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Scope and Limits of International Economic Cooperation and Policy Coordination

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Abstract

This study considers a number of important issues that relate to international economic cooperation and policy coordination with a view toward assessing the scope and limits to both that exist within the present international monetary system. The sources of the perceived need for cooperation and coordination are first identified, and the experience of countries with policy coordination within the current international monetary system are described. The benefits and costs to policy coordination are then discussed, followed by a consideration of possible ways of increasing the effectiveness of international cooperation.

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I. Introduction

There has been considerable attention directed recently toward the potential benefits of increased policy coordination among the larger industrial countries in improving the functioning of the present exchange rate system and in sustaining world economic growth and price stability. Recent attempts to lay the groundwork for coordination include the 1985 reports of the Deputies of the Group of Ten and of the Group of Twenty-Four, the Tokyo Economic Summit in May 1986, and the Interim Committee meetings in April and September 1986. The International Monetary Fund has also contributed to the process through its surveillance over the policies of member countries. The analysis of the World Economic Outlook has for some years emphasized economic developments in the major industrial countries whose policies and performance exert an important influence on the operation of the international monetary system and has included a discussion of the interactions of national policies of these countries and their repercussions on exchange rates and payments imbalances.

The purpose of this study is to consider international economic cooperation, defined to include sharing of information and international surveillance as well as the more specific issue of policy coordination among governments. The study draws on existing literature, both in academic journals and more policy-oriented studies, and also reviews the actual operation of the present international monetary system from this perspective. In doing so, it attempts to throw light on a number of important questions:

What is meant by the concept of "policy coordination," and how does it relate to other terms such as "cooperation," "convergence," and "harmonization"?

What is the relationship between the rules governing the international monetary system and the need for policy coordination, and the ability to achieve it? In particular, how does policy interaction differ under fixed and floating exchange rates?

What are the possible welfare gains from policy coordination under the current system of flexible exchange rates?

What policy lessons might be drawn from the experience with coordination under the present international monetary system?

How can the effectiveness of international cooperation be improved?

The central point of the theoretical literature on policy coordination is that there may be "externalities" relative to a country's macroeconomic policies that imply that policies chosen optimally from an individual country's point of view are not optimal in a global context. An example may be the use of the exchange rate as a competitive instrument, either to achieve output growth by excessive depreciation (as in the 1930s), or in order to decrease inflation quickly through exchange rate appreciation. If all countries simultaneously attempt to depreciate their exchange rate or increase their current account balance, these separate strategies will be self defeating, and will lead only to overinflationary or overdeflationary world policies.

Furthermore, there is a considerable lack of understanding of the effects of policies, on the part of policymakers, both domestically and on other countries, and the authorities in a given country normally must take decisions under conditions of uncertainty regarding the policy intentions of foreign countries. Cooperation in the form of exchange of information is necessary to permit countries to choose policies that are in their self interest. For instance, a country may embark on a fiscal policy that will ultimately prove unsustainable, but whose consequences, both domestic and international, are not initially appreciated. There is therefore a role for identifying problems of unsustainable domestic policies and incompatibility of national objectives and policies in an international forum.

1. Concepts of cooperation and coordination

It is important first to be clear as to terminology. Several closely related concepts--including cooperation, coordination, convergence, and harmonization--have frequently been used interchangeably in the literature, but have sometimes been defined in different ways by various authors. Interdependencies between countries arise for a number of reasons, including trade and financial linkages that transmit the effects of a policy-induced disturbance from abroad or of an external shock on key macroeconomic variables in the domestic economy. Similarly, feedback effects from other countries, including policy reactions to an initial disturbance, may modify the response of these variables to a policy action taken domestically, and potentially frustrate the achievement of domestic policy goals. Narrowly defined, and as used in the game-theoretic literature, policy coordination refers to decision making that maximizes joint welfare and thereby enables these international interdependencies to be positively exploited. 1/ This is intended to contrast with an "uncoordinated" regime, where each country is assumed to maximize its own welfare independently. A need for coordination in the narrow sense exists if the independent pursuit of national policies results in global outcomes that from the world point of view are non-optimal. Among policymakers, the term policy coordination has long been used in a broader sense, to

1/ See for example, Artis and Ostry (1986), p. 14.

refer to agreements between countries to adjust their policies in the light of shared objectives or to implement policies jointly. 1/ The following analysis provides a general discussion of key macroeconomic policy issues facing the main industrial countries; therefore it generally uses the broader definition of coordination employed by the policymakers. However, the narrow definition is used where applicable, particularly in discussions of the academic literature such as, for example, consideration of the welfare implications of game theory.

The term cooperation is here used in a very broad sense to encompass all forms of interchange between countries relating to economic developments and policy intentions. 2/ In addition to coordination proper, it also extends to looser forms of cooperation, including consultation among countries, information interchange, and international surveillance.

Convergence refers to developments in which the levels or rates of growth of economic variables move closer to each other over time. 3/ These developments may refer to either policies or economic performance. However, it is important to note that convergence in economic performance may require divergence in underlying economic policies. Furthermore, convergence in either policies or performance need not require coordinated or cooperative policies, nor may coordination of policies necessarily imply convergence of those policies.

Harmonization of economic policies refers to the application of national regulations with a view to achieving greater uniformity in economic structure across countries. 4/ The term has, in general, been used in a fairly restrictive sense to refer to microeconomic policies; for example, the adoption of specific taxation and tariff policies within the European Economic Community. Since the concern of the present study is with macroeconomic policy issues, the concept of harmonization, as defined above, is not extensively discussed.

2. Alternative forms of cooperation

International economic cooperation can take different forms, including the exchange of information among countries, policy coordination, and the adoption of rules governing the operation of the international monetary system. The most basic form of cooperation is the exchange of information between countries. Systematic collection of information about the policy intentions of, and recent developments in, other countries is vital to

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1/ The term "coordinated intervention" in exchange markets by central banks is a well-known example of this broader usage.

2/ See Artis and Ostry (1986), p. 21.

3/ See Artis and Ostry (1986), p. 21, and Steinherr (1984), p. 73.

4/ See Steinherr (1984), p. 73.

effective policy coordination. This form of international economic cooperation imposes the least constraint on national policymaking. Collection of relevant information about developments in important variables--such as the balance of payments, growth and inflation in the short and medium term--may act to identify possible global inconsistencies and the need for policy coordination. In recognition of the importance of further strengthening this form of cooperation, the IMF has recently been requested by the Interim Committee to consider the use of indicators of policy actions and economic performance in its surveillance over members' policies.

Policy coordination itself can be divided into two types: ad hoc or episodic coordination 1/ that is characterized by discussion among the interested parties, with action undertaken only once agreement is reached, and institutionalized coordination, or centralized decision making, in which decisions are taken either collectively by member countries (as for example in the European Monetary System), or by an institution acting on behalf of its membership. To date most examples of coordination have been episodic, though international institutions contribute to the information exchange and surveillance that are important forms of international cooperation. Another useful distinction is between those coordinated policy decisions that involve short-term discretionary demand management (fine-tuning), and those that are taken with regard to their medium-term consequences. International coordination of policies for short-run stabilization purposes is subject to the same criticism as domestic fine-tuning, namely that in the absence of detailed information concerning the effects of policies and their credibility, such coordination may do more harm than good. For instance, policies typically operate with a lag, but the length of lags is not precisely known; in these circumstances economic stimulus applied, for example, to counteract a recession may occur at an inappropriate time.

3. Plan of the paper

The paper first presents the reasons why cooperation and coordination may be desirable. It is argued in Section II that uncertainty about other countries' policies and their effects can be reduced by sharing of information. Pooling information on the stance of policies may make evident that individual policies are likely to be unsustainable in the future, and further that policies are incompatible from a global perspective. The form that this global inconsistency may take depends on the exchange rate regime. Section II further considers what conditions are necessary for policy coordination--in the sense of joint decision making by a group of countries--to be desirable.

The operation of the present international monetary system, which is characterized by a wide diversity of exchange rate agreements among countries, is described in Section III. Examples of recent experience with policy coordination are described, including developments within the European Monetary System and the meetings of G-7 countries.

1/ The term episodic coordination is due to Artis and Ostry (1986).

In Section IV, the costs and benefits of coordination are discussed in the context of the present international monetary system and from the perspective of recent theoretical and empirical studies. The broad conclusions of this discussion are that although the gains from coordination are clear when the effects of policies are known, they are less likely to be realized in a context of uncertainty about the way the economic system operates. There are also obstacles to the achievement of coordination and incentives not to implement agreed policies. Nevertheless, these obstacles make international economic cooperation, in particular monitoring of the transmission of economic policies and sharing of information, all the more essential.

Section V considers ways in which international economic cooperation can be made more effective, and reviews various recent proposals in that light. Since appropriate policies depend on the form of the international monetary system, on the nature of transmission mechanisms, and on the types of shocks affecting the world economy, any attempt at enhanced coordination of policies must be implemented in a flexible fashion. This suggests that schemes for coordination that rely on a single indicator, for example the exchange rate, are unlikely to be optimal primarily because they do not exploit all the information that is potentially available to policymakers, and may thereby give misleading signals for appropriate policy adjustment. Nevertheless, a clear analytical framework for devising and interpreting a set of key indicators is indispensable in advancing knowledge about the effects of policies, and thereby providing information on both the policy choices open to national governments and the scope for coordinating their policy actions. Finally, Section VI presents a brief summary.

II. Sources of the Perceived Need for Cooperation and Coordination

It is the interdependence of national economies that makes international economic cooperation desirable in some circumstances. If a country were completely independent of its neighbors, then obviously its policy choices would not be complicated by disturbances emanating from abroad or by the spillover effects of policies taken by other countries. In these circumstances, there would be no need for obtaining information about developments abroad or for coordination of economic policies. Needless to say, this is not a realistic description of the situation facing any country; furthermore, in recent years goods and financial markets have become much more integrated, tending to increase interdependence (Cooper, 1985).

Interdependence among countries takes a number of forms. Structural interdependence (Cooper 1985, p. 292) implies that events in one country strongly influence those in another. The main channel through which this occurs is trade in goods and financial assets; in general, greater

integration of goods and asset markets between countries is likely to lead to greater interdependence of the economies concerned. Correlation of exogenous disturbances facing two economies may increase their interdependence for a given level of structural interdependence (see Cooper, 1985). For instance, because of its large size and the fact that it was common to all countries, the oil price shock in 1973/74 produced essentially the same stagflationary effects in all industrial economies and increased interest in economic cooperation, in particular in sharing the large current account deficits of those countries with respect to OPEC. It may also be the case that there is interdependence of the objectives of policy. For instance, countries may share a concern for world inflation (not just inflation in their own country) or for economic growth in developing countries.

