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Policy Assignment Strategies with Somewhat Flexible Exchange Rates

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Abstract

The choice of assigning monetary or fiscal policy to external balance is complicated when the authorities are concerned with both the current account balance and the exchange rate. A strategy of using monetary policy to control the current account via the exchange rate may fail, because the relative-price effect is likely to be offset by the effect of monetary policy on aggregate demand. An alternative strategy, in which fiscal policy is assigned to limit shifts in the current account while the exchange rate is not directly targeted, may have a better chance of having favorable effects on both variables.

JEL Classification Numbers
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*/ I have benefited greatly from discussions on these issues and on earlier drafts of the paper with Max Corden, Andrew Crockett, David Currie, Michael Dooley, Robert Flood, Morris Goldstein, Jocelyn Horne, Marcus Miller, Paul Masson, Stephen Symansky, and David Vines. The views expressed are mine alone and should not be interpreted as reflecting those of my colleagues or of the International Monetary Fund.

Contents

I. Introduction

How can one design an approach to macroeconomic policy that will improve international economic performance in conditions where countries care about exchange rates but do not wish to adopt explicit exchange-rate objectives? Such circumstances appear to be inherently ambiguous because there is no clearly identifiable and quantifiable measure of external balance, and therefore no unequivocal way to formulate an objective function that could be maximized. To some extent, the exchange rate matters because it affects current account balances, but it may also represent a variety of other more visceral concerns, including the sectoral distribution of income and national pride; and it is linked as well to domestic balance, especially through its effect on aggregate price stability. However, none of these items is determined solely or even primarily by the exchange rate. Thus the external objective for macroeconomic policy cannot be identified solely by the exchange rate but must be extended to incorporate more fundamental concerns.

The organization of the paper is as follows. Section II examines the role of exchange rates and current account balances as alternative external objectives of macroeconomic policy. Section III then takes up the assignment problem: the question of which policies should be emphasized in efforts to achieve external balance. This topic is elaborated further in Section IV, in which the possibilities for effective policy cooperation based on the assignment of fiscal policy to external balance are discussed. A summary of the principal conclusions is offered in Section V.

II. The International Objectives of Macroeconomic Policy

1. Definition of the problem

The international objectives of macroeconomic policy depend, inter alia, on the exchange rate regime. 1/ Under a regime of pure floating, an important objective is for countries to cooperate so as to avoid "beggar thy neighbor" policies by which one country might attempt to gain a competitive advantage by encouraging markets to depreciate the currency or to export inflation by encouraging an appreciation. At the other extreme, the limitations of the floating-rate system have led some to propose a return to a system of fixed exchange rates or to develop a set of target or

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1/ For a general exposition of alternative regimes in this context, see Dornbusch and Frankel (1987). The following discussion ignores the possibility (which they discuss) of using taxes or controls to reduce capital mobility as a substitute for modifying domestic policies in order to achieve an external objective.

reference zones. 1/ In this case, the maintenance of exchange rates within the established bands would be the main proximate objective, but countries might also be supposed to wish to maintain "external balance," in the sense of avoiding large imbalances in their external payments positions.

Between these two regimes lies a gray area encompassing what might be called "somewhat flexible" exchange rates. That is, a distinction may be made between a pure floating-rate system in which countries choose to treat the exchange rate as a market-determined price over which they do not wish to attempt to exercise a direct influence, and a less pure but still flexible system in which the authorities wish to influence although not necessarily to set exchange rates. 2/ Such a regime might evolve because countries are uncertain of their ability to control exchange rate movements, or because they do not believe that exchange rate management will necessarily secure net benefits for the general welfare. They nonetheless would like to promote exchange rate stability along with other economic objectives, at least partly in order to avoid large current account imbalances.

In this paper, it will be assumed that the international policy objective is to secure benefits both for exchange rate stability and for current account balances. Because these objectives must be consistent across countries, their achievement may require cooperation or coordination of policies. However, it may be difficult for countries to pursue exchange rate and current account objectives independently because of a shortage of available instruments. In that case, countries either can focus on exchange rates and thereby hope to move toward their current account objectives, or they can focus on the current account and hope to reduce the volatility of exchange rates.

It has been shown elsewhere (see Boughton et al., 1986) that exchange rate adjustment is not a sufficient condition for current account adjustment, because the relationship between the two depends very much on the choice of policies for inducing changes in the exchange rate. In contrast, policies to limit current account imbalances will reduce exchange rate

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1/ The difference between fixed rates and target zones is that the latter does not require a commitment by the authorities to buy or sell foreign exchange within the established bands. Rather, it requires a commitment to implement policies that are intended to be consistent with a market-determined exchange rate that lies within the bands. General references on target zones are Williamson (1985) and Frenkel and Goldstein (1986). Also see Currie and Wren-Lewis (1987), Edison et al. (1987), Krugman (1988), and Williamson and Miller (1987).

2/ The term "somewhat flexible" is chosen in preference to "managed floating," because the latter carries the connotation of management through official intervention in foreign exchange markets. The connotation that is being sought here is one of management primarily through adjustment of domestic financial policies, as explained below.

volatility to the extent that they limit shifts in the mix of monetary and fiscal policies. By how much volatility would be reduced is quite difficult to assess, in view of the limited empirical success of exchange rate models. The empirical question is essentially whether exchange rate movements arise primarily from policy shifts or from independent speculative shifts on the part of private investors. It will be assumed here that the extent of the reduction would be significant, but it would be inappropriate to claim much more than that.

The implication of these general considerations is that--as a convenient simplification--the current account may be taken to be the external objective, while the exchange rate may be treated as an intermediate indicator. The objective of relative exchange rate stability may be assumed to be reasonably well satisfied as long as domestic policies are circumscribed by the current account objective. It should be noted that the objective for the current account need not be the achievement of balance, but normally will involve the avoidance of excessively large imbalances, somehow defined.

The remainder of this section outlines the more specific considerations behind this way of setting up the problem. Those who are prepared to accept the assumptions as realistic may wish to skip directly to Section III.

2. Elaboration

In a system without official intervention in foreign exchange markets, it is not obvious that it is sensible for countries to have any external objective. The current account balance is simply the reflection of the balance of national saving and investment, and the real exchange rate is a relative price determined freely through market transactions; both represent the endogenous outcome of presumably rational decisions. On the other hand, the saving-investment balance is determined in part--and shifts in the balance may be determined in large part--by government policy decisions; to argue that those decisions should take account of their effects on intertemporal and intergenerational wealth transfers is equivalent to arguing that they should take account of their effects on the external current account balance. Furthermore, shifts in real exchange rates may be determined in large part by speculative pressures in financial markets that give rise to shifts in the sectoral distribution of wealth; such shifts also are a legitimate concern of macroeconomic policy.

If one accepts the validity of an external objective for macroeconomic policy, the next question concerns whether it should be identified as the current account or the exchange rate. When James Meade (1951) formulated the idea of external and internal balance as the fundamental objectives of macroeconomic policy, he argued that external balance was synonymous with the balance of payments. Similarly, Mundell's classic (1962) article on the subject defined external balance in terms of equality between the trade

balance and net capital exports at the fixed exchange parity. This work, of course, was written in the context of fixed exchange rates. The introduction of floating rates forces a reevaluation of this equation by introducing the possibility that the exchange rate--either its level or its stability--may itself be an objective rather than (or in addition to its role as) an instrument of macropolicy.

Perhaps the leading exponent of the view that the external policy objective should be the exchange rate rather than the current account is Ronald McKinnon. McKinnon (1988, p. 86) argues that floating exchange rates are "socially inefficient because private foreign exchange traders face a huge gap in relevant information" arising from frequent, large, unanticipated fluctuations. In this view, there is no stable relationship between exchange rate changes and trade balances, but the latter constitute a separate problem to be dealt with by improvements in the stability of domestic policies rather than by international coordination.

