during the first half of the year.

The authorities then took further steps to stem inflows of short-term capital. To eliminate the favorable tax treatment of foreign borrowing, a stamp tax of 1.2 percent was imposed on capital inflows. 3/ Also, in an attempt to raise the cost of foreign borrowings by domestic residents, the authorities imposed a nonremunerated 20 percent reserve requirement on all new foreign borrowings by commercial banks or by financial corporations, except certain trade credits (June 1991). The extension of the reserve requirement to all outstanding foreign credits, except certain trade credits, was phased in during the following six months. It is also worth noting that the authorities took measures to encourage capital outflows: for example, commercial banks were permitted to increase external trade financing in foreign currency and use up to 60 percent of foreign currency time deposits for that purpose. 4/

To a certain degree, these control measures helped to contain the surge in short-term private capital inflows during the second half of the year. However, capital inflows gained strength again during the first half of 1992, when the interest rate differential widened further on account of rapidly falling interest rates in industrial countries. This wide interest differential was also attributable to the increase in central bank interest rates in 1992 that aimed to curb the then-accelerating domestic expenditure.

In mid-1992, the central bank undertook more aggressive sterilization measures to limit the growth of domestic credit in the face of rising net foreign assets: the central bank sold a large amount of promissory notes on the financial markets. In addition, the authorities tightened exchange controls further: the reserve requirement on foreign borrowings was extended to foreign currency deposits (January 1992); the reserve requirement ratio was increased from 20 to 30 percent for all foreign

1/ In Chile, the data on forward exchange rate premia are not available. However, an approximate measure can be calculated by using the actual ex post data on spot market exchange rates.

2/ Between end-1998 and end-1990, the peso depreciated steadily by about 20 percent. Accordingly, the covered interest differential (using the actual exchange rate data ex post instead of unavailable forward exchange rates) fell significantly during the same period.

3/ See IMF (1995b) for details.

4/ See Schadler (1993) for details.

liabilities of banks (May 1992); reserve deposits on direct borrowings abroad by Chilean firms were required to be held for one year regardless of the maturity of the credit, although the reserve requirement was maintained at 20 percent; the 30 percent ratio and the minimum withholding period (one year) were extended to all foreign loans (August 1992). Finally, controls on private capital outflows were relaxed: investment abroad by private pension funds was allowed, and the maximum period for advance purchase of foreign exchange to external debt was lengthened from 10 to 90 days before the due date (March 1992).

Among these measures, the increase of nonremunerated reserve requirements on overseas borrowing was deemed the most effective policy response for the following reasons: (i) it could be imposed relatively easily and quickly, especially when most of the inflows took the form of *short-term external borrowings by commercial banks*; (ii) it automatically discriminated against shorter-term inflows as it applied for a period of one year regardless of the maturity of the borrowings or deposits; and (iii) it helped offset the *quasi-fiscal costs* which the central bank incurred as a result of its aggressive open-market operations. Hence, it could be seen also as an automatic sterilization device which obviated the need for other costly sterilization measures and increased central bank profits. Indeed, owing to the nonremunerated feature of reserve requirements, central bank operating losses, which had resulted mainly from the low yields on the portfolio taken over through the open-market operations, declined from 2.3 percent of GDP in 1990 to 0.9 percent in 1991, and have remained at about this level since then.

The authorities did not resort to any discernible exchange rate policy at the outset of the surge in capital inflows. However, after recognizing the need to permit greater exchange rate flexibility, the authorities adopted a "wide-band policy"--i.e., they allowed the exchange rate to move within the widened band of 10 percent on either side of the reference rate, and revalued the reference exchange rate in three steps for a total appreciation of 8.4 percent by January 1992. ^{1/} The main purpose of the increased flexibility in exchange rate policy was to discourage the speculative component of capital flows by increasing the perceived risk of short-term exchange rate fluctuations. Also, the resulting exchange rate appreciation helped limit inflation to targeted levels. ^{2/}

Following the revaluation of the Chilean peso and the introduction of the control measures described above, the net inflows of capital decreased from 7.5 percent of GDP in 1992 to 5.9 percent in 1993, reflecting a significant drop in short-term capital inflows from 4.5 percent of GDP to

^{1/} Note that the exchange rate appreciation also had the desirable effect of preemptively mitigating some of inflationary pressures.

^{2/} See Schadler (1993), pp. 14-15, for detailed discussions on the exchange rate flexibility as a common policy response to a surge in capital inflows.

2.4 percent of GDP during the same period. However, the short-term capital inflows surged again in the last quarter of 1994, and the Chilean capital account surplus once again approached 7.6 percent of GDP in 1994. ^{1/} After dropping briefly in the first quarter of 1995, large capital inflows resumed in the second quarter of 1995. As in the previous episodes, the authorities responded by taking a number of measures aimed at further discouraging capital inflows: the Central Bank strengthened regulations to close loopholes of the 30 percent deposit requirement (June 1995) ^{2/}; it also extended the coverage of the deposit requirement to include some form of foreign direct investment--investment flows that do not represent an increase in the capital stock of Chilean firms but only the transfer of ownership from residents to nonresidents, such as foreign purchases of existing stocks, bonds, and American Depository Receipts (ADRs) (July 1995). The authorities also pursued further liberalization of capital outflows: the ceiling on foreign investment by private pension funds was increased to 9 percent of their assets; the pension funds were allowed, for the first time, to invest in foreign equities (May 1995); commercial banks were allowed to invest abroad up to 25 percent of their capital and reserves, and also the rating requirements for foreign financial investment by commercial banks were lowered (July 1995).

