

PRINCETON STUDIES IN INTERNATIONAL FINANCE

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**OBSTACLES TO
INTERNATIONAL MACROECONOMIC
POLICY COORDINATION**

JEFFREY A. FRANKEL

INTERNATIONAL FINANCE SECTION

**DEPARTMENT OF ECONOMICS
PRINCETON UNIVERSITY
PRINCETON, NEW JERSEY**

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IN INTERNATIONAL FINANCE**

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The author of this Study, Jeffrey A. Frankel, is currently Visiting Professor of Public Policy at the Kennedy School of Government, Harvard University, and an Alfred P. Sloan Research Fellow. His permanent positions are Professor of Economics at the University of California, Berkeley, and Research Associate of the National Bureau of Economic Research in Cambridge, Massachusetts. He has served at the President's Council of Economic Advisers, the International Monetary Fund, and the World Bank and has written extensively on macroeconomic topics. This is his second contribution to the publications of the International Finance Section.

DWIGHT M. JAFFEE, *Acting Director*
International Finance Section

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1 INTRODUCTION

It is possible to define international macroeconomic cooperation quite broadly, to include for example the exchange of information among policy-makers. But it is probably desirable to reserve for the term international policy *coordination* the more precise definition that is understood in the academic literature: the agreement by two or more countries to a cooperative set of policy changes, where neither would wish to undertake the policy change on its own but where each expects the package to leave it better off relative to the Nash noncooperative equilibrium in which each sets its policies taking the other's as given.¹ The gains are supposed to come specifically from externalities, or "spillover" effects that one country's policies have on other countries' economies but that the first country would have no incentive to take into account in the absence of coordination. If each country has well-defined objectives and knows the true model of the world macroeconomy, then it follows in general that there will exist cooperative solutions that are Pareto-improving—that do leave all countries better off.² This theoretical proposition makes successful coordination sound straightforward, even easy. But when we visualize the practical process of coordi-

This paper was presented in slightly different form at a conference on Blending Economic and Political Analysis of International Financial Relations that was held by Claremont Colleges and the University of Southern California on May 24-26, 1988. I began it when I was a Consultant in the External Adjustment Division, Research Department, International Monetary Fund. It is a revised version of IMF Working Paper 8729, UC Berkeley Economics Working Paper 8737, and NBER Working Paper 2505. I would like to thank the Institute of International Studies of the University of California at Berkeley for support, and Katharine Rockett for effective research assistance. The views expressed are the author's.

¹ Bryant (1987, p. 5) makes the same distinction between coordination and more general forms of cooperation. But other definitions of coordination are possible as well. For a review of definitions of coordination and related concepts, see Horne and Masson (1988), Corden (1986, Chap. 13), or Kenen (forthcoming). For an introduction to the literature, see Oudiz and Sachs (1984), Cooper (1985), or Fischer (1988). References in the political science literature include Axelrod and Keohane (1985), Odell (1982), and Oye (1985).

² There are two important qualifications to the generality of the standard proposition that coordination improves welfare: (1) If policymakers have enough independent instruments to reach their optimum target goals regardless of each other's actions, coordination is moot. (2) Rogoff (1985) has shown that if coordination reduces a government's ability to make a credible precommitment to anti-inflationary policies, coordination can reduce welfare. In Frankel (forthcoming), I argue that an international version of nominal-income targeting is the kind of coordination that can best address the problem of credibility, as well as the other obstacles to successful coordination.

nated policymaking, we can identify serious obstacles at each of three stages.

At the first stage, each country must decide what specific policy changes it would like to ask the other country or countries to undertake, and what, for its part, it would be willing to give up to get them. One can think of this stage as taking place in internal deliberations in advance of a Group of 7 or Summit meeting. At the second stage, the two or more countries must negotiate how the gains from coordination are to be distributed. One can think of this stage as constituting the actual bargaining. The negotiations might result in a set of agreed-upon target economic indicators.³ At the third stage, the agreement must be enforced, requiring a clear way of verifying which countries are abiding by the agreement, in addition to a specification as to what should be done if the agreement is violated (for example, whether penalties should be imposed).

From a reading of the existing literature, one might think that the only obstacles to coordination occur at the latter two stages: bargaining over the gains from coordination and then enforcing the agreement. But the premise of this study is that the problems that occur at the first stage may be more serious.⁴ It is not a trivial task to decide what policy changes are in a country's interest. If a country makes requests of its neighbors based on a misperception of the spillover effects, the true effect of coordination may be to reduce welfare rather than improve it. Furthermore, the gains from convincing trading partners to move their policies in the desired direction, even if they turn out to be positive, may be dwarfed by the potential gains from unilateral domestic changes of policies based on a better understanding of objectives or models.