At the other end of the spectrum, some have argued that the level of the exchange rate does not matter, or that its equilibrium level cannot be determined within a reasonable tolerance. In either case, the implication is that efforts at international coordination--if made at all--should focus essentially on the current account. For example, Genberg and Swoboda (1987) note that, for the large industrial countries, the exchange rate has the character of an intermediate variable--neither an instrument nor a target--and that it has no predictable link with the current account balance or other fundamental objectives.

A third view is that neither the exchange rate nor the current account balance should be a policy target. The exchange rate, it may be argued, is simply a relative price that should be allowed to adjust freely to reflect shifts in the balance of market supply and demand. The current account similarly reflects the outcome of differences in national preferences for saving and investment, and it should be allowed to assume whatever values are necessary. This view has been expressed, for example, by Herbert Stein (cited in Dornbusch, 1987), and by Alan Stockman (1987), and its rationale has been set out clearly by Corden (1985).

The difficulty with this third view is that there may be externalities associated with current account imbalances, as well as with exchange rate fluctuations. One potential cost of current account deficits, stressed by Feldstein (1987), among others, is that there are limits to the ability of even a reserve currency country to finance a growing external debt. Another, emphasized by Cooper (1986) and by Corden (1985), is that a current account deficit represents a transfer of income from future generations to the present; insuring that the extent of such transfers is consistent with the collective preferences of the public, as well as that conflicts do not arise between countries, is a legitimate concern of governments. Genberg and Swoboda (1987) cite other costs, including the effects of external imbalances on aggregate demand and on protectionist pressures.

In a fourth strand of the modern literature on external balance, it is assumed that there exists a simple mapping of the current account balance into the real exchange rate; the latter then may be taken as the proximate external objective. Recent examples include Corden (1987) and Williamson and Miller (1987). Both make the important qualification that one must take the total level of employment (Corden) or output (Williamson and Miller) as fixed in order to make such a mapping. The argument then is that a shift in the mix of financial policies that leaves output unchanged will alter the real exchange rate in a predictable way and thereby alter the current account balance.

The differences between this school of thought and those that treat the exchange rate and the current account as largely independent arise partly out of the analytical choice of whether to hold output fixed. However, several empirical issues might also force a choice between the exchange rate and the current account as the primary indicator of external balance. First, the elasticity conditions required for depreciation to lead to a strengthening of the trade balance may not be satisfied over a reasonable time horizon. Second, if exporters are able to absorb exchange rate fluctuations through shifts in unit profit margins, these fluctuations might have only a weak effect on prices in terms of the importers' currency. Third, in view of the limited success of exchange rate models, it might be more difficult to predict the effects of macropolicies on exchange rates than on current account balances. Fourth, exchange rates and current account balances might shift independently for reasons unrelated to shifts in policies.

These issues seem to lead to ambiguous conclusions about the best way to formulate the external objective. Given that countries do express interest in both exchange rates and current account positions, there is no generally accepted standard by which one could determine unequivocally which is foremost. Nonetheless, at least two observations may be advanced in support of the view that the primary focus should be on the current account. First, there is greater consensus in the professional literature about the determination of external balances than about the determination of exchange rates; therefore, the empirical basis for policy recommendations is more solid. Second, virtually the whole of the rationale for caring about exchange rates has to do with one dimension or another of international trade: if not the net balance, then its growth or its distribution. If a country had internal stability and a stable and balanced pattern of international trade, its concerns about changes in its exchange rate would be greatly diminished; however, the converse would not hold.

One may also note that the major industrial countries do, in fact, express concerns over the current account as well as over the exchange rate. For example, the Louvre Accord of February 1987, in which the large industrial countries "agreed to cooperate closely to foster stability of exchange rates around current levels," also cited the "serious economic and

political risks" associated with large trade and current account imbalances (see IMF Survey, March 9, 1987).

III. The Assignment of Policies

1. General considerations

The working hypothesis for this section will be that the external objective of macroeconomic polices is represented by the current account, on the assumption that the avoidance of excessive current account imbalances would also imply a reduction in the instability of exchange rates. This hypothesis does not exclude the possibility that exchange rates could play a useful role as an intermediate target; that issue will be examined below. The remaining open question concerns the choice of policy instrument to be given the primary emphasis in discussions on the achievement of external balance.

In a static optimal-policy framework, the assignment question would not arise: one would simply solve for the values of monetary and fiscal policy settings that were consistent with both internal and external balance. 1/ The question, however, is important in the context of limited policy coordination, because it is probably not realistic to expect countries to agree on mutually consistent settings for both monetary and fiscal policies. The problem, as Mundell (1960, 1962) showed, is that there may be a problem of dynamic stability if instruments are assigned to objectives over which they have relatively little influence. More particularly, as stressed recently by Genberg and Swoboda (1987), the possibility of dynamic instability is especially important in this context, because monetary policy--which has long been thought to be the natural choice to be assigned to external balance--has a relatively weak effect on current account balances.

It has been commonly accepted that monetary policy has a comparative advantage for external stability. Mundell (1962) demonstrated that in a fixed exchange-rate system with some capital mobility, the assignment of fiscal policy to external balance would be unstable. The floating-rate, two-country version of the Mundell-Fleming model (see Mundell, 1963, 1964) seemed to have similar assignment implications, because it suggested that monetary expansion in one country would lead unambiguously to a decline in

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1/ It is well known that simplified strategies, such as focusing on intermediate targets or assigning specific instruments to targets, are in general not optimal ways to maximize welfare. On intermediate targets, see Friedman (1975); on the use of simple assignment rules, see Currie and Levine (1985). The assignment approach is nonetheless adopted here in deference to the desirability of simplicity as a characteristic of the design of any practical scheme for policy coordination.

output in the other country because of the appreciation of the second country's real exchange rate. More generally, the emphasis that has been placed in much of the recent literature on exchange rate stability as the key to external balance, coupled with the recognition that monetary policy has a dominant role to play in determining exchange rates, has contributed to the view that monetary policy should be assigned to the maintenance of external balance.

The idea that shifts in monetary policy by a large industrial country will give rise to significant spillover effects on other countries has not been supported by the bulk of the empirical evidence. This conclusion is especially true with respect to the effect of monetary policy on the current account: most recent evidence shows a very limited impact on current account balances with an ambiguous sign. For example, Sachs and Roubini (1987) perform a set of tests with a global simulation model and find "a striking, and seemingly robust result of this model: monetary policy can be pursued by each region independently, without spillovers on the trade balance or level of activity in other regions." Helkie and Hooper (1988), summarizing the results of a comparison of the properties of nine internationally linked econometric models conducted by the Brookings Institution, concluded as follows: "an average of the simulation results suggested that a shift in U.S. money growth would significantly affect real interest rates but would have only a negligible effect on the current account."

Table 1 summarizes the results of selected recent model simulations. For this exercise, the effects of a policy change or other exogenous shock were simulated, with the magnitude of each disturbance being scaled to produce (a) a given path for the effective exchange rate of the U.S. dollar, or (b) a given path for nominal GNP. Specifically, the top part of the table shows the changes in the U.S. current account balance associated with a 10 percent nominal effective depreciation of the currency, assuming that the depreciation resulted from monetary expansion or from fiscal contraction. The bottom part shows the results of the same simulations, scaled for a 10 percent increase in nominal GNP. In the first set of simulations listed in each part, two versions of MINIMOD (Haas and Masson, 1986) were used, one with adaptive expectations and one with forward-looking model-consistent expectations. Simulations are also reported for MULTIMOD (Masson et al., 1988).

