

A Hitchhiker's Guide to International Macroeconomic Policy Coordination

by Owen F. Humpage

Owen F. Humpage is an economic advisor at the Federal Reserve Bank of Cleveland. The author gratefully acknowledges helpful suggestions from Fadi Alameddine, Brian Cody, Peadar Eberts, Norman Fietzke, William Gavin, and Dale Henderson.

Introduction

The last 10 years have witnessed a virtual explosion of articles about international macroeconomic policy coordination. In part, advances in econometric modeling, particularly in techniques for understanding strategic interactions among countries, have encouraged studies in this area. A further, more recent incentive for these studies is a renewed interest among policymakers in world institutions and in mechanisms that require a greater coordination of economic policies. Examples include target zones for exchange rates and a European central bank.

This article offers a hitchhiker's guide to the literature: a fairly nontechnical survey for those who want to follow along, but are not inclined to take the wheel.¹ We focus on the empirical literature that attempts to measure possible gains from macroeconomic policy coordination, offering notes on those assumptions and methodologies that circumscribe their interpretations. In the conclusion, we try to synthesize the overall policy implications of this important literature.

To begin, however, we ask the most basic question: Why do many economists believe international policy coordination is an important objective?

I. Cooperation and Coordination

Two terms continually reappear in our discussion: *international cooperation* and *international coordination*. Following the economics literature on this subject: *International cooperation* refers to the sharing of information. The term implies that each country establishes its macroeconomic objectives and sets its economic policies independently of all other countries, but that all share information about the world economy. This information includes observations on the nature of economic interactions, on the sources and extent of economic disturbances, on intended policy responses, and on the economic outlook in light of these disturbances and intended responses.

International coordination, in contrast, refers to the joint determination of countries' macroeconomic policies toward a collective set

■ 1 In deference to Douglas Adams, *The Hitchhiker's Guide to the Galaxy*. New York: Pocket Books, 1979.

of goals. Through policy coordination, countries attempt to maximize joint welfare, rather than their individual welfare. Policy coordination presupposes cooperation, but not vice versa.²

The major industrialized countries maintain many forums to encourage macroeconomic cooperation. Economic summits among the industrial countries, and meetings of the International Monetary Fund (IMF) or the Organisation for Economic Co-operation and Development (OECD), are the most formal of these forums. Similarly, one finds many examples of international macroeconomic policy coordination. The Plaza Accord in September 1985 represented an agreement, especially among West Germany, Japan, and the United States, to undertake specific macroeconomic policies to eliminate huge imbalances in their international accounts and to promote a dollar depreciation. Similarly, at the Bonn Summit in 1978, the major industrial countries agreed to policies that would encourage world economic expansion.

Besides these ad hoc arrangements, the world has also seen some more formal attempts at international policy coordination. Fixed-exchange-rate regimes, for example, operate within certain "rules of the game," methods of resolving international interdependencies, which ultimately require a coordination of macroeconomic policies. As is well known, rigidly fixed exchange rates prevent member countries, except the reserve-currency country, from pursuing independent monetary policies.

History shows that countries are eager to cooperate with their allies, but that these same countries are more reserved about their willingness to coordinate macroeconomic objectives. This observation provides a basis against which to consider the result of the following studies. Why do countries cooperate, but do not coordinate except occasionally on an ad hoc basis?

II. International Interdependence

The belief that international cooperation and coordination can make all countries better off in terms of their macroeconomic performance rests on the view that international interdependence among nations creates a type of policy externality, or spillover effect. The policies of one country affect economic developments in others, sometimes positively, sometimes negatively.

Countries understand these external effects, but evaluate them lopsidedly. They consider the implications of foreign policies on their own economic well-being and adjust their own policies accordingly. Nevertheless, acting individually, sovereign nations do not fully consider the implications of their own policies for the economic welfare of other countries. In the worst case, each country might engage in beggar-thy-neighbor policies; that is, enhance its individual welfare at the expense of other countries. The competitive depreciations of the 1930s are a classic example. More generally, however, when countries ignore the consequences of their actions for world welfare, these policies often prove to be suboptimal in the sense that some alternative set of policies, which account for the spillover effects, could make at least one country better off without making any other country worse off.