The global economy can be considered a closed economy, implying that there are adding-up constraints that apply to variables across countries (Hamada 1979). For example, trade balances and current account balances have to sum to zero (apart from any errors of measurement), and the change in reserves--or the overall balance of payments--when summed over all countries must equal the global supply of reserves. As a result of these constraints, if a country takes action to change its balance of payments, then this action will have repercussions for at least one other country. These "zero-sum" constraints on such national policy objectives as current account balances and holdings of international reserves give rise to the likelihood of international inconsistencies in policy targets. These inconsistencies, in turn, imply a potential need for cooperation and coordination among countries.

Interdependence implies that it is important to take into account the policy settings of other countries, and to understand the way economic policies and exogenous shocks are transmitted between countries. Thus there is a crucial role to sharing information concerning international developments and in explaining policy intentions to other governments. Given the rudimentary understanding of the precise nature of economic relationships, including possible lags in their operation, economic cooperation in extending economic knowledge both as concerns the structure of the economy and of the current and future values of relevant variables is likely to yield a high payoff. It is probably fair to argue that, because of the complexity of the international economy, policymakers at present do not fully understand let alone incorporate developments abroad into their policy choices. 1/ International economic cooperation in the form of information sharing helps those policymakers to understand better how the effects of their policies are modified by events abroad--including feedbacks of their own policies. However, the case for cooperation does not rest on the argument that those feedbacks are large. In the context of uncertainty concerning the state of the world, even the limiting case

1/ Of course, foreign repercussions may not be given much weight in policymakers' welfare calculations, but this is a separate issue.

of a country that is too small to have any influence on other countries--and hence free of feedbacks from abroad of its own policy actions--would still want to engage in international economic cooperation of this form. In fact, for a small country, such cooperation might be all the more necessary.

As noted earlier, it is useful to distinguish between the need for cooperation in the form of information exchange and economic policy coordination. The exchange of information, and a framework for interpreting that information, is an essential first step in cooperation. Achievement of this step would imply that governments, even when acting independently, could choose policies that would be less likely to lead to unexpected international feedback effects, thereby permitting them to achieve results closer to their objectives. In some circumstances, however, cooperation must also involve a further stage, namely the adjustment of policy goals in each country to make them internationally consistent and compatible (Cooper 1985, p. 316). 1/ This is most obvious when countries target the same variable--for instance, if two countries each target their bilateral exchange rate or bilateral current account balance.

The source of possible incompatibilities has been termed the "nth country problem," which manifests itself in different ways under different exchange rate regimes. Under a key-currency system with fixed exchange rates, central banks agree to intervene in the foreign exchange market to maintain a parity rate against the key currency, and balance of payments adjustment is achieved through the feedback of reserve flows onto the domestic money supply (in the absence of sterilization). The induced change in the money supply will have effects on output and prices which will tend to correct the payments disequilibrium. Typically, countries will not be indifferent to the levels of their reserves. If all countries target the level of international reserves, and the sum of reserve targets exceeds the world reserve stock, then policies have a global deflationary bias; if they fall short of the supply, then the world economy will experience inflationary pressures (Hamada, 1974). If the key-currency country (the nth country) is willing to act passively as a residual, and does not adopt a (net) reserve target, it ensures that the global supply of reserves can eventually be distributed according to the preferences of the other n-1 countries. The nth country also has the freedom to set its own money supply, since other countries ensure the maintenance of nominal parities. Under the Bretton Woods system, it was the United States that had the role of nth country. The system broke down when other countries were unwilling to accept the inflationary consequences of U.S. money supply growth, and the United States became increasingly unwilling to accept passively developments for its balance of payments.

In principle, a regime in which exchange rates float freely eliminates the need for official reserves, and allows each country to choose its

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1/ Compatibility need not ensure optimality, however.

money supply and rate of inflation. In practice, of course, no country is indifferent to its current account balance, its real effective exchange rate, or the level of its reserve holdings. If countries have targets for these variables, there must either be an nth country that does not have an explicit target, or else some way of making the targets globally compatible. This is the fundamental consideration that has given rise to the impetus for policy coordination in the present international monetary system, with its high degree of exchange rate flexibility. While the present system allows member countries almost complete freedom of choice about their exchange rate arrangements, a stable system of exchange rates remains of international concern and the object of Fund surveillance. 1/ In the absence of cooperation to achieve this, market mechanisms may establish compatible but non-optimal outcomes and persistence in trying to achieve those goals may destabilize the international economy.

The international incompatibility of policies is closely related to their unsustainability. However, policies are unsustainable for their ultimate consequences--both domestically and in the world economy--even if not currently incompatible with other countries' policies. An example is a fiscal policy that involves large government deficits and a persistent increase in the ratio of government debt to GNP, and large current account deficits. Such a policy may not be immediately incompatible with other countries' targets--indeed, the current account deficit may be viewed favorably abroad because of its stimulus to output in those countries, and capital inflows may occur as international asset holders take advantage of attractive returns--but the sustainability of such a policy is a valid concern to the authorities, because of the need to identify problems that may arise in the future. International economic cooperation as distinct from policy coordination may play a useful role in drawing attention to the unsustainability of policies, which may in some cases be more evident from an international than from a domestic perspective.

A demanding form of cooperation is economic policy coordination; this form has received much attention recently in the academic literature. The theoretical discussions have usually assumed that the economic structure of each country involved in the effort at policy coordination is known with certainty by all parties, as are the policy actions of all countries. In this context gains from coordination, in the sense of the improvement of each country's welfare relative to the outcome with independent policy setting by each country, require not only interdependence of national economies and the inability of governments to achieve their objectives perfectly (in other words, they have fewer independent instruments than targets), but also that feedbacks from abroad change the tradeoff between policy goals (Gavin 1986). For example, if these feedbacks fail to change a country's position along its short-run Phillips

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1/ The present Articles of Agreement require the Fund to "oversee the international monetary system in order to ensure its effective operation." See Article IV, Section 3(a and b) of the Fund's Articles (IMF (1978)).

curve, there will be no gains from policy coordination. Whether these conditions are satisfied or not is the subject of controversy; detailed knowledge of the economic system is essential in order to resolve the issue of whether coordinated policies should be different from policies that governments would have chosen independently, and in what direction coordinated policies would be different.

Coordination of economic policies may in some cases be desirable, but uncertainties concerning the precise goals of policymakers, the nature of economic transmission mechanisms, and the types of shocks affecting national economies make it difficult to generalize concerning the improvement that coordination would bring. Since the form of cooperation or coordination depends on the way the international monetary system functions, we now turn to a discussion of experience with the generalized flexibility of exchange rates as it has operated since 1973.

III. The Operation of the Present International Monetary System and Experience with Coordination

The present international monetary system is characterized by a wide diversity of exchange rate arrangements among countries. These arrangements include some form of fixed exchange rates achieved by pegging against individual currencies or a currency basket (adopted by many developing countries), limited flexibility of exchange rates against a single currency or group of currencies (as under the exchange rate mechanism of the European Monetary System), and greater exchange rate flexibility (practiced by some industrial countries, notably the United States, Japan, Canada, and the United Kingdom, and by some developing countries). While the actual number of countries that choose to operate under a fixed or adjustable peg system far exceeds those countries with floating currencies, the behavior of the latter group dominates the functioning of the international monetary system by virtue of its disproportionately large share of world trade. 1/

The existence of interdependencies makes it possible that the smooth functioning of the present "hybrid" system of exchange arrangements would be enhanced by some coordination of macroeconomic policies. However, the appropriate form that coordination might assume for different groups of countries depends upon the nature of the prevailing exchange rate arrangement. At the same time, the diversity of the exchange rate system increases the difficulties of defining rules or cooperative policies that are appropriate within and between groups of countries. The complexity of the present system also means that any policy lessons based upon an analysis of the "pure" cases of fixed and flexible exchange rates may require considerable modification in the light of the actual experience of countries within the current international system.

1/ As of December 31, 1986, 91 countries operated under a pegged exchange rate arrangement, 13 countries adopted a limited flexibility arrangement and 46 countries adopted a flexible exchange rate arrangement (IMF, 1987).

1. Lessons from the experience of the seven major industrial countries

The post-Bretton Woods experience of the main industrial countries may be characterized as independent floating, although the considerable intervention that has taken place at certain periods blurs any sharp distinction based solely upon an analysis of the pure regimes of fixed and flexible exchange rates. Four criteria might serve as a basis for evaluating the experience of these countries under the present exchange rate system: 1/ (1) Does the system help or hinder macroeconomic policy in the pursuit of domestic objectives? (2) How effective is the system in promoting external adjustment? (3) How does the system affect resource allocation in the world economy? and (4) How flexible is the system to changes in the world economic environment? Much of the recent interest in coordination has stemmed from a concern with the effectiveness of the present system, and from a perception that there is excessive exchange rate volatility, misalignment of the currencies of the main industrial countries, and continuing payments imbalances, especially of the United States, the Federal Republic of Germany and Japan. Chart 1 presents the evolution of current account balances and real effective exchange rates for the major industrial countries since the start of generalized floating. It indicates that there have been large swings in current account balances as ratios to GNP, especially since 1982 in the case of the United States and Japan, and correspondingly large swings in real effective exchange rates.

As a number of observers have noted, there are considerable methodological problems in determining the extent of payments imbalances and identifying the role played by the exchange rate system. 2/ Ideally, what is sought is a comparison of underlying payments imbalances (actual payments balances adjusted for factors such as the effects of lagged exchange rates and cyclical effects) with equilibrium payments balances. 3/ An additional problem arises in attempting to isolate the effect of the exchange rate regime from the period itself. For example, the immediate post-Bretton Woods period was characterized by large real disturbances leading to a marked deterioration in the terms of trade of the main industrial countries, but this was not the result of the exchange rate regime. Nevertheless, the current account balance is used here as a crude measure of payments imbalances, and Table 1 compares the level and persistence of payments imbalances since 1973 with measures for the preceding decade. 4/

1/ See IMF (1984b).

2/ For a discussion of these issues, see IMF (1984a,b).