Regardless of the choice of model or the length of time allowed for adjustment, the strengthening resulting from monetary policy actions is much smaller than that resulting from a shift in fiscal policy. That relation by itself would not necessarily be a problem, because countries could simply implement relatively large changes in monetary growth. The more serious problem is that the sign of the monetary effect on the current account is ambiguous. Although the simulations in Table 1 that incorporate the assumption of model-consistent expectations find positive signs (monetary expansion strengthening the current account), other models and

Table 1. United States: Change in Current Account Balance Resulting From Shifts in Monetary and Fiscal Policies

(In percent of GNP)

Exogenous disturbance	With adaptive expectations		With forward expectations	
	3 yrs.	5 yrs.	3 yrs.	5 yrs.
A. Scaled to a 10 Percent Nominal Effective Depreciation of the Dollar				
1. MINIMOD simulations 1/				
Expansionary monetary policy	-0.1	0.1	0.1	0.6
Contractionary fiscal policy	1.2	1.4	0.9	1.7
2. MULTIMOD simulations 2/				
Expansionary monetary policy			0.3	0.3
Contractionary fiscal policy			1.5	2.3
B. Scaled to a 10 percent rise in Nominal GNP				
1. MINIMOD simulations 1/				
Expansionary monetary policy	-0.4	0.2	0.2	1.0
Expansionary fiscal policy	-1.1	-1.8	-1.9	-2.3
2. MULTIMOD simulations 2/				
Expansionary monetary policy			0.5	0.3
Expansionary fiscal policy			-1.0	-1.0

1/ Source: Boughton and others (1986), Tables 41 and 42. Data have been normalized on 1987 GNP.

2/ Source: Masson and others (1988), Tables A1 and A2.

even other versions of the same models are less consistent. For example, the two versions of MINIMOD have opposing effects over a horizon of up to three years. 1/

There are many reasons for the weakness of the effect of monetary policy on the current account, and each of the empirical studies cited above offers some suggestions. The basic reason, however, is quite straightforward: the relative-price effects are roughly offset by the effects on the growth of domestic demand. That is, monetary expansion strengthens the current account by depreciating the real exchange rate, but it weakens it by stimulating domestic demand and thereby the demand for imports.

2. A two-country model

Table 2 sets out a simplified two-country model to illustrate the conditions under which monetary policy would have no effect on the current account balance. This model is not intended to be a realistic description of the total macroeconomic response to a shift in monetary policy; the point is to write down a set of equations that is simple enough to yield an analytically transparent result. The Appendix deals in more detail with the consequences of extending the model to cover many of the analytical complications that are necessary to provide a more realistic picture. The net effect of those complications is shown there to be fairly small. 2/

The model listed in Table 2 has a Keynesian structure, with domestic prices fixed and similar coefficients for each of the two identically sized countries. It is essentially the same as the two-country, flexible-rate version of the Mundell-Fleming model (Mundell, 1964), except that import and money demands are assumed to depend on expenditure rather than output, and the demand for money is deflated by the general price level. Specifically, real import demand in each country (equations 3 and 4) depends on domestic absorption and the exchange rate. Real absorption (equations 5 and 6) is a function of output, the rate of interest, and the level of government expenditure. The interest rate is assumed to be equated between countries through perfect capital mobility. The demand for real money balances (equations 7 and 8) depends on absorption and the interest rate.

1/ In addition to the potentiality in the Mundell-Fleming model that expenditure effects will dominate the relative-price effect, other possibilities for a negative monetary effect on the current account have been noted. For example, Liviatan (1981) developed an extension of the Calvo-Rodriguez (1977) model in which monetary policy leads on impact to a real appreciation and a weakening of the trade balance. Kimbrough and Koray (1984) estimated the reduced form of a model in which an unanticipated monetary expansion weakens the trade balance by raising the perceived real rate of return abroad.

2/ For other models leading to similar conclusions, see Genberg and Swoboda (1987).

Table 2. A Simplified Two-Country Model 1/

(1)	$y = a + x - m$	output identity
(2)	$y^* = a^* - x + m$	
(3)	$m = \alpha_1 a - \alpha_2 E$	home-country demand for imports
(4)	$x = \alpha_1 a^* + \alpha_2 E$	demand for home country's exports
(5)	$a = \alpha_5 y - \alpha_6 r + g$	domestic demand
(6)	$a^* = \alpha_5 y^* - \alpha_6 r + g^*$	
(7)	$L/P = \alpha_7 a - \alpha_8 r$	demand for money
(8)	$L^*/P^* = \alpha_7 a^* - \alpha_8 r$	
(9)	$P = \alpha_9 E$	overall price level
(10)	$P^* = -\alpha_9 E$	
(11)	$K = x - Em$	current account balance
(12)	$Y = Py$	nominal income
(13)	$Y^* = P^* y^*$	

1/ For notation, see Appendix.

Overall price levels in each country vary proportionally to the exchange rate (equations 9 and 10), the coefficient depending on the share of imports in absorption. The last three equations (11-13) define the three targets (K, Y, and Y*) at which the four instruments (L, L*, g, and g*) are aimed; the implications of having an excess instrument are discussed below.

What is desired at this stage is a solution of the model for the current account balance, K, as a function of the home-country monetary instrument, L, holding the other instruments fixed. This multiplier turns out to have an ambiguous sign, with the following property (starting from a position with balanced trade):

$$dK/dL \gtrless 0 \text{ as } 2\eta \gtrless 1 + 2\alpha_1\alpha_3/(1-\alpha_3),$$

where η is the price elasticity of import demand. This result, of course, is comparable to the Marshall-Lerner condition for the effectiveness of a devaluation, except that the requirement is much stricter. 1/ Here, the sum of the price elasticities must exceed unity by enough to offset the effect of monetary policy on the current account working through aggregate demand.

In order to clarify the magnitude of the expression for the monetary effect on the current account, two further assumptions may be made. First, assume that the income elasticity of the demand for imports is unity; then $\alpha_1 = m_y$, where $m_y \equiv m/y$ at the initial (balanced) position. Second, assume that the income elasticity of private expenditure demand is unity; then $\alpha_3 = 1 - g_y$, where $g_y \equiv g/y$ at the initial position. With these assumptions, the requirement for monetary expansion to strengthen the current account may be written as $2\eta > 1 + 2m_y(1-g_y)/g_y$.

Within a fairly broad range of values for the portions of total income accounted for by imports and government expenditure, this expression will have a value of around 2 to 3. For example, if $m_y = g_y = .1$ (i.e., if imports and government expenditure are each equal to 10 percent of output), then the sum of the import elasticities must exceed 2.8 in order for monetary policy to strengthen the current account in this simple version of the model. More generally, it may be seen that it is not necessary to introduce a very complicated story in order to justify the empirical finding that the effects of monetary policy on the current account are subject to a particularly long J-curve and have an ambiguous sign even in the long run.

The external effects of fiscal policy are quite different, because the relative price effects on the trade balance either work in the same

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1/ Because of the symmetry of the model, the expression 2η represents the sum of the import elasticities in the two countries.

direction as the expenditure effects or--if perverse--are weak relative to those of monetary policy. 1/ Suppose that a country undertakes to strengthen its current account by reducing government spending and thereby raising domestic saving. The direct effect on expenditure demands will reduce imports. In addition, the downward pressure on interest rates will contribute to a depreciation of the exchange rate; only if the price elasticities in import demands are quite low will this depreciation worsen the trade balance by enough to offset the expenditure effect.

