

The failure to cooperate and coordinate macroeconomic policies will leave countries worse off than an outcome involving cooperation

Most countries around the world interest in international economic cooperation have increased substantially in recent years. This heightened desire to coordinate economic policies with the major economic power is in part a response to the special problems (e.g. the sharp fluctuation in exchange rates) and the changes in the world economy. The world economy has become more interdependent: international trade has increases relative to production for domestic markets and international capital markets have become larger and more active. The failure to cooperate and coordinate macroeconomic policies will leave countries worse off than an outcome involving cooperation.

The basic theoretical model of interdependence is the two-country model developed by Robert Mundell (1963) and J. Marcus Fleming (1962). Then McKibbin and Sachs (1991) develop a multi-country model, which allows for flexible wages and prices and rational expectations. The basic two-country Mundell-Fleming model was the first to study macroeconomic interaction in a formal theoretical setting under the realistic assumption of high capital mobility between the ‘home’ and ‘foreign’ countries. This model examines the transmission of monetary and fiscal policies under different assumption about exchange rate flexibility, wage setting, and capital mobility. (See Table 1)

First, consider the expansionary monetary policy. Under the floating exchange rates conditions, the domestic monetary expansion always causes a depreciation of the home currency and a rise in home output, and it is usually regarded as a classic example of a ‘beggar-thy-neighbor’ policy because it result in an expansion of domestic output at the expense of foreign output. Assuming fixed exchange rates, in the case in which the foreign country is responsible for fixing the exchange rate, the monetary expansion in the home country will lead to a monetary expansion in the foreign country that is necessary to hold the exchange rate fixed. The result is a global monetary expansion.

Second, consider the fiscal policy transmission. For the floating exchange rates, fiscal policy is positively transmitted: higher fiscal spending at home raises output abroad. A fiscal expansion in the home country, increasing domestic demand, brings about an appreciation of the exchange rate that reduces foreign demand by enough that the output effects are zero. Note that the domestic fiscal expansion has a negative effect on the price level because the appreciation of the home currency lowers the price of foreign goods in the home market, which means on impact, and per unit of output expansion achieved, fiscal policy is less inflationary than monetary policy. If the home country fixes the exchange rate, a home fiscal expansion tends to appreciate the home currency. To offset the incipient appreciation requires a monetary expansion in the home country. The output effects are clear because the monetary policy expansion will reinforce the expansionary effects of the fiscal expansion. Under a given exchange rate regime, the move to indexation reduces the real effects on both the home and foreign countries’ output of a given fiscal policy change. (McKibben & Sachs ,1991)

| | | Central Bank | |
|------------------|--------------|---------------------------------------|---------------------------------------|
| | | Tight Monetary | Loose Monetary |
| Fiscal Authority | Tight Fiscal | Low Inflation Low Employment | Medium Inflation Medium Employment |
| | Loose Fiscal | Medium Inflation Medium Employment | High Inflation High Employment |

Table 1. A Monetary-Fiscal Game

Policy coordination has been defined numerous ways. Here, definition of the Group of 30 countries in 1988 will be adopted: countries modify their economic policies in what is intended to be a mutually beneficial manner, taking account of international economic linkages. And Cooper has expressed that the central issue of international economic cooperation is to keep the manifold benefits of extensive international intercourse free of crippling restrictions, while at the same time preserving a maximum degree of freedom for each nation to pursue its legitimate economic objectives. (Hallwood and MacDonald, 2000)

It is useful to consider two extreme positions to understand the international economic cooperation and policy coordination. At one extreme is the idea that each country should manage its own domestic monetary and fiscal policies with a concern for its own well-being only and without trying to take into account the effect of its policies on the other countries of the world. A government may understand that its economy is affected by the policies adopted elsewhere and that its own policies affect other countries but still choose to make its policy decisions unilaterally. At the other extreme is the view

that each country should formulate its economic policies in explicit coordination with every other country, so that the policies are chosen to maximize world economic welfare as a whole, or at least to achieve an aim of policies from which no country can be made better off without making some other country worse off. This statement of the alternatives might suggest that international coordination is unambiguously better than the uncoordinated pursuit of national self-interest.