The Chilean experience described so far does confirm the recurring theme in the text: the controls on capital inflows do help suppress short-term capital inflows temporarily, but they may become progressively ineffective and have to be intensified as market participants find ways to circumvent them.

3. Colombia

As in other Latin American countries, since 1990, macroeconomic management in Colombia has been complicated by large inflows of foreign capital. Mostly as a result of a tight money/credit policy and the reduced pace of nominal depreciation in the second half of 1990, the favorable interest differential attracted substantial capital inflows. The 1990 tax reform (which granted an amnesty to repatriated profits and dividends from residents' foreign investments) and the oil discovery also contributed to the large increase in the current account surplus and in private capital inflows. A special feature of the Colombian experience is that much of the capital inflow was concealed in the current account surplus, particularly as private transfers: transfers including workers' remittances rose by more than US\$600 million to US\$1.7 billion in 1991. Under the strict system of surrender requirements on foreign exchange proceeds, the large increase in the current account surplus and in private capital inflows automatically

^{1/} The large capital inflows were also spurred by the favorable outlook for world prices of Chile's main exports.

^{2/} The main focus of this new regulation was to rectify the possible misreporting of debt flows as financial investment or equity, and as conversion of domestic stocks to ADRs.

translated into a sharp rise in foreign reserves of the central bank. 1/ The large surplus in the overall balance of payments led also to a marked strengthening in the commercial banks' ability to supply funds to domestic financial markets; thus domestic liquidity increased significantly. This added to the inflationary pressures which were already high as inflation rose to 32 percent in 1990 from the previous five-year average of 24 percent. 2/

As in other capital-recipient countries, monetary policy during 1991 aimed to reduce inflation by limiting the growth of liquidity through sterilization operations. These operations to neutralize the monetary effect of the build-up of foreign reserves were composed mainly of three restrictive measures: (i) a 100 percent marginal reserve requirement was imposed on all new private sector deposits with the financial system, except for those in savings and loan institutions (January 1991); (ii) a sizable amount of open-market securities was placed, the stock of which doubled to approximately 60 percent of the monetary base during the year of 1991; and (iii) noninterest bearing exchange certificates were issued in exchange for all exports proceeds (June 1991).

Since central bank paper (Banco de la Republica bonds) was counted toward the meeting of reserve requirements, the imposition of high marginal reserve requirements created a "captive" market for the paper. This facilitated sterilization efforts through open-market-type operations. These operations, however, turned out to be costly as the central bank bonds yielded between 18 and 33 percent, and as an increasing share of financial system liabilities became subject to the marginal reserve requirements. 3/ In September 1991, the marginal reserve requirements were replaced by the previous system of average monetary reserve requirements on demand and time and savings deposits, with higher ratios this time. 4/

In addition, sterilization efforts through open-market sales were supported by the issuance of dollar-denominated exchange certificates by the central bank (June 1991). These noninterest-bearing certificates were exchanged for export and most other foreign exchange receipts which were subject to "surrender requirements;" upon maturity (of 360 days), they could be redeemed at the central bank's official reference exchange rate. They

1/ The gross international reserves of the Banco de la Republica rose to US\$6.6 billion, or nine months of imports of goods and services in 1991.

2/ Foreign assets of the monetary authorities rose from the two-year average of Col\$1,473 billion before 1990 to Col\$2,665 billion in 1990. The reserve money accordingly increased from the two-year average of Col\$1,355 billion to Col\$2,077 billion.

3/ By September 1991, nearly 5 percent of financial system liabilities became subject to the marginal reserve requirements.

4/ As a result, the monetary reserves in relation to financial system liabilities, which had ranged between 8 and 10 percent during the previous four years, rose to 13 percent at end-1991.

could also be sold to the central bank before maturity at a discount rate of 12.5 percent from the official reference rate. The combined placement of exchange certificates and open-market bills during 1991 was equivalent to slightly less than the build-up of net international reserves during the year.