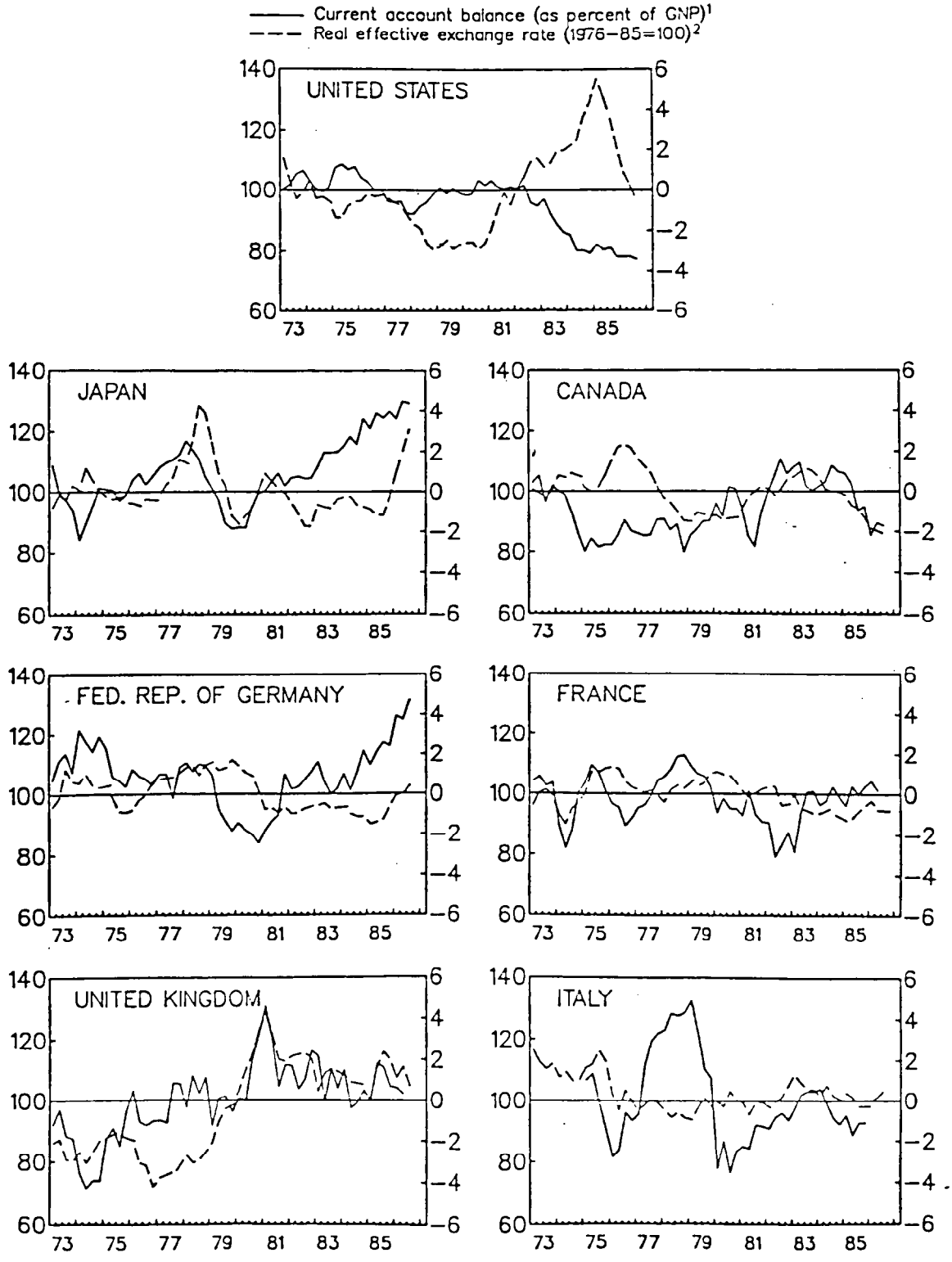
3/ The concept of equilibrium payments balances takes into account, among other factors, the sustainability of positions over the medium term. For a detailed discussion of underlying balance of payments positions, see IMF (1984a).

4/ This table is an updated version of one found in IMF (1984b).

CHART 1

MAJOR INDUSTRIAL COUNTRIES

CURRENT ACCOUNT BALANCES AND REAL EFFECTIVE EXCHANGE RATES, Q1 1973 TO Q3 1986



Sources: International Financial Statistics and staff estimates.

[1] Seasonally adjusted at annual rates; right-hand scale. Data for Italy extend from 1975 to 1985; data for France from Q1 1973 to Q2 1986, data for the United Kingdom from Q1 1973 to Q2 1986.

[2] Relative normalized unit labor costs adjusted for exchange rate changes, calculated using export weights; left-hand scale.

Table 1. Current Account Balances as a Percent of GNP: Major Industrial Countries, 1963-72 and 1973-85 1/

	Mean 2/		Standard Deviation		Serial Correlation 3/	
	1963-72	1973-85	1963-72	1973-85	1963-72	1973-85
United States	0.30	-0.51	0.46	1.22	0.86*	0.97*
Canada	-0.81	-0.91	1.15	1.18	0.43	0.47
Japan	0.79	0.78	1.15	1.47	0.83*	0.84*
Germany, Fed. Rep.	0.52	0.71	1.08	1.26	0.61*	0.57*
Italy	1.90	-0.88	1.47	1.92	0.81*	0.29
United Kingdom	0.19	0.05	1.07	1.67	0.46*	0.67*
France	-0.22 4/	-0.27	0.46 4/	1.05	...	0.11
Unweighted average	0.68	0.58	0.98	1.40	0.67 5/	0.64 5/

Source: IMF, International Financial Statistics

1/ Current account includes goods, services, and all current transfers, both official and private.

2/ Country means take into account the sign of current account imbalances. In contrast, group means are based on absolute values of country means.

3/ Statistic reported is the estimated coefficient on the lagged dependent variable in the first-order autoregression equation; * indicates statistical significance at the 95 percent level.

4/ 1967-72 only.

5/ Excludes France.

Table 1 shows that while some individual countries, notably the United States, Canada, and the Federal Republic of Germany, have experienced higher average and more variable current account imbalances under flexible exchange rates than in the last decade of Bretton Woods, this was not true for an unweighted average of the G-7 countries. On this basis, these countries experienced smaller payments imbalances under flexible exchange rates although their variability over time increased. As for the persistence of current account imbalances, the evidence indicates that it has not been noticeably reduced by exchange rate flexibility. In contrast, early proponents of floating exchange rates argued that flexibility would ensure prompt adjustment of external imbalances. For the United States and Japan, imbalances have been large and persistent under flexible rates.

2. Recent attempts at economic policy coordination among major industrial countries

The post-Bretton Woods experience of independent or joint floating by the major industrial countries has also been characterized by both synchronization of domestic policies that have at times ignored the amplification of effects due to spillovers from other countries as well as episodic attempts at cooperation and coordination. Since 1975, an important new instrument for achieving international coordination has arisen--the annual Economic Summit of the G-7 countries.

Pressures for coordination are likely to arise when the economic system is perceived as not working, and the Summit was a response to a need for international cooperation following the breakdown of Bretton Woods and the 1973 oil shock. Major industrial countries underwent a marked deterioration in economic performance after 1973, with sizable increases in both inflation and unemployment. This was accompanied by a sharp fall in productivity and output growth rates, both of which declined in 1973-75 to less than half of their respective averages for the previous decade.

The distinctive feature of Economic Summits is that they are limited to a small group of countries (currently the G-7) that carry most weight in international economic decision making. One important advantage of limiting the number of participating countries is that it reduces the number of conflicts and costs of negotiating. Unlike more permanent institutions, summits do not impose binding agreements on countries and the subjects considered may alter each year. This flexibility has proven to be both an advantage (in the face of a changing economic environment), and a disadvantage on occasions as illustrated in the discussion below.

In assessing the record of the Summits, it is useful to distinguish between the procedural and substantive achievements that have been made. On a procedural level, the Summits have established an increased awareness of policy interactions, a recognition of the role of exchange rate factors

in macroeconomic policy formulation, and the need for mutually consistent medium-term strategies. The significance of this accomplishment should not be understated. At a substantive level, the policy initiatives agreed to at summits have gone less far. The earlier Summits placed considerable emphasis on the importance of each country "putting its own house in order". The outcome was frequently a synchronization of domestic policies as illustrated in the period following the 1979-80 oil shock in which the main industrial countries independently implemented policies of monetary restraint. The latter led to historically high real interest rates and a generalized contraction in economic activity, with adverse consequences for economic growth in developing countries and for their capacity to service external indebtedness.

One important exception to this domestic focus was the Bonn Summit of 1978, which achieved agreement on a coordinated package of macroeconomic policies (as interpreted in the broad definition of this paper). Specifically, Germany agreed to measures which would increase the 1978-79 budget deficit by about 1 percent of GDP, Japan promised additional public expenditure, while the United States implemented an energy package to reduce oil imports. The form of macroeconomic coordination implemented was, to a large extent, a modified version of the "locomotive" model that had dominated discussion at the London Summit a year earlier. It was believed that the larger industrial countries should undertake more expansionary policies than otherwise in order to foster the conditions for an export-led world recovery. Whatever the economic merits of the Bonn measures, the success in reaching a coordinated agreement may be attributed to a number of factors. 1/ (1) A temporary synchronization of political ideologies; (2) An integration of the Bonn Summit agenda with lower-level discussions under the auspices of international organizations; and (3) A meshing of domestic and international issues in the sense that domestic advocates of internationally desired policies were able to use the Summit to shift the internal balance of power in their favor.

An assessment of the success of the economic measures implemented at Bonn is difficult and controversial in view of the impact of the second oil shock in 1979. By the end of 1978, recovery in economic activity was underway, but it was then halted by the 1979-80 oil price increases. The sharp economic downturn that followed was also marked by historically high nominal and real interest rates that accompanied restrictive monetary policies. In retrospect, it can probably be said that the Bonn measures placed insufficient emphasis on the medium-term consequences of fiscal expansion, and failed to provide sufficient flexibility for anti-inflationary monetary policies that were subsequently made necessary by the second oil shock. As a result, the expansionary measures decided at Bonn were soon revised, and the Bonn summit is widely considered to be an example of the pitfalls of international fine-tuning.

1/ See Putnam and Bayne (1984) and Artis and Ostry (1986).

The coordinated reductions in the discount rates of major industrial countries (and some non-G-7 countries as well) achieved in March and April 1986 may be interpreted as an example of successful coordination of monetary policies when there is a common perception of the goal to be attained--in this case, the need to lower nominal (and real) interest rates in the face of slow growth of output. They were also justified by the desire to avoid further exchange rate changes, in the light of the substantial depreciation of the dollar that had already taken place. The commitment to policy coordination was further strengthened at the economic summit in Tokyo in May 1986. However, the mixed success in achieving similar coordinated interest rate reductions among the G-7 countries since that time also highlights an important limitation of the summit as an instrument for achieving international coordination. It may prove difficult to achieve continuing agreements between countries through ad hoc policy coordination, in the face of changing circumstances, differing interpretations of the nature of agreements, and different models.