The effect of fiscal policy on the current account in the simple model has the property that

$$dK/dg \gtrless 0 \text{ as } 2\eta \gtrless 1 - 2(\alpha_1)^2 L_0/(\alpha_7 m_0).$$

This expression may be simplified by assuming unit income elasticities for import demand, as above, and for the demand for money. The result is that the elasticity requirement for fiscal contraction to strengthen the current account is $2\eta > 1 - 2m_y$. In contrast to the result for monetary policy, this expression is less than unity because the income and relative price effects are working in the same direction. For example, if imports are 10 percent of output, the sum of the import elasticities must exceed just 0.8 to get the expected fiscal effect in this model. Thus fiscal contraction may be expected to have a positive effect on the current account balance after a relatively brief J-curve adjustment.

3. Practical implications

The foregoing discussion suggests that, as a first approximation, macroeconomic relations among the largest industrial countries may be characterized by a model in which both monetary and fiscal policies affect exchange rates; monetary policy, however, has little or no effect on current account balances or on output in other countries, while fiscal policy has substantial effects. If exchange rates are fundamentally what countries care about, then the assignment of monetary policy to external balance makes sense. This type of assumption is essential in order to justify proposals such as that of McKinnon (1982, 1988), under which countries coordinate monetary policies so as to maintain exchange rates close to agreed parities. If, on the other hand, exchange rate stability is desired primarily in order to avoid destabilizing trade balances, then the picture looks rather different.

1/ For a study of the importance of fiscal policy as a determinant of shifts in current-account positions in large industrial countries, see Masson and Knight (1986). Fiscal policy is defined here in a very simple manner, as a change in the level of government spending for which the import content is identical to the average propensity (m_y). For a full discussion of the implications of the specification of fiscal policy, see Frenkel and Razin (1987).

Obviously, if monetary policies have no effect on current account balances, a scheme that assigns monetary policy to maintain current accounts at target levels will fail. What is not obvious is whether a scheme that first translates current account objectives into exchange rate targets and then assigns monetary policy to those targets will also fail. Such a scheme has been proposed recently by Williamson and Miller (1987) as a means of articulating the policy requirements for maintaining target zones for exchange rates.

Recall from Section III that Williamson and Miller, as well as Corden, argue that for a given output or employment path there exists a single mapping of current account balances into real exchange rates. Given this mapping, the choice between the two external objectives boils down to a question of which one can be most easily agreed and acted upon; as a practical matter, there is little doubt that the exchange rate is the preferred choice on these grounds. Furthermore, monetary policy adjustments, if mutually consistent between countries and not constrained by other considerations, could easily be used to maintain exchange rates within reasonably narrow bands. The effects on real exchange rates would be subject to greater errors than those on nominal rates, but the uncertainty and the practical difficulties of implementation would probably be much smaller than in the case of fiscal policies.

With monetary policy assigned to defend the target zones, the Williamson-Miller scheme would then assign fiscal policy to maintain internal balance within each country. Given internal balance, exchange rate stability would ensure current account stability. If, over time, the initial exchange rate targets turned out to have been wrong--in the sense of leading to an undesired pattern of current account balances--then they could simply be changed by mutual agreement.

The workings of the target zone proposal are illustrated in Figure 1. There are two targets: the current account balance (vertical axis) and nominal income (horizontal axis); and two instruments: monetary and fiscal policy. Two schedules are drawn, with slopes reflecting the empirical finding that monetary policy does not significantly affect the current account balance. With unchanged fiscal policy, the horizontal gg schedule is fixed, and monetary policy affects income by shifting the LL schedule. With unchanged monetary policy, the LL schedule is fixed, and fiscal policy alters both income and external balance by shifting the gg schedule. 1/

1/ The specification of the internal objective, though somewhat arbitrary, is not central to the issues being addressed. The justification for focusing on nominal income is that a nominal anchor is needed for macroeconomic stability, the government has greater control over nominal income growth than over the rate of inflation, and other potential nominal anchors such as monetary growth are subject to greater uncertainty in their effects on welfare. For expositions of the rationale for this type of policy

Suppose that the economy is initially at point A and that the authorities seek to strengthen the current account (from K_0 to $\bar{K}$). Under a target zone scheme, this objective would be translated into a desired depreciation of the exchange rate, and monetary policy would become more expansionary. The LL curve would shift to the right, and the new temporary equilibrium would be at point B. At this stage, nothing would happen to the current account, but nominal income would be higher. To restore internal balance, fiscal policy would then have to be tightened. This reaction would shift the gg schedule upward, and the economy would reach the desired point C. This process is dynamically stable; a problem would arise, however, if the adjustment process--during which time it would be apparent that the monetary expansion was succeeding only in depreciating the currency while failing to strengthen the current account--took long enough to sow confusion and throw the intended policy mix off course. That is, the information requirements for such a process may be quite strict.

A more complicated scenario would ensue if the initial imbalance were on the internal side. Figure 2 illustrates the case in which, starting from point A, the objective is to raise nominal income. With monetary policy minding the exchange rate, this objective would call for fiscal expansion, shifting the gg schedule downward to a temporary equilibrium at point B. Income would then be at its target level, but the current account would have weakened. Presumably at this point the exchange rate would be appreciated relative to its target zone, so monetary expansion would then be called for; this response would raise income further, and the new equilibrium would be at point C. Finally, fiscal policy would have to be reversed in order to restore internal balance at $\bar{Y}$.

The implications of these scenarios for the evaluation of the Williamson-Miller target zone scheme are as follows. In response to external imbalance, the scheme may break down because of the failure of the current account to respond to monetary policy, unless fiscal policy rescues the situation in time. In response to internal imbalance, fiscal policy will be destabilized, in the sense that any attempt to alter the level of income through fiscal policy will have to be reversed once monetary policy responds to the resulting external imbalance.

These inefficiencies are alleviated substantially if the assignment is reversed. Consider now the situation in which fiscal policy is assigned directly to the current account balance, monetary policy is aimed at