The ability of international macroeconomic coordination to permit countries to pursue more expansionary policies than would otherwise be possible is both a potential benefit and a potential danger. For instance, when a single country tries to expand by itself, it may soon find that rising imports create a balance of payments problem. A coordinated expansion by a group of trading partner can eliminate this balance of payment constraint and permit all of the countries to expand more than any of them could have done alone. When all economies are operating well below capacity, such coordination expansion can provide gains for all.

In the most independent arrangement, each country chooses its optimal policy taking the policy action of the other country as given. Equilibrium in each country is reached at the point where the benefits of expansion are balanced by the costs of appreciation, given the other country's decision. This is noncooperative equilibrium. Cooperation may result in less active use of the policy than when the countries are independently pursuing their own interests. (Feldstein, 1988) For example, suppose the targets of policy are output and inflation, and monetary policy is the only instrument. In the noncooperative equilibrium, each country is balancing the costs of added inflation against the benefit of higher output. But an expansionary policy in each country reduces output in the other. If monetary policy in each economy becomes less expansionary, the same income levels can be attained at a lower rate of inflation.

Any single country's policies have some 'spillover' effects on other countries, and the perceived constraints on policy action (the state of the balance of payments or the direction of change of the exchange rate) depend for any one country on the actions of other countries, the individualistic pursuit of economic policy is quite unlikely to be optimal. In the absence of direct cooperation, it is well known that the outcomes of such games are socially inefficient; there are alternative policies that would make all parties better off. The benefits of coordination can be illustrated at a basic level using the famous prisoner's dilemma game. (See Table 2) This game is described as static in nature because the game relates to the domestic country and foreign country each trying to set the optimal level of their monetary policy in response to an inflationary shock. (Hallwood and MacDonald, 2000) And the issues are illustrated in the following using a diagram developed by Hamada (1979).

| | | <i>Foreign country</i> | |
|---------------------|--------------------|------------------------|--------------------|
| | | <i>Easy money</i> | <i>Tight money</i> |
| <i>Home country</i> | <i>Easy money</i> | -9, -9 (i) | -11, -8 (iii) |
| | <i>Tight money</i> | -8, -11 (ii) | -10, -10 (iv) |

Table 2. The Prisoner's Dilemma and the Nash-Cournot Equilibrium

Figure 1 illustrates the loss function of each country define a set of indifference curves as ellipses in m_1 and m_2 space. Suppose each country wishes to minimize a loss function of the form:

$$L_i = \frac{1}{2} |y_i - y_i^*|^2 + \frac{\delta}{2} |e - e_i^*|^2$$

The indifference curves have their particular shape because of the potential spillover from country 1 to country 2. Complete policy independence for the two countries in the diagram by vertical straight-line indifference curve for the home country and the horizontal straight line for the foreign country. All the bliss points at which the indifference curves are tangential will represent the efficient, or optimal, policies for the two countries. Using this Nash reaction function may be illustrated for country 1 using the geometric argument in the diagram. The Nash reaction function for country 1 defines the policies which generate minimum losses given the policy following by country 2.

