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Explaining Sudden Stop, Growth Collapse, and BOP Crisis: The Case of Distortionary Output Taxes

GUILLERMO A. CALVO

The paper discusses a model in which growth is a negative function of fiscal burden. Moreover, growth discontinuously switches from high to low as fiscal burden reaches a critical level. Growth collapse is associated with a sudden stop of capital inflows, real depreciation and a drop in output (driven by a fall in the output of nontradables)—all of which have occurred during recent financial crises in emerging markets. The monetary version of the model is employed to show that balance of payments (BOP) crises could be a result of fiscal distortions. In particular, it is further argued that BOP crisis could be a justifiable central bank response to growth collapse, although realistic circumstances may make this response highly ineffective. An important policy implication of the model is that in order to avoid sudden stop crises, policymakers should aim at improving fiscal institutions. Lowering the fiscal deficit is highly effective in the medium term, but could be counterproductive in the short run if it relies on higher taxes.

Since Mexico’s tequila crisis of 1994/9, emerging market economies (EM) have entered a period of recurrent crises that go far beyond currency crises as experienced in advanced economies. EM crises are characterized by sharp recession, high unemployment, and an alarming rise in the number of people living below the poverty line. A common feature of these episodes is a sudden stop (SS), namely, a

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large reduction in the flow of international capital.\(^1\) This is illustrated in Table I which, incidentally, shows that the phenomenon predates the tequila crisis. Moreover, Calvo and Reinhart (2001) show that, on the whole, SS is absent in advanced countries. This leads me to the conjecture that SS is perhaps the central feature of EM crises from which all the others follow. Developing a theory that rationalizes the conjecture is a challenging task because EM crises have not been preceded by sharply deteriorating fundamentals (see Calvo and Mendoza, 1996a and b, for the case of Mexico). Thus, to model this fact, the theory should ideally be able to display market equilibrium discontinuity as a function of market fundamentals.

The basic model presented at the outset exhibits equilibrium discontinuity. A key assumption is that government expenditure has to be partly financed by output taxes, which, by their nature, lower the after-tax marginal value productivity of capital. Thus, the larger is government expenditure, the lower will be the rate of growth. There is a region, however, where high and low growth equilibria coexist. The intuition for this is straightforward: high (low) growth implies low (high) tax rates, sustaining high (low) growth. The model assumes that international financial institutions (IFIs) will realize that equilibrium indeterminacy is all a matter of expectations, and will help to coordinate the high-growth equilibrium. Thus, equilibrium is unique.\(^2\) A discontinuity will take place, however, at the point where multiplicity disappears, and only low growth can be sustained. This happens in the model when government expenditure, summarized by the stock of public debt, that has to be serviced by output taxes, reaches a critical level. If the economy is near that critical level, seemingly minor accidents, like a deterioration of the terms of trade or an increase in country risk, could throw the economy into the region where only low growth is sustainable. Moreover, since investment collapses, a SS will take place. The model is then extended to account for nontradable or home goods. In that context, it is shown that if the crisis contains an unanticipated component, then the SS will be accompanied by an increase in the real exchange rate (i.e., real devaluation).\(^3\)

Finally, the model is extended to incorporate money in a cash-in-advance fashion. Since money demand is positively correlated with aggregate demand, a collapse of the latter (discussed at the end of last paragraph) would bring about a drop in the demand for money. Thus, if the exchange rate is fixed, international reserves will fall precipitously, resembling a BOP crisis. The monetary economy is then employed to study optimal exchange rate policy in response to SS. Since SS is, after all, a cut in total credit, it may be optimal for the central bank to release some of its international reserves (e.g., through credit subsidy) to relieve the impact of SS on the private sector, especially when the new credit conditions contain an important surprise element. Under the usual rules that dictate the operation of a central bank, the latter can release reserves by expanding domestic

\(^1\)The expression sudden stop was first suggested, and the phenomenon highlighted, in Dornbusch, Goldfajn, and Valdés (1995).

\(^2\)For an earlier attempt to rationalize SS on the basis of multiplicity of equilibria and in an essentially static nonmonetary framework, see Calvo (1998b).

\(^3\)Real depreciation also takes place if the crisis is fully anticipated and, for example, it entails a higher consumption tax.
credit and pegging the exchange rate; pure floating would not do because, in that case, international reserves will remain intact. This reaction to SS has been quite common in EM. Therefore, the central bank may end up precipitating the BOP crisis. This policy, incidentally, is criticized in the paper by indicating that the recipients of central bank largesse may not be the intended target. The paper argues that if policymakers understand this difficulty, they may be driven to experiment with heterodox policies (like directing credit to specific sectors).

I. Basic Model

The basic structure of this model is taken from Calvo (1998c) which, in turn, is a dynamic extension of Eaton (1987). I will start by examining the case of an economy that produces tradable output by means of tradable capital, $K$. The production function is linear homogeneous: one unit of output is produced by means of $1/\alpha$ units of capital. The net cash flow, $S$, for a firm that accumulates capital at the rate $\dot{K}$ is given by (assuming away capital depreciation):

$$S_t = \alpha(1-\tau)K_t - \dot{K}_t,$$

where $\tau$, $0 \leq \tau \leq 1$, denotes the constant output tax rate. Thus, denoting the constant international real interest rate (i.e., the own rate of return on output) by $r$, the value of the firm at time zero, $V$, is given by:

$$V = \int_0^\infty S_t e^{-rt} dt.$$
Hence, assuming that $K_0 = 1$, and setting $z = K/K$ yields:

$$V = \int_0^\infty \left[ \alpha (1 - \tau) - z_t \right] e^{-\frac{\mu}{K} (r - z)} e^{dt}. \tag{3}$$

Notice, incidentally, that given linear technology, $z$ equals the rate of output growth.

