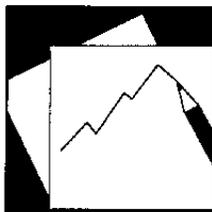


# Working Paper

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INTERNATIONAL MONETARY FUND



# IMF Working Paper

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## Different Strokes? Common and Uncommon Responses to Financial Crises

*James M. Boughton*

**IMF Working Paper**

Secretary's Department

**Different Strokes? Common and Uncommon Responses to Financial Crises**

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**Abstract**

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

Much of the debate about the management of financial crises has focused on structural and psychological issues regarding the conditions that are supposed to be necessary to restore investor confidence. Nonetheless, the paramount requirement in the short term is for countries in crisis to adopt correct macroeconomic policies. An analysis of conventional macroeconomic models reveals that countries can afford to run expansionary policies to restore internal balance only if they can afford to ignore the requirements for external balance. This arithmetic does not depend on whether macroeconomic policies were inappropriate before the crisis hit.

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## I. INTRODUCTION

The recent blossoming of literature on international financial crises has demonstrated the variegation of causes leading countries to economic disaster. Once thought to be almost universally originating from fiscal and other macroeconomic policy errors, financial crises are now generally understood to emanate just as easily from external shocks or from internal structural imbalances. Less attention has been paid to the implications of this discovery for post-crisis economic and financial management. It has become fashionable to criticize the IMF for applying univariate solutions to multivariate problems, for being “an overbearing organisation with a well-thumbed book of macroeconomic-policy nostrums,”<sup>2</sup> but that line of attack leads only to other questions. For example, if a country is initially in fiscal balance, does it follow that fiscal contraction is an inappropriate response to an external shock? More generally, does the uniqueness of each crisis and each country’s circumstances imply that a unique response is required?

Martin Feldstein (1998, p. 29) has made an eloquent case for tailored responses, with particular reference to the 1997 Korean crisis. The IMF, he suggests, responded with its

“traditional ... prescription of budget deficit reduction ... and a tighter monetary policy..., which together depress growth and raise unemployment. But why should Korea be required to raise taxes and cut spending to lower its 1998 budget deficit when its national savings rate is already one of the highest in the world, when its 1998 budget deficit will rise temporarily because of the policy-induced recession, and when the combination of higher private savings and reduced business investment are already freeing up the resources needed to raise exports and shrink the current account deficit?”

Instead, in his view, “the primary need was to persuade foreign creditors to continue to lend by rolling over existing loans as they came due. ... The key ... was to persuade lenders that Korea’s lack of adequate foreign exchange reserves was a temporary shortage, not permanent insolvency” (p. 31).

Max Corden (1998) made a similar argument against the Fund’s handling of the Asian crisis, though with a different interpretation of the requirements for reinstilling confidence. In his view, the choice was between fiscal expansion to offset the initial investment decline or tightening to restore confidence (pp. 5-6). “The first instinct of the IMF was for fiscal tightening. It ignored the good fiscal policies of the Asian governments. Obviously this was inappropriate and was proven to be so, given the deep slump that developed” (p. 18). Corden acknowledged the “limits to fiscal expansion, set by the funds available to the IMF” (p. 18),

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<sup>2</sup> “Sick Patients, Warring Doctors,” *The Economist* (September 18-24, 1999), p. 81. The opposite criticism also surfaces with some frequency. For example, Minton-Beddoes (1995) accused the Fund of “ad hoc improvisations” in violation of its own rules and mandate, as a consequence of a “quest for relevance” (pp. 128-29).

but he concluded that the strategy should have been to run as expansionary a policy as possible.

Steven Radelet and Jeffrey Sachs (1998) saw a different picture in the Asian crisis but also concluded that the response failed to take account of prevailing conditions. "The IMF's primary strategy for the three countries hardest hit—Indonesia, Korea, and Thailand—was to overhaul their financial systems" (p. 1). "[This] focus on 'fixing' Asia, without proper regard to the root problems of international financial market instability, imposed excessive costs on the East Asian economies" (p. 4). Their preferred strategy called for "orderly workout arrangements" in which the "debtor country would fall under IMF protection, which would facilitate negotiations between the debtor and private-sector creditors to restructure the repayment program" (pp. 73-74).

