Monetary Policy Implications of Increased Capital Flows

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Introduction and overview

The growing integration of world capital markets has led to major changes in the environment for monetary policy. It has broadened the range of considerations that need to be taken into account in decisions about the choice of exchange rate regime. It has undermined the use of intermediate targets for domestic monetary policy. And it has made international policy coordination both more complex and more important. In exploring these issues the perspective of this paper will be that of practical decisionmaking, rather than theory.

A good place to start is the so-called "impossibility theorem." This holds that policy authorities cannot simultaneously and continuously follow the three objectives of free capital mobility, fixed exchange rates, and an independent monetary policy.

Something has to give. But is it a simple matter of choosing one of the three goals to abandon, and then pursuing the other two? This is an oversimplification. Even with extensive capital controls, there are limits on how far it is possible to pursue an independent monetary policy without putting exchange rate stability at risk. And even if the exchange rate is allowed to float, monetary policy cannot be entirely independent of what is happening to the external value of the currency.

The question cannot be put in absolute terms. Now that global capital markets have become integrated, the issue is rather one of the relative importance attached to exchange rate stability and domestic monetary independence. In seeking an optimal tradeoff, policymakers will have to be aware of capital market responses to their policy actions.

In any discussion of the impact of increased capital flows on monetary policy, a first step is to assess the extent to which capital mobility has grown. The first section of this paper explores in more detail the factors that have contributed to greater capital movements. It provides some statistics to illustrate the explosive growth of cross-border capital flows in the past few decades. And it considers the extent to which the global capital market is now fully integrated, or whether significant differences in investor preferences remain, such that monetary authorities can indeed influence conditions in their respective markets.

From one perspective, it can be argued that capital mobility is now effectively perfect, in that formal impediments to cross-border capital flows have been removed in all the major industrial countries, and the volume of transactions has increased manyfold. Arguing along these lines would lead one to the conclusion that expected yields in different currencies (after due allowance for expected exchange rate changes) would be equalized. Currency denomination would then become largely irrelevant in borrowing and lending decisions, even under conditions of floating. Domestic monetary policy could affect the rate of inflation in domestic currency but not the effective interest rate faced by borrowers and lenders.

Alternatively, and in my view more realistically, one can view national capital markets as still being separated by the currency preferences and habits of market participants. Uncertainties with regard to the future evolution of interest and exchange rates mean that agents are not indifferent as to the currency denomination of their assets and liabilities. In addition, tax considerations influence the preferred form of yield (interest return versus capital appreciation). Moreover, stickiness in domestic wages and prices means that real interest rates can vary from country to country even if the yields in

different currencies do not. This suggests that domestic monetary policy retains the power to influence economic behavior, and can have a significant effect on cyclical developments.

Clearly, the scope for an independent domestic monetary policy is greater if exchange rates float. But floating has its own costs, especially if it leads to volatility and uncertainty in real exchange rates. Monetary authorities need to balance these costs against the advantages of greater freedom in setting domestic policies. The second section of the paper therefore discusses the choice of exchange rate regime in conditions of capital mobility.

The polar choices are free floating and fully fixed exchange rates. The arguments in favor of each are fairly well known, and the basis for a reconciliation of the arguments exists in the optimum currency area literature.[1] (Unfortunately, the theoretical insights of this literature have proved difficult to translate into practical guidance for decisionmaking.)

A major policy issue, particularly in the wake of the turbulence in the European exchange rate mechanism (ERM) over the past year, is whether "middle way" solutions, involving fixed-but-adjustable exchange rates, have been rendered more unstable by the growth of capital flows. In my view they have, so that a protracted period of fixed-but-adjustable rates with narrow margins is unlikely to provide a smooth "glide path" for the eventual achievement of European Monetary Union (EMU).

After a country has chosen its exchange rate policy regime (fixed, floating, or fixed-but-adjustable) it then has the task of adapting its domestic monetary policy to this environment. The third section of the paper deals with a number of issues connected with the formulation and implementation of monetary policy when capital is mobile. In other words, what should be the ultimate objectives of policy, and what instruments and intermediate targets should be employed?

This is a relatively simple matter for countries that have chosen to fix irrevocably to a dominant anchor, although even for them, issues arise as to how much of the room for maneuver provided by exchange

rate bands should be exploited. The issue is more complex and substantive where greater exchange rate flexibility is concerned. Once again, the role of the capital movements can be a complicating factor. Capital movements can obscure the signals being provided by, for example, monetary aggregates. In addition, as is well known, policy actions can lead to exchange rate "overshooting," when the speed of response in goods and financial markets differs.[2]

Understanding the issues involved in the choice of domestic policy regime has been greatly advanced by the theoretical insights provided by the literature on rational expectations, time-consistency, and reputation effects. The new framework for monetary policy in the United Kingdom, which I will describe briefly in this section, owes much to our growing understanding of the role of credibility.

The fourth and last section of the paper covers the question of international cooperation. This is a more contentious issue than it might appear at first sight. Some influential observers[3] have argued that international policy coordination is, in effect, a snare and a delusion. Countries should focus on getting their own macroeconomic policies right. Open trade and free capital markets will do the job of international adjustment, and will in the long run provide a more stable exchange rate environment than will result from activist coordination.

There is much in this view with which to agree. Certainly, responsible international behavior has to be based on stability-oriented domestic macroeconomic policies. And market forces ought to play the dominant role in determining trade and investment flows, and the pattern of exchange rates. Going against the grain of market views has almost invariably met with failure.

In my view, however, there remains an important role for policy coordination. It is based fundamentally on what we have learned about the behavior of international capital flows. International capital flows clearly influence the transmission of monetary conditions across countries. Experience also seems to suggest that they can lead to sustained misalignments in exchange rates. The overvaluation of the U.S. dollar in the early 1980s is perhaps the most striking example of

this. Why should such misalignments occur? Part of the reason lies in the overshooting phenomenon referred to earlier. Part is less easy to explain, but may be related to "herd instinct" among investors, discrete reappraisals of prospects for political stability, and other hard-to-quantify factors.

In this fourth section of the paper, therefore, I will try to evaluate the case for international coordination of monetary policies. I will also touch on the objectives that coordination can legitimately seek to achieve, as well as procedures for coordination. Such coordination can be pursued both within fixed rate regions, such as the ERM, as well as among the three major currency blocs.

The growth of capital flows

The past two or three decades have seen enormous changes in the world's capital markets.[4,5] If anything, the pace of change has accelerated in the past ten years. In large part, this has been a reflection of the growing ascendancy of the free market philosophy, and the recognition that the efficient functioning of capital markets is a central element in improving resource allocation in the real economy.

An important step in the growth of cross-border financial transactions was the removal of exchange controls. In the 1970s most industrial countries retained quite far-reaching exchange controls. The United States, Canada, Germany, the Netherlands, and Switzerland were the major exceptions. Now, virtually all industrial countries have abolished such restrictions. As a result, domestic and offshore markets have become increasingly integrated.

Just as significant has been liberalization and deregulation in domestic markets. As recently as ten or fifteen years ago, significant restrictions existed in most countries, covering geographical location and spread of business of financial firms; interest rates paid to depositors; access to new issue markets; and so on. At the same time, cartel-type arrangements among financial institutions were officially tolerated and sometimes used to support quantitative and even interest rate controls on lending.