The main lessons that might be drawn from the recent experience of G-7 countries with international cooperation are not only the difficulty of reaching a coordinated agreement but also the problem of determining the appropriate response in the form of synchronized or non-synchronized monetary or fiscal policies. Reaching international agreement is often complicated by a lack of domestic consensus, and, in some cases, by the absence of political will to carry out policies that are judged to be desirable. However, it is often unclear what the appropriate policies should be, and this difficulty reflects a lack of information concerning how the economic system works, especially within a changing economic environment. This issue is considered in more detail in Section IV below.

3. Lessons from the EMS experience

Useful lessons for international policy coordination may also be drawn from the experience of the group of European Community member countries whose currencies participate in the exchange rate mechanism (ERM) of the European Monetary System (EMS). 1/ From an analytical perspective, the ERM operates as an adjustable peg system with intervention by central banks to maintain nominal exchange rates within or at the margins around bilateral central rates of participating countries. 2/ Unlike Bretton Woods, in which a parity change in a situation of "fundamental disequilibrium" could be initiated unilaterally by member countries, the direction and magnitude of realignments within the EMS are determined by collective decision making. By virtue of their membership in the EC, EMS member countries also possess stronger political and economic ties than Bretton Woods partner countries with some harmonization of other policies such as agriculture and tariffs already in place.

1/ The group of participating countries are Belgium-Luxembourg, Denmark, France, Federal Republic of Germany, Ireland, Italy, and the Netherlands.

2/ The operation of the EMS is described in Ungerer and others (1986).

The goals of the EMS have a critical bearing on any evaluation of its performance and the extent to which this can be attributed to policy coordination. The stated objective of the EMS is to create a zone of monetary and exchange rate stability, as this is viewed as a necessary step toward achieving convergence in economic performance. The primary focus on monetary stability has meant that the control of inflation has formed a cohesive primary objective for member countries whose currencies participate in the exchange rate arrangement. The governments of countries such as France and Italy with past histories of relatively high inflation might expect to gain greater credibility, in terms of the inflationary expectations held by the private sector, by aligning their monetary policies to those of low inflation countries with established records of price stability such as Germany. The resulting improvement in these countries' output-inflation trade-offs could also benefit the German economy through positive trade linkages. 1/ The agreement to place a high weight upon reducing inflation has also served to weaken any threats to stability that might otherwise arise from conflict between internal and external balance, and any inconsistency between inflation targets desired by smaller members and larger countries. At the same time, the critical importance of inflation reduction in uniting ERM partner countries suggests a possible source of future instability and policy conflicts if the priority were to shift in some countries toward reduction of unemployment.

The goal of convergence of economic performance within the EMS, resulting from a general desire to reduce inflation rates from their high levels following the oil price shock of 1979, has required the achievement of some degree of convergence of economic policies. It is not the case, however, that convergence of policies can be equated with coordination of policies. 2/ Most writers have broadly identified coordinated policies of ERM countries with convergent policies while recognizing the possible inconsistencies that might arise between short and long-term goals. While the convergence toward monetary restraint in ERM member countries (measured by monetary and domestic credit aggregate growth rates) has been well documented, it is also apparent that this experience is not unique to this group of countries. 3/ A similar movement toward greater monetary restraint has been exercised in other industrial countries that have operated under more flexible exchange rate arrangements over the same period. Fiscal policies, in contrast, were not directed toward the

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1/ The EMS may be modelled as a cooperative game that yields benefits to its members that derive both from fixing the exchange rate and from allowing realignments to occur in response to shocks (see Melitz, 1985).

2/ In general coordinated policies need not be directed toward the goal of convergence, and convergence need not result from coordination. The convergence (for instance, of living standards) may require differential growth rates and hence divergence of policies over some adjustment period.

3/ See Ungerer and others (1986) and Artis (1986).

exchange rate, and show increasing divergence for ERM (and major non-ERM industrial countries) over the period 1979-85 although the EMS may have placed constraints on fiscal policies of particular countries in specific periods. An example is the reversal of the fiscal expansion undertaken by France in 1981-82. Faced with the need for frequent realignments within the EMS and consequent loss of credibility, as well as purely domestic considerations, the French government chose to restructure its demand policies.

Studies of the exchange rate performance of the ERM (Ungerer and others (1986), Artis (1986), and Rogoff (1985b)) show a reduction in the volatility of both actual nominal and real exchange rates between member countries and of the unanticipated component of those rates. If it were the case that greater predictability of exchange rates could be attributed to a change in private speculative behavior in response to a credible commitment to a set of central rates between ERM countries, then we might also expect to observe a corresponding reduction in the mean and variability of nominal and real interest rate differentials between ERM countries over the same period. The evidence given in Table 2, however, shows an increase in the mean and variability of short-term nominal interest rate differentials of ERM countries against deutsche mark denominated assets, although the mean and variability of nominal interest rate differentials adjusted for inflation appear to have fallen on average. 1/ More detailed analysis by Rogoff (1985b) suggests that average unanticipated real interest rate differentials for both France and Italy against Germany showed a rise over 1979-85. This finding is problematical insofar as it suggests that the observed exchange rate stability may derive from both the imposition of capital controls and from a willingness to use monetary instruments in order to resist exchange rate movements.

Measures of convergence of economic performance of ERM member countries, including inflation, unemployment and current account imbalances, are summarized in Table 3. These show a mixed record. Countries participating in the ERM have indeed experienced a convergence in price performance as measured by a fall in both average inflation rates and their dispersion around mean levels, although this fall is concentrated in the most recent 1982-1985 period. Again, this experience is paralleled by that of the group of non-member countries. In contrast, indicators of unemployment and current account imbalances show an increased divergence for both ERM countries and G-7 countries not included in the exchange rate arrangement. While the considerable increase in average unemployment rates for ERM members may be attributed to real factors and also to the revealed preference of policymakers for reducing inflation, it may also reflect unexploited opportunities for coordination of other policies, especially fiscal policy and microeconomic measures.

1/ Greater short-term variability in nominal interest rates may be associated with less variability in real exchange rates if the monetary authorities resist inflationary shocks through tighter monetary policies.

Table 2. Short-term Nominal and Real Interest Rate Differentials of EMS and non-EMS Countries. 1/ Domestic Interest Rate less Interest Rate in the Federal Republic of Germany.

(Percent per annum)

	Nominal Interest Rate Differentials			Real Interest Rate Differentials		
	1974-78	79-85	83-85	1974-78	79-85	83-85
EMS countries						
Belgium	1.65	2.44	3.28	-2.87	-0.04	-0.04
Denmark	7.06	6.18	5.79	0.78	1.52	2.45
France	4.35	4.90	6.03	-1.64	-1.26	1.06
Ireland	7.10	7.80	7.71	-3.61	-1.42	2.16
Italy	8.35	9.83	11.62	-3.34	-1.01	2.69
Netherlands	1.20	0.66	0.42	-1.95	0.28	6.28
Weighted mean 2/	4.92	5.76	6.97	-2.13	-0.78	1.46
Weighted standard deviation	3.04	3.43	4.02	1.61	1.58	1.27
Non-EMS countries						
Canada	3.09	4.95	4.57	-1.43	1.00	2.48
Japan	3.11	-0.12	0.95	-3.77	0.40	1.51
United Kingdom 3/	4.83	4.58	4.78	-6.63	-0.92	2.19
United States	2.03	4.23	3.17	-1.25	0.90	2.71
Weighted mean	2.58	3.33	3.28	-2.28	0.63	2.40
Weighted standard deviation	1.41	2.38	1.78	2.77	0.94	0.56

Source: IMF, International Financial Statistics

1/ In general call money rates; 3-month treasury bill rates for the U.K. and Canada. Real interest rate differentials are defined as nominal interest rate differentials deflated by inflation differentials.
2/ Weighted by each country's GNP.
3/ The United Kingdom is a member of the EMS but does not participate in its exchange rate mechanism.

Table 3. Indicators of Convergence: Inflation, Unemployment and Current Account Balances, Averages, 1974-85

	Consumer Price Indices			Unemployment Rates			Current Account Balances		
	1974-78	79-85	83-85	1974-78	79-85	83-85	1974-78	79-85	83-85
	(Annual change in percent)			(Percent)			(Percent of GNP)		
Belgium	8.38	6.98	5.61	6.05	12.12	14.37	0.13	-2.00	--
Denmark	9.96	8.66	5.48	5.83	9.12	9.75	-3.10	-3.75	-3.43
France	9.96	8.66	6.58	4.83	8.22	9.69	-0.04	-0.54	-0.33
Germany, Fed. Rep.	4.15	4.15	2.30	3.60	6.12	8.15	1.36	0.15	1.31
Ireland	15.03	13.38	7.01	8.02	12.36	16.27	-5.69	-9.65	-5.61
Italy	15.73	15.02	9.99	6.57	9.10	10.30	-0.61	-0.97	-0.62
Netherlands	7.45	4.58	2.77	4.08	11.16	15.26	2.09	2.64	4.48
Weighted mean 1/	8.45	8.33	5.39	4.71	8.11	9.93	1.86	2.81	2.26
Weighted standard deviation	4.48	4.23	2.64	1.78	2.87	3.91	2.01	3.27	2.23
Canada	8.81	7.92	4.15	7.16	9.60	11.23	-1.88	-0.40	0.14
Japan	8.39	3.60	2.15	1.90	2.38	2.66	0.36	1.06	2.74
United Kingdom	16.24	9.01	5.52	4.38	9.87	11.86	-1.14	1.10	0.88
United States	7.75	6.83	3.91	6.99	7.81	8.10	0.02	-1.03	-2.38
Weighted mean	8.37	6.37	3.66	5.66	6.88	7.39	0.85	0.90	1.54
Weighted standard deviation	4.59	2.40	1.42	2.56	3.53	4.38	0.72	0.30	1.07

Source: IMF, International Financial Statistics and World Economic Outlook data bank.

1/ Weighted by each country's GNP: For current account balances, the mean and standard deviation are unweighted; country means take into account the sign of current account imbalances while group means are based upon absolute country means.