The firm is assumed to maximize $V$ by choosing the growth path $z$, taking as given the international interest rate $r$, the tax rate $\tau$, and the technological constraints. A quick inspection of this problem shows that the optimum can be found among the constant-$z$ paths, in which case equation (3) can be expressed as:

$$V = \frac{\alpha (1 - \tau) - z}{r - z}. \tag{4}$$

Differentiating the right-hand side of equation (4) with respect to $z$, yields

$$\text{sgn} \frac{\partial V}{\partial z} = \text{sgn} [\alpha (1 - \tau) - r]. \tag{5}$$

As expected, therefore, the firm will grow as fast (slow) as possible if the net of tax marginal productivity of capital exceeds (falls short of) the rate of interest. Thus, in order to obtain well-defined solutions, one must constrain $z$ to a finite interval, and $z < r$. Concretely, I will assume that there exists some $\bar{z} > 0$ such that $0 \leq z \leq \bar{z} < r$. Setting 0 as the lower bound implies that capital cannot be unbolted; thus, the model belongs to the putty-clay family.

The next step is to endogenize the tax rate $\tau$. I will assume that the government inherits a stock of debt $D$, a share $\theta$ of which has to be serviced by means of output taxes. Again, assuming that the government has full access to capital markets, the tax rate $\tau$ must be such that:

$$\theta D = \alpha \tau \int_0^\infty K_t e^{-\eta} dt = \frac{\theta \tau}{r - z}. \tag{6}$$

Thus, using equation (6) in expression (5), we get the following fundamental relationship:

$$\text{sgn} \frac{\partial V}{\partial z} = \text{sgn} [\alpha - \theta D (r - z) - r]. \tag{7}$$

Notice that the bracketed expression in equation (7) increases with $z$. Thus, the low-growth equilibrium (LGE), i.e., $z = 0$, is possible if:

$$\alpha - \theta D r - r < \theta. \tag{8}$$

In other words, LGE exists if as firms set $z = 0$, they have no incentive, by expression (8), to revise their choice. It is worth noting, however, that this does not rule out the existence of other equilibria.

On the other hand, by a similar reasoning, the high-growth equilibrium (HGE), i.e., $z = \bar{z}$ exists if:

$$\alpha - \theta D (r - \bar{z}) - r > 0. \tag{9}$$
The left-hand-side functions in expressions (8) and (9) are drawn in Figure 1. Clearly, LGE exists if \( \theta D > \delta^1 = (\alpha - r)/r \), while HGE exists if \( \theta D < \delta^2 = (\alpha - r)/(r - \bar{z}) \). Thus, indeterminacy exists in the interval \((\delta^1, \delta^2)\). However, coordination among investors could drive the economy to the HGE. Success of this policy could be greatly aided by strong support from IFIs, requiring, in principle, no public sector resources. For, eliminating the bad LGE in the indeterminacy region is, in principle, a costless operation. Thus, I will assume that if LGE and HGE coexist, the economy will always settle at the HGE.

Consequently, the model implies high growth if \( \theta D \leq \delta^2 \), and low growth (actually, zero growth) otherwise. Equilibrium discontinuity (see Figure 2) is a key result because it helps to rationalize situations in which, all of a sudden, a roaring tiger becomes a whining pussycat. This feature is, unfortunately, somewhat clouded in the present model, given that linear production functions generate, as a general rule, corner solutions. Thus, the equilibrium discontinuity highlighted here may appear as a trivial and uninteresting proposition. To dispel that view the Appendix will “smooth the edges” of this model by assuming adjustment costs to investment. As shown there, under uniqueness, growth is a continuous and negative function of \( D \). It takes equilibrium multiplicity as depicted in the above model (prior to the equilibrium-selection criterion adopted here, which, in case of indeterminacy, picks the one yielding the highest growth) to generate discontinuity. Growth discontinuity takes place as the systems loses a good equilibrium and plunges to an equilibrium exhibiting lower growth. Notice that, although equilibrium multiplicity is a necessary condition to obtain growth collapse, it is not sufficient. For example, it is easy to construct examples exhibiting two equilibria in which equilibrium solutions converge toward each other as debt goes up. Thus, growth collapse, as depicted in the above model, never takes place. Instead, what one would have is a situation in which, except for a borderline case, the model yields two equilibria or none at all. Therefore, the set of models that yield growth collapse are strictly included in those yielding equilibrium multiplicity (before imposing the equilibrium-selection criterion). Thus, the existence of realistic examples yielding growth collapse cannot be taken for granted, which opens up an interesting research agenda.

In what follows, I will continue the discussion in terms of the present model because SS and other interesting implications are the same as in the more complex model presented in the Appendix (except in the few instances in which it will be explicitly noted).

The model or simple extensions provide interesting insights. For example:

- Variable \( D \) represents all-encompassing public debt. Therefore, it should include state-contingent public debt, like the one that surfaces during crises (see Diaz-Alejandro, 1985, for a detailed recount of how contingent public debt became apparent during Chile’s 1982/3 crisis; and Calvo, Izquierdo, and Talvi, 2002, for recent estimates). State-contingent debt has proven to be large

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4 The borderline cases in which expressions (8) or (9) hold with equality are of no interest and will not be discussed here.

5 In my view the IFI’s coordination role was successfully carried out in Mexico (1995), Korea (1997), and Brazil (1999), and helps to explain the rapid (V-shaped) recovery of those economies.
and to contain a sizable unanticipated component. Thus, a SS could take place even though the economy appears, to the naked eye, safely ensconced within the high-growth region (i.e., far to the left of critical point δ²).