By the early 1990s, most of these controls had disappeared. Those that remained were greatly reduced in scope. None of the large industrialized countries now retain ceilings or other major constraints on lending. Reserve requirements on banks have been lowered, and compulsory portfolio investment requirements on other financial institutions have been eased.

The more liberal regulatory environment undoubtedly contributed to developments in financial technology. (Of course, the causality was two-way: financial technology made it easier to avoid regulations, and thus hastened their demise.) Whatever the precise causal sequence, the spectrum of available financial instruments has been greatly enlarged. This has partly been the result of traditional financial instruments being issued in new countries and currencies. More significantly, perhaps, derivative instruments have been developed to facilitate new forms of hedging and position taking.

Information technology has played a role in this. High-speed computers have dramatically lowered the costs of processing information and executing transactions. This has, in particular, facilitated the development of highly sophisticated derivative products. It has made possible an explosion of gross financial transactions, relative to underlying asset stocks.

Other developments that have contributed to the growth of capital markets include securitization, and the increasing institutionalization of investment activity. Securitization has greatly increased the share of financial liabilities and claims that are readily tradable. And the concentration of portfolio management in more sophisticated institutional investors has resulted in growing demand for (and supply of) derivative products, as well as an increased willingness to trade securities across currency boundaries.

The combination of domestic financial liberalization, the removal of cross-border controls, and technological advance has resulted in a dramatic growth in international financial transactions. A few statistics will serve to illustrate this point. In the United States, for example, gross transactions in bonds and equities between domestic and foreign residents were just under 3 percent of GNP in 1970, had risen to almost

10 percent of GNP in 1980, and were not far short of 100 percent in 1990 (Table 1). The figures for the United Kingdom are even more striking. Although data are not available for the early years, the existence of exchange controls suggests that cross-border transactions in securities must have been very small in 1970, yet amounted to almost 700 percent of GNP in 1990. Other countries also show sizable increases, and the fact that the level of transactions is still far below that of the United Kingdom suggests there is substantial scope for further growth.

Table 1
Cross-Border Transactions in Bonds and Equities[1]
(as a percentage of GDP)

Countries	1970	1975	1980	1985	1990
United States	2.8	4.2	9.3	36.4	92.5
Japan	n.a.	1.5	7.0	60.5	118.6
Germany	3.3	5.1	7.5	33.9	57.5
France	n.a.	n.a.	8.4[2]	21.4	53.3
Italy	n.a.	0.9	1.1	4.0	26.7
United Kingdom	n.a.	n.a.	n.a.	367.5	690.1
Canada	5.7	9.6	9.6	26.7	63.8

[1]Gross purchases and sales of securities between residents and nonresidents.
[2]1982.
Source: BIS Annual Report 1992, p.193

Derivative markets are a more recent phenomenon, but their growth has been no less striking, **as** may be seen from Table 2. Perhaps most relevant in the context of the implications for monetary policy, foreign exchange transactions averaged some $880 billion a day in 1992[6]— roughly sixty times the volume of world trade in goods.

What does all this mean for domestic monetary policy?

One extreme would be to argue that world capital markets had now become so perfect that the cost of finance was effectively equal in all markets, with differences in nominal interest rates simply offsetting expected exchange rate changes. This would imply that shifts in

Table 2
The Expansion of Selected Financial Derivative Markets

(notional principal amounts in billions of U.S. dollars[1])

Instruments	1986	1987	1988	1989	1990	1991
Exchange-traded instruments	583	724	1,300	1,762	2,284	3,518
Interest rate options and futures	516	609	1,174	1,588	2,054	3,231
Currency options and futures	49	74	60	66	72	77
Stock index options and futures	18	41	66	108	158	210
Over-the-counter instruments	500	867	1,330	2,402	3,451	4,080[2,3]
Interest rate swaps	400[2]	683	1,010	1,503	2,312	2,750[2,3]
Currency and interest/currency swaps[4]	100[2]	184	320	449	578	700[2,3]
	—	—	—	450	561	630[2,3]
Grand total	1,083	1,591	2,630	4,164	5,735	6,900[2,3]
Memorandum items: Ratio of grand total to: International claims[6] of BIS reporting banks	0.27	0.31	0.47	0.64	0.76	1.007
OECD GDP	0.10	0.13	0.19	0.29	0.35	0.40[7]

[1] Amounts outstanding at yearend.
[2] Estimate.
[3] June.
[4] Adjusted for reporting of both currencies.
[5] Caps, collars, floors, and swaptions.
[6] cross-border and local foreign currency claims.
[7] Estimates on the basis of June figures.
Source: BIS Annual Report 1992, p. 192.

domestic monetary policy had rather little effect on real economic activity even in the short run. The alternative view is that the existence of different currencies, whose relative values can change, ***does*** distinguish assets with different denominations. Economic agents will, as a result, respond to changes in interest rates on domestic assets. Monetary policy, in other words, ***can*** affect economic activity in the short run, as well as the rate of inflation in the long run.

The argument that capital movements can negate an independent monetary policy, even when exchange rates are floating, runs as follows: economic agents allocate their portfolios so that returns, denominated in a common currency, are equalized at the margin. In making this calculation, they will add capital appreciation (depreciation) to any running yield. If the authorities in one country lower the yield on short-term assets, their currency will fall in exchange markets, so that the interest rate change is exactly offset by a corresponding change in the expected appreciation (depreciation) over the holding period. If ultimate borrowers and lenders are indifferent to the ***form*** in which they pay (or receive) the yield on an asset, they will "see through" the change in the nominal interest rate, and avoid changing their behavior.

The paradigm just sketched could be considered perfect currency substitutability. It leads to a conclusion made familiar by McKinnon.[7] This is that domestic monetary policy affects essentially the exchange rate among currencies. Monetary conditions (that is, interest rates adjusted for exchange rate changes) can only be changed by collective action by issuing monetary authorities acting together to affect the world money supply.

To my mind, the foregoing analysis overlooks two crucial factors which, in the real world, restore some freedom of maneuver to monetary authorities. First, goods and factor prices are a good deal more sticky than the exchange rate. When monetary policy causes the exchange rate to fall to maintain capital market equilibrium, no similar adjustment takes place in goods and factor prices. An exchange rate fall is therefore associated with a fall in real factor costs (that is, factor costs expressed in world prices). This leads to an increase in competitiveness and a "crowding-in" of domestic production.

A second factor helping restore autonomy to domestic monetary policy is imperfect substitutability among assets in different currencies. Although portfolio holders ought in principle to be indifferent between interest return and capital appreciation, it is hard to believe that risk aversion does not play a role. Exchange rate changes are notoriously hard to forecast, and interest differentials have proved to be extremely poor predictors of future currency movements.[8] In such cases, many investors and borrowers are likely to remain in their "preferred habitat" of domestic markets, notwithstanding some incentive to go outside.[9] In addition, where borrowing is constrained by current cash flow, a change in the current servicing costs of borrowing may affect behavior, even when the overall costs of borrowing remain unchanged. A further impact on behavior may be introduced by differences in the tax status of income and capital gains.