The short period of existence of the EMS and its continuing evolution mean that any policy lessons that might be drawn must be qualified ones. Furthermore, the EMS experience may be viewed as unique insofar as participating countries have a high degree of political commitment, similar economic structures, and, for some countries at least, capital controls. Nevertheless, based upon the earlier discussion and the evidence presented in Table 3, there are some comments that can be made. First, while the discipline of fixed but adjustable exchange rates may have served as the chief mechanism for achieving convergence in inflation for ERM countries, it is clearly not a necessary instrument for monetary discipline. Nor, it appears, is the exchange rate mechanism a sufficient instrument for achieving convergence in other measures of performance, in particular output growth and the reduction of current account imbalances, unless it is also accompanied by coordination of both fiscal and monetary policies.

IV. Costs and Benefits of Coordination in the Present Exchange Rate System: Lessons from the Literature

The previous section sketched some of the features of the present international monetary system, and discussed some attempts at policy coordination. In this section, the case for coordination of policies under a floating-rate system is analyzed in more detail, in the light of recent theoretical literature. Theoretical and empirical literature on transmission mechanisms is also surveyed, given their importance for coordination. The obstacles to achieving coordination are then discussed, as well as factors that suggest that coordination may not always be a good thing. Finally, the relatively few empirical studies on policy coordination are surveyed.

1. Sources of gains from coordination

A precise illustration of the types of problems that can arise from uncoordinated policies, and of the improvement that results from coordination is presented in the Appendix. It serves to illustrate conditions under which potential gains from coordination may arise, but also the sensitivity of these gains to the assumptions of the model, in particular the transmission mechanism and the objectives of the authorities.

In the model presented in the Appendix, an inflationary shock produces a situation in which each government has an incentive when acting independently to use exchange rate appreciation in order to bring down domestic prices. However, if they each attempt to do this through tight monetary policy, they will not be successful in using the exchange rate for this purpose; instead, they will just cause output to be lower in each country than would be optimal. A coordinated policy, in contrast, would account for the incentive to exploit the exchange rate as a competitive variable (Polak 1981) and would rule it out. This would permit monetary policies to be set in a way that would achieve the optimal speed of disinflation.

In this example, the optimal policy could be achieved either by changing the international monetary system--fixing the exchange rate--or by explicit negotiation of policies. In the terminology of this paper, the latter would involve policy coordination, while the former would be included in the broader concept of international cooperation.

The interrelationships among countries in the economic arena can be thought of as involving two stages: in the first stage, governments establish rules governing the international monetary system, and in the second stage, policy choices are made, in either a coordinated or uncoordinated fashion (Hamada 1979). In choosing the rules governing the international monetary system, an important consideration is that some systems may be more likely to bring about optimal policies (whether the result of explicit coordination or not) than others. Conversely, if policies are seen to be suboptimal, then countries may agree to change the international monetary system: "the malfunctioning of the policy interplay based on a particular rule of the game may become incentives for the parties to change the rule itself" (Hamada 1979, p. 321).

It could be questioned whether different systems really do lead to different outcomes. For instance, it has been suggested (Shafer and Loopesko 1983) that the greater flexibility of exchange rates was inevitable after the oil price changes of 1973/74, and would have occurred even if the Bretton Woods system had not been formally abandoned (in fact, the Second Amendment to the Articles of Agreement of the IMF did not come into force until 1978). The role of the EMS in promoting greater fixity among the currencies participating in the exchange rate mechanism is also disputed, some maintaining that with frequent realignments the outcome is much the same as a managed float (Giavazzi and Giovannini 1985).

The extreme view that the form of the international monetary system does not change the policy outcome does not seem tenable, however. It is hard to deny that the Bretton Woods system of adjustable pegs at times induced deficit countries to adjust domestic demand when they would not otherwise have done so. Although it is true that, unless sovereignty has formally been relinquished over national autonomy, countries can usually withdraw from international monetary arrangements, 1/ there may be strong reasons for not doing so. Just as the "reputation" of a government is important in allowing it to convince its own residents of its commitment to a certain policy, and thereby succeeding in actually implementing that policy (Kydland and Prescott 1977), reputation is important in the international arena. There may in any case be circumstances when a rational calculation of costs and benefits leads to a decision to abrogate an agreement, but it cannot be denied that the rules of the international monetary system change the cost/benefit structure.

1/ For instance, Canada chose to float its exchange rate in the period 1951-1962 and again starting in 1970, and France withdrew from the "Snake" arrangement limiting exchange rate flexibility among European currencies on two occasions during the 1970s.

The example of policy setting discussed above seems to imply that fixed exchange rates are necessarily superior to floating rates, because they rule out the competitive use of the exchange rate to achieve policy goals. However, the question is much more complex than that simple example suggests. First, countries are not the same, either in their policy goals or in their economic structures. Second, a variety of exogenous shocks affect those economies, and for some of them, exchange rate movements are clearly appropriate for adjustment: "...floating rates should be considered as having a comparative advantage against some types of disturbances and a comparative disadvantage against others" (IMF 1984b, p. 25). Third, in view of far-reaching transformations of the world economy that have occurred in recent decades, it is important for a system to be adaptable to unforeseen or imperfectly understood structural changes.

It is clear that no international monetary system will automatically lead to optimal policy choices in all circumstances. For instance, Gavin (1986) shows that each of three alternatives--floating rates with uncoordinated monetary targets, a fixed exchange rate system, and a system (advocated by McKinnon (1984)) in which national money supplies are adjusted to achieve a global money supply target--dominates the others in some circumstances. Therefore, there would seem to exist a clear need under any international monetary system for international policy coordination to achieve an improvement over uncoordinated policies. However, the form that policy coordination should take, and the implications for policy settings, depends to a large extent on the nature of policy transmission mechanisms, which is the subject of the next section.

2. Transmission mechanisms under fixed and flexible exchange rates

The particular exchange rate system that is adopted may also affect the nature of the interdependence among countries, in particular the transmission of economic policies. If countries were not affected by the policies of others, then there would be no externalities to be eliminated by coordination. The hopes of the many advocates of exchange rate flexibility were that it would bring about a greater degree of independence among countries; however, experience of the currencies of the major industrial countries since the advent of generalized floating in 1973 has been that interdependence is not eliminated by exchange rate flexibility. On the contrary, with increased capital mobility, floating exchange rates have made countries more sensitive to certain types of external shocks.

There is a voluminous literature concerning the transmission of the effects of economic policies under fixed and flexible exchange rates. 1/ Mundell (1962) and Fleming (1962) analyzed the transmission of policies from the perspective of high capital mobility and fixed wages and prices.

1/ See Mussa (1979), and Boughton, Haas and Masson (1986) for surveys of that literature.

They further assumed that, given inelastic exchange rate expectations, high capital mobility would equate interest rates at home and abroad. Under fixed exchange rates, monetary or fiscal expansion in a large country is likely to be positively transmitted to other countries by increasing aggregate demand at home and also imports from abroad. In contrast, under flexible exchange rates a monetary expansion in a large country in the Mundell-Fleming model leads to an increase in output at home but a decline in output abroad. A small country cannot affect its interest rate, but a monetary expansion will stimulate output and depreciate the exchange rate. As for fiscal expansion, it is completely ineffective as a tool for increasing domestic output in the case of a small country, as the exchange rate appreciates sufficiently to crowd out the increase of demand at home. Otherwise, the conditions for monetary equilibrium would not be satisfied. Fiscal expansion in a large country will however have some effect in stimulating output at home and abroad, and this will be associated with a rise in the world rate of interest. Thus, fiscal expansion is transmitted positively under flexible exchange rates in the Mundell-Fleming model.

Two important elaborations on that model for flexible exchange rates involve accounting for exchange rate expectations in the context of sticky goods prices, and modelling aggregate supply. Both of these elaborations have the effect of weakening the clear conclusions concerning the direction of linkages between countries under flexible exchange rates. Dornbusch (1976) has allowed for sticky--not fixed--prices and for exchange rate expectations that correctly anticipate future movements. In this model, interest rates need not be equal at home and abroad, and an increase in government expenditure can cause an expansion in output, even in a small country. Moreover, monetary expansion need not be transmitted negatively to the foreign country, and monetary shocks cause overshooting of the nominal exchange rate in the short run. Models of aggregate supply 1/ have exploited the distinction between the real wage calculated from the point of view of the firm and the real wage calculated from the point of view of the worker, or consumer. When effects of the terms of trade on the consumption wage are taken into account, a fiscal expansion at home is less likely to cause an expansion of output abroad, and a monetary expansion at home is more likely to be associated with a rise in output abroad.

The ambiguity concerning the direction of transmission effects has not been conclusively resolved by the estimation of empirically-based macroeconomic models. A recent conference sponsored by the Brookings Institution (see Bryant and others (1986)) examined the responses of 12 multicountry models to hypothetical fiscal and monetary shocks. The models considered were quite diverse, ranging in size and approach

1/ See, among others, Argy and Salop (1979), Sachs (1979), and Corden and Turnovsky (1983).

(structural and nonstructural), and intellectual philosophy (Keynesian and New Classical). In all the models an increase in the U.S. money supply stimulated output in the United States, at least in the first two years of the simulations. In four of the models, the remaining industrial countries experienced higher output in each of the first two years, while in another four, the OECD area as a whole experienced lower output--athough some countries showed gains and some losses. The remaining models did not show a consistent pattern, with the sign of the transmission effect changing in the first two years.

As for a change in U.S. fiscal policy, there was more of a consensus despite the diversity of models used: a U.S. fiscal contraction produced lower output in both the United States and in the remaining industrial countries in all but two models. However, the size of the transmission effects and their profile over time differed considerably across models (and also across countries), often for reasons that were not well understood even by the model builders themselves. The limitations of existing large-scale macroeconomic models are well known, and are undoubtedly recognized by policymakers. In particular, it is to be expected that the structure of the economy may not be invariant to the types of policies chosen. However, to the extent that these models are used by individual countries in policy formulation (in conjunction with other information) or that officials have implicit models that differ, then it suggests that international agreement concerning what policies are desirable is likely to be difficult to achieve currently. There may thus be gains from information exchange insofar as such cooperation leads to greater understanding and consensus concerning the operation of the world economy.