As an example, consider an argument that seemed to underlie discussions for coordination at the Group of Five meeting in September 1985.³ Acting unilaterally, as if isolated from the other nations, the United States could eliminate its current-account deficit by tightening monetary and fiscal policies. The cost, however, would be a substantial slowing in real economic activity and perhaps a recession. Similarly, West Germany and Japan could unilaterally eliminate their current-account surpluses through a monetary and fiscal expansion. The cost would be a more rapid inflation rate in both countries.

But these countries are not isolated. The coordination problem results because the individual actions of each country tend to benefit the others. The contraction in the United States would help eliminate the West German and Japanese current-account surpluses by lowering their exports. Similarly, the expansion in West Germany and Japan would help eliminate the U.S. current-account deficit by encouraging U.S. exports. Realizing this

■ 2 Although the distinction between international cooperation and international coordination seems simple and straightforward, confusion easily can result. Most empirical studies of international interdependence use techniques of *game theory*, which describes the strategic interactions of individuals. Game-theoretic literature often uses the term *cooperation* to imply the joint determination of policy, or what the economics literature calls as coordination. See Cantoroni and Edison (1989), Horne and Masson (1988), and Cooper (1985).

■ 3 The Group of Five (G5) refers to France, Japan, the United Kingdom, the United States, and West Germany. The Group of Seven (G7) refers to these five countries plus Canada and Italy.

interdependence creates an incentive for each country to attempt to avoid the costs associated with the corrective policy by "free riding" on the policies of the others. This positive policy spillover results in too little overall corrective policy. The external imbalances might persist.

Cooperation could eliminate the attempt to free ride on the policies of the other countries in this case. Countries would provide more corrective policies and world welfare might be enhanced.

As this example suggests, interdependencies among countries arise because the structures of their economies are intertwined through trade and financial flows.⁴ Trade and capital flows among nations create what Cooper (1985) has termed structural interdependencies. U.S. real GNP, for example, depends in part on real net exports. Net exports, in turn, depend on foreign income, on the foreign marginal propensity to import, and on the terms of trade between exporters and importers. U.S. price levels similarly depend on foreign prices as translated through exchange rates. U.S. interest rates are linked to foreign interest rates and to expected exchange-rate movements through arbitrage. These and other similar linkages among countries transmit shocks between the U.S. economy and the rest of the world.

Structural interdependencies among nations' economies have always existed. Cooper (1985, 1986) suggests that largely because of advances in technology and communications, structural interdependencies among countries have increased over the last 40 years, making these linkages all the more important in policy considerations. This consensus view suggests that the potential benefits from international policy coordination are greater now than at any time since World War II.

Fieleke (1988), however, investigates an array of empirical data bearing on the extent to which markets are integrated. His data do not reject the consensus view that the world is becoming more closely integrated, but they do not depict the world as a single market. Similarly, Wyplosz (1988) presents evidence suggesting that the trade linkages between the United States and the European Economic Community are small. He argues that the main linkages are from financial flows. In short, although interdependencies are increasing, one must be careful not to overstate their importance.

Beyond these structural interdependencies, mutual economic objectives can create policy conflicts. The United States and West Germany might both desire stable currencies or a balanced current account. These objectives do not conflict, and cooperation to achieve them is possible. If, however, each country wants its currency to appreciate relative to the other, or if each country desires a bilateral current-account surplus against the other, the desired values for these mutual objectives are inconsistent. The closer one country comes to achieving its objective, the further the other country moves from its goals. Coordination might not be possible.

The existence of interdependencies and consistent mutual objectives is not, in itself, sufficient to require cooperation among countries. As Oudiz and Sachs (1984) suggest, if countries can adjust their domestic policy variables in a manner that fully compensates for the foreign influence, then those countries need not cooperate to attain their national policy targets.⁵ The crucial ingredient is that the spillover alters the relationship between domestic policies and their ultimate targets, or that it changes the relationship among the targets in a manner for which no domestic offset is feasible. Moreover, it implicitly assumes that countries do not have enough independent policy instruments to maintain all of the desired policy goals.

Assume, as is typical of most models used to study macroeconomic policy coordination, that goods prices are sticky and that a short-run trade-off exists between inflation and output. If a foreign country expands its money supply, a temporary real depreciation of its currency could worsen the current account and real growth in the home country. In response, the home country might attempt to expand its money supply to offset the real depreciation of the foreign currency and the slower real growth. The negative externalities associated with these policies result in too much overall expansionary policy; worldwide inflation would be higher. Thus, the faster foreign money growth alters the relationship among exchange rates, current-account balances, and inflation rates in a manner that the home country cannot offset with a limited number of policy instruments. A coordinated policy response might have produced a better outcome.