In this study I consider difficulties at the first stage—uncertainty regarding which changes in the policies of foreign countries are in the home country's interest and what the costs are of the domestic policy changes requested by the other country. I leave the later issues of bargaining and enforcement to other authors. Three things need to be known before the coordination process can begin: (1) Where does the initial position of the

³ At the Tokyo Summit of May 1986, it was decided that the Group of 5, or henceforth the Group of 7, would focus on a set of "objective indicators." At the September 1986 IMF Annual Meetings, the use of these indicators was publicly discussed. The indicators at the time had more to do with the targets each country hoped to attain using only its own policy instruments than with targets that were set cooperatively. Nevertheless, these indicators might be viewed as prototypes for the variables that the countries would bargain over if coordination were to become more serious.

⁴ Holtham and Hughes Hallett (1987, p. 130) agree: "Economists have perhaps focused on moral hazard problems because of their interesting logical character rather than because of their empirical importance. It seems likely that uncertainty and model disagreement are greater obstacles to international cooperation."

domestic country lie relative to the optimum values of the target variables? (2) What are the correct weights to put on the various possible target variables?⁵ (3) What effect does each unit change in the domestic (or the foreign) macroeconomic-policy variables have on the target variables; that is, what is the correct model of the economy?

These three elements follow very simply from the algebraic expression for the welfare function. I specify here a function of three target variables, although I could as easily have more or fewer.

$$W = \frac{1}{2}y^2 + \frac{1}{2}w_x x^2 + \frac{1}{2}w_\pi \pi^2 \quad (1)$$

$$W^* = \frac{1}{2}y^{*2} + \frac{1}{2}w_x^* x^{*2} + \frac{1}{2}w_\pi^* \pi^{*2}, \quad (1^*)$$

where W is the quadratic loss to be minimized, y is output (expressed relative to its optimum and in log form), x is the current account (expressed as a percentage of GNP and again relative to its optimum), π is the inflation rate, w_x is the relative welfare weight placed on the current account, w_π is the relative weight placed on inflation, and an asterisk (*) denotes the analogous variables for the foreign country. I will refer to two policy instruments: the money supply, m (in log form), and government expenditure, g (as a percentage of GNP). The marginal welfare effects of changes in these policy variables are then given by

$$dW/dm = (y)y_m + w_x(x)x_m + w_\pi(\pi)\pi_m \quad (2)$$

$$dW/dg = (y)y_g + w_x(x)x_g + w_\pi(\pi)\pi_g \quad (3)$$

$$dW/dm^* = (y^*)y_{m^*} + w_x(x^*)x_{m^*} + w_\pi(\pi^*)\pi_{m^*} \quad (4)$$

$$dW/dg^* = (y^*)y_{g^*} + w_x(x^*)x_{g^*} + w_\pi(\pi^*)\pi_{g^*} \quad (3)$$

$$dW^*/dm = (y^*)y_m^* + w_x^*(x^*)x_m^* + w_\pi^*(\pi^*)\pi_m^* \quad (2^*)$$

$$dW^*/dg = (y^*)y_g^* + w_x^*(x^*)x_g^* + w_\pi^*(\pi^*)\pi_g^* \quad (3^*)$$

$$dW^*/dm^* = (y^*)y_{m^*}^* + w_x^*(x^*)x_{m^*}^* + w_\pi^*(\pi^*)\pi_{m^*}^* \quad (4^*)$$

$$dW^*/dg^* = (y^*)y_{g^*}^* + w_x^*(x^*)x_{g^*}^* + w_\pi^*(\pi^*)\pi_{g^*}^*, \quad (5^*)$$

where the policy multiplier effect of money on output is given by y_m , the effect of money on the current account by x_m , etc. If we wished to solve for the optimum, we would set these derivatives equal to zero (with the target variables y , x , etc., first expressed as linear functions of the policy variables m , g , etc.). In the Nash noncooperative equilibrium, in which each country takes the other's policies as given, we would need only equations (2), (3), (4*), and (5*) for the solution. Each country ignores the effect that its poli-

⁵ This includes the question of which variables should be excluded from consideration altogether and which included.

cies have on the other country, so equations (4), (5), (2*), and (3*) do not enter. Indeed, this is precisely the standard reason why the noncooperative equilibrium is suboptimal. These cross-country effects enter only in the determination of the cooperative solution.