The view that each episode of financial difficulty is unique and requires a unique set of responses—and that the IMF fails to recognize it—long predates the Asian crisis. Willem Buiter wrote in 1983 of the "trivialization of the public debate about budgetary and financial policy" that occurs when the IMF claims that "public sector deficits ... are bad always and everywhere, regardless of circumstances, and discretionary spending cuts and/or tax increases should be implemented to reduce these deficits always and everywhere regardless of circumstances" (reprinted in Buiter, 1990, pp. 25-26). Tony Killick (1995, p. 13) described the prevailing view in developing countries as "that the IMF is too much of a monetary organisation, dogmatically applying a monetarist approach to balance-of-payments policy in standardised ways which pay insufficient heed to individual country circumstances, and that it is inflexible in its dealings with debtor governments."

Evaluating the recent criticisms of the Fund's crisis management strategy is not straightforward, because the arguments are grounded as much in psychology as in economics. Feldstein's and Corden's economic premise appears to be that a country's optimum fiscal policy is unaffected by an exogenous capital outflow. (A weaker version would be that initial fiscal strength permits room to ease in response to an outflow.) Feldstein's psychological premise, quoted above, is that a combination of stable macroeconomic policies and reassurances from the IMF and others could have stopped the crisis by enhancing confidence and credibility and thereby inducing creditors to maintain exposure in Korea. Corden, in contrast, suggests that confidence comes from a commitment to tighten policies. Radelet and Sachs's economic premise is that institutional weaknesses in both domestic and international financial markets interacted to bring on the Asian crisis. Their psychological premise is that macrostability and persuasion will not suffice to stabilize financial flows; institutional and regulatory reform are required. Since the outcome depends on expectations that are extrinsic to the model, analysts are confronted with the possibility of multiple equilibria.<sup>3</sup>

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<sup>3</sup> A growing segment of the finance literature endogenizes expectations consistently with the predictions of the model so as to generate multiple equilibria intrinsically. For a survey, see Masson (1999). The basic point for the problem at hand is that expectations need not be irrational to generate multiple equilibria.

The central role of investor psychology in financial crises is illustrated by the infamous case of the closing of 16 Indonesian banks in 1997 (see Enoch, 2000). Faced with an incipient collapse of the banking system because of declining confidence in the banks' soundness, the government accepted the Fund's advice to close the weakest banks but resisted closing all of those identified as insolvent. The argument that the banks remaining open were sound enough to survive was partly financial and partly political, but it also reflected a psychological judgment that depositors would recognize and accept the systemic improvement and would leave their money in the open banks. The strategy failed disastrously, not because the financial analysis was wrong but because it misjudged the requirements for reinstating confidence. Instead of aborting the panic, it catalyzed it, as depositors feared that the 16 closings heralded a more general shutdown.

A second example may be drawn from the Mexican debt crisis of August 1982 (see Boughton, 2000, 2001). Mexico's fiscal policy was unsustainably expansionary, but the newly elected government was promising to correct the situation when it took office in December. IMF staff urged the authorities to act earlier and more decisively, but as long as the major international bank creditors were prepared to maintain their exposure, there appeared to be no reason to panic. Why did the banks approve a large syndicated loan to Mexico at the end of July and then refuse to roll over other jumbo loans two weeks later? That catastrophic loss of confidence was not triggered by a spate of bad news in the first half of August, but by a reassessment of the bad news that had been accumulating for several years. Should the IMF have responded more forcefully and more publicly? To answer that question requires a complex judgment about market psychology and expectations.

As this brief summary indicates, much of the debate about crisis management focuses on structural and psychological issues that are not addressed by macroeconomic models. Nonetheless, countries hit by economic or financial crises must adjust macroeconomic policies. What do conventional models suggest? Do they give wrong answers because they omit important economic relationships?

This paper will abstract both from second-guessing the "animal spirits" of investors and from analyzing the structural details of Fund-supported adjustment programs in order to look more closely at the underlying macroeconomics.<sup>4</sup> Specifically, a key proposition in much of the analysis of the Fund's response to the Asian crisis is that if fiscal policy was acceptable before the crisis, the traditional prescription of budget tightening is inappropriate and will only injure the economy. The difficulty with that argument is that macroeconomic theory does not generate an optimum fiscal policy. All that theory tells us is that governments must limit the growth of debt so as to satisfy the intertemporal budget constraint.