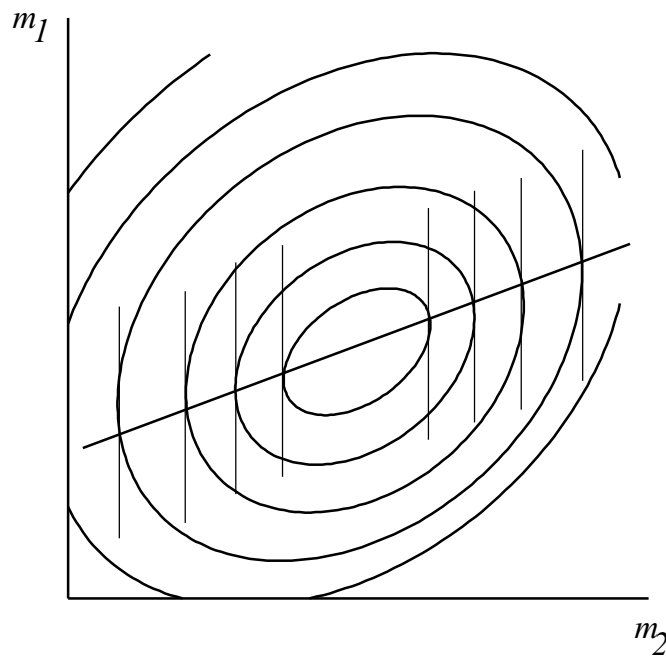


Figure 1. Construction of the Nash Reaction Function for Country 1

Figure 2 is a “Hamada diagram” which provides a general illustration of the case of two countries. Both countries are assumed to have preferences regarding economic goals (output, employment, inflation, etc.). If other variables which are not dependent on policy actions are taken as given, these goals can be depicted solely as functions of the policy instrument values chosen by each country. For simplicity, each axis can be thought of as measuring just one policy instrument, though in the diagram as shown it is assumed that an index which combines these instruments can be used to scale each of the axes. It is also assumed that a point like B1, and that of country 2 by a point like B2 gives the bliss point of country 1, in terms of these policy instrument values. These points correspond to the minimum possible losses for country 1 and country 2 respectively. Without cooperation, the world economy finds the equilibrium at point N where the Nash reaction functions intersect. The contract curve is shown on the diagram as joining the two bliss points B1 and B2.

The diagram also shows the reaction curve for each country. This simply plots the policy instrument values of the one country responding to the other’s choices. It is constructed to represent the country in question setting its own policy instruments to achieve the best outcome for it, given the other country’s policy stance. (Corden, 1985) Since achieving the best outcome here means reaching the highest possible preference curve, the reaction function for country 1 (NRF1) runs through all the points of tangency between vertical lines (which represent country 2’s given policy values) and the indifferent curve for country 1. And country 2’s reaction function (NRF2) joins the points of tangency between horizontal lines and country 2’s indifferent curves.

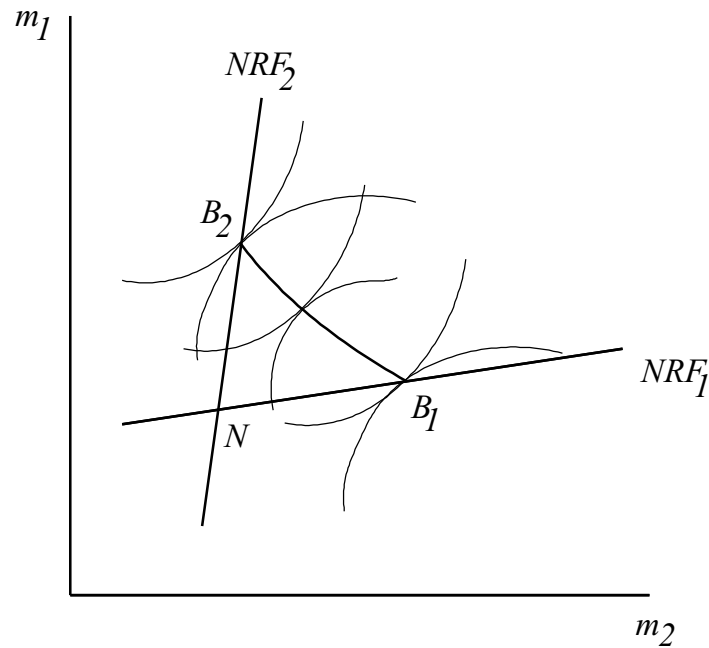


Figure 2. Nash Equilibrium with Incompatible Exchange Rate Targets in the Two Country Model

In the figure 3, there are three types of equilibrium are represented. N, the Nash equilibrium, is the point at which the two reaction curves intersect; S, the Stackelberg equilibrium, with country 1 as leader; and the contract line joining B1 and B2 being the locus of possible cooperative solutions. The country optimizing myopically forms each curve, which is taking as given the other country's policies. Hence the intersection depicts the position, which emerges when both countries behave in this way. S is the Stackelberg, or leadership, with country 1 as the leader. Country 1 is not myopic. It determines its own policies so as to force country 2 to adopt policies, which, in combination with its own, provide it with the best attainable level of welfare. This means, S is on country 2's reaction curve, at the point most advantageous to country 1 (a point of tangency with one of country 1's preference curves). Notice that although country 1 is the leader, both country 1 and country 2 may be better off under its leadership than under the

myopic Nash regime, which means that S is on better indifferent curves for both countries than is N . Finally, there is the cooperative solution. This is the locus of points of tangency between the indifferent curves of the two countries. Thus the solution is Pareto-optimal: an improvement for both countries simultaneously is not possible from a point on the curve. Which point on this locus is actually chosen depends on a variety of factors, including ‘bargaining strength’.