■ 4 One also could envision a world in which a set of independent countries faced a common external economic shock, such as an oil-price shock. These countries might benefit more from a joint response than from a unilateral response.

■ 5 "... the inefficiency of uncoordinated policymaking arises not from the mere fact of interdependence; but because one country's policies affect another's targets in a way that is (linearly) distinct from that country's ability to affect its own targets." Oudiz and Sachs (1984), p. 28.

instead of maximizing welfare as given in equation (1), they maximize a joint utility function,

$$(3) \quad W = bU^1 + (1 - b)U^2,$$

with respect to the policy instruments. For each value of b (the weight attached to the home country's welfare function), this maximization will yield a unique value of the policy instruments. Line bb' in figure 1 depicts these values. A subset of these points will fall in the indifference-curve lens, described above, and will make both countries better off. Participating countries, of course, must negotiate the utility weights; point E in figure 1 represents one such negotiated solution.

Although this one-shot policy game helps illustrate the basic idea that policy coordination can improve welfare, and although it underpins much of the empirical estimation to date, it is, nevertheless, hopelessly artificial. The strategic behavior of nations more closely resembles a sequence of games or a dynamic game where the state of the world changes in response to repeated economic shocks and policies, where strategies change in response to states of the world and build on past strategies, and where the economic model changes as the players learn about the economy.⁸ As discussed in subsequent sections of this paper, much of the more recent literature adopts dynamic techniques, which have produced some important considerations and results that contrast markedly with the one-shot policy experiments.

IV. Econometric Models and Policy Coordination

The measurement of gains from policy coordination and the policy implications that one derives from a policy game as described in the previous section depend crucially on the economic model that was used to generate them. This literature presents a wide variety of econometric models, reflecting different schools of economic thought and opinions about the optimal degree of abstraction. Holtham (1986) provides a useful survey.

Most, but not all, of the analysts rely on large econometric models. Nearly all of the models embody some form of lagged adjustment in wages and prices, a feature that allows monetary policy to affect real output and real exchange rates. Many include forward-looking expectations, at least in asset markets. Substantial differences among the models also result from the approach

for assigning parameter values. Some parameters are purely statistical estimates, specific to the time period of their estimation. Others take assigned values, consistent with an economic theory and with generally expected magnitudes. This variety allows findings to be compared across many different techniques and should serve to distinguish between those findings that are artifacts of a specific model and those that are more general.

Nevertheless, certain caveats apply to nearly all of these models and should restrict one's willingness to accept their policy implications. For example, in the one-shot game, the results refer to a specific time horizon and could change substantially if the time horizon was altered. One would expect, for example, that in a model with sticky prices, a monetary expansion might initially result in a real depreciation. Later, however, as prices adjust, the real exchange rate would revert to its long-term value.

Similar comments apply to any trade-off between inflation and real output. A model simulated over a short time frame could produce a set of welfare implications entirely different from those of a similar model estimated over a longer time frame. Policy coordination might prove empirically beneficial in the short run, but not in the long run. This is also the case in the specification of the governments' welfare functions. Ultimately, governments might seek to maximize the standard of living (output per capita), but what are the choices for the short term? The welfare implications depend crucially on this specification.⁹

A second problem is that models of the type used in policy-coordination experiments are vulnerable to the Lucas critique. Lucas (1976) argues that the parameters estimated in econometric models reflect past relationships among economic agents and policymakers. If these relationships changed, historically estimated parameters would no longer provide accurate forecasts, nor would policy simulations provide credible results. A shift from autarky to coordination can profoundly alter governments' reaction functions and interactions between the government and the private sector. The parameters estimated over the no-coordination regime will not accurately reflect outcomes after coordination, and the welfare results of such experiments remain suspect.

■ 8 For a review of game theory, see Friedman (1986).

■ 9 See Holtham and Hughes Hallett (1987).

V. National Sovereignty, Coordination, and Reputation

Macroeconomic policy coordination, by its very nature, compromises national sovereignty. Issues of national sovereignty appear throughout the literature under three distinct guises. The first, monetary policy sovereignty, arises because the objective of policy coordination often is exchange-rate stabilization. As already noted, fixed exchange rates require a convergence of monetary growth (and inflation) rates, constraining domestic policy discretion. The second sovereignty issue refers to the traditional domestic ordering of policy preferences. Policy coordination might require a set of policies not in keeping with traditional preferences; for example, higher rates of inflation in West Germany.