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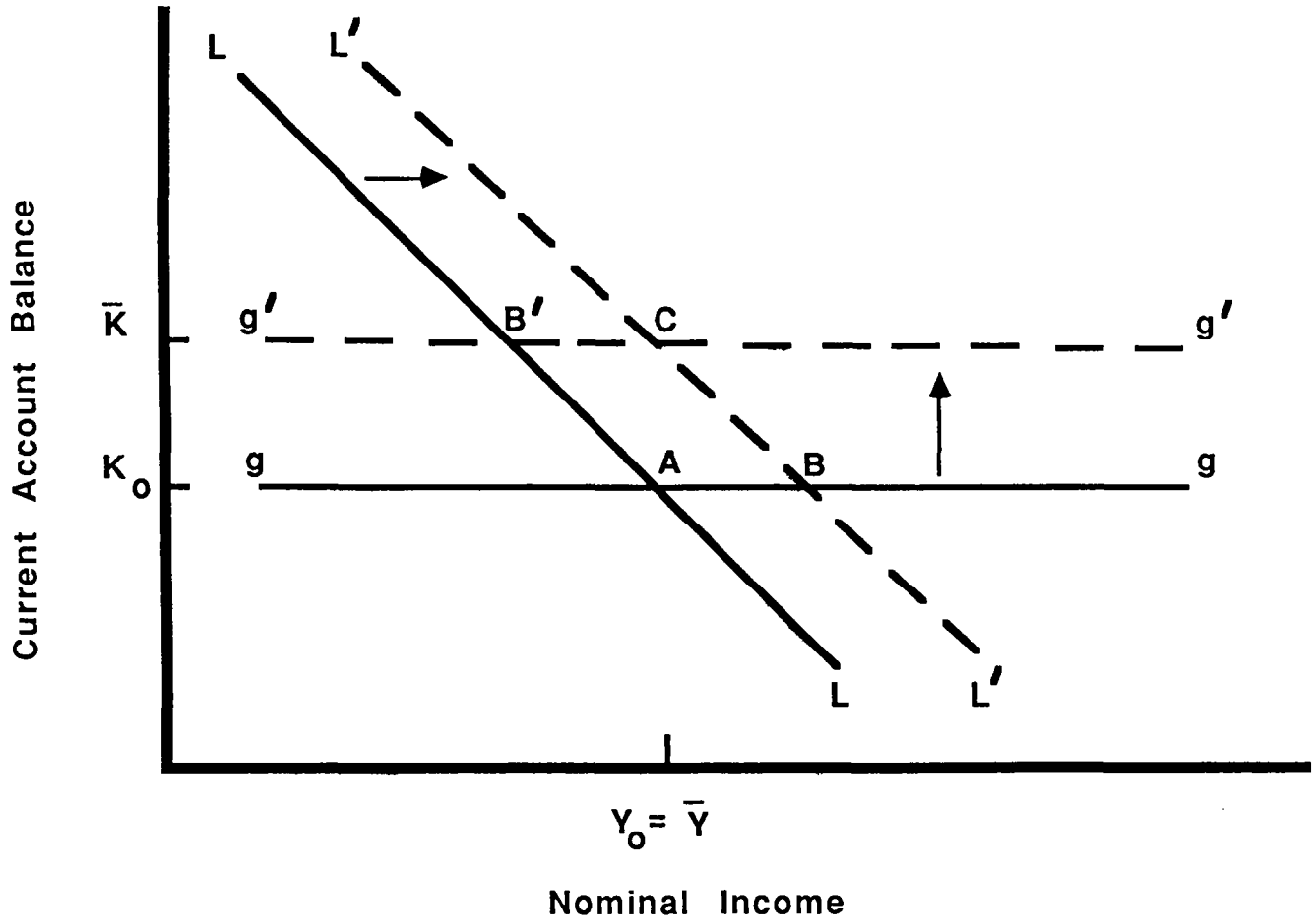
continued
strategy, see Vines and others (1983) and Currie and Levine (1985). In the absence of supply shocks, a nominal and a real target for internal balance would be equivalent, but the choice is material even in a simple two-country demand-oriented framework because policy disturbances in one country act as supply shocks on its trading partners and so cannot be ignored.

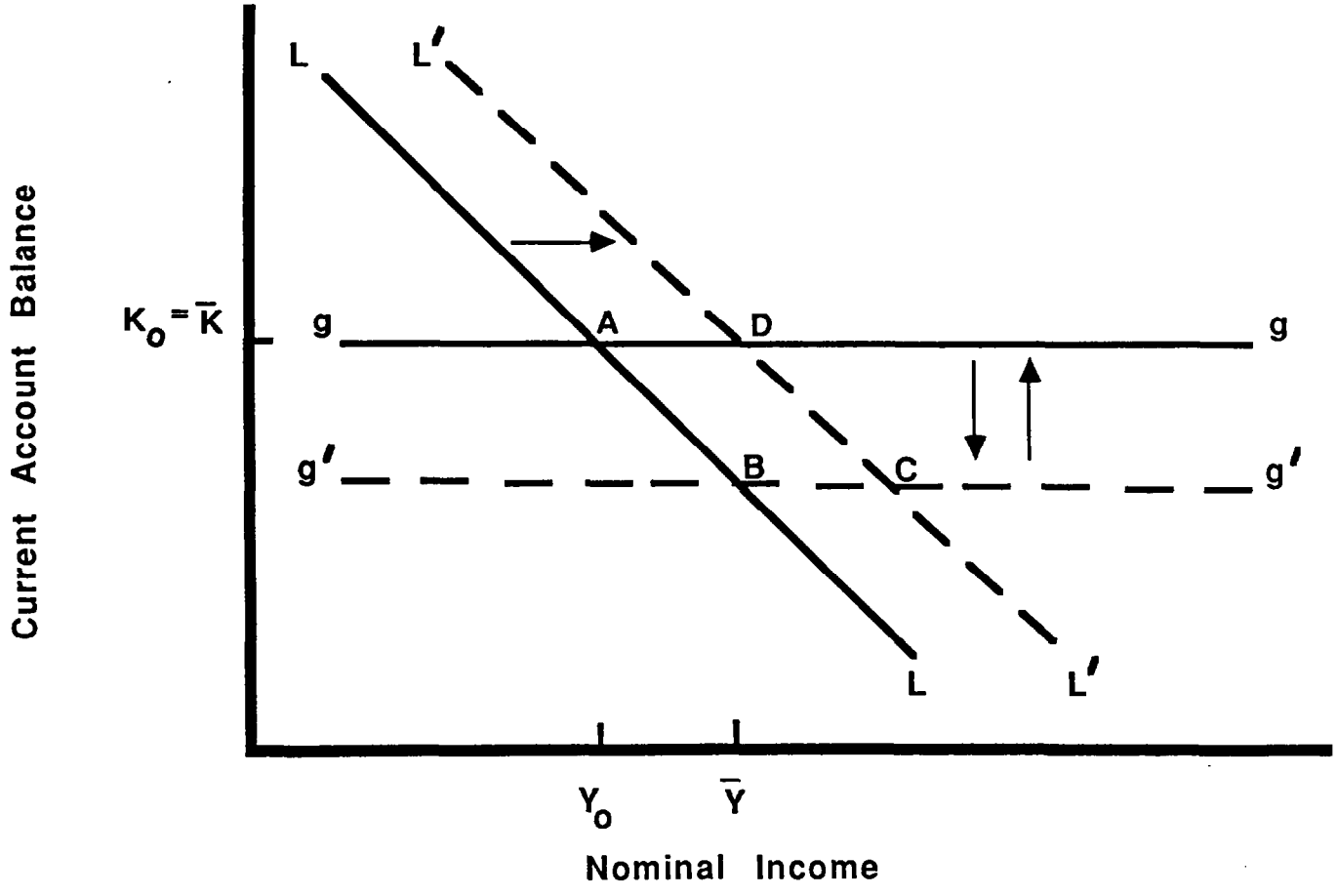
Figure 1. Adjustment to a Current Account Target



Notation:

gg = constant fiscal policy; fiscal expansion shifts gg downward
LL = constant monetary policy; monetary expansion shifts LL to the right

Figure 2. Adjustment to an Income Target



nominal income, and the exchange rate is left to find its own market level. If a country wanted to strengthen its current account, as in Figure 1, it would first contract fiscal policy (to point B'); monetary policy would then be eased to offset the undesired decline in income. The advantage over the target zone scheme would be that one would see more clearly the effects of the policy shifts on the targeted variables. If a country wanted to raise nominal income, as in Figure 2, it would simply ease monetary policy (to point D); fiscal policy would not have to change at all, in contrast to the temporary expansion that would be required under the target zone proposal. With policies more stable and more transparent, the likelihood of wide swings in exchange rates would be reduced.

IV. A Simplified Model of Policy Cooperation

The preceding analysis is too simplified to serve as a model of policy cooperation. To develop a more complete analysis, it is necessary both to allow for other policy objectives and to incorporate other features that might alter the relationships between instruments and targets. This section sketches some of these complications and then offers a model of international policy cooperation that is consistent with the more general framework.