The pursuit of such aggressive sterilization policy, however, led to some unintended side effects. First, the heavy placements of open-market bills led to a rise in their interest rates to a peak of almost 47 percent in mid-1991. This increase, combined with a decline in foreign interest rates, spurred further capital inflows. As the rate of nominal depreciation of the peso slowed down further during 1991, the interest rate differential adjusted for the exchange rate expectation (the so-called uncovered interest rate differential) also widened. Second, the aggressive sale of open-market securities led to an increased cost of debt service and thereby to a deterioration in the quasi-fiscal position of the central bank. 1/

The authorities significantly reduced the open-market placement of securities in the following year. Instead, they sought to counterbalance the capital flows by relaxing controls on outflows, or accelerating the trade reform that would raise imports: they speeded up the planned schedule of tariff reduction; also, the strict system of exchange surrender requirements was relaxed substantially to enable exporters to use their foreign exchange accounts abroad to pay for imports or to invest in financial assets abroad. 2/

These policy changes implied that the main objectives of monetary and exchange rate policy shifted toward the reduction of domestic interest rates and, at the same time, weakened expectation of currency appreciation. Accordingly, the interest rate differential adjusted for exchange rate change (covered interest rate differential) fell markedly in mid-1992; thus the pace of private capital inflows decelerated substantially. Colombia's experience suggests that if a country's capital account is sufficiently open, sterilization attempts tend to have limited effectiveness, as additional capital inflows respond quite sensitively to a widening interest rate differential. Under these circumstances, less conventional measures were employed. Indeed, when the capital inflows gathered momentum again in 1993, the authorities imposed an effective tax in the form of nonremunerated deposit requirements (VDR) of 47 percent on all foreign loans with a maturity of 18 months or less (September 1993). Also, as in Chile, the Colombian authorities instituted a "wider-band" exchange rate policy to allow greater exchange rate flexibility. 3/ Despite these restrictions on foreign borrowing, the private sector's medium-term indebtedness doubled in

1/ The quasi-fiscal position of the Banco de la Republica deteriorated from near equilibrium in 1990 to a deficit of about 0.8 percent of GDP in 1991.

2/ See Schadler et. al. (1993) for details.

3/ See IMF (1995c) and Schadler et. al. (1993) for details.

1994, in part because borrowers moved to longer maturities to avoid the deposit requirement. The controls on external borrowing, therefore, were made more strict: the requirement was not only extended to loans with maturities of up to three years, but also a higher deposit ratio was applied to loans with a maturity of one year or less (March 1994); the maximum maturity of the loans subject to the VDR was later extended to five years (August 1994).

4. Spain

The surge of capital inflows during 1987-92 can be attributed to basically two factors: the liberalization of policies regulating international capital flows and a tightening of monetary policy. One of the most important liberalization measures in late-1986 and early-1987 was the relaxation of the restrictions on foreign loans to the private sector, which induced significant capital inflows in the form of *private credit*. At the same time, the adoption of a restrictive monetary policy stance combined with the interest rate liberalization during the first half of 1987 induced a substantial increase in domestic interest rates. This resulted in a wider interest differential between domestic and overseas markets. Also, the persistent appreciation of the peseta's exchange rate, which originated mainly from the impressive performance of the Spanish economy, led to the strong expectation of further peseta appreciation. This change in exchange rate expectation reinforced the widening trend in the interest differential adjusted for expected change in exchange rate, thereby attracting large endogenous capital inflows (see Chart 2(a)). 1/

When private capital inflows reached an historical record in mid-1987, the authorities introduced one liberalization measure to encourage capital outflows and three restrictive measures to sterilize the monetary effects of the inflows: the partial liberalization of Spanish investment abroad (including real estate investments); the imposition of reserve requirements on nonresidents' Spanish bank accounts in convertible pesetas (April 1987); the prohibition of short-term repurchase agreements by nonresidents on domestic financial assets; and the limitation of short-term foreign financial loans through the raising of the minimum maturity of loans which did not require prior authorization (June 1988). 2/ As Chart 2(a) shows, these measures limiting the inflows turned out to be very effective in preventing capital inflows, especially portfolio investment flows and direct credit flows which are sensitive to the change in the covered interest

1/ Deviations from covered interest rate parity reached a maximum of 12 percentage points in the third quarter of 1987.

2/ Foreign loans with maturity of less than three years became subject to prior authorization.

CHART 2

CAPITAL FLOWS AND COVERED INTEREST DIFFERENTIAL

Source: IMF, International Financial Statistics.

differential. 1/ Toward end-1988, however, as interest rates started rising again and the capital controls became binding, the authorities supplemented the restrictions on inflows with stronger measures to encourage capital outflows. In this context, they fully allowed companies engaged in portfolio investment activities to invest abroad and abolished ceilings on foreign real estate investment (December 1988).

As the surge of capital inflows was not interrupted, two additional control measures were taken at this point. First, the authorities imposed a special reserve requirement on foreign borrowings to dampen the capital inflows, i.e., a nonremunerated reserve requirement of 30 percent on new foreign loans to residents, and 20 percent on banks' net foreign currency borrowing (January 1989). Second, in an attempt to stem the appreciation of the peseta induced by the capital inflows, the Government decided to enter the ERM in June 1989. This measure was designed to brake expectations of further appreciation of the peseta, and thereby to reduce the interest rate differential adjusted for expected exchange rate changes.