- The critical debt level δ² is a function of the production parameter α. Recalling Figure 1, it is clear that δ² declines as α falls. A negative terms of trade shock could be captured by a lower α. Thus, a deterioration in the terms of trade could plunge the economy into the LGE, causing, as will be argued in the next section, a SS. This observation, incidentally, shows that for economies that are near their critical debt levels, a relatively minor terms of trade deterioration can bring about a substantial decline in output growth.

- The model assumes that the government and the private sector have access to capital markets. However, D could also stand for country-risk-adjusted public debt, in which case an increase in country risk implies a larger D. Thus, even in the benign case in which the private sector is immune to country risk, θD could jump to the low growth region as a result of an increase in country risk. This is relevant for rationalizing the effects of events like the Russian 1998 crisis (see Calvo, 1998a, and 1999; and Calvo and Mendoza, 2000), which resulted in an increase in country risk all across EM, and appears to have left in its wake a noticeable growth slowdown in Latin America (see Calvo, Izquierdo, and Talvi, 2002).

- Debt levels that can be sustained without inducing low growth, decline with the share of debt that has to be serviced on the basis of distortionary taxes (i.e., as θ increases). Thus, if labor supply were inelastic, for example, it would be optimal to raise labor taxes and set θ = 0. However, tax evasion may make this impossible or at least impractical. This suggests the key role of tax reform and adequate fiscal institutions for growth and stability.
II. Sudden Stop and Home Goods

So far our discussion did not require any reference to utility functions because, in the model, there is complete separation between production and consumption decisions. The latter is, in general, essential information to compute current accounts (and, hence, address the issue of SS) or model the behavior of the real exchange rate, which requires bringing to the picture home or nontradable goods.

Suppose that there exists a representative individual whose utility function is time separable, and the subjective rate of discount is constant and (for simplicity) equal to the international rate of interest $r$. The instant utility function will be denoted $u(c,h)$, where $c$ and $h$ stand for consumption of tradable and home goods, respectively. Output of home goods is described by a concave production function $f(x)$, where $x$ stands for input of tradables. Functions $u$ and $f$ satisfy the standard regularity conditions. The analysis will be centered on interior solutions.

The above assumptions guarantee that optimal consumption of tradables and nontradables, and production of nontradables will be constant over time. The budget constraint under these conditions boils down to:

$$r[V - (1 - \theta)D] = c + x,$$

where time subscripts are dropped because all paths are constant over time. The square-bracketed expression is net wealth after taking into account distortionary taxes (netted out from $V$) and nondistortionary taxes, $(1 - \theta)D$. Thus, the optimal

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6For a discussion of this model in the more general case in which the rate of discount is different from the international interest rate, see Calvo (1998c). The latter also addresses welfare issues and the impact of controls on capital outflows that will be skipped in the present paper.
(market equilibrium) consumption and production plan is obtained by solving the following problem:

$$\max_c u(c, f(r[V - (1 - \theta)D] - c)).$$ \hspace{1cm} (11)

Solving equation (11) yields the following familiar first-order condition, equating the marginal rate of substitution between tradables and nontradables and the respective marginal rate of transformation:

$$\frac{u_1(c, f(r[V - (1 - \theta)D] - c))}{u_c(c, f(r[V - (1 - \theta)D] - c))} = \frac{1}{f'(r[V - (1 - \theta)D] - c)} = p.$$ \hspace{1cm} (12)

where $p$ is the relative price of home goods with respect to tradables (i.e., the inverse of the real exchange rate). By equation (12), equilibrium $c$ and $p$ are functions of net wealth. Moreover, by equations (4) and (6):

$$\alpha - z - (r - z)D = 0.$$ \hspace{1cm} (13)

Recalling that $\alpha < r$, condition (9) for the existence of a HGE requires that $\alpha > r$. Thus, by equation (13), $V$ is an increasing function of $z$. This can be employed to show, incidentally, that if HGE and LGE coexist, then HGE pareto dominates LGE, as expected.

By equations (10) and (13), the current account (surplus) at time 0, $CA_0$, satisfies, assuming that $K_0 = 1$ and is entirely owned by domestic residents,

$$CA_0 = \alpha - z - rD - c - x = \frac{\alpha - z}{r - z}.$$

Hence, $CA_0 < 0$ on HGE and $CA_0 = 0$ on LGE. Consequently, as the economy switches from high to low growth, the current account deficit exhibits a discontinuous collapse to zero. Thus, SS takes place, since a nonmonetary economy like the present one, $-CA_0 = $ capital inflows at time 0. Moreover, assuming that consumption of nontradables is a "normal" good, it follows that, given $p$, consumption of nontradables falls as net wealth (i.e., $V - (1 - \theta)D$) declines. Therefore, by equation (12), as growth collapses, $x$ falls and $f'(x)$ rises, implying that the SS would be accompanied by real depreciation (i.e., $p$ falls). Clearly, in this case GDP will also collapse because the output of nontradables falls. All of these results are fully in line with empirical observations (see Calvo and Reinhart, 2000; and Calvo, Izquierdo, and Talvi, 2002).

Money

The model can easily be extended to a monetary economy. For example, suppose the demand for money is subject to a cash-in-advance constraint, such that:

$$\text{demand for nominal money} = M^d = E(c + ph).$$ \hspace{1cm} (15)
where $E$ is the nominal exchange rate (i.e., the price of foreign exchange in terms of domestic currency). Thus, first-order conditions (12) remain intact, and, if the representative individual internalizes the government budget constraint, one can show that money is supernueral in the sense that, along steady states, the real side of the economy is invariant to the presence of money.