Targets for macroeconomic policy in the large industrial countries may include, in addition to stability of nominal income growth and of external balance, the maintenance of a sustainable rate of economic growth and of an adequate transfer of resources to developing countries. 1/ In terms of the model developed above, these two additional targets both imply that a lower level of real interest rates may be desired than would obtain at the equilibrium determined by internal and external balance. For a given level of output, the growth target requires low real interest rates in order to stimulate home investment, while the resource-transfer target requires relatively low fiscal deficits (and therefore low real interest rates) to generate the desired trade surplus vis-a-vis the rest of the world. Thus the presence of these additional targets can be expressed very simply as an objective for the level of real interest rates. 2/ Because (in the absence of capital controls) each country cannot independently pursue its own agenda for real interest rates without throwing the other targets off the desired path, this type of target must be set cooperatively.

1/ A closely related approach would be to introduce a target for wealth, as in Meade and Vines (1987) and Blake et al. (1988). In terms of the semi-reduced form discussed below, the implications would be identical.

2/ This simplification ignores possible quantitative inconsistencies between the two added targets, which in any case could be resolved only through the use of additional instruments.

When the problem is posed in this way, one gets a different picture of the international cooperation problem compared with the game-theoretic models in the policy coordination literature. The problem is frequently stated as one of a shortage of instruments. In the simplest formulation (e.g., Hamada (1974)) there are two instruments (monetary policy in each country) and three targets (internal balance in each country, plus the common objective for external balance); coordination offers the possibility of moving closer to the global optimum. In an expanded model that includes fiscal policy (e.g., Oudiz and Sachs (1984)), there are four instruments but five targets (say, growth in each country plus the three listed above). Here, in contrast, there is a potential match involving four instruments and four targets: internal balance in each country plus the common objectives for external balance and for real interest rates. The task of policy cooperation is twofold: to reach agreement on the common objectives and on the emphasis to be given to each instrument in achieving them.

The second type of extension that should be made is to incorporate behavioral features of the economy that are thought to be important in a macroeconomic framework but that were ignored in the simple framework discussed earlier. The following are examples of possible extensions. First, flexibility of domestic prices in response to policy shifts may be introduced; this extension would break the simple dependence of the overall price level on the exchange rate. Second, one could allow the real exchange rate to affect the supply of real output directly through the gap between product and consumption real wages. Third, one could model the effect of changes in the inflation rate on real interest rates and on the real exchange rate. Fourth, the notion of fiscal policy could be expanded by allowing tax revenues to depend on the level of income. Fifth, the influence of existing stocks of debt, both internal and external, could be introduced. Sixth, there is the possibility that such debt instruments might or might not be considered to be net wealth by the private sector. Seventh, debt instruments denominated in different currencies might not be perfect substitutes, opening the possibility for sustained real interest differentials between countries. Eighth, anticipated policy shifts might have strong effects on behavior via expectations.

Although each of these extensions is important, there is no presumption as to their net effect for any of the issues that are relevant here. Notably, it was argued on the basis of the simple model in Table 2 that the external effects of monetary policy appear to be quite small; would the inclusion of these extensions in the analysis significantly alter that conclusion? Judging from the empirical findings of fairly comprehensive models (as discussed in Section III), the answer would appear to be negative. This question is taken up more specifically in the Appendix, where it is shown that both an extended version of the model and the simpler Mundell-Fleming version lead to essentially similar conclusions.

Either the simple model discussed earlier or the extended model of the Appendix may be reduced to a four-equation system in which the four target

variables are functions of the four instruments. Dropping the monetary policy terms that are expected to have very small values, this system has the following form:

(1) $Y = Y(g, g^*, L)$

(2) $Y^* = Y^*(g, g^*, L^*)$

(3) $K = K(g-g^*)$

(4) $r = r(g+g^*, L+L^*)$

The most striking conclusion to be drawn from this system is that the international coordination of monetary policy is neither necessary nor sufficient for attaining the targets; fiscal policy coordination, however, is necessary and--if monetary policy is aimed correctly at internal balance--sufficient as well. Suppose that fiscal policy were to be aimed instead at internal balance. Aggregate monetary policy (L + L*) could then be used to influence interest rates; it would still remain necessary, however, to coordinate that policy with the differences in fiscal stances in order to keep the current account in line.

These considerations lead to a model of medium-term policy cooperation that has these main elements:

a. aggregate fiscal policy could be aimed at limiting the growth of demands on available savings, so that the global level of real interest rates could be kept within acceptable bounds;

b. differences between national fiscal stances could be circumscribed as needed to maintain external balance;

c. each country could use monetary policy independently to maintain internal balance.

To illustrate how such a program might work, consider the effects of one country deciding to embark on an anti-inflationary policy; i.e., to try to reduce nominal income. 1/ With fiscal policy constrained by cooperative agreements, this decision would call for a tightening of monetary policy, which would have the undesired side effect of raising world interest rates. Aggregate fiscal policy would then have to be changed; in general, both

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1/ This example does not deal with the more complicated problem of a country attempting to achieve the structural result of reducing inflation with reducing the rate of growth of real income. That outcome would normally require the introduction of an additional policy instrument, although there may be circumstances where it could be achieved by a shift in the monetary-fiscal mix.

countries would have to move toward a more contractionary fiscal stance, and in the end the second country would also have to ease its monetary policy in order to maintain internal balance. Thus a shift in the domestic objectives of one country would constrain the policy mix to be adopted by the other country. Depending on circumstances, it might be necessary for discussions between the countries to focus on the initial setting of the objectives or on the subsequent adjustment of fiscal policies. In neither case would it be particularly helpful to bring monetary policies explicitly into the discussions.

What happens to the exchange rate in this world? In general, exchange rates would shift in response to any policy action, shift in expectations, or other disturbance. Nothing in the model as outlined would call on countries to adjust policies in direct response to such movements. The relevant empirical question concerns the extent to which the observed swings in, and volatility of, exchange rates have resulted from shifts in the mix of policies rather than from independent shifts in private portfolio preferences. This question, of course, is impossible to answer. Empirical analysis of exchange rate movements for key currencies explains, at best, no more than half of the broad swings observed in the 1980s on the basis of measured differences in macropolicies (see, for example, Boughton (1988)). Part of the remainder, however, may well be attributable to shifts in market perceptions about the stability or the sustainability of those policies. All that can be claimed is that cooperation to limit shifts in the mix of policies would contribute unambiguously to the stability of exchange rates. The extent of the reduction can be determined only through experience.

A major caveat is that fiscal policy cannot be used effectively as an instrument for short-term policy adjustments, either for domestic or international objectives. Tanzi (1988) discusses the empirical obstacles to effective fiscal coordination, and Polak (1988) reviews the difficulties that many countries have experienced in implementing fiscal policy flexibly, especially during the 1980s. Not only is it difficult for countries to agree upon and implement fiscal changes quickly; it also is important for budgetary decisions to be aimed at stable medium-term targets. Furthermore, agreements on the appropriate use of fiscal policy would be complicated by the multidimensionality of the budgetary process; as Frenkel and Razin (1987) have shown, the international effects of a given shift in the fiscal position may be affected substantially by the choice of which expenditure or which tax is to be changed.

These complications are not necessarily disadvantageous if the objectives of international cooperation are sufficiently limited. If coordination were directed primarily at stabilizing exchange rates, the stickiness of fiscal policies would be a fatal blow. The objective of constraining current account imbalances, in contrast, is a medium-term goal that is more consistent in its time dimension with the fiscal instrument. In other words, cooperation could be sought, not to attempt to fine tune

each country's budget for external purposes, but to circumscibe any budgetary shifts that might bring policies between countries into conflict.

V. Conclusions

This paper has argued in favor of an assignment strategy for macroeconomic policy in large industrial countries that would focus more on current account balances than on exchange rates, and would emphasize fiscal policy more than monetary policy in efforts to achieve external balance. The fundamental problem with the exchange rate as an external objective is that the conditions under which there would be a reliable relationship between exchange rates and external balance are unrealistically restrictive. The steady-state relationship between the level of the real exchange rate and the level of the current account balance depends very much on the mix of policies that is pursued in each country; only in circumstances in which each country is able to maintain internal balance might the real exchange rate serve as a reliable guide (aside from dynamic considerations) to the prospects for external balance.