These aspects of sovereignty represent the counterweights against which the benefits of international cooperation are measured. They do not preclude international policy coordination, but countries that engage in international policy coordination expect gains that exceed the perceived losses associated with these sovereignty issues. The fact that nations highly value these aspects of national sovereignty might help to explain why countries prefer to coordinate on an ad hoc basis.

A third sovereignty issue deals with the incentive to cheat. In the one-shot policy game, which figure 1 illustrates, coordination is not feasible without some supranational agency to guarantee compliance. As one can easily see in figure 1, each country has an incentive to revert back to an uncoordinated form of policy setting, once it believes the other country has adopted the coordinated policy option. Because disparate countries like the United States, West Germany, and Japan are not likely to relinquish such broad authority as setting monetary and fiscal policy to organizations like the IMF or the OECD, many argue that international policy coordination is infeasible.

This result stems from analysis in a one-shot policy game. In games that repeat, countries establish reputations, and it is possible to attain solutions that resemble coordinated solutions, but that do not require a loss of sovereignty.¹⁰ Canzoneri and Henderson (1988) and Oudiz and Sachs (1985) discuss a class of game-theory models in which countries will independently adopt what seems to be a coordinated policy, but maintain the option of reverting back to an uncoordinated equilibrium. These models, unlike

the one-shot models, assume that governments act to maximize present utility and the expected discounted value of future utility, and that the shocks to the economy repeat. Consequently, at any point in time, policymakers weigh each possible policy option, including that of reneging on a coordinated-like policy, in light of the repercussions each option has for the future.

Basically, these models suggest that countries will independently adopt coordinated-like policies as long as any expected gains from reneging are small relative to the expected losses of shifting away from the coordinated-like policy to an uncoordinated policy for all future periods. One problem with this class of models, however, is that many different solutions resembling coordination might exist (see Friedman [1986]). As noted in Canzoneri and Henderson (1988), nations would need to consult in forums such as the IMF or OECD to focus on a particular coordinated-like solution.

VI. Benefits of Macroeconomic Policy Coordination

Theory offers a strong case for possible gains from macroeconomic coordination, but the existing empirical literature suggests that the benefits from policy coordination are small and asymmetrically distributed. In a pioneering study, Oudiz and Sachs (1984) investigate the gains to the United States, West Germany, and Japan from the coordination of their macroeconomic policies. The exercise relies on simulations of the Federal Reserve Board's Multi-Country Model (MCM) and the Japanese Economic Planning Agency (EPA) model over the period 1984 through 1986, and assumes that governments target real output, inflation, and the current account. The results suggest very small overall welfare gains from policy coordination: no more than 1 percent of GNP, even in the case of a common oil-price shock. Japan benefited most from policy coordination; the United States generally benefited least.

Subsequent studies tend to confirm the main result of Oudiz and Sachs; the overall gains from coordination seem small. Nevertheless, these other studies have suggested some factors that might determine the size of the benefits from coordinated macroeconomic policies. Oudiz and Sachs, for example, believe that the welfare gains would increase with the number of countries that were willing to coordinate their policies.¹¹

■ 10 See Friedman (1986).

■ 11 It would also seem that the difficulties and costs of achieving and maintaining a coalition would increase with the number of countries.

McKibbin and Sachs (1988) construct a five-sector model with forward-looking asset markets and sticky prices in goods markets. They assign parameter values to the model, and they simulate various types of exchange-rate regimes, each of which implies different institutional arrangements for the coordination of policies. These exchange-rate regimes include a free float, one in which governments do not coordinate policies; a float with policy coordination among governments; and two types of fixed exchange-rate regimes, differing with respect to the rules governing total world money growth. McKibbin and Sachs find that the welfare gains from a float with policy coordination generally exceed those of an uncoordinated float, but beyond this, the results elude a simple generalization. The welfare ranking of these various monetary regimes differs from country to country (or region), and overall welfare is rather insensitive to the regime choice. McKibbin and Sachs do offer some evidence that the choice of exchange regime might depend on the type of economic shock that the country (or region) experiences.