Of these two measures, the impact of the nonremunerated deposit requirement on capital inflows was most apparent: net foreign borrowing by residents--provided directly from abroad or indirectly by Spanish banks--declined from Ptas 512 billion in 1988 to Ptas 73 billion in 1989. In particular, the imposition of 30 percent noninterest-bearing deposit with the Bank of Spain on new foreign borrowing by private enterprises was very effective in limiting that specific form of capital inflow. This was reflected in the marked deceleration of the market for medium- and long-term bonds of domestic nonfinancial enterprises throughout 1990. 2/

However, as nonremunerated deposit requirements were not regarded as compatible with EC provisions, this type of exchange control was later eliminated: the 20 percent reserve requirement was abolished in March 1990, and the 30 percent reserve requirement was also abolished in March 1991. The removal of capital controls on financial investments by nonresidents was also prompted by the fact that the controls gradually ceased to be effective as market participants found alternative ways to circumvent them. For example, loans granted by foreign firms to their Spanish subsidiaries and

1/ The portfolio investment and direct credit flows decreased sharply from 366 billion pesetas in the third quarter to 138 billion pesetas in the fourth quarter of 1987. Accordingly, total net private capital inflows during the same period decreased from pesetas 482 billion to pesetas 275 billion.

2/ The 20 percent nonremunerated deposit requirement imposed on Spanish banks' short open foreign exchange position raised the cost of foreign borrowing by 25 percent. This measure also reduced the ability of nonresidents to speculate against the peseta, because Spanish banks reduced the swap rate offered to nonresidents and therefore the incentives to buy pesetas.

classified as direct investment were not affected by the deposit requirement, and thus became an avenue for circumvention. 1/

During 1990, despite the joining of Spain to the ERM, there was a process of continuous appreciation of the peseta resulting from high interest rate differentials. This movement in the exchange rate induced the central bank to intervene massively in the foreign exchange market, which led to a large accumulation of net official reserves. In addition, the monetary authorities, who were reluctant to let the money supply grow by the corresponding amount of accumulated reserves, resorted to an aggressive sterilization policy. The main instruments of this policy were open-market sales of certificates of deposit issued by the Bank of Spain and 10-day repurchase agreements using certificates of deposit. As happened before, this tight monetary policy, combined with the exchange rate developments (i.e., the process of continuous appreciation of the peseta against all ERM currencies) that fostered further expectation of the peseta's appreciation, prompted another wave of large capital inflows which reached their peak in early 1991 at 6.6 percent of GDP. The removal in March 1991 of the last capital controls, in particular the 30 percent reserve requirement on foreign borrowing by the nonfinancial sector, also contributed to the capital inflow.

However, with the outbreak of the Middle East conflict toward mid-1991, the peseta depreciated sharply due to Spain's high dependence on imported oil. The rapid change in expectations of the prospects of the Spanish economy and of the currency value in future, in particular, resulted in large outflows of foreign capital. The expectations of a depreciation of the peseta during this period and the following ERM crisis in mid-1992 stemmed also from a lax fiscal policy stance compared with other countries in the European Monetary System. Although the ERM constraints implied a shift in emphasis toward fiscal policy as the main control instrument, the fiscal stance was more expansionary than could be sustained by the central bank's ability to extend credits to the Government. 2/

In order to defend the peseta, the authorities basically had three policy options. First, without abandoning the ERM, the central parity of the peseta could be devalued. During the ERM crisis of September 1992, however, the 5 percent devaluation of the peseta alone was not able to stem further speculative movements against the peseta. Second, the authorities could raise interest rates to the point where expectations of devaluation were compensated by high domestic interest rates. However, this option of very high interest rates, even when it was credible, could jeopardize the recovery of the Spanish economy. The last available option to prevent a speculative attack was to impose capital controls on short-term capital movements--this was actually chosen by the Spanish authorities.

1/ See Galy (1993) for detailed discussions on the effectiveness of capital controls in Spain.

2/ See Galy (1993) for detailed discussion.

Specifically, the authorities reintroduced the following capital controls to hinder the capital outflows: (i) a compulsory, noninterest-bearing deposit equivalent to 100 percent of the increments in the long position in foreign exchange; (ii) a deposit with the same characteristics of the increments in loans and deposits of nonresidents denominated in pesetas; and (iii) a marginal reserve requirement ratio of 100 percent on peseta-denominated liabilities of domestic banks with their branches, subsidiaries, and parent companies. 1/ These measures, like a proportional tax on interest earned in foreign currency, were designed to discourage speculative capital outflows. There is some evidence that between September and November 1992, these controls were, at least temporarily, effective in preventing capital outflows. 2/

The lesson to be drawn from the Spanish case is that, capital controls, while initially effective in preventing currency speculation against the peseta provided only temporary relief. No doubt this was due largely to the high degree of capital mobility after Spain joined the ERM, and to the relatively highly developed nature of Spanish financial markets.