The focus here is on the fact that the economy may not be at an optimal point, neither the constrained optimum of the Nash noncooperative solution nor the Pareto-improving move to the cooperative solution, owing to the policymakers' lack of knowledge regarding the relevant parameters. Equation (2), or any other of the eight derivations above, neatly illustrates the three kinds of uncertainty: uncertainty regarding the initial position y , x , and π ; the welfare weights w_x and w_π ; or the policy multipliers y_m , x_m , and π_m . As we will see, the uncertainty is so great that we typically cannot identify the signs of expressions (4) and (5) with confidence; that is, the domestic country cannot be sure whether it should ask the foreign country to expand or to contract its monetary and fiscal policies in order to improve its own welfare. Similarly, as we cannot be sure of the signs in expressions (2) and (3), the domestic country does not know how to respond to foreign requests for changes in its policies. This uncertainty is a serious stumbling block to any effort at coordination.

One might reasonably argue that this uncertainty is no different from the uncertainty that always plagues policymaking, and that the implication for governments is simply that they should maximize expected welfare.⁶ But international spillover effects, which are the essence of international coordination, are more subject to uncertainty, particularly with respect to their sign, than domestic effects. One can argue in defense of discretionary domestic policy (as opposed to rules of the monetarist type) that a small policy change in the desired direction is better than none. It is more difficult in the face of uncertainty to make the argument that some international coordination is better than none.

Four conclusions emerge from this study. First, if policymakers in 1989 are serious about activist international coordination, they should begin by specifying clearly in what direction they wish their partners to move their policies and what they are willing to give up for it; otherwise, vague calls for coordination must be considered political grandstanding. Second, we should recognize that the result from the theoretical literature that coordination necessarily improves welfare is too strong. If policymakers are mistaken about their initial position, about the appropriate weights on the targets, or about the policy multipliers, then coordination may reduce welfare instead of increasing it. Third, even when it works out that coordination im-

⁶ As in Brainard (1967). Ghosh (1987) is among those who claim that the perils of uncertainty do not apply to international policy coordination any more than to policymaking by national authorities in general.

proves welfare, the gains are so small that they are usually dwarfed by the potential gains from unilateral policy changes unless the authorities know precisely the initial position, target weights, and policy multipliers. Fourth, gains from the exchange of information, for example regarding the multipliers, offer an alternative rationale for international cooperation.

Chapter 2 considers uncertainty regarding the initial position, and Chapter 3 uncertainty regarding the welfare weights. Chapter 4 reviews some results concerning the implications of disagreement over the correct model, and Chapter 5 presents new extensions of the analysis to allow for policy-makers' recognition of the uncertainty regarding the model. Chapter 6 considers the effects of unilateral policy changes based on better models and draws some conclusions.

2 UNCERTAINTY REGARDING THE INITIAL POSITION

It is clear from the above equations that uncertainty regarding the initial values of y , x , and π —output, the current account, and inflation—relative to their optima translates into uncertainty regarding the desirability of various policy changes. Uncertainty regarding initial values can, in turn, be broken into three components.

First, there is uncertainty regarding the current value of the target variable in question. It is well known that GNP and the other variables are measured with a lag and are often revised subsequent to the initial estimates.

In a recent study of U.S. GNP revisions, Mankiw and Shapiro (1986) find that the standard deviation of the revision from the preliminary estimate of the real growth rate to the final number is 2.2 percentage points (see also Zarnowitz, 1982, and Zarnowitz and Moore, 1982). Some statistics are reported in Table 1. Since the mean of the true growth rate over the sample period was 2.4 percent per year (and the standard deviation 4.6 percent), the revisions are very large. Mankiw and Shapiro point out that when the preliminary estimate indicates no growth, the probability that the final estimate will exceed 2.0 percent is 18 percent (assuming a normal distribution). Sometimes we do not know whether the economy is currently in a boom or a recession, to within a 90 percent confidence interval. Even the preliminary estimate is available only sixty days after the midpoint of the quarter, not contemporaneously.¹ Furthermore, there could be large errors in the final GNP numbers, owing to both conceptual and measurement problems. The initial estimates of inflation numbers also contain measurement errors, and the trade statistics have been notorious in recent years both for undergoing large revisions, in the case of the United States, and for failing to satisfy “adding up” constraints across countries, which indicates the existence of large measurement errors.