My tentative conclusion is that, even when there is considerable capital mobility, countries can acquire a degree of monetary policy independence if they are prepared to forego control of the exchange rate. In more concrete terms, a cut in domestic interest rates will have an effect on domestic savings/investment decisions that will not be offset by an accompanying expectation of subsequent appreciation of the exchange rate.

Capital flows and the choice of exchange rate regime

The choice of exchange rate regime is a key element in establishing the environment for domestic monetary policy. This section therefore considers a number of issues related to this decision. Realistically, of course, the choice is mainly relevant for small and medium-size countries. The currencies of the three major countries, the United States, Japan, and Germany, are likely to float against one another for the foreseeable future. Other countries, however, can choose either to let their currencies float freely, to peg them irrevocably to another currency or group of currencies, or to adopt some intermediate regime of fixed-but-adjustable rates. This question is particularly relevant for European currencies.

Before getting into the substance, a brief terminological digression may be helpful. I will reserve the definition *fixed* exchange rate for a

situation in which the authorities of the country concerned have expressed their intention not to change their currency's parity in terms of its peg and this commitment is regarded as fully credible by the markets. I will define a *floating* exchange rate as one where the value of a currency is allowed to vary continuously in response to changing market conditions. A *fixed-but-adjustable* arrangement is one where markets perceive the possibility of a step change in the value of a currency as a result of an administrative decision. This taxonomy obviously does not capture all possible regimes: a crawling peg, for example, involves parities and margins, but can be designed to avoid discrete changes in market rates. Target zones also can combine elements of fixity and flexibility without requiring step changes in rates.

The degree of capital mobility can be an important consideration in which exchange rate regime to adopt in practice. It will be my contention in this section that capital mobility adds to the stabilizing properties of both fully fixed and freely floating exchange rates. However, it adds to the destabilizing properties of fixed-but-adjustable systems. This means that countries are pushed toward the two ends of the spectrum that runs from fully fixed to fully flexible rates, leaving fewer in the middle ground. And it means that when countries wish to shift from one end of the spectrum to the other (say to establish a monetary union) they should do so only when conditions are right and without lingering too long in an intermediate stage.

Before examining the impact of capital flows on the choice of exchange rate regime, it is perhaps wise to begin by asking what functions we expect an exchange rate regime to serve. At the most general level, an exchange rate regime should contribute to the achievement of internal and external balance in participating national economies.

To be slightly more specific the goals are:

—to enable countries to pursue domestic macroeconomic policies that permit the achievement of noninflationary growth, without undue cyclical fluctuation,

—to promote the international adjustment process through achieving and maintaining sustainable real exchange rates, and

—to facilitate the removal of impediments to or distortions in international trade and investment.

Fixed exchange rates have been favored by their advocates because they are thought to provide a better environment of stability for the growth of trade. In addition, for countries prone to inflation, linking to a stable anchor has often been seen as imparting a welcome counterinflationary discipline. It is accepted that exchange rate fixing means giving up an independent monetary policy. But the subordination of domestic policies to an external constraint is not necessarily a bad thing if cyclical conditions in the "follower" and "leader" country do not get too far out of line and if movements away from sustainable real exchange rates are corrected relatively quickly.

It has always been recognized, of course, that simply fixing *nominal* exchange rates does not ensure *real* rates that are either stable or sustainable. **A** mechanism is needed to make sure that domestic prices move in a way that is consistent with overall balance of payments equilibrium. Capital mobility can help in this connection by ensuring that "good" balance of payments deficits (that is, those that reflect an efficient use of world saving) are financed by sustainable capital inflows. It also, I will argue, adds to the pressure to correct "bad" (that is, unsustainable) deficits.

Under fully fixed exchange rates, capital flows can help avoid fluctuations in the domestic price level in response to reversible movements in the balance of payments. Consider the case of acountry with a sudden increase in investment opportunities (say, as a result of oil discoveries). In the absence of capital flows, domestic absorption would have to be cut back in order to "make room" for the resources used in the new investment. This process would be reversed once the output of the investment came on stream. With freedom of capital movements, however, the country can tap international savings. Its current account will initially deteriorate, and will strengthen subsequently as the yield from the initial investment builds up.

Capital flows also help to stabilize fixed rate systems (provided they are credibly fixed) by preventing structural disequilibria from building up over time. In the absence of capital flows, a current account deficit caused by loss of competitiveness can be financed by reserve drawdowns and official borrowing. The effect of a weaker trade position on domestic economic activity can be offset, for a time, by easier monetary and fiscal policy. Eventually, however, the perpetuation of inflation differentials can no longer be sustained (perhaps because borrowing opportunities are exhausted). A painful and potentially wasteful process of deflation becomes necessary if the fixed exchange rate is to be maintained.

With capital mobility, however, an incipient loss of competitiveness can, in principle, lead more quickly to self-correcting developments. Monetary policy cannot be eased to offset the effect of a declining trade position on overall economic activity. Fiscal policy, too, will be constrained by the ability of domestic savers to direct their savings abroad if they perceive the government to be over-borrowing. The realization by labor market bargainers that they cannot be "bailed out" by continuing inflation should help limit unrealistic wage bargains. (Admittedly, this influence does not appear to have worked very effectively in Germany following reunification.) In general, however, capital mobility helps ensure that a loss of competitiveness gives rise to corrective disinflationary pressures in a timely fashion.

With floating exchange rates, too, increased freedom of capital movements is likely to be a stabilizing factor. If foreign exchange markets handle mainly transactions arising from the current account, the principal source of exchange rate "smoothing" is official intervention. If official reserves are limited, current account imbalances can lead to undesirable volatility in the exchange rate. The existence of efficient capital markets should allow "good deficits to be financed without a change in the exchange rate. Unsustainable deficits can be corrected through a rapid movement of the exchange rate to a new equilibrium, at which level capital inflows can be attracted during the period in which the current account is strengthening. In principle, the deeper the market for a currency, the more stable should its exchange rate be in the face of temporary shocks.

Thus, the growth of capital flows, and the growing sophistication of international investment, should be beneficial to the working of floating exchange rates. Broadly speaking, I believe this theoretical expectation applies in practice. To go further and claim that floating rates thereby produce optimal results is a more debatable proposition. It assumes that market participants can identify sustainable real exchange rates and act so as to bring actual exchange rates toward them (the efficient markets hypothesis). Experience does not allow us to be sanguine on this point. Nevertheless, it is not clear how far the fault lies with the policy signals the authorities have given, and how far with market imperfections as such. Either way, a case can be made for a degree of policy coordination to manage the working of floating rates. I will return to this issue in the final section of the paper.

The stabilizing properties of capital flows are very different when exchange rates are *fixed* but adjustable. Fixed-but-adjustable rates are compatible with exchange market stability in the absence of capital mobility, but become more difficult to manage as capital markets become more integrated. This is not to say that such systems are necessarily unstable: but the preconditions for successful operation become more demanding.

In the absence of capital mobility, fixed-but-adjustable exchange rate systems offer an attractive "middle way" between the polar choices of irrevocable fixing and free floating. The element of fixity helps avoid the volatility that might otherwise arise from cyclical and other reversible fluctuations in the current account position. And the "safety-valve" of parity adjustments allows unsustainable disequilibria to be corrected without painful domestic deflation or inflation.