5. Thailand

In 1989, Thailand's economy continued to expand rapidly. The external current account deficit widened to about 3 percent of GDP. The deficit, however, was more than financed by a very large inflow of foreign capital and the overall balance of payments recorded a sizable surplus \$3.9 billion in 1989, up from \$1.5 billion in 1988. The increase in the capital inflow was fueled mainly by private capital flows, which accounted for approximately 89 percent of the total capital inflow. Most of the inflows were in the form of private sector loans which almost doubled to \$3.4 billion in 1989, up from \$1.8 billion in 1988. The rapid growth in private sector loans was attributable, among other factors, to the growth in investment demand and to an exemption from withholding tax of interest payments on long-term foreign loans. This withholding tax exemption was introduced in mid-1988 as part of the authorities' efforts to encourage

1/ The first measure, which prevented exporters and importers from covering their operations against the exchange rate risk, was later replaced by the requirement of a compulsory one-year, noninterest-bearing deposit of 100 percent of the banks' increment of net sales of pesetas against foreign exchange to nonresidents and on the forward sale of foreign exchange against pesetas to nonresidents. In this way, the measure attempted to penalize only swap operations of nonresidents against the peseta.

2/ See IMF (1994) for detailed discussion on the effectiveness of capital controls during July-December 1992. By examining the onshore-offshore differential, this study concludes that the controls were at least somewhat successful in impeding the capital movements. Fieleke (1993), however, draws a slightly different conclusion on the efficacy of the capital controls in Spain, noting that in the end, the authorities were required to devalue the peseta.

accommodative monetary policy aimed at financing high rates of economic growth through foreign borrowings. Attracted by the economy's strong performance and stable conditions, direct foreign investment also increased by 41 percent in 1989. The increases resulted partly from external factors such as the strengthening of the Japanese yen and the rapidly rising labor costs in other regional competitor countries since the mid-1980s. However, major factors in the surge in inflows were considered to be the interest rate differentials vis-à-vis overseas and the relatively stable exchange rate of the baht. Interest differentials adjusted for exchange rate changes (covered interest differentials) widened sharply during the third and fourth quarters of 1988, and, with a short lag, the surge in private capital inflows followed (see Chart 2(b)).

As a consequence of such inflows and the resulting accumulation of net international reserves, the growth of the monetary aggregate in Thailand accelerated significantly in 1989. 1/ 2/

In order to reduce excess liquidity resulting from the capital inflows, the Bank of Thailand initially resorted to traditional instruments of monetary control, such as a higher rediscount rate and more restricted access to the refinancing facility. When the Bank of Thailand increased its rediscount rate from 8 to 12 percent at end-1990, the amount of commercial banks' refinancing was reduced from 100 percent to 50 percent of the face value of the qualifying notes. The monetary authorities also pursued a sterilization policy through open-market-type operations. Such operations were conducted mainly through issuance of central bank papers and government bonds repurchases. These operations are estimated to have absorbed, on average, 14 percent of the reserve money growth from net foreign assets during 1988-91. However, the main factor contributing to the slowing down of the reserve money growth during this period was public sector credit, the growth of which declined from -6.2 percent in 1987 to -35 percent on average during 1988-91. The remarkable improvement in the overall surplus of the

1/ The net international reserves held by Thailand's monetary authorities almost doubled to \$4.3 billion during 1989, and the growth of broad money accelerated from 18 percent in 1988 to 26 percent in 1989.

2/ One of the policy challenges for Thai monetary policy was the growth of broad money which significantly accelerated in 1989, while reserve money growth increased at a pace only slightly higher than in 1988. This implies that the money multiplier of broad money increased markedly during the initial surge in inflows. One of the reasons why the relationship between the growth in monetary base and the growth in the broad monetary aggregate became unstable was the sharp increase in asset prices during the capital inflows episode and the resulting wealth effect on expenditure. In the presence of this wealth effect, the growth in monetary base that would be appropriate to achieve a given monetary policy target can cause too rapid a growth in broad money.

consolidated public sector, as reflected in the rising government deposits with the Bank of Thailand, was made possible by strong fiscal restraint measures and a cyclical recovery in revenue.

On the other hand, sterilization operation which pushed up domestic interest rates at a time when foreign rates fell sharply, attracted additional inflows toward end-1990 (see Chart 2(b)). The increasing openness of the Thai capital account at that time also contributed to the additional inflows. Policy responses to the inflows now included the following three measures: (i) regarding the lower interest rate differential as being the key to the reduction of the private sector foreign loans, the authorities decided to eliminate implicit subsidies in the interest cost of foreign loans, namely, a 10 percent withholding tax on interest payments to nonresidents, which had been suspended two years earlier, was reimposed in March 1990; (ii) to ease restrictions on capital outflows, the authorities permitted residents to open foreign exchange accounts with commercial banks in Thailand and to transfer freely up to \$5 million abroad for direct investment in April 1991; and (iii) to absorb capital inflows through an increased deficit in the current account, most of the existing import barriers were liberalized, along with major tariff reduction. These policy adjustments, along with the above-mentioned fiscal restraint, successfully moderated the surge in capital inflows by 1992.

A major point that stands out in Thailand's policy response was the sustained tightening of fiscal policy during the capital inflows episode. The growing budget surplus, reflected in rising, sizeable government deposits with the central bank, was the main factor offsetting the contribution to reserve money growth from the balance of payments surpluses. ^{1/} The decline in net claims on Government helped limit the growth of net domestic assets in reserve money, thus exerting downward pressures on nominal and real domestic interest rates.