3. Obstacles to coordination

Knowledge of how the economic system operates is far from perfect, as has been illustrated above in the discussion on transmission mechanisms and the experience of countries under the present international monetary system. Disagreements both among different arms of the same government and between governments can also at times be great concerning the effects of a particular policy. The lack of consensus--indeed conflicts in views--concerning a model of the economic system may well make agreement impossible; or if governments do manage to reach agreement, then there is no guarantee that welfare will actually be improved. Second, there are costs to negotiating and policing agreements when there are incentives to renege on those agreements and a reluctance of governments to limit their freedom of maneuver. These considerations may seriously limit the scope for international policy coordination. Third, instead of viewing governments as maximizing the welfare of their citizens, it may be more realistic to consider coordination in a context in which the aims of the government and the private sector may differ, as might be the case, for instance, if political leaders' planning horizons did not extend beyond the next election. A consequence of this viewpoint is that coordination among national governments will not necessarily improve the welfare of the private sectors in those countries, and hence it may not be desirable.

a. Lack of consensus concerning the functioning of the economic system

A reason for inability to achieve policy coordination is disagreement concerning the way the economic system functions, and, in particular, the strength and even the direction of the transmission mechanisms for economic policies. As discussed above, existing models give conflicting signals about the direction of the transmission mechanisms. Cooper (1986) has argued that international cooperation in the area of disease prevention took the good part of a century, despite obvious advantages to all countries, because of lack of firm scientific evidence concerning the nature of disease transmission. Once a scientific consensus emerged, progress was rapid. By analogy, success in economic cooperation is likely to be greatest where the knowledge of the effects of policies is most developed. An example of successful cooperation may be the harmonization of the value added tax and the standardization of packaging and labelling regulations within the European Community. In contrast, there is much disagreement concerning the effects of macroeconomic policies on policy objectives.

Disagreement among domestic policymakers may also be an obstacle to international coordination. In most countries domestic objectives reflect the outcome of considerable bargaining among interest groups, which may leave little scope for compromise at an international level (Polak 1981). However, the view is cited in McKibbin (1985) that international agreements have been achieved in recent years precisely when there have been substantial disagreements between national authorities, for example between monetary and fiscal authorities, leaving some scope for coalitions across countries of officials with similar objectives.

b. Costs of negotiating and policing agreements

There may be advantages to some countries from a noncooperative solution if they can impose their policies on others (Steinherr 1984). To use the terminology of oligopoly theory, a Stackelberg solution in which one country acts as leader and another as a follower may benefit the former in some cases. 1/ An example may be the operation of pegged exchange rate system in the 1950s and early 1960s, which allowed the United States to operate its monetary and fiscal policies with little immediate concern for their repercussions for the U.S. balance of payments, as other countries played the role of follower and ensured that their policies were consistent with their dollar pegs. This situation, which gave the United States an extra degree of freedom, was tolerated by other countries only so long as U.S. policies were perceived as neither too inflationary nor too deflationary. However, inflationary pressures in the United States eventually led to the breakdown of the system.

1/ It is also possible that a large share of the gains from Stackelberg leadership by a large country may accrue to the smaller countries (see Eichengreen, 1985).

In other circumstances, countries may benefit from being followers; this is also termed the "free rider problem", which can occur if there is an international public good from which all countries benefit, but to which each would like to minimize its contribution. An example that is sometimes cited is the attempt to stimulate aggregate demand by increased government expenditure. If fiscal stimulus is transmitted positively to other countries, then all will experience an increase in demand; however, each country individually may not want to carry out fiscal stimulus because of unfavorable balance of payments consequences. The optimal outcome from the point of view of a country suffering from deficient demand and pressure on its balance of payments would be to have other countries stimulate demand. This was the situation of a number of industrial countries during the 1970s, after the stagflationary oil price shock; hence the interest in "locomotive" and "convoy" theories to put pressure on Germany and Japan to expand domestic demand (Artis and Ostry 1986). 1/

A somewhat different version of the locomotive model and accompanying free rider problem may occur if countries maintain current account imbalances through optimal lending and borrowing policies abroad, and wish to improve their terms of trade in financial assets (see Corden, 1986). In this case, the international public good is a greater volume of trade in goods and services financed by trade in financial assets. In the absence of coordination, the volume of trade is lower than it would otherwise be since both debtor and creditor countries would like to restrict their borrowing and lending to prevent rises and falls in interest rates, respectively. While both countries gain from extra lending and borrowing, they may not wish to carry out the appropriate policies because of the cost in terms of lower or higher interest rates, respectively.

Another issue that has received a lot of attention in the academic literature on optimal policy choice in a closed economy is "time inconsistency", starting with the seminal work of Kydland and Prescott (1977). Time inconsistency refers to a problem associated with the possibility that authorities will find it advantageous to change their plans in the future. Suppose that a government, maximizing a given objective function, chooses an optimal monetary policy designed to bring down the rate of inflation; the optimality of this policy is predicated on the presumption that a restrictive policy in the future, if anticipated today, will have the effect of lowering expectations of inflation, and thereby have an immediate effect on inflation. If this occurs, then the government will have obtained the benefits of the tight policy, without actually having implemented it; when the time comes to incur the unemployment cost of the

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1/ The "free rider problem" also applies to the use of appreciation to achieve a reduction of inflation discussed above. In this case, each country may run a contractionary monetary policy but want other countries to expand their money supplies, allowing the first country to achieve a larger appreciation.

policy, the government will therefore not have the same incentive to pursue its restrictive policy. Since private agents also are aware of this problem, they will assume that the government will not carry out its announced policy (which will no longer be optimal), and hence will not lower their inflation expectations.

However, if policymakers can acquire a reputation for not reneging on agreements, then they may reap the benefits of optimal, but time-inconsistent policies. In this case, they can credibly commit themselves to future policy actions, even though at some point it might seem optimal to renege. The same considerations apply to the possibility of reaching optimal policies through cooperation among national governments. In some circumstances, it may seem attractive for governments to negotiate agreements, for instance to stimulate aggregate demand, but to fail to "carry out their end of the bargain" though benefiting from the actions of the other parties to the agreement. The incentive toward this type of behavior, if perceived to be pervasive, might make cooperative behavior impossible, unless there are penalties attached to non-compliance.

Though this obstacle to cooperative behavior at the international level has a certain plausibility, there are several considerations that limit its import. As Canzoneri and Henderson (1986, chapter IV) argue, considerations of reputation may allow a cooperative equilibrium to be achieved, even with incentives to renege on agreements. Using techniques of game theory, they show that an equilibrium with optimal policies can be achieved provided there are credible threats of retaliation in later periods should a party to an agreement behave non-cooperatively. It thus appears that the absence of international cooperation is more likely due to other considerations, for instance the uncertainty about the effects of policies discussed above. It also suggests that cooperation will be more successful when there are clear "performance criteria" and it is easy to verify that a party is holding up his side of the bargain. The monitoring aspect is easier to achieve when there is regular exchange of information and contact within established institutions, such as the European Community. A related issue is that cooperation in a number of fields may allow bargains to be struck such that a gain in one area is traded off against concessions in another; thus agreements may be easier when policy packages are concluded on a regular basis (Steinherr 1984).

Coordination among governments is costly in terms of the negotiating process and time lags in reaching agreement. Economic summits and negotiations among lesser officials may involve a considerable diversion of attention away from domestic economic and political issues (Artis and Ostry 1986). Furthermore, agreements, even if achieved, are likely to involve substantial further efforts of implementation, as there are often incentives for cheating that must be minimized--possibly through monitoring, cajoling by the other participants of the agreement, or threats of retaliation.

The costs of coordination are likely to rise with the number of participants, so that limited cooperation, whether among the larger industrial countries or within regional groups, is more likely than cooperation on a global basis. Effectiveness of summits might also be enhanced by representation from international institutions, although in practice the spring Interim Committee and OECD meetings indirectly contribute to the preparations of a summit. Such institutions may contribute significantly to the negotiating process by their global focus as well as representing the interests of developing and smaller industrial countries. Nevertheless, the economist's Pareto-optimal cooperative policy is unlikely to emerge. As Artis and Ostry (1986,p. 19) argue,

> ...[the form coordination takes] is unlikely to be that of continuous consultation across the board; rather, transparent systems with high profiles on good and bad behaviour seem preferable.

Given the policing costs of ad hoc agreements and the efforts needed to consider issues of policy on an ongoing and time-consuming basis, changes in the rules governing the international monetary system would seem obviously preferable, provided it were possible to codify rules that proscribed recourse to "bad" policies. Indeed Polak (1981) argues that explicit coordination should be considered a second best; where it is clear what rules should guide policies then they should be subject to administration and policing by international organizations rather than being subject to continuous renegotiation. In summary, although the theoretical case in favor of policy coordination may be strong, there are a number of real-world problems that may limit its practical possibilities.

c. Is coordination necessarily a good thing?

The discussion until now has been based on the presumption that, while there may be obstacles to achieving it, coordination is necessarily desirable, as it permits moving closer to the Pareto optimal solution. More fundamentally, it may not be true that coordination improves global welfare (Rogoff 1985a). It could be argued that, being voluntary, it surely would not take place if welfare was expected to be reduced. However, coordination involves only a subset of actors in the economy, and consequently there is no guarantee that it leads to a better solution than independent behavior, even leaving aside uncertainty as to the effects of policies.

In Rogoff's model, for example, central banks target employment and price stability, but their employment target (though socially optimal) is higher than that of wage setters. Wage setters are able to frustrate any effort by their country's central bank to raise the level of employment, by setting base nominal wages "at a sufficiently high level so

that, in the absence of disturbances, the central bank will not choose to inflate the money supply beyond the point consistent with wage setters' desired real wage" (Rogoff 1985a, p. 202). When the two countries' central banks act non-cooperatively, they are constrained by the fact that if one inflates, the positive effect on employment will be mitigated by a depreciation of the exchange rate, which, given indexation of wages to the CPI, will mainly show up in higher inflation. If both countries increase the money supply, however, the exchange rate will not change, and the stimulative employment effects will be larger. If they can agree to cooperate, then, the outcome will be a higher global inflation rate, but a better response to negative output disturbances in each country. Since these two effects go in opposite directions, it is quite possible that welfare in one or both countries may be lower than in the non-cooperative solution.

A more extreme view of the negative aspects of coordination denies that government policy choices are based on attempts to maximize a country's welfare. In this view, policy makers have their own objective of personal power and profit, as do the bureaucrats that negotiate and implement agreements; policy coordination is viewed as collusion (Vaubel 1985, p. 235):

> Collusion among private producers reduces their 'cost', in terms of demand lost, of raising price. International collusion among politicians reduces their 'cost', in terms of votes lost, of acting against the wishes of their voters. It enlarges the choice set of governments, but it reduces the choice set of the citizens, regardless of whether the standard of comparison is perfect competition, oligopoly or duopoly.