As long as current and future deficits are small enough to rule out a long-run Ponzi game, a wide range of fiscal policies might be implied by prevailing economic conditions. In

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<sup>4</sup> For overviews on the actual practice of financial programming at the Fund, see Fischer (1997), and Mussa and Savastano (1999). For detailed inside analyses of the Fund's handling of the Asian crisis, see Lane and others (1999), and Boorman and others (1999).

practice, depending on circumstances, advocates of fiscal soundness have appealed for governments to adopt policy goals such as (a) balancing the budget over the business cycle, (b) placing a ceiling on the ratio of debt to output, or even (c) eliminating debt or a subset of it, at least in net terms. No generally accepted macroeconomic model supports any such objective as an optimizing strategy except under restrictive assumptions. Instead, welfare maximization places fiscal policy within a broader structure such as stabilizing output growth at a sustainable (noninflationary) rate or, more generally, optimizing a social welfare function. In any such model, shifts in exogenous conditions that affect national saving or investment rates might well require a shift in the level and timing of fiscal actions.<sup>5</sup>

One way to isolate the role of macroeconomics in the debate is to examine the macro models that are in use at the Fund to see if they rule out certain plausible outcomes or omit key relationships that would generate those outcomes. The central section of this paper summarizes the properties of three theoretical macro models that have been developed by IMF staff to analyze the linkages between aggregate demand and external payments positions. That review is followed by some general conclusions about the use of macroeconomic policies in response to financial crises.

## II. THEORETICAL MACRO MODELS AT THE IMF

Of the numerous models developed at the IMF for policy analysis, three are particularly apt for illustrating the nature of the recommended policy responses to internal or external shocks: Jacques Polak's classic model of the monetary approach to the balance of payments, the "merged" model developed by Mohsin Kahn and others to endogenize economic growth, and the Mundell-Fleming model, which was modified recently by Timothy Lane and others to study the effects of capital flows in the context of the Asian crisis. A common feature of these three models, at least in their simplest form, is that they treat capital flows as exogenous and thus can be used to analyze small open economies that depend on externally rationed credit for financing the balance of payments. Although the IMF may provide credits to offset part of a capital outflow, and the Fund's involvement may induce other capital to flow back in, countries in financial crisis typically still face a lower net inflow than they did *ex ante*.<sup>6</sup>

These models have not been used directly to generate performance criteria for Fund-supported adjustment programs. Rather, they have been used to generate key insights on how such programs are or should be designed: on the linkages between domestic credit creation and the balance of payments, between output growth and the current account, between capital flows and the growth / payments nexus, and so forth. The extent to which more modern

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<sup>5</sup> For an exposition, see Blanchard and Fischer (1989), esp. pp. 126-35 and 583-91.

<sup>6</sup> This analysis does not examine the rationality of assuming that capital markets allocate credit to countries exogenously rather than on the basis of a market-clearing response to conditions in the country. For an analysis of the role of international capital markets in generating and spreading financial crises, see Calvo (1998, 1999).

macroeconomic concepts—notably intertemporal dynamics, time consistency, expectations theory, and the role of credibility—have been incorporated in empirical program design is difficult to determine.<sup>7</sup>

### A. The Polak Model

The basis for financial programming and consequently for policy conditionality at the Fund is the “Polak model,” which was first developed in the 1950s to link domestic credit creation to national income and international reserves. In its simplest guise, as expounded in Polak (1998), the model may be written as follows (with some modifications from Polak’s notation).

$$(1.1) \quad \Delta L = k\Delta Y$$

$$(1.2) \quad M = mY$$

$$(1.3) \quad \Delta R = X - M + K$$

$$(1.4) \quad \Delta L = \Delta R + \Delta D$$

where all variables are expressed as nominal values:

L = stock of money

Y = GNP

R = international reserves

M = imports

X = exports

K = capital inflow to nonbank sector

and D = domestic credit of the banking system.

It is useful to think of this as a “fiscal” version of the model. For a country with primitive financial markets and given values of X and K, an increase in the fiscal deficit will be financed primarily by domestic credit expansion, D. Alternatively, equation (4) may be replaced by a slightly less aggregated financial sector:

$$(1.4') \quad \Delta L = q\Delta H$$

$$(1.5) \quad \Delta H = \Delta R + \Delta D_c$$

where H = the monetary base, or “high-powered money,” and  $D_c$  = domestic credit of the central bank. This “monetary” version is a little more transparent, since  $D_c$  is a directly observed policy instrument.