The problem with monetary policy as the instrument to be assigned to external balance is that it may seriously aggravate the obscurity of the international transmission process. Empirical evidence strongly suggests that monetary policy has little effect on external balance, and this paper has discussed some simple models that illustrate a straightforward rationale for this phenomenon.

These limitations could be partially overcome to the extent that countries were to cooperate over the medium term (covering a period of, say, two to three years) on the basis of the linkages between fiscal policies and current account balances. More specifically, a feasible model of medium-term policy cooperation might be one with the following principal elements. First, countries could seek agreement on an appropriate range for real interest rates and on an aggregate fiscal stance that would be broadly consistent with that rate level. This initial step is intended to limit policy conflicts concerning interest rate levels; fiscal rather than monetary policy is required for this purpose for consistency with other policy objectives. Second, agreement could be sought on at least general objectives for current account balances and on the relative stances of fiscal policy that would be consistent with those balances. This second step would limit conflicts over what is acceptable in terms of external balance; monetary policy cannot, for the reasons discussed above, be used for this purpose. Third, each country could use monetary policy independently to pursue internal balance. By thus allowing exchange rates to float freely, while constraining current account imbalances through medium-term fiscal agreements, countries would be able simultaneously to maintain independence to pursue their own national interests while contributing indirectly to exchange rate stability.

An Expanded Model of Internal and External Balance

This Appendix sets out an extended version of the model discussed in the text. As with the simpler version, it describes two identical economies linked by trade and capital flows. It is extended here to allow for several features (described in section 1) that may be important determinants of the international transmission of policy effects. The model, listed in Table A1, is a static medium-term system; the dynamics are suppressed and all stock-flow interactions are exogenous.

1. Description of the model

The first two equations in Table A1 are the income identities for the two countries, which for simplicity are assumed to constitute a closed trading system. Equations (3) and (4) describe import demand equations for the two countries, with demand depending on the level of domestic demand as well as on relative prices. Equations (5) and (6) express the demand for goods and services in each country (absorption). These last expressions are rather more complex than in the simplified version of the model, having been derived from the following subsystem:

$$(20) \quad c = \alpha_3 y^p$$

$$(21) \quad y^p = y + rB_d/P_d - T^p/P_d$$

$$(22) \quad T^p = \alpha_7 T + (1 - \alpha_7)[P_d g + r(B_d + B_f)]$$

$$(23) \quad I = I_0 - \alpha_4(1 - \alpha_8)r$$

$$(24) \quad a \equiv c + I + g$$

Equation (20) states that real consumption expenditure (c) is proportional to real permanent disposable income (y^p). The latter is defined in equation (21) as real output, plus the real interest received on residents' holdings of government debt and foreign assets, minus the perceived real value of permanent tax liabilities (T^p). Nominal permanent tax liabilities are a weighted average of actual liabilities and the level of total government outlays, as described in equation (22). Under full debt neutrality ($\alpha_7 = 0$), the method of financing expenditures will not matter and people will treat outlays, rather than current taxes, as the relevant variable that must be deducted from income to derive

Table A1. Expanded Two-Country Model

Equations

(1) $y = a + x - m$

(2) $y^* = a^* - x + m$

(3) $m = \alpha_1 a - \alpha_2 R$

(4) $x = \alpha_1 a^* + \alpha_2 R$

(5) $a = \alpha_3[y + r^*B_f^* - \alpha_7(T - rB_d)/P_d - (1-\alpha_7)(g + rB_f/P_d)]$

$- \alpha_4(1-\alpha_8)r + I_0 + g$

(6) $a^* = \alpha_3[y^* + rB_f - \alpha_7(T^* - r^*B_d^*)/P_d^* - (1-\alpha_7)(g^* + r^*B_f^*/P_d^*)]$

$- \alpha_4(1-\alpha_8)r + I_0^* + g^*$

(7) $L/P = \alpha_5 a - \alpha_6 r$

(8) $L^*/P^* = \alpha_5 a^* - \alpha_6 r^*$

(9) $P = (1 - \alpha_1)P_d + \alpha_1 P_d^* E$

(10) $P^* = (1 - \alpha_1)P_d^* + \alpha_1 P_d/E$

(11) $K = P_d x - P_d^* E \cdot m + r^*B_f^* - rB_f$

(12) $Y \equiv P \cdot y$

(13) $Y^* \equiv P^* y^*$

Table A1 (continued)

$$(14)\quad R = E \cdot P^*_d / P_d$$

$$(15)\quad \Delta R = \alpha_{11}(r^* - r)$$

$$(16)\quad T = \alpha_8[P_d y + rB_d + r^* B^*_f]$$

$$(17)\quad T^* = \alpha_8[P^*_d y^* + r^* B^*_d + rB_f]$$

$$(18)\quad y = y_0 R^{\alpha_9} P_d^{\alpha_{10}}$$

$$(19)\quad y^* = y_0 R^{-\alpha_9} P^{*\alpha_{10}}_d$$

Notation and initial values 1/

a	1	real absorption (domestic demand)
B^d	0.48	stock of government bonds held by domestic residents
b^f	0.06	stock of government bonds held by nonresidents
E	1	nominal exchange rate (increase = depreciation)
g	0.23	real level of government expenditure
K	0	current account balance
L	0.76	stock of money
m	0.12	volume of imports by the home country
P	1	overall price level
P_d	1	price level for domestically produced goods
R	1	real exchange rate (increase = depreciation)
r	0.043	interest rate

1/ Stock and flow variables are expressed as percent of initial output.

Table A1 (continued)

T	0.20	nominal tax revenue
x	0.12	volume of exports by the home country
y	1	real output
*	value for the second country	
α	fixed coefficient	

Coefficients 1/

α_1	0.12	marginal propensity to import
α_2	0.12	relative price coefficient on import demand
α_3	0.77	marginal propensity to consume
α_4	0.50	interest rate coefficient in absorption demand
α_5	0.79	scale coefficient in money demand
α_6	0.76	interest rate coefficient in money demand
α_7	0.667	debt neutrality coefficient ($0 \leq \alpha_1 \leq 1$; 0 = full neutrality)
α_8	0.20	marginal tax rate
α_9	0.10	competitiveness effect on supply of output
α_{10}	1	information-cost or money-illusion effect on supply of output
α_{11}	10	effect of interest-rate differential on the real exchange rate

1/ Derived on the basis of the assumptions described in the accompanying text, and normalized on a value of unity for real output.

permanent disposable income. 1/ At the other extreme, where $\alpha_7 = 1$, then equations (20) to (22) constitute a standard Keynesian consumption model, except for the explicit addition of interest income to output. 2/

This subsystem is completed by equation (23), which links investment (I) to the cost of capital via the after-tax real interest rate, and equation (24), which defines absorption as the sum of its components. The solution to equations (20) through (24) is given by equation (5) of the model. Equation (6) is derived similarly for the second country.

The demand for money is described by equations (7) and (8), where three features are of note. First, the relevant deflator is the aggregate price level rather than the deflator for domestic output, on the hypothesis that the demand for money is a demand for purchasing power. Second, on the same grounds, the relevant scale variable is absorption rather than GNP. Third, the model contains only one interest rate in each country, ignoring shifts both in the term structure and in inflationary expectations.

Equations (9) and (10) describe aggregate price levels in each country as weighted averages of domestic and import price indexes. The weights on import prices are simply the portions of demand accounted for by imports. Next, the current account of the balance of payments is defined by equation (11), and equations (12) and (13) define nominal income. Equation (14) defines the real exchange rate as the relative price of domestic output cobverted by the nominal exchange rate.