The trick, of course, is to be able to distinguish between reversible fluctuations in the current account and unsustainable disequilibria. Doubtless, policymakers have often got it wrong. But when capital movements are limited, they will at least not be forced into making unneeded changes in exchange rates because of overwhelming market pressure. Nor will they be required to subordinate domestic economic objectives in order to control pressure on the exchange rate.

The situation is quite different when capital markets are fully

integrated. The calculation that private agents make is not simply whether a deficit is reversible or fundamental, but whether the authorities may be forced into a realignment. And if so, when and by how much? It is quite possible for speculators to believe the existing exchange rate to be compatible with current account equilibrium, but still to take positions against a currency. For example, if a portfolio manager believes there is a 20 percent chance that a currency will devalue by 10 percent in the next two weeks, and an 80 percent chance that it will not, an interest differential of 50 percent in favor of the suspect currency would be required to justify continuing to hold it.

There are, moreover, self-reinforcing factors at work. The more pressure builds against a currency through capital flows, the more other market participants may come to believe the authorities will succumb. If the pressure is absorbed by intervention, markets will know that the financial resources to continue intervening are finite. If pressure is resisted by increasing interest rates, any incompatibility with domestic policy requirements will be noted. This incompatibility with domestic requirements will be particularly acute if short-term. money market rates are quickly passed forward into politically sensitive lending rates. This is the case in the United Kingdom where the great bulk of home mortgages are adjusted in line with changes in money market rates.

The vulnerability of fixed-but-adjustable rate systems can be illustrated by developments in the ERM over the last year. Following the Danish referendum, and in the run-up to the French referendum, market participants realized that ERM parities could not necessarily be regarded as the basis for locked parities in Stage III of EMU. At the same time, they were increasingly aware of the cyclical disparities in the position of member countries. Germany, the anchor, was still struggling with the inflationary consequences of reunification, while many other countries were in, or headed toward, recession, with rising unemployment.

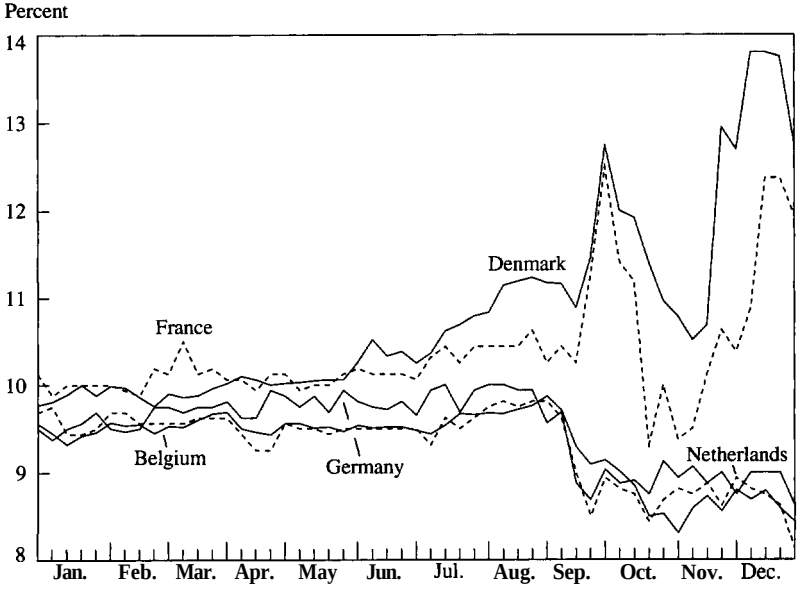
Portfolio managers had to take a view on the chance of existing parities being changed. Initially, most of them concluded the danger was not imminent, probably because pressures on official reserves remained moderate, and all countries had made a strong political

commitment to hold their existing parities. But as movements out of suspect currencies built up, pressures became self-reinforcing. Where pressures were met by increases in interest rates, market participants had to ask how long such rates could be maintained, given their basic inconsistency with domestic economic requirements. Where countries chose to use intervention or borrowing, the question was how far they would be prepared to incur additional indebtedness, with the risk of foreign exchange losses if devaluation could not be avoided.

Interestingly, a distinction can be drawn between those countries (the Netherlands is the best example) that were regarded by the markets as having a fully fixed relationship with the deutsche mark; and others whose situation was regarded as at least potentially subject to realignment. France and Denmark were in the latter category, although both successfully resisted realignment pressures until mid-1993. Countries with fully credible pegs (which in 1992 included Belgium and Austria as well as the Netherlands) were not subject to major capital flows. They were therefore able to survive the initial turbulence without pressure on their exchange rates or any need to change interest rates (Chart 1). Countries with fixed-but-adjustable pegs all had to make major changes in interest rates in the "wrong" direction from a domestic perspective, in order to preserve their exchange rates.

What should we regard as the main lessons of the ERM crisis for the selection of exchange rate regimes? First, it is clear that for those countries who are able and willing to bind their economic policies to those of the anchor country, there are advantages in convincing markets that the instrument of exchange rate adjustment has been effectively abandoned. The more markets believe that other forms of adjustment will always be used in preference to exchange rate realignment, the less likely is exchange market pressure to emerge in the first place. The Netherlands and Austria have reached this position, and it protected them from much of the turbulence in the ERM. Other countries made valiant efforts to put themselves in the same position. In the end, however, markets were not convinced that their policies could be sustained. This was because divergences in cyclical positions had become so significant that the subordination of monetary policy to the exchange rate link was perceived as economically and politically unrealistic.

Chart 1
Short Term Interest Rates in the EC*



* 3-month Euromarket rates.

A second conclusion is that those countries that are thought willing to avail themselves of exchange rate flexibility should not become too committed to any particular exchange rate. So long as markets suspect that a central rate can change, it will be costly to preserve it when it comes under pressure. Those countries that have not yet established an adequate anti-inflationary track record would be better advised to retain more flexibility than existed in the period 1987-92. This could either be through floating, or through the use of wide margins (wider than 2 1/4 percent) and a willingness to undertake timely realignments. In particular, it is desirable that realignments should normally be smaller than the width of the band. This was recognized in the Basle-Nyborg agreement as necessary to avoid the "one-way bet" nature of speculating on a parity change.[10]

Third, and this is perhaps the more novel conclusion, the route from flexibility to fixity should not be the gradual one of progressive hardening. Rather, countries should establish a track record of price stability during a period in which their exchange arrangements are

relatively flexible. The attempt to use "hard exchange-rate constraints to enforce price level convergence when the initial position is one of substantial inflation divergence has considerable dangers. International portfolio managers will inevitably be skeptical about whether external disciplines will be allowed to work when domestic disciplines have proved inadequate. Such skepticism means that destabilizing capital flows are a constant risk when markets perceive an inconsistency between the objectives of internal and external balance. Accordingly, any move to "hard exchange rate constraints should only take place when the prospective need for exchange rate adjustments has been virtually eliminated.

Implementing monetary policy under alternative exchange rate regimes

Once the monetary authorities have chosen an exchange rate regime for their currency the question arises of the operating guidelines for domestic monetary policy. In other words, what should be the intermediate objective of policy and what should act as the trigger for changes in policy settings? Here too, capital flows are an important element of the environment affecting policy decisions.