Canzoneri and Minford (1988) focus on the reasons for the small gains from policy coordination. Their analysis with the Liverpool World Model is particularly interesting, because it compares countries of similar magnitude in a model with large spillover effects from monetary policy. They test to see if the gains from policy coordination are sizable in a model with large spillover effects. Canzoneri and Minford find that the difference between the two solutions, although showing gains from monetary policy coordination, are not very different in terms of their policy implications: "...probably infeasible in an operational sense..." [p. 1149]. Canzoneri and Minford go on to investigate the importance of other factors. Spillovers, the weights on arguments in the preference function, and the size of the shocks all matter, of course, but what seems to be especially important to secure sizable gains from coordination is the simultaneous inheritance of conflicting problems, such as high inflation and recession.

Taylor (1985), using a model that embodies forward-looking wage setting and sticky prices, finds that coordination enhances overall world welfare, particularly when the countries that coordinate their policies exhibit dissimilar preferences for price and output stability. He finds, however, that the gains from policy coordination are not always evenly distributed, and policy coordination makes at least one country (West Germany) worse off. Hence, coordination would require side payments to West Germany. Taylor also suggests that the source of the shocks might

be important; demand shocks do not provide benefits from coordination, but supply shocks, under some circumstances, could.

The existence of mutual policy objectives between countries also seems important for the assessment of gains. Holtham and Hughes Hallett (1987) find large gains for policy coordination across a wide range of econometric models when they introduce an exchange rate as a policy objective. Not only is the exchange rate a shared policy objective, but its introduction results in more policy objectives than policy instruments, which increases the potential gains from policy coordination.

Taken together, these studies suggest that policy spillovers among the major industrialized countries, at least as captured by standard large econometric models, are small on average. Nevertheless, these studies do suggest that countries might benefit from macroeconomic policy coordination on an ad hoc basis, especially when confronted with conflicting shocks, when the shocks are large, when countries share common objectives, and when the participants have dissimilar national priorities.

Canzoneri and Henderson (1988) argue, however, that these results do not close the case against macroeconomic policy coordination. The small gains from coordination might result because most studies consider only one-shot games.¹² The disturbance that starts the game is a one-time disturbance. Canzoneri and Henderson argue that if conflicts between countries are continual, and if the affected target variables receive large weights in countries' social welfare functions, then coordination can render much larger gains. Ongoing conflicts arise when the gains of one country come at the expense of the other, such as when both countries attempt to achieve a bilateral current-account surplus.

Similarly, Currie, Levine, and Vidalis (1987), using dynamic techniques, find large gains from international policy coordination when governments have established credibility with the private sector and when economic shocks are permanent. According to these economists, studies that do not find large gains from macroeconomic coordination do so because they fail to consider the important interplay between international cooperation and domestic policy credibility.

■ 12 Many of the one-shot games seem to embody an inherent contradiction in that they adopt models with some degree of forward-looking behavior, and yet they specify a government that attempts to maximize only a current-period utility function.

VII. Model Uncertainty

The standard approach to international policy coordination assumes that the participants have complete knowledge about the workings of the world economy and about its present state (see also Cody [1989]). It assumes that governments understand the nature of economic disturbances and know about the appropriate policy responses to these shocks. Moreover, the models assume that governments have well-established preference functions, defined over relatively few target variables, and that these preferences truly reflect those of society in general.

Much of the recent literature questions these assumptions. Not only could such uncertainties prevent nations from coordinating their economic policies, but coordination under model uncertainty could leave nations worse off in terms of their economic welfare than under no coordination.

Frankel and Rockett (1988) investigate macroeconomic policy coordination when policymakers disagree about the true model.¹³ Their experiments include coordinating monetary policy to achieve real growth and current-account objectives, and coordinating both monetary and fiscal policies to achieve real growth, current-account, and inflation objectives. Frankel and Rockett consider combinations of 10 large econometric models.¹⁴ They allow one to represent the true model of the world economy and allow each of the participating governments to adopt a model. Repeating the selection process allows for 1,000 possible combinations. Frankel and Rockett find, however, that policy coordination reduces the economic welfare of the United States and the non-U.S. OECD sectors in roughly half of the cases *relative to the true model*. The results are virtually unchanged in experiments where policymakers, realizing their ignorance about the true model, follow a weighted average of 10 econometric models.