Second to uncertainty regarding the current true values of the variables in question, there is uncertainty regarding how they are likely to move during the next year or more in the absence of policy changes (the “baseline forecast”). This information is relevant under the assumption that any policy

¹ Until 1985, a “flash estimate” was available thirty days after the midpoint of the quarter. Mankiw and Shapiro find that the revision from flash estimate to final number also had a standard deviation of 2.2 percent. Note that the revisions in nominal GNP are larger than in real GNP (because the true variability of nominal GNP is larger).

TABLE 1
FINAL REVISIONS IN U. S. GNP GROWTH RATES FROM EARLY ESTIMATES
(*estimation period: 1976:I-1982:IV*)

	Nominal (current dollars)	Real (1972 dollars)
Standard deviation of revision from flash estimate	3.1	2.2
Standard deviation of revision from preliminary estimate	2.7	2.2
Mean of final growth rate	9.9	2.4
Standard deviation of final growth rate	5.7	4.6

SOURCE: Mankiw and Shapiro (1986), Tables 2 and 3.

changes agreed upon will have their major impact after a year or more rather than immediately.

Kenen and Schwartz (1986) have studied the accuracy of current-year forecasts by the IMF *World Economic Outlook* for the last fifteen years (1971-85). These forecasts usually appear in April or May of the year in question and are based on information available through February or March. Their results are summarized in Table 2. The root mean squared error among the Summit 7 countries is 0.773 percentage points for real growth and 0.743 percentage points for inflation. These relatively small prediction errors are nevertheless large enough to reverse the signs of the derivatives of the welfare-function equations (2) to (5). Errors would presumably be much larger for the horizons of two years or more that are probably most relevant for policymaking. Many major international econometric models show the effects of monetary and fiscal policy peaking in the second year in the case of output, and not reaching a peak within six years in the case of the price level or current account.

The forecasting record of other agencies or private-sector firms is not noticeably better than that of the Fund (see McNees, 1979, and Zarnowitz, 1984). Such uncertainty need not accrue to the discredit of the economics profession: forecasting future disturbances is by its nature a near impossible task.

The third component of uncertainty regarding the initial position of the economy relative to its optimum is the location of the optimum. The location of full employment and potential output can be given relatively objective-sounding definitions: the nonaccelerating inflation rate of unemployment and the level of output when the factors of production are fully

TABLE 2
ANALYSIS OF IMF FORECASTS IN INDUSTRIAL COUNTRIES
(error measured as forecast less actual)

Variable	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Summit 7	All Countries
Real GNP growth current year: ^a									
Mean actual GNP growth	3.513	2.971	2.233	2.380	4.440	1.907	2.667	3.150	2.833
Mean algebraic error	0.067	0.164	0.480	-0.253	0.813	-0.160	0.240	0.192	0.247
Mean absolute error	1.227	0.621	1.107	1.280	1.533	0.880	1.160	0.658	0.647
Root mean squared error	1.535	0.781	1.319	1.722	2.221	1.143	1.314	0.773	0.767
Real growth one year ahead: ^b									
Mean absolute error	1.833	1.142	1.508	2.058	2.033	1.442	1.691	0.967	1.217
Root mean squared error	2.353	1.460	1.889	2.661	3.683	1.911	2.031	1.198	1.629
Inflation (GNP deflator) current year: ^b									
Mean actual inflation	8.067	9.480	4.580	14.633	5.800	11.680	6.687	6.558	7.200
Mean algebraic error	-0.900	-0.900	0.153	-1.080	-0.007	-0.640	-0.527	-0.275	-0.293
Mean absolute error	1.687	1.127	0.513	1.920	1.513	1.573	0.713	0.608	0.573
Root mean squared error	2.407	1.155	0.687	2.738	2.242	2.016	0.924	0.743	0.776
Inflation one year ahead: ^c									
Mean absolute error	2.175	1.467	0.800	3.400	2.525	3.258	1.058	1.044	1.167
Root mean squared error	3.170	1.780	1.077	4.145	3.502	4.069	1.410	1.172	1.634
Current-account balance (billions of \$) current year: ^d									
Mean actual current account	-1.915	-1.400	2.754	-2.246	9.454	1.746	-21.825		
Mean algebraic error	-0.354	-2.067	-0.785	-0.454	-1.569	-1.531	0.600		
Mean absolute error	2.308	2.917	4.000	2.592	6.261	2.485	10.667		
Root mean squared error	3.105	4.009	5.083	2.972	7.967	3.430	13.962		

^a 15 annual observations (14 for France and Germany and 12 for Summit 7).