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<sup>7</sup> Two key elements that are not explicit in the class of models reviewed here are the effects of forward-looking expectations and of the policymaker’s credibility on the timing of policy responses; see Burnside, Eichenbaum, and Robelo (1999) and Clarida, Gali, and Gertler (1999). Those factors are at least implicit in many Fund-supported adjustment programs, even if they are not introduced through a formal model; see the exchange between Sebastian Edwards and Morris Goldstein in Edwards (1989).

Obviously, a great deal of structure—fiscal policy, inflation, exchange rate adjustment, productivity shocks—must be added to this model before it can yield useful policy prescriptions. To that end, Fund staff have developed or adapted many country-specific models that build on the simplified framework and incorporate the policy instruments and other variables that are needed to explain each country's particular circumstances.  $D_c$  in this general model can be thought of as a metaphor for the full range of macroeconomic policy actions. Expansionary policy is represented by an increase in  $D_c$ , and policy "adjustment" is represented by a decrease. Similarly,  $R$  is a metaphor for external stability, which in a more complete model would be represented by a combination of reserve and exchange rate adjustment.

The policy implications of an exogenous shift in capital flows may be illustrated by solving the model for internal and external balance:

$$Y = \frac{1}{qm+k} [kY_{.1} + q(X + K + \Delta D_c)]$$
$$\Delta R = -\frac{qm}{qm+k} \Delta D_c - \frac{mk}{qm+k} Y_{.1} + \frac{k}{qm+k} (X + K)$$

Because of the simplicity of the model, not only do all fiscal and monetary policies have similar effects; so do all external shocks. A shift in capital flows is perfectly substitutable for an export shock, regardless of whether  $X$  responds to a shift in foreign demand or to a supply shock in the export commodity or industry. In any event, the preferred policy response to such a shock depends critically on whether the goal is to restore internal or external balance. To stabilize domestic output in the face of an exogenous loss of capital inflows ( $\Delta K < 0$ ),  $D_c$  must be increased commensurately. Conversely, to prevent the capital outflow from depleting net international reserves or forcing depreciation,  $D_c$  must be cut.

Much of the criticism and defense of the Fund involves a dialogue of the deaf. Critics such as Buitter, Corden, and Feldstein accuse the Fund of urging countries to tighten policies in circumstances when expansion would be needed to stabilize and restore output. The Fund defends its advice on the grounds that an initial contraction is needed to stabilize and restore reserves or, more generally, to stabilize the exchange rate. This debate, however, has nothing to do with the structure of the underlying macroeconomic model.

To reconcile these two positions requires (a) a recognition by the critics that external stability and international reserves are important—regardless of the exchange regime—and that reserves cannot be replenished purely through official financing without creating moral hazard problems<sup>8</sup> and (b) a recognition by the Fund's defenders that output is important, not

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<sup>8</sup> Replacement of private with official capital bails out private investors, shifts the burden of risks, and poses new threats to other countries (potentially including those in remote parts of the world). Even if official capital could be mobilized in unlimited amounts for this purpose, (continued...)

only for the obvious reasons but also because a sharp drop in output can bring a loss of confidence that will aggravate the initial adverse shock. If an objective function that weighted output and reserve losses were added to the model, the sign on the reaction of  $D_c$  to  $K$  would become ambiguous.<sup>9</sup> For countries with very low initial levels of reserves, a perceived need for exchange rate stability to prevent disruption of production and trade, and poor access to new sources of external financing, the necessity of a cut in  $D_c$  remains clear. In other cases, viable policy options involve more flexibility.