These losses result from assuming the wrong model. Frankel and Rockett find that the gains to any single country from discovering the true model and moving to it are often greater than any gains from coordination.

Domestic policymaking undoubtedly suffers from many of the same types of uncertainty as does international policy coordination. With autarkic policymaking, however, differences in the policy multipliers of various models are generally more a matter of degree than of direction.

When the models allow for global interdependencies, however, the policy multipliers often disagree in terms of sign as well as magnitude. For example, all but three of the models presented by Frankel and Rockett show the conventional result on the domestic economy from a change in domestic monetary policy. The magnitude of the nominal income multipliers ranges from 0.1 percent to 3.0 percent for the United States and from slightly positive (less than 0.05 percent) to 1.5 percent for the rest of the OECD. The degree of consistency with respect to the direction and the magnitude of domestic fiscal-policy multipliers is about the same.

The models, however, show a wide variance in the size and direction of the effects on foreign economies from domestic monetary policy.¹⁵ The different results among these models stem largely from how each links monetary policy with the current account. The monetary expansion in models that have sticky prices can cause a real depreciation, which tends to improve the current account. At the same time, however, the increase in money growth also could cause an expansion in real income, which would tend to worsen the current account. The net impact on the current account, then, will depend on the relative weights that a specific model attaches to each of these effects. A worsening in the domestic country's current account will tend to benefit real economic activity in the foreign sector, while an improvement in the home country's current account will tend to worsen the economic outcome abroad.

With a closed economy, a policy decision made with the wrong model probably will err in terms of degree and not in terms of direction. With an open economy, however, the wrong model can advise governments to expand when they should contract. The welfare losses that Frankel and Rockett observed resulted when the governments chose models that differed in the sign of their international policy multipliers from that of the true model [p. 330].

Holtham and Hughes Hallett (1987) find results that tend to confirm those of Frankel and Rockett. They generate 200 cases, roughly half of which produce worse outcomes. This result is not dependent on the assumption about how the gains are split between the countries. Holtham and Hughes Hallett also observe that the models

■ 13 See also Frankel (1988).

■ 14 See Holtham (1986).

■ 15 The models remained fairly consistent in the sign of the foreign response to domestic fiscal policy, but the magnitude of this response seemed to vary substantially among the models.

in their study offer a wide variance in policy prescriptions, but that this variance is greater under no cooperation than under cooperation.

Ghosh and Masson (1988) criticize Frankel and Rockett because their procedure implicitly assumes that policymakers do not take model uncertainty into account. Frankel and Rockett's policymakers simply choose a model that may or may not be the correct one. Brainard (1967) shows that the optimal policy setting in a model with uncertain parameters differs from the optimal setting for policy in the same model with known parameters. Extending this work, Ghosh and Masson argue that rational policymakers attach probabilities to their model parameters and that model uncertainty, measured by the variance of the parameters, can increase incentives for coordination.¹⁶

To illustrate this, they first present a model, with no uncertainty, in which policy coordination is not necessary because each player can adjust for the policy spillovers of the other; the coordinated and noncoordinated solutions are then the same. With model uncertainty, an additional policy spillover enters the problem because the policy choices of one country affect the uncertainty experienced by the other in a manner that cannot be offset. Each country "... incorrectly estimates the efficiency of [or the variance associated with its] instrument and chooses an inappropriate degree of intervention." [p. 235] The coordinated and noncoordinated outcomes then differ. In simulations of their econometric model, Ghosh and Masson find that uncertainty increases the gains from coordination, but that the gains are modest.

A key aspect is that all policymakers share the same probabilities about alternative models and that these probabilities are equal to the actual probabilities. It is not clear that coordination would be possible or optimal if this were not the case.¹⁷ These probabilities could likely change with the economic state of the world and might not be the same for different policymakers, since policymakers do have different views of the world.

VIII. Consistency

Thus far we have discussed international macroeconomic policy coordination in a context that assumes no interaction between the government and the private sector. Some recent studies take issue with this assumption and suggest that when governments coordinate macroeconomic policies, private-sector behavior can change in such a way that the country is worse off than in the absence of coordination.