Changes in the real exchange rate are generated by interest rate differentials, as shown in equation (15). In keeping with the static character of the model, the expected future change in the nominal exchange rate--which would otherwise enter equation (15) as a determinant of expected differences in yields--is assumed to be zero.

The next two equations (16 and 17) relate tax revenues to a base that includes interest income. In each country, interest income is assumed to be taxed where it is received, regardless of its source.

1/ These calculations implicitly assume that both outlays and revenues are perceived as following a random walk. It is also assumed that corporate profits are fully passed through to the personal sector through dividends, so that national and personal income are equivalent.

2/ This practice amounts to defining output as GNP net of net interest receipts from the rest of the world. Although the choice of definition has little quantitative importance for the issues discussed here, it is conceptually helpful to analyze the role of interest rates and debt stocks separately from that of the output of goods and other services.

Finally, the supply of output is captured by equations (18) and (19). Departures from the trend or potential level are generated by changes in the real exchange rate or in the domestic price level. Specifically, an appreciation of the real exchange rate will raise the supply of output by raising the real wage that is relevant to workers (W/P) relative to that which is relevant to firms (W/P_d). In addition, a rise in domestic prices will raise output to the extent that information costs are important in factor markets. 1/

2. Parameters and data

A number of assumptions have been made in order to parameterize the model for illustrative purposes. First, income elasticities for import demands, private absorption, and money demand, and price elasticities for imports, have all been set to unity. Second, the semi-elasticities of demand for money and for investment with respect to the interest rate have both been set at unity. For money demand, this choice approximates the steady-state elasticities estimated for major industrial countries in papers such as Boughton (1981) and Atkinson and others (1984). For the investment function, the choice is purely arbitrary; however, the properties of the model are more sensitive to the ratio of these two elasticities than to their levels, and the assumption of equality has the advantage of neutrality. 2/

For the extended version of the model, the following additional assumptions have been made. First, the marginal tax rate has been set at 0.2, which is close to the average tax rate in the United States. Second, the "debt neutrality" parameter (α_7) has been set at 2/3, which is approximately the value estimated in Carmichael (1983). Third, α_{11} has been set equal to the effect of the interest differential on the effective rate of the U.S. dollar estimated in Boughton (1984), allowing for a two-year response. Fourth, the semi-elasticities of the supply of output with respect to the real exchange rate and the domestic price level have been set arbitrarily at 0.1 and 1, respectively.

The initial conditions for the model approximate those for the United States in the first half of the 1980s, except that it has been assumed for simplicity that each country is in initial trade balance. The values of parameters and of relevant data are listed in the table.

1/ For an exposition of the first point, see Argy and Salop (1979); on the latter, which generalizes the standard "money illusion" arguments, see Boughton and Fackler (1981).

2/ Heuristically, this assumption may be described loosely as giving the IS and LM curves slopes that are equal in absolute value.

3. Properties of the model

In contrast to the simple model described in the paper, the solution of the full model is too complex to lead to clear analytical implications. Note, however, that this model reduces to the text model by making several simplifying assumptions. First, assume that initial debt stocks are all zero. Second, fix the level of domestic prices in each country, while retaining flexibility of output and overall prices ($\alpha_9 = 0$ and $\alpha_{10} = \infty$). Third, assume perfect capital mobility so that interest rates must be equal in each country ($\alpha_{11} = \infty$). Fourth, assume no discounting of future tax liabilities associated with current interest receipts ($\alpha_7 = 1$). Fifth, assume all taxes are lump sum ($\alpha_8 = 0$).

With two more simplifying assumptions, the model can be equivalent to the flexible-rate, two-country version of the Mundell-Fleming model (Mundell, 1964). First, let import and money demands depend on output rather than on demand. Second, let money demand be deflated by domestic rather than overall prices. With these modifications, and the other parameters described above, the model has the properties shown in Table A2. In particular, fiscal policy is transmitted positively and monetary policy negatively, a property which holds unambiguously in this simple model. Fiscal expansion weakens the current account, as does monetary expansion, although in the latter case the effect is negligible.

Similar properties hold in the slightly extended model used in the text (Table A3). The only qualitative difference in the two sets of results is that in Table A3 the current account strengthens slightly in response to monetary expansion. In both versions, the sign is ambiguous; a lower price elasticity of demand for imports would result in a weakening of the current account.

The properties of the full model are illustrated in Table A4. Again, most results are qualitatively unchanged, with two exceptions. First, both monetary and fiscal expansion now generally produce substantial price increases, because domestic as well as import prices are now allowed to respond. Second, monetary expansion now produces a more substantial weakening of the current account balance. More generally, the implication is that the elasticity requirements for monetary expansion to lead to a strengthening of the current account are more strict than in the simpler models.

Table A2. Simulated Effects of Exogenous Shocks in a Two-Country Model: Mundell-Fleming Version

(In percent, except as noted)

	Disturbance	
	Government spending 1/	Money stock 2/
Output		
home	3.4	5.4
abroad	3.4	-1.0
Domestic demand		
home	5.9	4.6
abroad	0.9	-0.2
Export volume	-0.8	0.6
Import volume	1.7	-0.1
Current account balance 3/	-1.3	-0.0
Interest rate 4/		
home	3.5	-1.0
abroad	3.5	-1.0
Aggregate price level		
home	-1.3	0.7
abroad	1.3	-0.7
Exchange rate 5/		
nominal	-10.3	6.1
real	-10.3	6.1

1/ Effects of a rise equal to 5 percent of initial GNP
2/ Effects of a rise equal to 5 percent of the initial stock
3/ Change in percent of the initial value of exports
4/ Change in percentage points
5/ An increase indicates a depreciation

Table A3. Simulated Effects of Exogenous Shocks in a Two-Country Model: Version Used in Text

(In percent, except as noted)

	Disturbance	
	Government spending 1/	Money stock 2/
Output		
home	1.7	5.4
abroad	5.0	-1.0
Domestic demand		
home	4.6	4.7
abroad	2.1	-0.3
Export volume	-1.0	0.6
Import volume	1.8	-0.1
Current account balance 3/	-1.6	0.1
Interest rate 4/		
home	3.5	-1.0
abroad	3.5	-1.0
Aggregate price level		
home	-1.3	0.7
abroad	1.3	-0.7
Exchange rate 5/		
nominal	-10.6	5.5
real	-10.6	5.5

1/ Effects of a rise equal to 5 percent of initial GNP
2/ Effects of a rise equal to 5 percent of the initial stock
3/ Change in percent of the initial value of exports
4/ Change in percentage points
5/ An increase indicates a depreciation

Table A4. Simulated Effects of Exogenous Shocks in a Two-Country Model: Expanded Version

(In percent, except as noted)

	Disturbance	
	Government spending 1/	Money stock 2/
Output		
home	3.3	2.6
abroad	4.7	-0.7
Domestic demand		
home	5.1	2.4
abroad	2.9	-0.4
Export volume	-0.4	0.2
Import volume	1.4	-0.0
Current account balance 3/	-1.0	-0.4
Interest rate 4/		
home	8.5	-1.5
abroad	7.9	-1.2
Aggregate price level		
home	3.2	2.7
abroad	4.8	-0.7
Exchange rate 5/		
nominal	-6.2	5.3
real	-6.1	2.4

1/ Effects of a rise equal to 5 percent of initial GNP
2/ Effects of a rise equal to 5 percent of the initial stock
3/ Change in percent of the initial value of exports
4/ Change in percentage points
5/ An increase indicates a depreciation

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