### B. The Merged Model

The basic Polak model alone does not provide guidance on the effects of adjustment programs on output. The potential rate of output growth is left unexplained, as is the division of nominal income growth into its real and inflationary components. In a series of papers written in the late 1980s, Mohsin Khan, Peter Montiel, and Nadeem Ul Haque attempted to endogenize real growth by merging the Polak model with the class of growth models used at the World Bank.<sup>10</sup> The following is a slightly simplified version of the model presented in Khan and others (1990). The full model includes the exchange rate, government consumption, and lump-sum taxes as policy instruments, in addition to domestic credit. It thus adds some of the structure that is needed for practical financial programming. In this modification, the exchange rate and government consumption are fixed, taxes are proportional to nominal income, all lagged and fixed exogenous variables are set equal to unity, and second-order terms are ignored.

$$(2.1) \quad \Delta L = k\Delta Y$$

$$(2.2) \quad \Delta M = m\Delta y + b\Delta P$$

$$(2.3) \quad \Delta R = X - M + K$$

$$(2.4) \quad \Delta L = \Delta R + \Delta D$$

$$(2.5) \quad \Delta Y = \Delta y + \Delta P$$

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the quality of the new equilibrium would be fundamentally different from the old. The solution to an exogenous capital outflow therefore must involve recreating the conditions—economic, political, and psychological—that induced capital into (or to stay in) the country before the crisis.

<sup>9</sup> Normally, output and reserves would both be lower in the new short-term equilibrium. The question is not whether the *economy* would have to adjust, but whether a contractionary policy action would be necessary to reach that point or whether policy could be eased somewhat to soften the blow from the capital outflow.

$$(2.6) \quad Y - T - C - I = \Delta L - K_p - \Delta D_p$$

$$(2.7) \quad G - T = K_g + \Delta D_g$$

$$(2.8) \quad \Delta X = -c\Delta P$$

$$(2.9) \quad \Delta y = \frac{I}{\rho(1 + \Delta P)}$$

$$(2.10) \quad C = (1 - s)(Y - T)$$

$$(2.11) \quad T = tY$$

$$(2.12) \quad K = K_p + K_g$$

$$(2.13) \quad D = D_p + D_g$$

The new notation is mostly standard macroeconomic usage.  $D$  is debt to banks, and the subscripts  $p$  and  $g$  refer to the debt of the private and public sectors, respectively.  $K_p$  and  $K_g$  are capital flows to these two sectors. The coefficients  $b$  and  $c$  are responses of imports and exports to relative prices, and  $\rho$  is the incremental capital-output ratio (ICOR).

Although this model is much more detailed than the basic Polak model, the principal difference comes from the addition of equation (2.5), which allows the domestic price level to absorb some of the shock that would otherwise fall on output, and equation (2.9), which allows investment to raise output via the capital stock. If the dynamics in this model were explicit, a sustained tightening of monetary policy would have less severe short-run effects but more severe long-term effects than in the basic model.

The merged model can readily be solved for three equations representing roughly the real, monetary, and external sectors. Following Khan et al., these equations are labeled BB (for the real, or “[World] Bank,” side), MM, and BP.

$$(BB) \quad \rho\Delta y = K + \Delta D$$

$$(MM) \quad k(\Delta y + \Delta P) = \Delta D + \Delta R$$

$$(BP) \quad \Delta R + m\Delta y + b'\Delta P = K$$

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<sup>10</sup> For a similar but less detailed extension of the Polak model, see Chand (1989).

where  $b' \equiv b + c$ .<sup>11</sup> As with the Polak model, this system may be solved for the requisite demand-management policy ( $\Delta D$ ) in response to an exogenous capital outflow ( $-K$ ), first assuming that the goal is to prevent output from falling and then assuming that the goal is to prevent reserves from falling. The first case is quite straightforward. From (BB), with  $\Delta y=0$ ,  $\Delta D = -K$ . The central bank must raise domestic credit so as to compensate exactly for the outflow of foreign capital. Consequently, from the solution to (MM) and (BP),  $\Delta R = K$ . That is, reserves fall by the full amount of the outflow, and the current account is unaffected.

Stabilizing output is not feasible if reserves are insufficient to compensate for the outflow ( $R_0 < -K$ ). Taking the alternative strategy of stabilizing reserves ( $\Delta R=0$ ), the solution is more complex.

$$(2.14) \quad \Delta D = \frac{k(\rho - m + b')}{mk + b'(\rho - k)} K$$

$$(2.15) \quad \Delta y = \frac{(b' + k)}{mk + b'(\rho - k)} K$$

The signs on these expressions are ambiguous and depend particularly on the relative magnitudes of the ICOR ( $\rho$ ) and the income elasticity of import demand ( $m$ ). As a benchmark, consider the situation if  $b' = 0$  (i.e., if the Marshall-Lerner conditions are just met). Then

$$(2.14') \quad \Delta D = \left(\frac{\rho}{m} - 1\right)K$$

$$(2.15') \quad \Delta y = \frac{1}{m}K$$

In this situation, a capital outflow results unambiguously in a fall in output, but it does not necessarily follow that a contractionary demand management policy is needed to stabilize reserves. The capital outflow itself pulls output down and thus reduces demand for imports. If that effect is strong enough, reserves may be stabilized without any policy adjustment. If  $b' > 0$ , the need for adjustment may be further reduced.