Thus, recalling that under the crisis scenario highlighted above (i.e., $D$ unexpectedly moves from the high to the low growth region) $c + ph$ declines, it follows that, given $E$, the demand for money will exhibit a discontinuous fall. Consider the case in which $E$ is fixed. The SS will be associated, therefore, with an unexpected drop in international reserves. If the latter is high enough, a BOP crisis would ensue. Notice that the model gives an anti-Krugman rationale for the BOP crisis (Krugman, 1979). The crisis in the present model is entirely rooted in real factors: SS comes first, BOP follows. Policy implications are also very different. For example, Krugman crises can be prevented by following a tighter fiscal policy, whereas in the present model tighter fiscal policy (if based on higher tax rates) could actually trigger the crisis. Not because fiscal balance is undesirable, but because the instruments to achieve it are distorting! Once again, what the present model highlights is the importance of improving fiscal institutions.

**Anticipated Crises**

Although I believe SSs contain a significant unanticipated component, the present model can also rationalize the case in which a SS is fully anticipated. In the first place, notice that, in general, investment decisions are predicated on:

\[ \text{sgn}\left[ \int_0^\infty \alpha(1 - \tau_s) e^{-\tau_s - t} ds - 1 \right] \quad (16) \]

The integral in expression (16) equals the present discounted value of net of taxes return on a unit of investment. Thus, investment will take place when the latter exceeds its cost ($= 1$), i.e., when the sign in expression (16) is positive; moreover, if expression (16) is negative, no investment will occur. As expected, when $\tau$ is constant expression (16) boils down to expression (5). Now consider the situation in which from time 0 to $T$ debt is zero, but everyone knows that at time $T$ the public sector will be loaded with debt $\delta D = \delta^2 + \varepsilon$ (where, it should be recalled, $\delta^2$ is the critical level of distortionary debt beyond which low growth is the only equilibrium solution, recall Figures 1 and 2, and $\varepsilon$ is a positive number). Moreover, suppose that on the interval $(0, T]$ the tax rate $\tau = 0$; afterwards, $\tau$ is set at a constant level necessary to service debt $D$. One can easily show that as $\varepsilon$ converges to 0, investment will be set at its maximum level in the interval $(0, T]$, and $z_t = 0$, for $t > T$. Thus, a fully anticipated growth collapse at time $T$ would take place. Will this result in a SS? Since the growth crisis is fully anticipated and consumers have access to the capital market (and are not subject to taxes that distort the consumption time profile), consumption will
remain undisturbed. However, investment will go from $\bar{z}K_t$ to zero. Therefore, at the onset of the growth crisis, a SS will take place.\(^7\)

In what follows I will show how to construct a monetary example that would be a polar opposite to Krugman's (1979). Suppose that the economy starts with zero debt, a positive fiscal deficit, and zero distorting taxes, $\tau$. Clearly, debt will be increasing throughout time and, if policy remains the same, it will eventually reach the critical level $\delta^2$. At this juncture, the government eliminates fiscal deficit by resorting to the inflation tax to cover the primary deficit (as in Krugman, 1979) and services the outstanding debt as in Section I (i.e., employing distorting taxes). Obviously, the economy will display high growth until net output-distorting debt reaches the critical level $\delta^2$, and then switch to low growth forever.\(^8\) The monetary economy under fixed rates will again display a sudden loss of international reserves at crisis, reflecting the effect of anticipated inflation (as in Calvo, 1987).

One could even generate a BOP crisis à la Krugman (1979) if public debt includes (with a negative sign) international reserves. If, for example, the critical minimum level of reserves is zero, it can be shown that the crisis coincides with full depletion of international reserves, in conjunction with a run against the domestic currency. Once again, however, the BOP crisis is inherently real.\(^9\)

The following points are worth making:

- As explained, real depreciation follows from an unanticipated SS, not the other way around. Given the tendency to focus on exchange rates, however, a casual observer might conclude that the main culprit was currency over-appreciation. As "proof" she will likely point out that the real exchange rate shows no sign to return to its prior-to-crisis level.

- Suppose the utility function $u$ is homothetic in tradables and nontradables. Hence, given $p$, the demand for nontradables, $h$, is proportional to the demand for tradables, $c$. In particular, during a SS and, given $p$, the demand for nontradables falls in the same proportion as the demand for tradables. Let us focus on the case in which the current account deficit, $CAD$, becomes zero. Then, given $CAD$, the smaller is the domestic supply of tradables (net of international debt and precommitted transfers) in terms of tradables' consumption, $\omega$, the larger will be the proportional drop in $c$ at SS. Consequently, the smaller is $\omega$, the larger will be the fall in $c$ and $h$ (given $p$) caused by the SS. Variable $\omega$ measures the economy's ability to supply domestic absorption of tradables. In Calvo, Izquierdo, and Talvi (2002), variable $\omega$ is called "un-leveraged absorption of tradable goods;" $\omega$ is shown to vary widely across countries (Argentina and Brazil are shown to have one of the lowest $\omega$). Therefore, the same $CAD$ adjustment could have significant differences across countries depending on $\omega$.

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\(^7\)This does not hold true in the Appendix model because in the latter investment is a continuous function of time. Even though investment does not display a discontinuous fall, however, it will show a declining trend.

\(^8\)Again, this does not follow in the Appendix model, in which a lower growth is attained in a continuous manner.