Under fixed exchange rates with full credibility and no margins, the question becomes trivial. Arbitrage will equalize interest rates throughout the monetary area, and at all maturities, for equivalent assets denominated in different currencies. This would be the situation of Stage III of EMU, before a common currency was introduced. It is not different in substance to the situation that prevails in a single currency area like the United States.

A slightly more interesting case is where fixed exchange rates exist with full credibility, but with margins of fluctuation around parities. This would roughly correspond to the situation of the Netherlands within the ERM. In principle, while monetary policy will be "keyed to that of the anchor currency the existence of margins ought to permit a measure of flexibility in interest rate policy. If margins are at 2 1/4 percent, an ERM member with full credibility ought to be able to reduce its short-term interest rates below German levels by, say, 2 percent for about a year, without falling out of the band. Its currency

would decline to a point at which the expected subsequent appreciation back to the central rate would compensate for the lower interest yield in the meantime.

In practice, the authorities of countries such as the Netherlands have been very reluctant to use the flexibility that might be thought to exist in principle. They generally consider the credibility of their fixed rate to be at risk if they allow the exchange rate to depart more than marginally from the central rate.[11] Thus the Netherlands has for some time observed de facto margins for the guilder of about one-half of 1 percent around the central rate.

The conclusion to be drawn is that, in a fixed rate system, the introduction of narrow margins provides only limited additional room for maneuver in monetary policy. Capital flows are equilibrating only so long as fluctuations in the exchange rate are kept within very strict limits. This means that interest rate differentials must be kept small.

What about systems that avowedly use fixed-but-adjustable exchange rates? In this case, the potential for destabilizing capital movements is clear. Monetary policy has to be formulated in order to prevent such pressures from arising.

Dilemmas abound, as recent experience has shown. If "follower" countries align their interest rate policy on the anchor, they may find it inappropriate for their own domestic needs. This may be because they are at a different stage in the economic cycle, or because underlying inflation differentials require a different nominal rate to produce the same real yield. Consider the case of a country with relatively strong inflationary pressures, linked to a currency with better price stability. If the high inflation country has the same nominal interest rates as its partner, real interest rates will be lower, and economic activity will be stimulated further. Inflation will tend to rise. If, on the other hand, it raises interest rates to combat inflation, it will experience heavy capital inflows that push its currency to the top of the band. This was the experience of Spain and Italy during much of the 1990-92 period. It is a dilemma that has come to be known as the "Walters Critique" of the ERM.[12]

The reports of the Monetary Committee and EC Governors Committee[13,14] on the lessons to be learned from the exchange rate turbulence of 1992-93 attempt to address this question. They recommend that the interest rate policies of ERM members should be clearly directed to defense of the exchange rate, if they are to carry conviction. They also recommend that, where economic fundamentals have diverged, exchange rate 'adjustment should be undertaken promptly, before market pressures have been able to build up. These recommendations are easy to state, but much harder to carry into practice in the dilemma situations likely to characterize the actual operation of a fixed-but-adjustable exchange rate system.

Lastly, I turn to the issue of implementing monetary policy under floating rates. The complication introduced by capital flows is that they may obscure the signals used to guide monetary policy, or act against the objective of domestic monetary policy.

It might be thought that the common pursuit of monetary policies aimed at price stability ought also to produce stable capital flows, and thus stable real exchange rates. Certainly, in the absence of stable counter-inflationary monetary policies, the prospects for exchange rate stability are dim.

The "monetarist" corollary would be for countries with an independent monetary policy to adopt the objective of stable growth in their domestic money supply. Provided there is a reasonably robust relationship between money and nominal GNP, the pursuit of such a rule by all countries should stabilize exchange rates and inflation rates. The knowledge that monetary authorities have committed themselves to a stabilizing rule would enable private agents to plan with confidence. Any tendency for exchange rates to move away from the medium-term equilibrium consistent with the monetary rule would be countered by capital flows.

Unfortunately, experience does not suggest that the relationship between money and GNP is robust enough to perform the stabilizing role that a monetarist rule would assign to it. (Though doubtless monetarists might accuse policymakers of undermining a stable relationship by excessive recourse to discretionary policy shifts!)

In most countries that have used monetary aggregates as a guide to policy, previously stable relationships have tended to break down. The reasons are not fully clear, and may vary from country to country. Financial liberalization has undoubtedly played a part. A greater variety of assets, and new ways of holding transactions and precautionary balances, have brought unpredictable changes in the shares of wealth economic agents choose to hold in the form conventionally classified as "money." Greater mobility of capital has also contributed to obscuring the meaning of monetary aggregates. When exchange market conditions are stable, foreign currency denominated assets can perform the function of adding to domestic liquidity. When markets are more disturbed, inflows and outflows of funds can have temporarily significant effects on the monetary base.

Faced with these uncertainties, monetary authorities have been obliged to rely less on monetary targets, and more on discretionary assessments of monetary conditions. Even those that still believe monetary aggregates have a crucial role to play, such as the Deutsche Bundesbank, have been forced to allow targets to be missed for extended periods without taking countervailing action.

The weakening of the traditional relationships between money and nominal GDP poses a difficult issue for policymakers. To return to a purely discretionary policy regime puts credibility at risk. How, economic agents may ask, can we assess the objectives of policy, and the likely reaction to different types of economic disturbance? How can we trust the authorities not to weaken or abandon their commitment to stated policy goals?

In the United Kingdom, the authorities have attempted to deal with the credibility issue by specifying as precisely as possible the ultimate objective of monetary policy, then being as transparent as possible about the decisionmaking process. The framework is similar, in its broad lines, to that employed in some other countries operating with inflation targets (Canada, New Zealand, Sweden, and Finland, among others).

The point of departure is uncontroversial enough. It is the proposition that the ultimate goal of monetary policy is to deliver price

stability, durably and credibly. In order to provide guidance to economic agents, and a yardstick to measure success, we have quantified the inflation objective. It is to hold inflation of the Retail Price Index (RPI) in the range 1-4 percent during the lifetime of the present parliament (that is, probably until 1996 or 1997).[15] In the latter part of this period, it is intended to reduce inflation to the lower half of the target range, while in the longer run, price stability probably implies RPI inflation in the range 0-2 percent.

There is no single intermediate objective, such as a monetary aggregate, as an operating target for monetary policy. In the terminology of Bryant and others, there is a "one-stage" decisionmaking procedure, not a two-stage one.[16] U.K. experience does not suggest that the relationship between any potential intermediate target and the ultimate objective is reliable enough to improve on the direct pursuit of the ultimate objective.

In the absence of intermediate objectives, what acts as a trigger for a policy response? I believe it is easiest to think of U.K. monetary policy as driven by a single indicator: namely, the forecast for inflation one to two years ahead. This forecast is built up from a careful assessment of the various factors that determine inflation: the current level of cost and price increases, prospective changes in demand pressures, developments in monetary aggregates, changes in the exchange rate, asset price developments, commodity price trends, and so on.