In this view, cooperation may enhance the chances of politicians to be re-elected, because of publicity given to summits and the possibility of shirking some of the blame for unpopular decisions, but it does nothing to increase welfare of the countries concerned. While this cynical view of government behavior is a good antidote to the assumption that social welfare is necessarily of paramount importance, it seems too negative an assessment. In any case, its main import concerns possible reform of the electoral process and the public choice problem (Brennan and Buchanan 1980), rather than the issue of international cooperation.

4. Empirical evidence

Even if there is a strong theoretical case for expecting policy coordination to lead to a better global outcome (at least when governments try to maximize the welfare of their citizens and the effects of policies are well understood), it is an empirical question as to the magnitude of those possible gains. To date there have been relatively few empirical studies, to a large extent because technical issues concerning methods of solution and time inconsistency had to be faced first.

Oudiz and Sachs (1984) were the first to attempt to quantify the gains from cooperative policies among industrial countries relative to a Nash equilibrium, where every country knows exactly what the others are doing, all countries agree on the true model, but each takes as given the others' policies. The authors thus explicitly assume away uncertainty about the effects of policies and the gains from exchange of information. The parameters of the "true" model are assumed to come alternatively from the Federal Reserve Board's MCM model or the Japanese Economic Planning Agency model. Calculation of optimal monetary and fiscal policies with these parameter sets implies that cooperation produces little improvement in welfare relative to the Nash equilibrium.

In a more recent paper, McKibbin and Sachs (1985) use their four-region MSG model, "calibrated" to recent data (rather than estimated using econometric techniques), to examine possible gains to cooperation, especially those accruing to developing countries. 1/ It is assumed in the model that in response to an inflationary shock, industrial countries raise interest rates sharply when acting in an uncoordinated fashion with a view to benefiting from the effects of currency appreciation on their price levels. When all countries try to do so, the attempt is self-defeating, and as a result interest rates are above their optimal level. Coordination of the policies of the industrial countries, on the other hand, leads to lower global interest rates, through easier monetary policy. Effects on output and inflation in the industrial countries are small, as is the effect on their welfare; however, the welfare of developing countries is greatly improved by the cooperative policy, as their terms of trade improve and debt service declines.

Taylor (1985) treats policy coordination in a stochastic setting, and assumes that each government's objective is to minimize the forecast variance of output and inflation in the country. Using a model that is estimated and simulated subject to the assumption of rational expectations, he computes optimal cooperative and non-cooperative policy rules in response to a supply (or inflation) shock. The cooperative solution has the property that governments are more accommodative of inflation than when acting in an uncoordinated fashion, but this result may depend on the relative weights given to the variance of output and inflation in the welfare calculation. Although world welfare is necessarily higher when policies are coordinated, it is not the case that all countries benefit: in his model, two of the larger G-7 countries actually experience a fall in welfare. Therefore, for the cooperative solution to be Pareto superior to a situation where each country maximizes its welfare independently, some mechanism would have to exist for compensating those countries that were made worse off.

1/ See also McKibbin and Sachs (1986).

The conclusion that emerges from the empirical studies considered above is clearly that gains from coordination are small. 1/ However, the assumptions made in these studies that information is freely available and that there is a consensus on how the global economy operates are serious limitations. Canzoneri and Minford (1986) argue that the real issue is whether governments take account of the best available information on foreign policy actions in making their own choices, not whether they formulate policy jointly. The Nash equilibrium assumes that a country takes into account policies chosen abroad (but assumes that they do not respond to the home country's choices). Canzoneri and Minford contrast this with the "insular" solution, where governments take no account of what other governments are doing, in the sense that they assume that other governments' actions reflect their average behavior in the past. They argue that such a model better describes the actions of France and other European governments in the first part of the 1980s. They show that in the Liverpool World Model, insular behavior has a strongly negative effect on the welfare of industrial countries.

The issue of lack of consensus concerning the correct model of the economy is considered by Frankel and Rockett (1986). They suppose that 8 international macroeconomic models represented at a Brookings conference that took place in March 1986 ("Empirical Macroeconomics for Interdependent Economies") are candidates for the "true" model. Coordination between the U.S. and non-U.S. central banks improves U.S. welfare in only 289 out of the 512 possible combinations of models (each of the two regions believes that one of the models is true, but the actual true model may differ from both), while the non-U.S. region's welfare improves in only 297 cases.

Both Canzoneri and Minford (1986) and Frankel and Rockett (1986) illustrate the importance of what we have called the most basic form of cooperation, the exchange of information. Empirical knowledge of transmission mechanisms and understanding of how each country's actions affect others are at a rudimentary stage. It is important that the implications of policy choices be understood; this is a precondition for gains to be made by jointly deciding on policies.

5. A general assessment

The technical literature that we have surveyed above provides a valuable insight into policymaking in interdependent economies: under some circumstances, choices made independently by national governments may not be as effective in achieving their objectives as policies that

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1/ A more recent study (Currie, Levine and Vidalis (1987)) claims that this negative assessment results from comparison of time consistent policies only--that is, it is assumed that governments cannot carry out fully optimal policies because of lack of credibility. Their work suggests that non-coordinated policies may be significantly worse than coordinated ones when governments are able to implement time inconsistent policies.

are coordinated with other governments. The practical implications of this theoretical possibility are still unclear, however, and to date they have not been fully explored in the literature. Much of the work has assumed that the structure of economies is known, and the models used have not adequately reflected the complexity of the economic system. In particular, the dangers of fine-tuning of policy instruments when the precise effects of those policy instruments--and especially the lags with which they operate--are not known, have not been considered. Therefore, empirical estimates of the gains to coordination are not really relevant to real-world policy choices. Confidence that coordination is likely to improve welfare requires knowledge of the functioning of the economic system. It seems that international cooperation that includes information interchange and multilateral surveillance would for the forseeable future yield greater benefits than coordination of economic policies.

How coordination is actually to be achieved is also usually not made clear. Since there are costs to negotiating and policing agreements, it must be shown that these costs do not exceed the benefits in terms of better achievement of policy objectives. Further work is warranted on possible institutional frameworks for achieving coordination.

In many circumstances, establishing appropriate rules for the functioning of the international monetary system and achievement of coordination of economic policies would be seen as substitutes. Given the difficulties of achieving coordination, the design of the international monetary system should have the goal of making countries choose policies on their own that are optimal from a global standpoint--or at least as close to optimal as possible (Hamada 1979). However, it is unlikely to be the case that any system can be designed that automatically yields the best policies in all circumstances. The present exchange rate system has stood up well to a variety of shocks since the advent of generalized floating in 1973, and it has the advantage of being flexible and adaptable. The focus of this paper is therefore mainly how the present system can be made to function better. Specific proposals are discussed in the next section.

V. Increasing the Effectiveness of International Cooperation

The paper has distinguished international cooperation, which includes information interchange and international surveillance, from coordination (also included in cooperation), which refers to agreements between countries to adjust their policies in the light of shared objectives or to implement policies jointly. It has been argued that measures to improve international cooperation are clearly desirable, even though the case for coordination is less clear. Indeed, the consequences of coordination implemented within a wrong or ill-informed assessment of underlying economic conditions may conceivably lower the welfare of the participating countries, as discussed above. A strong case therefore exists for improving the overall information base.

Of particular interest is a recent initiative to collect indicators of policy actions and economic performance for major countries. Their role would be to give timely warning of the emergence of serious imbalances and to monitor progress in eliminating such imbalances. Careful analysis of these indicators might also help to suggest periods when policy coordination was desirable. A more ambitious proposal would use such indicators to trigger a change in policy if they departed from their target zones.

1. Economic indicators

Economic indicators refer to various measures of a country's policy actions and economic performance over a specified period. Such indicators have been in use for some time by individual countries as part of their domestic surveillance effort to assess and monitor their economic performance. Their significance for the policy coordination debate derives from the request by the Interim Committee in April 1986 that a study be undertaken of the possible use of indicators in a medium-term framework, and for the purposes of multilateral surveillance. 1/ The Committee further noted that "such indicators might help to identify a need for discussion of countries' policies". The desirability of such a study was reaffirmed at the May 1986 Tokyo Economic Summit and by the Interim Committee in September 1986. In particular, it was suggested that the role of indicators be developed and extended to consider more explicitly the international interactions of policies.

Within the context of the present discussion, it is worth considering more specifically how the further development of a set of economic indicators might increase the effectiveness of international cooperation. Section II identified three sources of the need for coordination: (1) Ignorance on the part of policymakers of the intentions of the authorities in other countries and of the implications of their decisions, (2) Externalities created by trade and financial linkages between countries, and (3) Global inconsistencies related to the nth country problem. In addition to their role as a guide to domestic policy action, the development and analysis of a set of economic indicators might enable a clearer and more timely identification of the need for international coordination emanating from any of these sources. This in turn supports the case for the inclusion of a broad range of indicators, encompassing both policy instruments and targets. A broad range of indicators would supplement the uncertain link between exchange rate movements and the setting of monetary and fiscal policies, thereby reducing the likelihood of misleading signals. Further, if indicators are to act as a warning signal to the authorities, sole reliance upon data with long time lags, such as current account imbalances and output, is likely to be insufficient.

1/ See Crockett and Goldstein (1987), Chapter III.

The collection of data alone would be inadequate for the purposes discussed above unless it were also accompanied by an analytical framework within which short and medium-term developments can be assessed. One suggested application of economic indicators is to compare the international inconsistencies over the medium term of national projections. Early warning signals could lead to actions to avoid a possible conflict in policy objectives. A further use would be to focus attention upon the possible unsustainability of current account developments over the medium term. The specific use of indicators to highlight global inconsistencies could fulfil a further function. An appropriate set of indicators could serve as a signaling device to the authorities to identify both unsustainable policies and developments in individual countries that might be corrected by policies pursued independently, and those that would benefit from some form of policy coordination.

In summary, the further development of economic indicators--including establishing different sets of indicators to serve different purposes--could fill an important role in international surveillance. They could help to identify serious imbalances affecting one or several countries, requiring the independent adjustment of national policies and possibly also international coordination of those policy adjustments. By acting as a trigger to activate multilateral discussion, indicators would strengthen the consultation process and the information interchange between countries that is critical to effective cooperation.

2. Target zones

Target zone proposals focus primary (although not exclusive) attention on the role of movements in exchange rates for signaling the need for offsetting adjustment of macroeconomic policies. 1/ Target zone proposals differ from proposals that call for a return to a regime of fixed exchange rates because, though the authorities would intervene in the foreign exchange market to maintain exchange rates within a zone, there may be no formal commitment to do so. In the so-called "hard" version of target zones, monetary policy is geared toward maintaining exchange rates within a narrow, infrequently revised and publicly announced zone. In the "soft" version, more limited attention is paid by the monetary authorities to the exchange rate, and the zones are fairly wide, frequently revised and confidential.