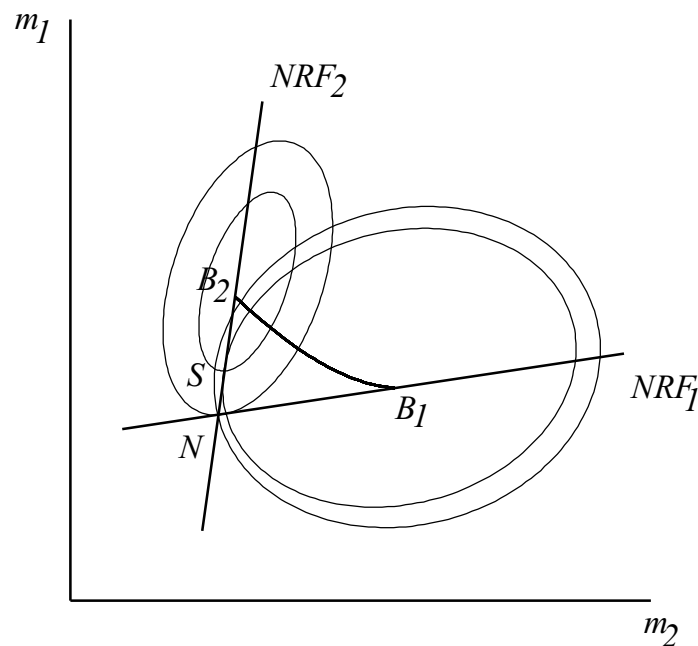


Figure 3. Stackelberg Leader Solution in the Two Country Model with Incompatible Exchange Rate Targets

Coordinated policies are more desirable than uncoordinated policies, but unfortunately, policymakers generally have an incentive to cheat in these Pareto-improving outcomes, and politically sovereign policymakers seem to have difficulty achieving them. For example, the home country believes the other country will maintain

its instrument at a coordinated equilibrium on the contract curve, it would be in the interests of the home country to move to its reaction function and so obtain a higher level of utility, in this instance the gains from coordination will not be reliable. The cheating problem is compounded by the difficulty of defining and verifying cooperative problems, and by the moral hazard this implies. (Canzoneri and Gray, 1985) There are two types of cheating, one is domain cheating, another is player-domain cheating. The former type of cheating has a Stackelberg nature because of the lack of a retaliatory instrument after time zero, whilst the latter is a Nash-type problem in player space. Both types of cheating are problems covered by the general concept of reputation and, from a policy coordination perspective, player-domain cheating is likely to be the most important component of reputation. (Hallwood and MacDonald, 2000)

Optimal cooperative policies depend on the objectives of the policymakers, the nature of the transmission mechanism between the economies, the policy tools that they have available, and the nature of the disturbances that hit their economies and call for policy responses. Differences in objectives between countries affect the basic principle of gains from cooperation. The ongoing nature of policy interactions among countries, reputational considerations make cooperative equilibrium more likely. (Barro, 1986) Each country knows it will be better off in the long run if the cooperative equilibrium is maintained. Countries may develop strategies both to punish those that do not cooperate, and to earn a reputation for reliability. It then becomes possible that countries will reach and stay at the cooperative equilibrium. Coordination through reputation, without explicit international agreements, is less likely the more countries there are. When everyone is at the cooperative equilibrium, the temptation for one small country to break ranks is very strong. The potential cost to it of doing so may also be high, for it is more dependent on the world economy than is a larger country. But because it inflicts very little damage on the rest of the world by not cooperating, it is not certain that it will be penalized. Finally,

in the absence of coordination, policies which rely on reputation may be undesirable. (Currie et.al., 1987) This is because the government which has reputation can more readily affect market expectations, and the coordination failures, especially those relating to the exchange rate, that arise from the noncoordination of policies are more likely to be increased when a government has reputation.

From all above issues, which discussed on policy coordination, considering the game theory relating to the optimality of cooperative strategies, then, make a convincing case that coordination is generally superior to noncooperative policy-making.

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