These various influences are not captured in a single or composite indicator. Instead, we have attempted to be as transparent as possible in revealing the basis on which our assessment of inflation trends is made. As part of this process, the Bank of England publishes a comprehensive quarterly analysis of inflation trends and prospects. This is set out in the Bank of England Quarterly Bulletin and is also separately available.[17] We cannot hope, of course, that inflation forecasts will always be right. What we do aim at is to convince market participants that the assessment is unbiased and professional. Over time, therefore, it should provide the appropriate basis for stability-oriented use of monetary instruments.

The instrument of monetary policy is the authorities' control over

short-term interest rates. In practice, we recognize that monetary conditions involve more than simply looking at the level of nominal short-term rates. An assessment of expected inflation is necessary to obtain real interest rates; and changes in the exchange rate act as an independent influence tightening or easing perceived monetary conditions. Subject to these caveats, the authorities would act to tighten monetary conditions when the "news" about price pressures one to two years out showed an increase in inflation. We would aim to keep monetary conditions tight for so long as our inflation forecast showed a likelihood of inflation being outside the top of the target range.

International coordination of monetary policies

This section deals with the issue of how far countries should coordinate their monetary policies in the face of increased capital mobility. International policy coordination has received mixed reviews in recent years. Despite the potential benefits suggested by game theory (for example, the Prisoner's Dilemma), doubts persist.

It is not hard to imagine situations in which policy coordination can be counterproductive. Consider, for example, a case in which countries agree to try and stabilize exchange rates through adjustments in interest differentials. If an enlarged fiscal deficit in one country is tending to push up the equilibrium real exchange rate (as with the U.S. dollar in the early 1980s), its monetary policy might have to be excessively accommodative to restrain the rise. In other words, if fiscal policy is overexpansionary, monetary policy may have to be overexpansionary as well, to balance the effect on the exchange rate. The result would be higher inflation.

The fact that policy coordination can be misapplied is not, of course, an argument against coordination per se. But it is a reason to be clear about policy objectives, and the interaction among various objectives.

In a fully fixed exchange rate system, the issue of coordination among members of the system is straightforward. There can only be one monetary policy, and arbitrage will act to keep interest rates together throughout the system. There is, of course, an important question as to whether the monetary policy is set by a hegemonic

"anchor" country, or is shared in some fashion between members of the system. But this does not change the fact that, under irrevocably fixed exchange rates, coordination involves all countries following a single monetary policy.

Of more interest in present circumstances is the issue of policy coordination in a situation of fixed-but-adjustable exchange rates. A system such as the European exchange rate mechanism is designed to emphasize mutuality in policy obligations. Three areas in which coordination is required can be distinguished: first, the choice of exchange rate parities; second, adjustment of monetary policies (that is, interest rates); third, exchange market intervention.

It seems reasonable that there should be mutual agreement in the setting of parities, if there are mutual obligations in the defense of parities. Unless creditor countries feel that they have "bought in" to the existing pattern of exchange rates, it is probably unrealistic to ask them to do more in defending it if it comes under pressure.

To help ensure greater support for parities, the reports of the Monetary Committee and Central Bank Governors' Committee on the September crisis have suggested procedures aimed at facilitating a more continuous review of the appropriateness of exchange rates in the ERM.[18] One can be skeptical, of course, about how much flexibility will be achieved. The exchange rate is a highly sensitive variable, and devaluation is nearly always viewed as a political defeat. An expressed willingness, in the abstract, to consider realignment is not the same thing as doing it in a concrete case. If the ERM is to be revived and strengthened it will be important, therefore, to devise procedures that allow peer pressures to be brought to bear effectively, and that help depoliticize exchange rate adjustments.

The second element in managing a fixed-but-adjustable exchange rate system is the use of interest rates to defend against pressures provoked by capital flows. It was this element that produced the most vocal criticism of the working of the ERM in the September 1992 crisis. Some members of the system were faced with the requirement to raise domestic interest rates to very high levels to counter incipient capital outflows. Moreover, there was a self-reinforcing character to

interest rate increases. A moderate increase induced some economic agents to view the new level as "unsustainable" in a domestic political context, and therefore to attempt to move more funds out of the currency. A further interest rate increase was then required, and so on.

In a fully symmetric system, there would probably be some sharing of the interest rate adjustment burden. Policymakers would take a collective view on the aggregate monetary policy appropriate to meet the counterinflationary goals of the fixed rate area as a whole. Once a suitable aggregate monetary policy was in place, pressures on exchange rates could then be met by broadly symmetric interest rate adjustments. Countries facing downward pressure on their exchange rate would increase interest rates, while those experiencing capital inflows would lower rates. The mere knowledge that such a system of burden sharing was in place could contribute to the stability of the system by discouraging capital flows in the first place.

While the symmetric approach has a clear rationale in theory, it has drawbacks in practice. Chief among these is the fear that it would be seen as diluting the anti-inflation discipline of the system. The German authorities believe that to compromise on their domestic counterinflation objectives would undermine the anchor role of the deutsche mark, to the long-run detriment of all participants in the system. Given the nature of the Bundesbank's domestic legal responsibility, it is hard not to sympathize with this view. Until, therefore, the credibility of all members of a fixed-rate system is effectively established, it is perhaps unrealistic to expect the anchor country to modify its monetary policy in order to ease pressures on its partners. The corollary is that divergent policy needs are bound to lead to major strains in the system.

The third element in the cooperative management of a fixed-but-adjustable exchange rate regime concerns intervention arrangements. In the ERM, intervention obligations are mutual and unlimited when two currencies reach the permitted margin of fluctuation against one another. This gives rise to two sorts of problem. First, those countries which intervene are subject to risk of loss in the event of a realignment. The creditor country lends its currency to the debtor country at a fixed ECU conversion rate. If a realignment takes place before the transac-

tion is unwound, both the creditor and the debtor will suffer a loss, in terms of their own currency, when reserve holdings return to their original level. (This has been particularly resented by creditor countries when they felt that the exchange rate they were called upon to defend was unrealistic.)

The second complaint is that capital flows financed by marginal intervention enlarge the money stock in the creditor country. Precise sterilization of capital inflows is not easy, particularly when the amounts involved are large. This complicates monetary management and makes the interpretation of monetary conditions difficult. In the second half of 1992, for example, sales of deutsche marks by European central banks (including those of the Nordic countries) reached DM284 billion, equivalent to some 18 percent of the stock of German M3 in mid-1992. Of this, DM188 billion was used to defend ERM parities.[19] This contributed to the very rapid rise in broad money during the same period.

Various techniques can be imagined to limit intervention obligations, or to spread the burden of risks differently. But such techniques risk undermining the credibility of intervention in defending rates. If there were ceilings on the volume of intervention, this fact would almost certainly become known to market participants, perhaps provoking additional capital flows when it was thought that the ceilings were being approached. And if the burden of exchange risk were shifted, so as to protect creditors against loss, this could be interpreted as a weakening of their commitment to defend existing parities.

The approach which seems to have been preferred by EMS members[20] prior to the ERM crisis of July/August 1993 involved a package. On the one hand, countries would accept the need to make timely exchange rate realignments when "fundamentals" diverge. On the other, there would be a greater mutual commitment to defend parities when exchange rates were judged to be appropriate. This defense would involve a willingness on the part of weak currencies to use interest rates promptly; and by creditor countries to extend visible and extensive financial support. This approach was used with success in the defense of the Danish krone in February 1993.