An exchange rate rule may act as an effective mechanism for achieving monetary discipline, as illustrated earlier by the experience of countries whose currencies participate under the ERM of the EMS. However, the experience of this group of countries and of the major industrial countries that operate under floating rates shows that this

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1/ An extensive discussion of target zones is given in Frenkel and Goldstein (1986).

mechanism is not necessary for reducing inflation nor is it sufficient for eliminating current account imbalances. It can be argued that since the exchange rate is a powerful transmission channel between countries, undesirable movements in both the level and variability of exchange rates may provide a useful measure of undisciplined policy actions. However, the exchange rate is not the only channel of transmission of macroeconomic policies. Hence, fixing exchange rates will not remove all the sources of interdependencies between countries. The role of the exchange rate in the transmission mechanism will differ according to the type of disturbances to the domestic economy. For example, with some shocks, greater fixity of exchange rates may intensify sub-optimal outcomes resulting from decentralized decision-making, while for other shocks, target zones may lead economies closer to a Pareto-optimal outcome. 1/

It can also be argued that exclusive focus on exchange rate movements vis-a-vis a specified target zone may not be a sufficient statistic for the purposes of international surveillance. For example, current IMF practice is to use a range of domestic indicators to monitor economic policies. Use of the exchange rate as the primary indicator of disequilibria in underlying macroeconomic policies could send misleading signals, and thereby elicit an inappropriate policy response. Target zone proposals also leave unsolved the issue of the appropriate policy instruments that might be used in response to any departure from the zone. The difficulty here is that appropriate measures depend upon identifying the source of exchange rate movements. For instance, a sustained real appreciation of the exchange rate may reflect a structural fiscal deficit or excessive real wages; in both cases a monetary response would be inappropriate. Even if the underlying causes of exchange rate movements can be identified, during periods of major disturbances and shifts in saving-investment balances, the required change in target zones may be impractical to implement.

In summary, it appears that the emphasis placed upon exchange rates as a trigger for appropriate macroeconomic policies may be misplaced. Nevertheless, one important merit of this proposal needs to be recognized; the desirability of paying greater attention to exchange rates in the conduct of macroeconomic policy. When combined with the use of other indicators, explicit attention to the consistency of exchange rates is likely to lessen the resort to beggar-thy-neighbor policies that might otherwise result in undesirable world outcomes.

VI. Summary and Conclusions

This study has considered a number of important issues that relate to international cooperation and policy coordination with a view toward assessing the scope and limits to both that exist within the present international monetary system. In the discussion, the term 'policy coordination' has been used mainly in the sense understood by policymakers; that is, it

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1/ For a theoretical discussion of these points, see Gavin (1986).

refers to agreements between countries to adjust their policies in the light of shared objectives or to implement policies jointly. Economic cooperation was defined more broadly to include both coordination and other activities such as consultation and information interchange among countries. The perceived need for cooperation and coordination were identified as arising from the various interdependencies that exist between countries. One of the main implications of these interdependencies and the considerable uncertainty pertaining to developments and policies in other countries is that there are clearly benefits, of potentially large but unknown magnitude, to be derived from international cooperation in the form of information exchange and international surveillance. In the present international monetary system, it is likely that international cooperation can be enhanced by an analytical framework and information base that permits the identification of existing or potential imbalances which may seriously affect one or several countries. An example of such an initiative is work at the IMF on indicators of policy actions and economic performance for major countries. Progress in this area may also serve to identify the need for policy coordination, and to increase the likelihood of its being effective in improving the functioning of the international monetary system.

APPENDIX

The Gains from Coordination in a Specific Model

The model that is presented below is based upon Cooper (1985). Assume that there are two countries with the same structure for simplicity, and that the government of each country tries to minimize a loss function that is the weighted sum of squared deviations of output growth and inflation from target levels. Inflation is a weighted average of the rate of change of domestic output prices and import prices. Each economy is assumed to have a simple structure, in which output depends positively on its real exchange rate (calculated as the price of foreign goods in terms of domestic goods) and negatively on the real interest rate, and where interest rates result from monetary equilibrium (with money demand depending on real output, the output deflator, and the nominal interest rate). The parameters of the equations for both countries are assumed to be the same. Furthermore, the price of domestic output is assumed to change at the same exogenous rate in both countries, and exchange rate expectations are assumed to be static. A consequence of this latter assumption, and one of perfect substitutability between domestic and foreign bonds, is that interest rates are equalized in the two countries.

Each country has one policy instrument, its own money supply, and two targets, for real output growth and for a zero rate of inflation. A reduced-form relationship can be derived that makes each of the endogenous variables a function of the two countries' money supplies. If the home country increases its money supply faster than the rate of domestic price increase, then--provided the other country's money supply is given--output at home rises, as does the rate of inflation, and the home country exchange rate depreciates. However, the model also implies that growth rates of output and prices in the foreign country decline. Thus, monetary policy is negatively transmitted in this model--expansion at home produces contraction abroad--and this is a crucial feature when considering gains from coordination. If both countries expand together, then both experience an increase in output (as positive domestic effects dominate the negative transmission effects), but the exchange rate does not change. Since the rate of change of domestic goods prices is assumed exogenous, the constancy of the exchange rate implies that neither country experiences higher inflation. 1/

Now optimal policy settings in response to a common inflationary shock can be described under two alternative assumptions: 1) the two countries each act independently, taking the other country's policy as given, or 2) the countries find a way to coordinate their policies in order to reach the best possible outcome for both of them. The former is usually described as the Nash equilibrium, and the latter, the cooperative equilibrium. It is instructive to examine the latter first. Since by assumption the

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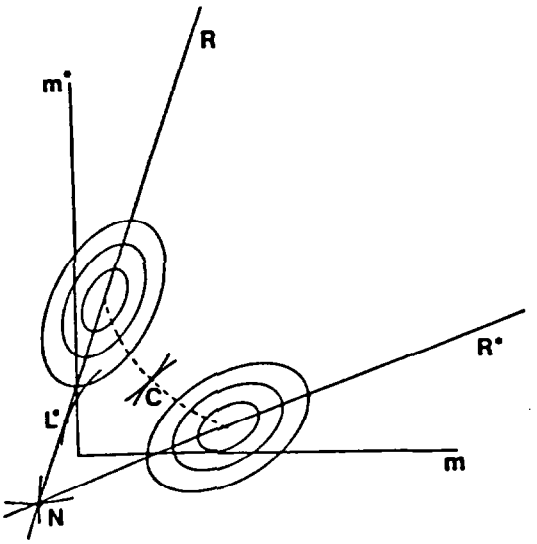
1/ The constancy of domestic prices in the face of a common monetary expansion is especially unrealistic. More realistic models give less unambiguous conclusions concerning the gains from policy coordination.

countries have the same parameters, what is optimal for one will be optimal for the other; hence, the cooperative equilibrium will involve an unchanged exchange rate. As a result, both countries' inflation rates will equal the common exogenous rate of change of domestic prices, whatever the (common) growth rate of their money supplies. In the cooperative equilibrium, therefore, the two countries will be free to expand their money supplies at a rate sufficient to achieve their output targets exactly.

If countries act independently, and take as given the money growth rate of the other country, it may seem that they can achieve a lower rate of inflation by appreciating their currency. If the home country assumes that the foreign country's money supply is fixed and then calculates its optimal money supply, that money supply will be lower than the level that was described above. Starting from an initial equilibrium where both output and inflation targets were met, each country would be willing to tighten its monetary policy in the face of an inflationary shock in order to trade some output growth for a better inflation performance. Optimal non-cooperative policy settings can be described by a reaction function that links home-country money growth to what is expected in the foreign country. Similarly, if the foreign country takes the monetary policy setting of the home country as given, its optimal policies can also be described by a reaction function.

The contrast between the Nash and cooperative solution can be illustrated in a simple diagram (Figure 1), also taken from Cooper (1985). The reaction functions are plotted as lines R and R^*. Their intersection, at N, is the Nash equilibrium. Each country has tried to use exchange

Figure 1.



rate appreciation to lower its rate of inflation, but in a self-defeating way. In the Nash equilibrium, money growth rates are lower in each country than in the optimal, cooperative solution (C), but this has not produced the expected appreciation since the other country has done the same thing. The ellipses in Figure 1 correspond to regions of equal utility; the sets for the home and foreign countries are centered on points where money growth rates m and m^* equal the rates of growth of domestic prices, with larger ellipses corresponding to lower utility. The best each country can do, given the assumed constraints facing the two countries and embodied in the global economic structure, is point C, which corresponds to tangency between an ellipse for the home country with one for the foreign country.

The discussion has not so far suggested how the cooperative equilibrium might be achieved. In the very simple example that was presented, the source of suboptimality of the noncooperative solution is the attempt of both governments to exploit a common, and competitive (Polak 1981), variable, the exchange rate. If such behavior were ruled out--as it was explicitly under the Bretton Woods system--then in this example each country would be led to choose independently its optimal policy. That is, if the exchange rate were fixed at an appropriate level, then each country would necessarily choose the optimal value for m (or m^*). An alternative way of achieving those optimal settings would be for the two governments to negotiate a joint monetary policy: by recognizing that independent action is suboptimal, they could rule out the competitive appreciation of the Nash solution. The outcome can (in this case) be achieved either through changing the rules governing the international monetary system or by explicit negotiation of policies.

The above example is unrealistic in a number of respects. First, as will be discussed in the next subsection, transmission mechanisms are more complicated than assumed in that model. Second, the example does not consider the effects of other instruments, in particular, fiscal policies. Third, the model is not dynamic, and given the fixity of domestic output prices, has purely short-run Keynesian properties. Aside from the effect of exchange rate depreciation on consumer prices, there are no inflationary consequences from stimulating aggregate demand. Another dynamic feature that is ignored is the accumulation of asset stocks resulting from changes in saving and investment. Fourth, only one type of shock--a common inflationary shock--is considered. Real shocks or inflationary shocks that affect the two countries differently have different implications for optimal cooperative and noncooperative policies. Finally, the objective function of the authorities is unrealistically simple. Since each country is assumed to target only domestic variables, there is no direct incompatibility between the objectives of the authorities. If in addition they target the current account balance (because of its consequences either for domestic employment or for the accumulation of claims on foreigners), then the possibility of direct incompatibility of objectives arises; such incompatibility can only be resolved satisfactorily through some sort of coordination between the countries concerned, or establishment of rules proscribing current account targets.

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