This line of criticism extends ideas concerning the time-consistency aspect of government policy, which Kydland and Prescott (1977) originally presented. At its heart is the idea that coordination might create incentives for governments to engage in activities detrimental to the best interests of the private sector. Private agents predicate their activities on expectations about government actions. Consumers, for example, base decisions about work and savings, in part, on tax rates, and they negotiate nominal wages on an assumed inflation rate. Before we can establish that coordination unequivocally improves welfare, we must consider how coordination might alter private expectations about the likelihood of governments to achieve inflation goals, to raise taxes, or to alter other implied agreements with the private sector.

Rogoff (1985) considers the effect of policy coordination on nominal wage demands. In his model, he allows that money is not neutral with respect to employment and to real exchange rates. Individual governments desire higher employment levels than private markets, but the inflation consequences of seeking higher employment constrain them. In the absence of international policy coordination, part of the inflation constraint results from a real exchange-rate depreciation. When countries coordinate their policies—that is, both nations expand money growth to increase employment—a real depreciation does not follow. Coordination eliminates one of the constraints on government and raises the inflation associated with a given reduction in unemployment. Wage-setters realize this, however, and raise their nominal wage demands to compensate themselves for the higher expected inflation rate under international policy coordination. International policy coordination then imparts an inflationary bias to policy and exacerbates central banks' credibility problems with the private sector. Rogoff concludes that, because time-consistent nominal wages are higher, cooperation might not increase nations' welfare.

■ 16 When model uncertainty stems from the international transmission of the effects of countries' economic policies, an incentive exists for coordination; when uncertainty stems from the impact of domestic policies on domestic variables, the implications for coordination are ambiguous. As already noted, most uncertainty among economic models seems to center on the international transmission of policy responses.

■ 17 On this point, see Frankel (1988), pp. 32-33.

Kehoe (1986) also questions whether policy coordination necessarily will improve social welfare. He argues that, in the absence of policy coordination, governments might face incentives that effectively commit them to certain behavior. For example, competition to attract capital might force governments to impose very low taxes on capital. The private sector can make decisions, affecting its present and future well-being, knowing that the mobility of capital restricts the ability of individual governments to impose high taxes on capital. Under policy coordination, however, governments need no longer compete and could have an incentive to raise taxes on capital. With policy coordination, then, the private sector will not adopt the same set of decisions with respect to savings and investment.

The conclusion that macroeconomic policy coordination *necessarily* will affect government incentives and private expectations in a manner detrimental to social welfare might not be valid. Oudiz and Sachs (1985) offer an example in which policy coordination actually enhances welfare. In their example, in the absence of policy coordination, governments engage in competitive currency depreciations, which the forward-looking currency market anticipates. Policy coordination removes these incentives and improves welfare in their model.

As Canzoneri and Henderson (1988) note, these articles do reach a common conclusion despite their dissimilar results: macroeconomic policy coordination can affect government credibility relative to the private sector, with important implications for social welfare. This is not an indictment of policy coordination, since the same problem exists in autarky, but it highlights the need for an institutional framework that minimizes time-inconsistency problems.

One can find some work along these lines in the literature on the European Monetary System (EMS). Giavazzi and Pagano (1988) consider the interplay between central-bank credibility and international arrangements. They show how high-inflation countries can derive welfare gains from pegging their nominal exchange rate with a low-inflation country. Inflation then results in a real exchange-rate appreciation that constrains the tendency of the high-inflation country to inflate. Especially interesting for the question at hand, Giavazzi and Pagano then consider institutional arrangements, compatible with the EMS, to deal with the current-account problems such a peg might impose on the high-inflation country. These arrangements include periodic real depreciation and temporary membership. Collins (1988) considers alternative models of the EMS and shows that the form in which participants

resolve their international interdependencies, the "rules of the game," affects the average rate of inflation and the divergence among participants.

Woven through these time-consistency discussions is the thread of an argument pulled from the fabric of public choice. That thread questions more generally if governments act to maximize a utility function that accurately reflects the preferences of the private sector or, instead, if governments seek to foster a different set of objectives. If governments do seek to maximize utility functions different from those of the private sector, one cannot conclude that macroeconomic policy coordination is welfare-enhancing, since the resulting government coalition could push policies further from the social optimum.¹⁸

IX. Cooperation Instead of Coordination

Although the issues remain unresolved, for the most part, the literature casts doubt on the case for macroeconomic policy coordination. Nevertheless, we do witness governments voluntarily participating in international forums to their mutual benefit. Have the models and arguments missed something?