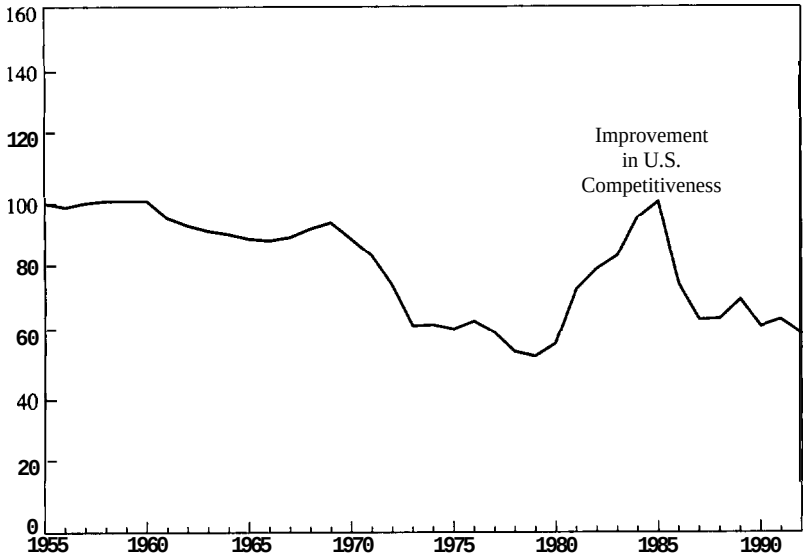
Cooperation in managing the exchange rate consequences of capital flows is also important between countries with floating currencies. Capital flows are now so large relative to current transactions that exchange rate movements are largely driven by changes in the incentives for capital flows, at least in the short-to-medium term.

In many circumstances, the influence of capital flows on exchange rates can be benign. Consider, for example, the case when one country experiences an increase in economic activity, relative to its partners. The reasons could be fiscal stimulus or simple "animal spirits." The result is that the ex ante investment/savings balance shifts toward spending, and interest rates tend to rise. Rising interest rates attract capital from abroad, causing the exchange rate to appreciate and moderating the rise in interest rates. The partner country will experience a strengthening of net exports, due both to the higher activity in the first country and to the improvement in its competitiveness. The effects of the initial disturbance to demand in the first country are therefore spread to its trading partners. At the risk of oversimplification, it may be said that capital mobility improves welfare by spreading the effects of inflationary and deflationary influences that would otherwise be "bottled up" in the country of origin.[21]

But actual experience with capital flows under floating exchange rates has not always been so beneficial. Both theory and observation suggest that capital movements can cause exchange rates to "overshoot" their long-term equilibrium, in response to short-term disturbances. The simple reason for this, first clearly identified by Dornbusch,[22] is that different markets tend to reach equilibrium at different speeds. Markets in financial assets equilibrate very quickly, those for goods and physical capital more slowly. Moreover, "bubble" phenomena can lead to the creation and sudden reversal of market disequilibria.

Whatever the theoretical arguments, it is certainly true that real exchange rates have been more volatile under floating rates than they were in the Bretton Woods period. Chart 2 shows fluctuations in the real DM/U.S.$ rate for the period 1955-93. It may be seen that the rate has become markedly more volatile after about 1970.

Chart 2
Real DM/U.S. Dollar Exchange Rate*



* Deflated by CPIs.

Not everyone sees this volatility as a problem. Studies of the effect of exchange rate volatility on trade have had mixed success in finding substantial effects.[23] These studies, however, have generally focused on exchange rate volatility over very short periods, for which hedging techniques are readily available. Most observers remain uncomfortable with a situation in which medium-term swings in real exchange rates far exceed the contemporaneous shift in competitiveness. The heightened uncertainty that results is seen as reducing the willingness to engage in international trade and direct investment. Moreover, shifts in balance of payments positions fuel protectionist pressures.

Three types of approach to reducing exchange rate volatility among floating currencies can be distinguished: target zones, "sand-in-the-wheels," and policy coordination. This paper ends with a brief consideration of each.

The "target zone" approach has been imaginatively developed and tirelessly advocated by John Williamson.[24] The idea is that the major

countries with floating exchange rates should commit themselves to hold their exchange rates within a (perhaps quite broad) band that is considered consistent with long-term sustainability in the balance of payments. If exchange rates tend to move outside this range, such movements would be resisted by the conventional means (intervention, policy statements, changes in fiscal/monetary mix). Different policy responses will of course be needed, depending on the perceived reason for movements in the market rate. The basic target zone approach can therefore be enriched by specifying the response to be used in particular circumstances.[25]

There are two aspects of the target zone proposal that make me skeptical of its applicability, at least in any very formal fashion, to the currencies of the three largest industrial countries. First, the identification of an equilibrium exchange rate remains elusive. Even the use of wide bands is of limited assistance, since negotiation inevitably focuses on the mid-point of the bands first, then the ranges. Second, use of monetary policy to target the exchange rates can lead to the compounding of an error in fiscal policy. If, for example, an expansionary fiscal policy leads to exchange rate appreciation (as in the United States in the early 1980s, or Germany more recently), easing monetary conditions to hold the exchange rate down would serve to intensify inflationary pressures. Advocates of target zones would admit that the response to exchange rate movements has to be differentiated according to the underlying causes. Too often, however, the inflexibility of fiscal policy is likely to force the authorities to use a monetary policy response, whether or not it is indicated.

The "sand-in-the-wheels" approach is widely associated with the name of Tobin.[26] More recently, Eichengreen and Wyplosz[27] have argued that some form of control over capital flows offers the most promising prospect of maintaining stability in the ERM in the run-up to monetary union. Tobin's proposal rests on the proposition that unfettered capital flows can be destabilizing because of "irrational" behavior, or by simple "churning," by private market participants. The imposition of restrictions (or, better, a tax) on cross-border transactions would discourage destabilizing speculative movements. It would also curtail rent-seeking behavior on Wall Street and the City of London, a further social benefit in Tobin's eyes. Moreover, pro-

vided the tax is set at a low level, the impact on "productive" international capital flows should be slight.

I am not very attracted by this proposal either. In the first place, it is difficult to believe that market participants will not find ways to get around it, and to take positions in ways that do not involve the payment of tax. Second, a tax would impair the efficiency and stabilizing properties of capital markets by reducing liquidity and making hedging more difficult. And third, the short-term foreign exchange rate volatility that is the object of the proposal is much less damaging than the medium-term misalignments that distort international trade and threaten protectionist pressures.

A more modest role for "sand-in-the-wheels" would be to buy time in a period of exchange rate turbulence to enable more far-reaching policy adjustments to be agreed and implemented. Something of this sort occurred during the ERM crisis of September 1992. Some countries imposed restrictions or taxes on borrowing to finance capital outflows, while others employed moral suasion to induce domestic banks to refrain from passing on higher money market rates to borrowers. Such techniques probably helped the countries concerned withstand the immediate crisis. Their usefulness beyond the short term is open to doubt, however. Even the knowledge that their use was being considered would make portfolio managers unwilling to invest in assets whose liquidity might be compromised. The lessons of experience suggest that any short-term gains from capital restrictions are outweighed by longer-term costs.