6. Indonesia

Indonesia is an interesting example of a country that has experienced strong fluctuations in foreign capital flows since late 1980s. The monetary policy stance, that dealt both with the volatile liquidity and the exchange rate pressures associated with the recurring capital inflows and outflows, changed frequently. For example, monetary policy shifted to protecting the exchange rate during 1987-88, when the speculative capital outflows exerted strong downward pressure on the rupiah's exchange rate. ^{2/} Indirect monetary instruments, such as open-market operations using central bank paper (SBIs) and the discount window facility, were available to the Bank of Indonesia (BI). These instruments, however, were

^{1/} The decline in net claims on Government offset, on average, was 60 percent of the contribution to reserve money growth from net foreign assets during 1988-91.

^{2/} For further discussions, see Bisat, Johnston, and Sundararajan (1992).

only at their embryonic stage of development. The central bank's swap operations in the foreign exchange market became the main monetary instrument. By allowing banks to convert their foreign exchange position into rupiah under forward cover, the central bank attempted to curb the substitution of foreign asset for domestic asset by Indonesia banks, and effectively encouraged capital inflows.

Together with high domestic interest rates associated with the further tightening of monetary policy toward end-1990, these swap operations were prime suspects behind the large increase in private capital inflows during September 1990-May 1991, when the BI's provision of the swap facilities became excessively large, providing greater incentives for banks' offshore borrowings. The central bank discontinued using the foreign exchange swap operations rather belatedly (October 1991), and imposed direct, quantitative controls on all foreign borrowings: annual ceilings for commercial borrowing, with subceilings for individual sectors were set by the Debt Management Team. To contain the rapid expansion of bank credit, it also strengthened banking supervision and prudential regulation, particularly on the maintenance of adequate liquidity, mandatory provisioning for nonperforming assets, and banks' foreign exchange exposure. Despite these restrictive measures, the capital inflows did not moderate until 1993, when the central bank acted to reduce domestic interest rates and thereby narrowed the national interest differential. 1/

1/ The lowering of official interest rates was done mainly by the gradual, but steady, reduction in the cut-off rate in the central bank paper (SBI) auctions.

Table 3: The Mix of Sterilization Instruments for Selected Countries

Country	Market Operations	Reserve Requirements	Refinance Facilities	VDR or taxes	FX or Swap Operations
Chile	Open market-type operations using central bank paper (1-year promissory notes) were gradually intensified during 1990-1992. Longer-term promissory notes (4-, 6-year) were placed (April 1992). Raised the real annual interest rate posted by the central bank on auction of its 90-day indexed promissory notes (reference rate) (August 1992). More active use of repurchase agreements (RP) was introduced (1993).	The 20 percent reserve requirement on foreign borrowing was extended to foreign currency deposits (January 1992).		A stamp tax of 1.2 percent was imposed on capital inflows (June 1991). A nonremunerated deposit requirement of 20 percent imposed on all new foreign borrowings by commercial banks and financial corporations (June 1991); the extension of the VDR to all outstanding foreign credits was phased in (July-December 1991); the ratio of VDR increased to 30 percent (May 1992). The coverage of VDR was extended to all inward foreign direct investment that does not increase the capital stock of Chilean firms (July 1995)	Increased commissions on swap operations (August 1992).
Colombia	The net sale of central bank paper (Banco de la Republica bonds) was increased threefold in 1991.	A temporary marginal reserve requirement of 100 percent was imposed on all new private sector deposits with the financial system, except those with savings and loan institutions (January 1991).		A nonremunerated deposit requirement of 47 percent was imposed on all foreign loans with maturities of less than 18 months (September 1993). This was extended to foreign loans with maturities of up to 3 years (March 1994), and then up to 5 years (August 1994).	Non-interest bearing foreign exchange certificates denominated in U.S. dollars were issued in exchange for all export proceeds which were subject to surrender requirements (June 1991). Upon maturity, the certificates were redeemed at the official reference exchange rate.
Korea	The net issuance of central bank bonds (MSB) was increased by won 2 trillion during September 1992-September 1993. The repurchase agreements (RP) using the MSBs and government securities (FESB) became the main monetary instrument (1993).	Reserve requirements on local currency deposits were raised in three steps from 4.5 percent in 1987 to 11.5 percent in 1990.			The central bank discontinued swap operations with foreign commercial banks in Korea after the BOP went into surplus. (The swap rate was previously chosen to provide an incentive for capital inflows.)