^b 15 annual observations (12 for Summit 7).

^c 12 annual observations (9 for Summit 7).

^d 13 annual observations (12 for France and the United States).

SOURCE: Kenen and Schwartz (1986), Tables 1, 3, 9, and 13.

employed, respectively. But estimates nevertheless vary widely.² Zero seems an obvious choice for the optimum value of inflation. Estimates for the optimum current account are much more problematic. Zero again seems a natural choice under the Polonius principle of international finance: "Neither a borrower nor a lender be."³ But estimates of optimal current account balances can vary widely; theoretical analyses suggest that the optimal rate of borrowing (or lending) can be quite large, to finance either longer-term investment and growth or shorter-term shortfalls in real income.

The point is clear. The policymaker's estimates of the current values of y , π , and x in his country could easily be off by several percentage points in either direction, which would flip the signs of the three terms—any one of which could change the sign of the derivative of the welfare function—in equations (2) to (5). Thus, coordinated policy changes could move the economy in the wrong direction.⁴

To take an historical example, 1974 was a year of sharp recession in the United States. But, because of misleading initial data (and because of unfamiliarity with the effects of an oil shock), President Ford declared inflation to be "Public Enemy Number One," even though we know in retrospect that the recession had already begun. He subsequently had to reverse his policy priorities and enact expansionary fiscal policies. If, as part of a coordination process, the United States had asked trading partners in 1974 to adopt measures that would have deflationary effects, soon thereafter it would have wanted precisely the opposite.

² For example, estimates of the U.S. natural rate of unemployment vary from 5 to 7 percent. Moreover, there is no particular reason why the natural rate of unemployment or potential output should be the optimum value relative to which society measures y in the objective function (1). The official target for U.S. economic policy under the Humphrey-Hawkins Act of 1978 is 3 percent unemployment (for workers over twenty years of age).

³ Dooley and Isard (1986) argue that whenever one country incurs substantial net indebtedness to another, the creditor runs the risk that the debtor will find the temptation irresistible either to default explicitly or to impose other taxes on foreign holdings. This argument suggests that a zero current-account balance might be desirable. Summers (1988) argues that governments, for political reasons, do indeed seek current accounts of zero. (See also Shakespeare.)

⁴ Of course, misperception of the baseline position relative to the goal will cause problems for *uncoordinated* policymaking as well. Hughes Hallett (1987) argues that welfare in the coordinated policymaking equilibrium may be relatively more robust to such "information errors" than in the Nash noncooperative equilibrium.

3. UNCERTAINTY REGARDING WEIGHTS ON TARGET VARIABLES

The issue of the correct relative weights w_x and w_π for the target variables in the objective function (1) is even more subjective than the issue of the optimal values of the target variables.

Some would argue that the only appropriate objective is to maximize the value of income, or consumption, and that the correct weight on the other variables is zero. To be more correct theoretically, it is the present discounted value of consumption that should be maximized. One can then view the inclusion of the current account in the one-period analysis as foreshadowing events in all the future periods.¹ If the country maximized current consumption while running a large current-account deficit, it would have to undergo lower consumption in the future to service the debt incurred. One can view the motivation for including inflation in the same way. If higher output could be attained with no welfare costs beyond the contemporaneous resource loss from higher inflation, then the cost might be viewed as negligible. But the true cost in fact includes a higher level of inflation inherited in the future, which will eventually necessitate a recession to eliminate it.² Thus a one-period objective function that includes inflation and the current account in addition to output seems to capture the relevant elements.

The ultimate argument for putting weight on inflation and the current-account deficit comes not from theory but from consideration of the economist's place in the policymaking process. Society views these variables as "bads" and can be said to have a utility function that includes them in the same way that consumers have utility functions for the goods (and bads) they consume. An economist who maximizes a theoretical welfare function that excludes such variables is not solving a problem that society wants answered.

One way to obtain estimates for the weights w_x and w_π is to carry one step further the argument that the choices of the political process should be

¹ The assumption that governments should seek to attain both "internal balance" (full employment) and "external balance" (trade balance) is part of the venerable Meade-Mundell framework of policymaking. See Obstfeld (1988) regarding the appropriate definition of external balance.

² One could make an analogous argument for including the budget deficit as a fourth target variable, as McKibbin and Sachs (1988) do.