The third means of reducing exchange rate volatility in conditions of capital mobility is through intensified policy coordination. The grandly named "*G-7* process" is intended to be the vehicle by which the major countries inform each other about their respective policy goals and intentions, and strike mutually beneficial bargains. After the initial success of the Plaza and Louvre agreements, however, it is not easy to detect policy shifts that have come about as a result of the G-7 process.

Yet if exchange rate movements are driven largely by changes in relative policy mix, it is essential to address the issue of policy mix if

a basis for exchange rate stability is to be achieved. And the achievements are not as meager as is sometimes assumed. There is now a consensus around the proposition that monetary policy should be addressed to price stability, as well as a broad agreement as to what price stability means. Equally, there is a shared desire to bring budget deficits down to more sustainable levels. (The present level of fiscal deficits is sometimes used to suggest that this desire has no substance. I think this overlooks the hard decisions that have been necessary to prevent deficits being even higher than they are.)

There is also the beginnings of agreement on how policies in individual countries should be adjusted in furtherance of the international adjustment process. In 1992, for example, it was widely agreed that Japan should deal with its slowing in economic activity by fiscal expansion, while in Germany, the appropriate approach would be fiscal restraint, balanced by easier monetary conditions. In the United States, a reduction of the fiscal deficit was seen as helpful in "making room" for an improvement in the payments position.

So in my view, there exists a rudimentary basis for a model of international economic interactions. I believe it will be more fruitful to build on and extend this beginning, rather than seek other, more simplified means of dealing with international capital flows.

A difficult task is to develop a procedural basis for ongoing, policy coordination. In an earlier contribution,[28] I identified three levels on which international cooperation and coordination could take place:

—agreement on a set of formal rules binding national authorities,

—development of operational guidelines on how policies should respond in typical situations, and

—the establishment of institutional procedures for monitoring and evaluating policies on a continuing basis.

The first of these seems out of reach, as a way of formalizing cooperation among the three major economic areas. Apart from subscribing to the principle of not "manipulating" exchange rates to

gain competitive advantage, it seems unlikely that countries will find a formula for international policy coordination similar to that in, say, the Bretton Woods System.

The other two levels of cooperation could, I believe, be developed further. Institutional procedures for cooperation are now mainly based on the G-7. These could usefully be developed so as to take into account economic developments elsewhere in the global economy, and to permit analytical staffwork to underpin policy coordination. This points to greater involvement for international organizations. This should facilitate the other basis for coordination; namely, the analysis of policy interactions among countries, and the development of models of policy response.

The continuing integration of world capital markets will give rise to evolving challenges for domestic policymakers. Addressing these challenges will, I believe, call for an intensification of international cooperation on a variety of levels.

Author's Note: The views expressed in this paper are those of the author and not necessarily of the Bank of England. Helpful comments on an earlier draft were provided by Tony Coleby, Morris Goldstein. Charles Goodhart, Mervyn King, John Williamson, and Paul Wright.

Endnotes

[1]Yoshihide Ishiyama, "Theory of Optimum Currency Areas: A Survey," IMF Staff Papers, vol. 22, no. 2 (July 1975).

[2]Rudiger Dornbusch, "Expectations and Exchange Rate Dynamics," Journal of Political Economy, 1976, pp. 1161-75.

[3]Martin S. Feldstein, "Thinking About International Economic Coordination," reprinted in Journal of Economic Perspectives, vol. 2, no. 2 (Spring 1988) pp. 3-13.

[4]Bank for International Settlements. *62nd Annual* Report *1991-92*, pp. 191-212.

[5]Group of 10, "International Capital Movements and Foreign Exchange Markets: A Report to the Ministers and Governors by the Group of Deputies" (April 1993).

[6]Bank for International Settlements, Central Bank Survey of Foreign Exchange Market Activity in April 1992, Basle (March 1993).

[7]R.I. McKinnon, "An International Standard for Monetary Stabilization," Institute for International Economics, MIT Press, 1984.

[8]Peter Isard, "Exchange Rate Modeling: An Assessment," in Ralph Bryant, Dale Henderson, Gerald A. Holtham, Peter Hooper, and Steven Symansky, eds., Empirical *Macroeconomics* for Interdependent *Economies*. Washington: Brookings Institution, 1988).

[9]Michael Mussa and Morris Goldstein, "The Integration of World Capital Markets," a paper prepared for the symposium 'Changing Capital Markets: Implications for Monetary Policy," Jackson Hole, Wyo., August 19-21, 1993, Federal Reserve Bank of Kansas City.

[10]Committee of Governors of the Central Banks of the Member States of the European Economic Community, "Report on the Strengthening of the EMS' (September 1987).

[11]André Szasz, "The ERM Hard Core: The Netherlands Case" in Paul Temperton, ed., The European Currency *Crisis*, EFFAS/European Bond Commission, (forthcoming).

[12]A.A. Walters, Britain's Economic Renaissance, Oxford, 1986.

[13]Monetary Committee of the European Community, "Lessons to be Drawn from the Disturbances on the Foreign Exchange Markets" 28 (April 1993).

[14]Committee of Governors of the Central Banks of the Member States of the European Economic Community, "The Implications and Lessons to be Drawn from the Recent Exchange Rate Crisis," (April 21, 1993).

[15]Defined for this purpose as the 12-month change in the Retail Price Index excluding mortgage interest payments. RPIX was chosen because of its timeliness and familiarity. A range for inflation (rather than a point) was selected in order to give a clear signal of the margins beyond which policy action would be called for.

[16]Ralph C. Bryant, Peter Hooper, and Catherine L. Mann, "Evaluating Policy Regimes and Analytical Models," (forthcoming).

[17]Bank of England, "Inflation Report," various issues.

[18]Monetary Committee of the EC and Committee of Governors, 1993.

[19]Group of 10, paragraph 57.

[20]See Monetary Committee.

[21]J. Marcus Fleming. "Domestic Financial Policies Under Fixed and Under Floating Exchange Rates," *IMF Staff Papers*, vol. 9, no. 3 (November 1962) pp. 369-79. Robert A. Mundell, "Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates," *Canadian Journal of Economics and Political Science*, vol. 29, no. 4 (November 1963), pp. 475-85.

[22]See Dornbusch.

[23]International Monetary Fund, "Exchange Rate Volatility and World Trade," Occasional Paper No. 28.

[24]John Williamson, The *Exchange Rate System*, 2nd ed., Institute for International Economics, Washington, 1987.

[25]John Williamson and Marcus H. Miller, "Targets and Indicators: A Blueprint for the International Coordination of Economic Policy," Institute for International Economics. Washington, 1987.

[26]James Tobin, "A Proposal for International Monetary Reform," Cowles Foundation Discussion Paper 506 (October 1978).

[27]Barry Eichengreen and Charles Wyplosz, "The Unstable EMS," INSEAD Paper (April 1993).

[28]Andrew D. Crockett, "The Role of International Institutions in Surveillance and Policy Coordination," in Ralph Bryant, David A. Currie, Jacob A. Frenkel, Paul R. Masson, and Richard Portes, eds., *Macroeconomic Policies in an Interdependent World*, Brookings Institution, 1989.