\(^9\)Contrary to this scenario, however, most recent BOP crises seem to have been driven more by an expansion of domestic credit from the central bank than by a fall in the demand for monetary aggregates (see Flood, Garber, and Kramer, 1996; Kumhof, 2000; and Calvo, 2001). This issue will be taken up in the next section.
EXPLAINING SUDDEN STOP GROWTH COLLAPSE, AND BOP CRISIS

- In this model, crises are very tame. There is no room for default, for example. However, this can be easily rectified assuming, for instance, that the government repays only if the default alternative would be more costly. One can show that, abstracting from direct default costs, on the low-growth region the default alternative dominates low growth plus full debt repayment. Thus, (i) even if government is not intent on driving debt beyond the critical level, a bit of uncertainty will generate country risk premia, and (ii) in the anti-Krugman example, in which sooner or later the critical threshold is crossed, the critical threshold will be zero. To see this, note that if it was positive and equal to \( \bar{D} \), for example, then investors would stop lending before \( D \) reached \( \bar{D} \). Otherwise, the “last” loan before reaching \( \bar{D} \) will immediately be declared in default, a hardly attractive investment proposition. However, a positive \( \bar{D} \) could be generated if there are direct default costs (a realistic assumption).

- The model assumes that output of home goods falls as the cost of raw materials rises or, equivalently, as the real exchange rate rises (i.e., as the relative price of home goods with respect to tradables \( p \) falls). In actuality, however, another important factor in nontradables’ output contraction during a crisis is liability dollarization, i.e., the existence of debt denominated in terms of tradables (dollar debt, for short). Under these conditions, for example, an unanticipated SS could give rise to bankruptcies in the home goods sector, resulting in momentarily lower output. How deep and persistent is the output collapse will depend on bankruptcy legislation and the efficiency of the judicial system, and, of course, it will also depend on how much dollar-indebted is the home goods sector. The latter, incidentally, could be especially large after a capital inflow episode like the one that occurred in EM during the first half of the 1990s.

- The weaker the enforceability of financial contracts, the more likely will be that loans impose collateral constraints, by which the value of attachable assets cannot fall short of a predetermined proportion of the loan. Thus, it has become popular to assume that the loans a firm or individual can take depend on some measure of net worth. Thus, if the collateral constraint is binding, a depreciation of the real exchange rate, i.e., a fall in \( p \), may call for liquidation of productive assets. If we further assume, following Kiyotaki and Moore (1997), that the liquidated assets will go to less efficient hands, then output will suffer a contraction. Thus, a crisis could display a fall in output of nontradables even though, in principle, output would be perfectly price inelastic in absence of the financial shock. Output contraction by this channel does not even require bankruptcy to take place. At any rate, however, these extensions show that the financial channel could add to the depth and persistence of the crisis (see Diaz-Alejandro, 1985). Whereas raw materials are flows, financial obligations are stocks. A stock reversal could actually cause much more damage than a flow cost increase, particularly if the latter is deemed to be temporary.

\[10\] This is one of the key new topics in the EM literature. See, for example, Calvo (2001) and Jeanne (2000).

\[11\] This line of research has been pioneered by Kiyotaki and Moore (1997) for the closed economy, and extended to the open economy by Caballero and Krishnamurthy (2001a, b, and c), Izquierdo (2000), and others.
III. Sudden Stop and Monetary Policy

I will conduct the discussion taking as background the previous section’s model, focusing on the case in which the SS is largely unanticipated and causes a credit crunch in the home goods sector (due to, for instance, collateral constraints or margin calls). The analysis will center on policies taken after SS and also policies that can be implemented before SS to cushion its deleterious effects. Clearly, in this model credit is cut because outstanding credit is too large relative to the economy’s capacity to repay. Thus, only policies that have an impact on the latter will have a chance of becoming effective. Monetary policy can influence the ability to repay in at least two different ways: (i) managing international reserves, and (ii) changing relative prices in the face of price/wage stickiness.

Management of International Reserves

A common feature in recent crises is a large expansion of domestic credit from the central bank. As pointed out by Flood, Garber, and Kramer (1996) and Kumhof (2000), this feature is not captured by the first-generation Krugman-Flood Garber models (see Krugman, 1979; and Flood and Garber, 1994). In the latter, the crisis is triggered by a sudden decline in the demand for domestic money. Actually, as illustrated by the tequila crisis (see Calvo and Mendoza, 1996b), in most cases (Argentina and Hong Kong SAR are exceptions) the loss of international reserves is almost entirely driven by domestic credit. The demand for domestic money shows no atypical decline. Can one find a rationale for that?

The following accounting identity is worth recalling:

\[ KI = CAD + \Delta R. \]  

where “errors and omissions” are ignored, and \( KI, CAD, \) and \( \Delta R \) stand for, respectively, capital inflows, current account deficit, and accumulation of international reserves, \( R. \) A SS is reflected in a sharp drop in \( KI. \) If the central bank lets the exchange rate float, then no reserves will be lost, and the entire adjustment will fall on the current account, calling for a sharp real depreciation (a sharp fall in \( p, \) in the model’s notation). This, in turn, might provoke sizable income redistribution, including bankruptcies in the nontradable sector. Thus, the central bank will have incentives to follow an expansionary policy that places some of its international reserves in private hands (the nontradable sector’s, if the main objective is bankruptcy prevention). Pure floating cannot work, because the central bank would not be able to release its reserves (unless they are directly transferred to the fiscal authority). Therefore, under standard practices the central bank will be forced to adopt some kind of pegging accompanied by domestic credit expansion (hopefully before domestic money holders wise up to the impending crisis). This rationalizes the fact (observed in Mexico in 1994/5

\[ \text{Thus, this section departs from the basic model in Section I, and is more speculative than earlier sections.} \]
and Brazil in 1998/9) that the SS occurs first, and it is later followed by a currency crisis provoked by the central bank (not only by panicky domestic money holders). Thus, devaluation follows the SS. Since the latter is contractionary, this analysis also provides a rationale for contractionary devaluation, a well-known phenomenon in developing countries (see Diaz-Alejandro, 1963; and Sebastian Edwards, 1989). Notice, however, that under this interpretation, output contraction is not the result of devaluation: SS would be.