Countries might not be able to achieve a high degree of policy coordination with respect to specific policies and a wide range of targets, but they may be able to coordinate in terms of less-demanding criteria. Frenkel, Goldstein, and Masson (1988), in an analysis that seems particularly relevant to recent policy discussions, consider two such criteria: smoothing monetary and fiscal policies, and adopting target zones. Both policy options seek to avoid sharp swings in the real exchange rates.

They simulate these policies in an IMF multi-country model, MULTIMOD, which includes equations for the United States, West Germany, and Japan; for the other G7 countries; and for the other (non-G7) industrial countries. Their model allows for perfect foresight in capital markets and for sticky prices in goods markets. A monetary expansion also improves the current-account balance in the short term as the relative price effects dominate the income effects.

The results of the simulations, though preliminary, do not support policies aimed at smoothing monetary or fiscal policies. Smoothing policy does not generally tend to smooth fluctuations

■ 18 See Vaubel (1986).

in economic variables, and seems to increase the volatility of interest rates in the model. Frenkel, Goldstein, and Masson argue that economic shocks, other than those associated with abrupt policy changes, seem most responsible for exchange-rate variations. Unsmoothed policy changes might offset such shocks, but smoothed policies could not.

Their simulations also do not lend support to proposals for exchange-rate target zones. Indeed, their results suggest that target zones could prove counterproductive because monetary policy might then face conflicting objectives. If, for example, the real exchange rate appreciated because of a shift in asset preferences away from the dollar, the United States might temporarily offset the appreciation through a monetary expansion. As the U.S. inflation rate accelerated following the monetary expansion, however, the real exchange rate would appreciate again. This finding suggests that target zones, relying only on monetary policy, may not be feasible.¹⁹

Apparently aware of such criticisms, some proponents of target zones suggest that countries direct fiscal policy toward maintaining target-zone arrangements and direct monetary policy toward promoting real growth. Frenkel, Goldstein, and Masson find that this policy fares only slightly better than the purely monetary scheme. They also note that the more elaborate targeting proposal assumes a higher degree of fiscal-policy flexibility than seems feasible given the existence of large budget deficits in the United States and abroad.

Canzoneri and Edison (1989), noting that policy coordination might be infeasible, allow countries to share information about the shocks and about policy instruments. In their simulation, policy choices are either monetary targets or interest-rate targets, and the shocks stem from the size of U.S. budget deficits. Their results suggest that countries can derive large gains, relative to the gains from policy coordination, simply from sharing information about shocks and policy instruments. Unfortunately, their models suggest, at least in the case of sharing information, that the benefits of cooperation might accrue only to a single player.

X. Conclusion

When we compare these individual, often abstract, and technical studies of international policy coordination, they begin to reveal an image that we can reconcile with the observed behavior of nations. Nations seem to cooperate regularly and freely, but they coordinate policies infrequently, only when all participants clearly see the ends, and understand the means, of such efforts. This literature does not seem to offer much support for formal, international institutions that require continual policy coordination, such as fixed exchange rates or a narrowly defined target zone.

A recurring empirical finding of this literature is that the benefits from policy coordination are small. This finding suggests that, although international interdependencies are increasing, policy spillovers do not seem critical to the economic well-being of the largest industrial countries today. The types of economic shocks that could enhance the returns from macroeconomic policy coordination do not occur with sufficient frequency to justify any ongoing commitment that might sacrifice national policy independence. Moreover, economists do not agree on the magnitude, or even the direction, of some key international policy repercussions. Model uncertainty makes coordination difficult, and coordination with the wrong model could lower world welfare.

The literature suggests that nations can secure most of the gains associated with international coordination—small though these gains might be—through the sharing of information about world conditions, shocks, and policies. International cooperation is relatively costless in terms of national sovereignty. Perhaps this explains the willingness of countries to meet often in forums that allow for the exchange of information.

The literature also suggests that policy coordination on an ad hoc basis is feasible and could be beneficial. Indeed, we do observe nations coordinating their macroeconomic policies from time to time. The literature suggests that the benefits of coordination seem to increase when countries face problems that pose policy dilemmas, such as simultaneous inflation and unemployment, and when the gains of one nation come at the expense of others. The benefits from this type of coordination could be large, particularly if the form of the coordination tends to enhance the credibility of governments relative to the private sector. Coordination that adversely affects the private sector's perceptions of government will affect expectations and could reduce welfare.

■ 19 Feldstein (1989) makes a similar argument.

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