Table 3. The Mix Sterilization Instruments for Selected Countries (Concluded)

Country	Market Operations	Reserve Requirements	Refinance Facilities	VDR or taxes	FX or Swap Operations
Spain	10-day repurchase agreements using central bank papers became the main instrument (May 1990).	Reserve requirement ratio was raised in several steps to 17 percent of banks' eligible liabilities in 1989, but was reduced to 5 percent in March 1990.	The Bank of Spain's rediscount rate on treasury bills was increased from 12.3 percent to 13.8 percent during December 1988-June 1989.	A 30 percent nonremunerated reserve requirement on new foreign loans by resident and 20 percent on banks' net foreign currency borrowings were imposed (January 1989).	
Thailand	The central bank increased open-market-type operations in the repurchase market for government bonds during 1987-91. The Bank of Thailand issued central bank bonds in 1990.		The amount of refinancing was reduced from 100 percent to 50 percent of the face value of the qualifying assets. The central bank's rediscount rate was also raised from 8 to 12 percent at end-1990.	A 10 percent withholding tax on interest payments to nonresidents, which had been suspended two years earlier, was reimposed (March 1990).	
Indonesia	Open market operations using central bank paper (SBI) became the main instrument of reserve money management (1992). The Bank Indonesia lowered in several steps the cutoff rate in auction of the SBI during January 1992-March 1993.				Bank Indonesia provided swap facilities to banks at a forward premium so that the banks would convert their foreign exchange positions into rupiah under forward cover during September 1990-May 1991.

References

- Alexander, William E., Tomás Baliño, and Charles Enoch, *The Adoption of Indirect Instruments of Monetary Policy*, IMF Occasional Paper, No. 126 (Washington: International Monetary Fund, June 1995).
- Argy, Victor, "Choice of Exchange Rate Regime for a Smaller Economy: A Survey of Some Key Issues" in *Choosing an Exchange Rate Regime, The Challenge for Smaller Industrial Countries*, ed. by Victor Agry and Paul De Grauwe (Washington: International Monetary Fund, 1990).
- Baumgartner, Ulrich, "Capital Controls in Three European Countries," *Finance and Development* (Washington), Vol. 14 (December 1977), pp. 46-49.
- Benavie, Arthur and Richard Froyen, "Optimal Monetary Policy with an Interest Equalization Tax in a Two Country Macroeconomic Model," *Journal of Macroeconomics*, Vol. 14. (1992), pp. 449-66.
- Bisat A., O. Johnston, and V. Sundararajan, "Issues in Managing and Sequencing Financial Sector Reforms: Lessons from Experiences in Five Developing Countries," IMF Working Paper, WP/92/82 (Washington: International Monetary Fund, 1982)
- Calvo, Guillermo A., "The Perils of Sterilization," *Staff Papers*, International Monetary Fund (Washington), Vol. 38, No. 4 (December 1991), pp. 921-26.
- Calvo, Guillermo A., Leonardo Leiderman, and Carmen Reinhart, "The Capital Inflows Problem: Concepts and Issues," IMF Paper on Policy Analysis and Assessment, PPAA/93/10 (Washington: International Monetary Fund, 1993).
- _____, "Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors," *Staff Papers*, International Monetary Fund (Washington), Vol. 40, No. 1 (March 1993), pp. 108-50.
- Carling, Robert G., "Reform of Monetary Instruments in Southeast Asia," in *Monetary Instruments in Southeast Asia*, in *Frameworks for Monetary Stability*, ed. by International Monetary Fund (1994).
- Carrasquilla, A., "What Sustains Moderate Inflation?," Mimeo (Colombia: Banco de la Republica, 1993).
- Chinn, Menzi, and Jeffrey Frankel, "Financial Links Around the Pacific Rim: 1982-1992," forthcoming Chapter 2 in *Exchange Rate Policy and Interdependence: Perspective from the Pacific Basin*, ed. by R. Glick and M. Hutchison (England: Cambridge University Press, 1993).
- Deutsche Bundesbank, *The Deutsche Bundesbank: Its Monetary Policy Instruments and Functions*, Vol. XXX, No. 7 (Frankfurt, Germany: 1982).

- Dooley, Michael P., Eduardo Fernandez-Arias, and Kenneth M. Kletzer, "Recent Private Capital Inflows to Developing Countries: Is the Debt Crisis History?," NBER Working Paper 4792 (Cambridge, Massachusetts: National Bureau of Economic Research, July 1994).
- Dornbusch, Rudiger, *Dollars, Debts, and Deficits* (Cambridge, Massachusetts: MIT Press, 1986)
- Edwards, S. and M. Khan, "Interest Rate Determination in Developing Countries: A Conceptual Framework," *Staff Papers*, International Monetary Fund (Washington), Vol. 32 (September 1985).
- Eichengreen, Barry and Charles Wyplosz, "The Unstable EMS," *Brookings Papers on Economic Activity*, No. 1 (Washington, 1993)
- Faruque, H., "Dynamic Capital Mobility in Pacific Basin Developing Countries: Estimation and Policy Implication," IMF Working Paper, WP/91/115 (Washington: International Monetary Fund, 1991).
- Fieleke, Norman S., "International Capital Transactions: Should They Be Restricted?," IMF Paper on Policy Analysis and Assessment, PPAA/93/20 (Washington: International Monetary Fund, 1993).
- Frankel, Jeffrey A., "Sterilization of Money Inflows: Difficult or Easy?," IMF Working Paper, WP/94/159 (Washington: International Monetary Fund, 1994).
- Fry, Maxwell, "Financial Opening and Monetary Control in Pacific Basin Developing Countries," in *Financial Opening: Policy Issues and Experiences in Developing Countries*, ed. by Helmut Reisen and Bernhard Fischer (Paris, France: OECD, 1993)
- Galy, Michel, Gonzalo Paster, and Thierry Pujol, "Spain: Converging with the European Community," IMF Occasional Paper, No. 101 (Washington; International Monetary Fund, 1993)
- Garber, Peter and Mark P. Taylor, "Sand in the Wheels of Foreign Exchange Markets: A Skeptical Note," *The Economic Journal*, Vol. 105 (Oxford, England, and Cambridge, Massachusetts, January 1995).
- Girton L. and D.W. Henderson, "Central Bank Operations in Foreign and Domestic Assets Under Fixed and Flexible Exchange Rates," *International Finance Discussion Paper*, No. 83 (Washington: Board of Governors of the Federal Reserve System, 1976).
- Goldstein, Morris and Michael Mussa, "The Integration of World Capital Markets," IMF Working Paper, WP/93/95 (Washington: International Monetary Fund, 1993).