This discussion highlights the possible desirability of pegging the exchange rate once a SS is detected. Exchange rate pegging allows the central bank to transfer its international reserves to the private sector. Is pegging responsible for the crisis in a deeper sense? I would not deny the possibility, but the present model shows that the roots of a SS may rest on fiscal dysfunction and be totally divorced from exchange rate policy.

Is central bank credit the best way to help the private sector during a SS? I have some serious doubts, because the new domestic credit will likely go to the public sector (slowing down desirable adjustment in government expenditure), and firms that have access to international credit markets (multinationals). The latter, in particular, are likely to use additional domestic credit to unwind their dollar debts, an attractive proposition in view of impending devaluation, and that central bank credit expansion may momentarily push domestic interest rates for prime borrowers below market equilibrium. Thus, it is conceivable that domestic credit expansion drains international reserves from the central bank without substantially relieving the pressure on the current account. This bleak scenario, which unfortunately appears not to be uncommon, helps to explain why, during a SS, governments might be driven to adopt heterodox policies. For example, controls on capital outflows (e.g., Malaysia, 1998), socialization of private debts (e.g., Chile, 1982/3, see Diaz-Alejandro, 1985), or controls on the direction of bank credit (Brazil, 2002).

A serious difficulty with heterodox policies is that, as a general rule, they imply breaking established rules or implicit contracts, opening up the door for time inconsistency, and political economy maneuvers, specifically wars of attrition where different groups vie to benefit from central bank credit (see Sturzenegger and Tommasi, 1998). Wars of attrition result in policymaking paralysis, becoming very hard to know which side will win. The policy impasse, in turn, increases the option value of waiting, which results in further investment and credit contraction—and declining growth (see Calvo, 2002).

One way to get a better outcome might be for the government to offer (or support) exchange rate hedge contracts that will be activated the moment a large devaluation takes place. In this fashion, the loss of reserves would be automatic, helping to ameliorate the after-crisis tug of war. It should be noted, however, that government hedges may end up being underpriced, because their

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13 This requires changing the anti-Krugman example in Section II to allow for the central bank to issue domestic credit in response to a SS. Central bank hyperactivity during BOP crises, incidentally, is a widely observed fact, as noted by Flood, Garber, and Kramer (1996) and Kumhof (2000).

14 Once again, this policy would be especially relevant if the private sector suffers a credit crunch. Brazil offers a recent example of this kind of central bank policy: see the Financial Times (2002).
price reflects, in part, the government’s assessment of the likelihood of crisis. Thus, in order to show the authorities’ high confidence in current policies, unrealistically cheap hedges may be offered, increasing the fiscal cost of a crisis and, in terms of the above model, also the likelihood of crisis (because contingent net public debt goes up).

**Wage/Price Stickiness**

This phenomenon lies at the heart of the literature on optimal exchange rate regimes and optimal currency areas (e.g., Flood and Marion, 1982; and Calvo, 2001 for a critical assessment). A standard result is that if the economy is hit by a real shock, it is optimal to let the exchange rate free to float. Thus, since a SS is essentially a real shock, one might reason that floating would be optimal—at least, until the dust settles.  

Let me first note that, in practice, the choice between fixed and floating exchange rate regimes in the aftermath of a SS often turns out to be just an academic exercise. Many economies are swept away by events and end up devaluing their currencies before the exchange rate issue is even raised! However, Argentina and Hong Kong SAR in 1995 are interesting counterexamples. These economies were able to maintain their currency board regimes despite massive loss of international reserves. At any rate, the issue that I would like to raise is whether, subject to having enough international reserves, it may be socially desirable to keep a peg a little longer after a SS, in order to slowdown the relative price adjustment.

As noted, SSs call for sharp changes in relative prices (often involving a real currency depreciation, a fall in $p$). Thus, firms saddled with dollar debts, may be forced into costly asset liquidation or outright bankruptcy. Quick convergence to the new set of equilibrium relative prices will bring this situation into the open, and financial chaos might ensue. Could a temporary peg make a difference? The instinctive answer is probably “no” because, otherwise, sectors that should see their equilibrium relative price fall would instead see their quantities contract—resulting in a wash at best. However, this intuition misses an important point, namely, the microeconomics of price setting. To illustrate, suppose that prices are set in a highly competitive environment, such that, under normal circumstances, profits are near zero. Thus, a shock that set initial home good prices above their new full equilibrium level is observationally equivalent to firms colluding and setting their prices at a higher-than-competitive equilibrium level. Output will fall but firms’ profits may rise. This is not always the case, but, in the present context, it is a definite possibility. Therefore, relative price stickiness (brought about by price stickiness plus an exchange rate peg) may help to relieve financial stress. Consequently, the existence of price stickiness may be another reason in favor of pegging in response to a SS.

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15In actuality, however, as shown in the earlier discussion of the monetary economy, a SS gives rise to both real and nominal shocks. Thus, if anything, the standard literature would call for a dirty float.

16For an example in terms of a micro-founded staggered-prices model, see Calvo (2000).
IV. Final Remarks

- The central message of this paper is that currency crises in EM may just be a sideshow, and that the key factors behind the collapse of economic activity and growth may stem from dysfunctional domestic policies and serious financial vulnerabilities. The latter give rise to sharp changes in market equilibrium in response to relatively minor real shocks. Thus, BOP crises could just be one of the many deleterious effects of a SS.

- The model is silent about the factors that trigger a SS. Any shock that pushes the economy beyond the critical debt level would trigger a SS. It could be an external factor, as Calvo, Izquierdo, and Talvi (2002) claimed was the case recently in Argentina, but it could also be an internal factor, like a domestic political or corporate governance scandal.