The merged model, in this comparative-statics form, is a longer-term model. In the short run, the Polak model shows unambiguously that contraction is required to stabilize reserves. The implication of this extension is that additional temporary financing may be a sensible substitute for demand contraction as a means of stabilizing reserves until the adjustment process represented by equations 2.14 and 2.15 is completed. Nonetheless, even if reserves are stabilized temporarily through new financing with no change in macro policies,

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<sup>11</sup> The BB equation derived from the full model contains an additional RHS term,  $+[s(1-t) + t - k]y$ . The equation has been simplified here by assuming  $k = t + s(1-t)$ ; that is, that saving is absorbed at the margin by money demand. This simplification masks the role of shifts in saving propensities or tax rates, but it does not affect the analytical results discussed below. See Khan and others (1990), pp. 172-73.

output (or at least income, via the real exchange rate) still must fall eventually in order to bring about the equilibrating drop in import demand.

### C. The Modified Mundell-Fleming Model

Fund staff working on Asian economies in the aftermath of the 1997 crisis developed a variant of the Mundell-Fleming model to analyze the short- and medium-term effects of exogenous capital flows (Lane and others, 1999, Appendix 7.2). This model is also useful for explicitly endogenizing the domestic interest rate and the exchange rate. The structure of this model is such that an exogenous capital outflow leads to a depreciation that generates the current-account surplus (or reduced deficit) needed to offset the outflow. In a fixed-exchange-rate system, a decline in output would normally be needed to generate that surplus, but here it will force enough currency depreciation to get the needed result. Output will actually rise as a corollary effect, unless the negative wealth effect of depreciation on consumer demand is sufficiently large.

The model is readily understood as a single reduced-form equation and an equilibrium condition:

$$(3.1) \quad Y = C(Y, E) + I(r) + G + \chi(Y, E)$$

$$0 < C_Y < 1, C_E < 0, I_r < 0, \chi_Y < 0, \chi_E > 0$$

$$(3.2) \quad \chi = -K$$

where  $\chi$  = net exports (the current account balance) and  $E$  = the exchange rate (domestic-currency price of foreign exchange). Other variables are in conventional notation. Note that this, like the Polak model, is a fixed-price model. Because countries are assumed to have limited resources, international reserves are also fixed (compare equation 3.2 with 1.3 or 2.3).

Now consider the model's comparative-statics multiplier effects. First, the fiscal multiplier, assuming that monetary policy controls  $r$  and is fixed, is

$$\frac{dY}{dG_{(dr=dK=0)}} = \frac{1}{1 - C_Y + \varepsilon}$$

$$\text{where } \varepsilon = \frac{C_E \chi_Y}{\chi_E}$$

In the conventional Mundell-Fleming model,  $C_E = 0$ , so  $\varepsilon = 0$ . Otherwise,  $\varepsilon > 0$ , and the fiscal multiplier is reduced but still positive. Qualitatively, this is a standard Keynesian effect.

Second, the effect of an exogenous capital outflow with fixed domestic policies but a flexible exchange rate is

$$\frac{dY}{dK}_{(dr=dG=0)} = -\frac{1 + C_E / \chi_E}{1 - C_Y + \varepsilon}$$

$$0 < -\frac{dY}{dK} \leq \frac{dY}{dG} \text{ if } |C_E| < \chi_E$$

This result suggests that allowing the capital outflow to generate depreciation while holding domestic interest rates and government spending fixed will lead perversely to an increase in output. In the special case where  $C_E = 0$ , a capital outflow has the same effect as an expansionary fiscal policy. Capital inflows thus have a Dutch-disease effect in this model: they cause the exchange rate to appreciate and weaken output. This effect is of course inconsistent with the conventional wisdom that developing countries need capital inflows in order to grow. As a corollary, if output was initially on target, the appropriate fiscal response to a capital outflow is to cut spending.