- Gulde, Anne-Marie, "Liquid Asset Ratios--An Effective Policy Tool?," MAE Operational Paper, MAE/OP/4 (Washington: International Monetary Fund, 1995).
- Haque, Nadeem U. and Peter Montiel, "Capital Mobility in Developing Countries--Some Empirical Tests," IMF Working Paper, WP/90/117 (Washington: International Monetary Fund, 1990).
- Hooyman, Katharina, "The Use of Foreign Exchange Swaps by Central Banks," *Staff Papers*, International Monetary Fund (Washington), Vol. 41 No. 1 (March 1991)
- International Monetary Fund, *Determinants and Systemic Consequences of International Capital Flows*, Occasional Paper, No. 77 (Washington: International Monetary Fund, March 1991).
- _____ (1995a), "Financial Transaction Taxes," SM/95/100 (Washington: International Monetary Fund, 1995)
- _____ (1995b), *International Capital Markets: Development, Prospects, and Key Policy Issues*, World Economic and Financial Surveys, (Washington: International Monetary Fund, August 1995).
- _____ (1995c), *Capital Account Convertibility: Review of Experience and Implications for IMF Policies*, Occasional Paper, No. 131 (Washington: International Monetary Fund, October 1995).
- Johnston, R. Barry and Chrys Ryan, "The Impact of Controls on Capital Movements on the Private Capital Accounts of Countries' Balance of Payments: Empirical Estimates and Policy Implications," IMF Working Paper, WP/94/78 (Washington: International Monetary Fund, 1994).
- Keynes, J.M., *A Treatise on Money*, 2, (London, England: MacMillan, 1930).
- Kouri, J., K. Penti, and Michael G. Porter, "International Capital Flows and Portfolio Equilibrium," *Journal of Political Economy*, Vol. 82 (May/June 1974).
- Laurens, Bernard, "Refinance Instruments: Lessons from Their Use in Some Industrialized Countries," IMF Working Paper, WP/94/51 (Washington: International Monetary Fund, 1994).
- Lindner, Deborah, "Foreign Exchange Policy, Monetary Policy, and Capital Market Liberalization in Korea," paper prepared at a conference, "Korea at a Cross Road: South-North Economic Integration, Liberalization and Development Prospectives," American Enterprise Institute for Public Policy Research, September 28-29, 1992 (Washington).
- Marston, David, "Short-term Absorption of Capital Inflows," MAE Operational Paper, MAE OP/95/3 (Washington: International Monetary Fund, 1995).

- Organization for Economic Cooperation and Development, *Controls on International Capital Movements: The Experience with Controls on International Financial Credits, Loans, and Deposits* (Paris: OECD, 1982).
- Ötoker, Inci and Ceyla Pazarbaşıoğlu, "Exchange Market Pressures and Speculative Capital Flows in Selected European Countries," IMF Working Paper, WP/94/21 (Washington: International Monetary Fund, 1994).
- Page, Sheila, *Monetary Policy in Developing Countries* (London: Routledge, 1993).
- Pomp, Richard D., "The United States Interest Equalization Tax," *Bulletin* Vol. XXVIII, No. 1 (1974).
- Reisen, Helmut, "Macroeconomic Policies Towards Capital Account Convertibility," in *Financial Opening: Policy Issues and Experiences in Developing Countries*, ed. by Helmut Reisen and Bernhard Fischer (Paris, France: OECD, 1993), pp. 43-55.
- Schadler, Susan, Maria Carkovic, Adam Bennett, and Robert Khan, *Recent Experiences with Surges in Capital Inflows*, IMF Occasional Paper, No. 108 (Washington: International Monetary Fund, December 1993).
- Sohmen, E., *Flexible Exchange Rates* (Chicago: The University of Chicago Press, 1969).
- Tobin, J., "A Proposal for International Monetary Reform," Cowles Foundation Discussion Paper 506, Yale University (1978).
- Tseng, Hui-Kuan, "Forward Market Intervention, Endogenous Speculation, and Exchange Rate Variability," *American Economic Journal*, Vol. 31, No. 1 (1993).
- World Bank, *The Emerging Asian Bond Market*, 1995 (Washington, June 1995).