- The main policy lesson from the model is that EM should strive to improve fiscal and financial institutions. But, perhaps equally important, policymakers should get ready for the possibility of a SS. They should go through SS drills, much as well run buildings go through fire drills. Under normal circumstances, fires are low probability events. If not well managed, however, the resulting stampede may dramatically increase the number of casualties.

- As noted, IFIs have a big role to play in coordinating high growth when both high and low growth coexist. Actually, if the model is not misleading, before reaching a SS, there is always a region of indeterminacy in which IFIs could play that role. Outside that region, however, the situation becomes more complicated, because most EM do not qualify for grants (as opposed to loans) from IFIs in response to debt crises (heavily indebted poor countries, HIPCs, are the exception). Moreover, the G-7 have expressed serious concern about the moral hazard implications of bailout packages.17

- Still, IFIs could play a useful role as coordinators of private sector bail-ins and enforcers of fiscal reform. The former would lower the level of public debt, thus pushing the economy into the high-growth region. Fiscal reform could also be very effective if it helps to lower tax distortions (e.g., $\theta$ in the present model). If countries are left on their own, these reforms may be hard to implement, because of political reasons. In the basic model in Section I, for example, fiscal tightening would be effective if it relies on lowering government expenditure in a credible and sustainable manner, which is usually tangled with serious political economy problems. IFIs could help to break the stalemate by offering “loans for reform.” If successful, the loans would be fully repaid because fiscal reform would place the economy on the high-growth path.

- However, the model suggests that outside the high-growth region, simple minded, belt tightening fiscal programs, relying on higher taxes, could be counterproductive in the short run.

17For a critical assessment of the moral hazard view in connection with recent EM crises, see Calvo (2002).
Thus, a literal reading of the model shows that a tax hike will have no effect, given that, in principle, it does nothing about total public debt, $D$, or its distortionary impact, $\theta$. However, higher taxes may help to bring the economy back to high growth. The hard question in this respect is whether a belt tightening policy will enjoy political support during the transition in which pain is not immediately rewarded by high growth.

Often during crises, tax hikes rely on taxes that are nondistortionary in the short run (i.e., wealth taxes and, in general, taxes on “sitting ducks”), but which would be highly distortionary if agents anticipated their continuation in the future. Therefore, these taxes are effective if policymakers can credibly ensure the private sector that they will be eliminated as soon as the emergency situation blows over. Conceivably, IFIs could help to reinforce credibility in this context, although I am highly skeptical: in the future there will likely be a new set of policymakers both in the world at large, and the country in question—making enforceability extremely difficult.

- Finally, a technical note. This paper shows that SSs can be both anticipated or unanticipated. My conjecture, though, is that SSs contain a large element of surprise, and that the recent episodes have a lot to do with the 1998 Russian crisis, and resulting perception that EM securities constitute a much more risky asset class than previously thought. However, this should not be read as belittling the relevance of domestic factors. On the contrary, as the model shows, the critical debt level is intimately related to domestic institutions. Moreover, given the strong nonlinearities implied by the model, domestic factors could be powerful multipliers of external shocks. The problem for the econometrician is that nonlinearities imply that, faced with the same external shock, some economies enter into deep crisis, while others escape totally unscathed. Moreover, those that are drawn into crisis will likely trigger additional domestic factors that contribute to the depth of the crisis (like political instability). Thus, the econometrician could wrongly infer that domestic factors are the sole determinants of these crises. Furthermore, if the number of crisis countries is small (e.g., at the time of writing, Argentina was the only large Latin American country that went into deep crisis after the Russian shock), empirical estimates will suffer from well known small-sample problems.
APPENDIX

The main purpose of this section is to show that the SS follows from the existence of tax distortions and not from the knife-edge feature of the model in the text. With that in mind, I will modify the previous model and assume that investment is subject to adjustment costs. More concretely, I will assume that the output cost per unit of capital associated with capital growth is portrayed by \( \phi(z) \), where function \( \phi \) is strictly convex and twice continuously differentiable (implying \( \phi'' > 0 \)). Notice, incidentally, that in the text I assume \( \phi(z) = z \). Thus, to stay close to that model in a neighborhood of 0, I will further assume \( \phi(0) = 0 \), and \( \phi'(0) = 1 \); moreover, I will assume that there exists \( \underline{z} \) and \( \overline{z} \) such that \( 0 < \underline{z} < \overline{z} < r \), such that \( \phi \) is defined on that open interval, and \( \lim \phi'(z) = \infty \) as \( z \) converges to \( \overline{z} \) from the left, while \( \lim \phi'(z) = -\infty \) as \( z \) converges to \( \underline{z} \) from the right. Moreover, to simplify the analysis, I make the realistic assumption that \( \lim \phi'(z) \) as \( z \) converges to \( \overline{z} \) from the right is finite (specifically, it does not converge to \( \infty \)).

Therefore, the value of the firm at time 0, \( V \), satisfies (see equation (4)):

\[
V = \frac{\alpha(1-\tau) - \phi(z)}{r - z}.
\]

Hence,

\[
\text{sgn} \frac{\partial V}{\partial z} = \text{sgn} \left[ -\phi'(z)(r - z) + \alpha(1 - \tau) - \phi(z) \right].
\]

and, if \( \frac{\partial V}{\partial z} = 0 \), then:

\[
\text{sgn} \frac{\partial^2 V}{\partial z^2} = -\phi''(z)(r - z) < 0.
\]

Thus, first-order conditions are sufficient for a maximum of \( V \) with respect to \( z \) because \( V \) does not contain a local minimum.