The difficulty here is in the assumption that the domestic interest rate ( $r$ ) is determined solely by monetary policy. Capital inflows should be allowed to reduce the cost of financing investment and thereby to raise aggregate supply as well as demand. The simplest way to model this relationship is to let domestic investment be a positive function of capital inflows.<sup>12</sup> Then

$$(3.1') \quad Y = C(Y, E) + I(r, K) + G + \chi(Y, E) \quad I_K > 0$$

and

$$\frac{dY}{dK}_{(dr=dG=0)} = -\frac{1 + C_E / \chi_E - I_K}{1 - C_Y + \varepsilon}$$

$$\frac{dY}{dK} > 0 \text{ if } |C_E \chi_E - I_K| > 1.$$

Now capital inflows raise output in two ways: via a wealth effect from currency appreciation and a financial effect on capital investment. If we assume that those two effects are large enough to make  $dY/dK > 0$ , while the wealth effect alone is not so large as to nullify the normal Keynesian fiscal effect, then we have the expected comparative static results.

Third, using this expanded version, we can calculate the required fiscal response to an exogenous capital outflow, holding  $r$  constant and letting the exchange rate depreciate.

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<sup>12</sup> An alternative approach is to assume that the negative wealth effect from depreciation exceeds the direct effect of depreciation on the current account ( $|C_e| > X_e$ ). That would correct the sign on  $dY/dK$ , but it would also reduce the magnitudes of both  $dY/dG$  and  $dY/dK$ . If neither capital flows nor fiscal policy has a sizable effect on output, then the realism and relevance of the model seem doubtful.

$$\text{Let } \eta \equiv 1 + C_E / \chi_E - I_K$$

$$\text{Then } \frac{dG}{dK}_{|dY=dr=0} = \eta$$

If  $\eta < 0$  (as needed to get  $dY/dK > 0$ ), then  $dG/dK < 0$ . The appropriate response to an exogenous outflow is to raise government spending. That keeps output on target, while the exchange rate depreciates to generate the required strengthening of the current account. In terms of macroeconomics, this is the real core of the criticism of the Fund's handling of the Asian crisis. Rather than contracting domestic demand, a country facing a financial crisis can simply let the exchange rate absorb the brunt of the attack.

The obvious response to this criticism is that the required depreciation might be so large as to destabilize the economy, and it could trigger fears of a continuing depreciation spiral. Tightening monetary and fiscal policies may be a more measured and balanced response to an outflow. Which policy is preferable in a particular set of circumstances cannot be determined from macroeconomic theory, but insights could be gleaned from a more detailed empirical analysis of the country's productive structure (see Furman and Stiglitz, 1998). Some industries, some agricultural sectors, some financial firms would gain from devaluation, and some would lose. Because both the balance of interests and investor expectations vary from case to case, so does the optimum exchange regime.

Fourth, consider the effect of a capital outflow when monetary policy keeps the exchange rate fixed rather than the interest rate. This regime may require allowing international reserves (R) to vary, as in the first two models reviewed above.

$$(3.2') \quad \chi = \Delta R - K$$

In the general case, where the goal is to stabilize output, the interest-rate response (with G fixed) is

$$\frac{dr}{dK} = -\frac{I_K}{I_r} > 0$$

and the reserve response is simply  $dR = dK$ . Thus, as in the earlier models, a capital outflow requires a cut in interest rates (or a rise in government spending), and reserves must be allowed to fall by the full amount of the exogenous outflow.

When output stabilization is not feasible and the goal must be to restore external balance, then output must be allowed to fall.

$$\frac{dY}{dK} = -\frac{1}{\chi_Y} > 0$$

In this case, however, the sign of the policy response is ambiguous:

$$\frac{dr}{dK} = \frac{(1 - C_Y - \chi_Y) + I_K \chi_Y}{-\chi_Y I_r} < 0 \text{ unless } |I_K \chi_Y| \geq (1 - C_Y - \chi_Y)$$

A capital outflow will require a hike in interest rates to stabilize reserves unless the drag on investment reduces import demand by enough to offset the conventional multiplier effect. While this secondary effect might be quite strong in some cases, it is less likely that it would work quickly enough to prevent a temporary depletion of reserves. In any situation where the initial reserve stock is vulnerable to attack, the central bank is unlikely to have time to allow the adjustment of investment and import demands to bring about a new equilibrium.

### III. IMPLICATIONS AND CONCLUSIONS

What can one learn from macroeconomic theory about the appropriate and viable policy responses to a financial crisis? Several implications emerge from the above review.

First, the fundamental explanation for differences in view on this issue is found even in the simplest monetary model. If a country has enough resources to withstand the shock of a sudden capital outflow, then it can afford the luxury of aiming to stabilize output in the face of the shock. The required resources might come from holding a large initial stock of foreign exchange reserves (as explicitly modeled here), from imposing controls or taxes on outflows, or from acquiring replacement financing from external sources or domestic saving. In any case, output stabilization will call for an expansionary monetary or fiscal policy under most circumstances. If the country lacks the necessary resources, then contractionary adjustment policies will be required to stabilize external flows unless currency depreciation is a viable alternative. Whether depreciation would bring larger or smaller welfare losses than a contraction of aggregate demand is a structural issue on which macro models offer little guidance.

Second, although the three models reviewed above differ substantially in their coverage of macroeconomic relationships, they all lead to similar conclusions about the need for conventional policy adjustment in cases where external balance is essential and the availability of financing is limited. Perverse situations could arise, as illustrated by the Dutch-disease implications of the modified Mundell-Fleming model. Those situations, however, appear to be inconsistent with prevailing conditions in most emerging markets. As long as capital inflows are growth-stimulating, the withdrawal of such flows is likely to require a standard adjustment response.

Third, the argument that a country with a strong initial fiscal position need not tighten in response to a financial crisis is contradicted by these models. What matters for macroeconomic equilibrium is not the fiscal balance but the overall level of national saving. A withdrawal of foreign capital requires an offsetting increase in domestic capital to restore external balance, irrespective of the initial fiscal position. In the Korean crisis, the effect of the initial capital outflow on net saving was offset by a collapse of business investment, after which the Fund approved a softening of the fiscal requirements in the program. The problem was not an inadequate macroeconomic framework but a limited ability to predict the effects of fiscal tightening on investor confidence.

Fourth, the structure that is omitted from these models is primarily long-term in nature. No role is given to shifts or differences in the distribution of wealth across production sectors or income groups. No allowance is made for deficiencies in the quality of governance or the

sustainability of the natural environment or exhaustible resources. It is not hard to construct arguments for less orthodox approaches to adjustment in the presence of those types of structural problems. A country with a weak government, a poor political system, an inefficient economic structure, a high incidence of poverty, or a vulnerable physical environment may not be able to withstand the shock of a sharp economic downturn. Even if the downturn is a temporary byproduct of policy corrections that are expected to bring long-term economic and social benefits, the government may not have enough credibility to convince potential creditors and donors to support it through the transition. Nonetheless, if the short-run requirements for stability are paramount in a crisis, heterodox solutions that require time to work will be of no practical value.

Beyond these specific observations, one may draw some more general conclusions that may help clarify the debate on policy responses.

First, at least two methods for examining the macroeconomic requirements for stability have validity and are useful under carefully specified circumstances: (a) find the required policy adjustment, taking the availability of financing as given; or (b) find the level of financing required to generate a desired outcome. The Fund uses primarily the former, while the World Bank and many outside observers focus more on the latter. The suggestion that financing is readily enough available to treat it as an endogenous equilibrating variable in the midst of a financial crisis is not obviously valid.

Second, the core of the debate over appropriate policy responses has less to do with macroeconomics than with investor psychology and national economic and political structure. To resolve such a debate requires better modeling of those processes and relationships. Would structural optimization provide an escape from the need to adjust macro policies, and escape from the tradeoff between currency depreciation and financial collapse? What are the requirements for restoring investor confidence? What effects would sudden shifts in income distribution have on production and spending decisions? These and related structural questions cannot be answered satisfactorily by reference to the current generation of economic models.

Third, macroeconomic analysis does support the argument that responses to financial crises should be tailored to each country's circumstances, but not for the reasons most commonly advanced in the literature. What matters crucially in this context is not the initial fiscal position but the short-term constraints on external balance. If a country in crisis can afford to sacrifice reserve or exchange-rate stability or can attract replacement financing quickly, then it can—and must—expand domestic policies and forego the more usual forms of adjustment.

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