Plugging budget constraint (6) to substitute for \( \tau \) in expression (19), we get:

\[
\alpha - \theta D(r - z) - \left[ \phi(z) + \phi'(z)(r - z) \right] = J(z, D).
\]

Previous assumptions ensure that \( J(z, D) \) converges to \( \infty \) as \( z \) goes to \( \overline{z} \) from the right, and to \( -\infty \) as \( z \) goes to \( \underline{z} \) from the left. Hence, equilibrium existence is ensured for all \( D \). It can further be shown, by expression (21), that \( J_\tau(z,0) < 0 \) for all \( z \in (\underline{z}, \overline{z}) \). Thus, equilibrium is unique for \( D = 0 \). This result should not surprise us because if \( D = 0 \), there is no distortionary taxation. Moreover, as a general rule, under uniqueness, equilibrium is a continuous function of \( D \). This shows that in order to get the SS discontinuities discussed in the text, it is, as a general rule, necessary for the model to exhibit multiple equilibria (before imposing the equilibrium-selection principle according to which the economy settles on the highest growth equilibrium).

I will now show an example where equilibrium is not unique (in absence of the equilibrium-selection principle). By expression (21), and recalling that \( \phi(0) = 0 \) and \( \phi'(0) = 1 \), we have:

\[
J(0, D) = \alpha - \theta Dr - r.
\]

Let \( D^* \) be such that \( J(0, D^*) = 0 \). This implies that if \( D = D^* \), then \( z = 0 \) maximizes the value of the firm \( V \) with respect to \( z \). Clearly, by expression (22),

\[
\theta D^* = \frac{\alpha - r}{r} > 0.
\]
Moreover, by expressions (21) and (22), at $D = D^c$, 

$$J_z(0,D^c) = \frac{\alpha - r}{r} - \varphi''(0)r.$$  

(24)

Hence, given $r$, for $\alpha$ sufficiently large or $\varphi''(0)$ sufficiently small, we can ensure that $J_z(0,D^c) > 0$. Thus, drawing the $J$ function, given $D$, under these conditions readily shows that, if $D = D^c$, the economy will exhibit at least three equilibrium solutions (illustrated by the solid line in Figure A1). Moreover, by expression (21), the $J$ function shifts down as $D$ increases. Hence, there exists some $\bar{D} > D^c$ such that $J(z, \bar{D}) < 0$ for all $z \in [0, \bar{z})$. However, the “bad” negative growth equilibrium is never lost (illustrated by the dashed line in Figure A1). This implies that there will be some critical $D$ (equivalent to $\delta^2/\theta$ in the main text’s model) such that a growth collapse, SS, etc., will take place even if $D$ suffers a slight increase. Moreover, since the richer model could depict any number of equilibria, there could be succession of SSs as $D$ increases.

In closing, notice that the share of distorting debt in output at time zero, $\frac{\theta D^c}{\alpha}$, satisfies, by expression (23),

$$\frac{\theta D^c}{\alpha} = \frac{1 - \frac{r}{\alpha}}{r}.$$  

(25)

Thus, distorting debt in the multiple equilibria example can be made as small a share of output as desired by selecting $\alpha$ sufficiently close to $r$, and $\alpha > r$. This shows that the example does not require unrealistically high debt ratios.
REFERENCES


Panel Discussion—
Promoting Better National Institutions:
The Role of the IMF

JEFFREY A. FRANKEL*
NANCY BIRDSALL*
JEFFREY SACHS*
GUILLERMO ORTIZ*

Remarks by Jeffrey A. Frankel

I. What Are “Institutions”?  
What do we mean by institutions? The generality of the word cries out for a definition. But I am not going to attempt it. A narrow interpretation would consist of only specific legal bodies or procedural mechanisms. Examples include regulatory agencies, such as securities and exchange commissions, standards-setting bodies (e.g., for accounting), and what are sometimes called “commitment devices” (currency boards (CBs), guarantees of central bank independence, balanced budget amendments, the Stability and Growth Pact, etc.). A broad definition would include everything about a society that is more detailed than the basic theoretical model in a graduate economics textbook: from the existence of efficiency wages and a six-month gold futures market, to culture. The notion of institutional quality that has become common in the growth literature lies at an intermediate level of generality, and pertains to property rights and rule of law. I am happy to accept that usage. But, before I turn to it, I want to flag the wide variety of issues that could be termed institutional, and to observe that they may not necessarily all be correlated. For example, democracy is on many people’s list. But the commitment devices I named (currency boards, independent central banks, stability pact), are

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Table 1. Institutions Range Along Two Dimensions

<table>
<thead>
<tr>
<th>How relevant is this issue to balance of payments problems?</th>
<th>How sure are we that we know the right answer?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Very</td>
</tr>
<tr>
<td>Not Relevant</td>
<td>Religion</td>
</tr>
<tr>
<td>A Little</td>
<td>Social capital</td>
</tr>
<tr>
<td>Fairly</td>
<td>How to close banks and dispose of NPLs; what are the best bankruptcy procedures</td>
</tr>
<tr>
<td>Very</td>
<td>How to restore confidence in a crisis</td>
</tr>
</tbody>
</table>

distinctive for being institutions that prevent macroeconomic policy from being determined in "too democratic" a manner.

In Table 1, I have placed an array of what might be termed institutions, ranked across two dimensions: (i) How sure are we what the right answer is? and (ii) How clearly relevant are they to the business of the IMF, which I will interpret as countries' balances of payments, and, to a lesser extent, economic growth. The bottom row is, and has always been, clearly within the purview of the IMF. Within the bottom row, I have put monetary policy in the far right, because we are pretty confident what is the relationship between money and the balance of payments, exchange rate, and inflation. I have chosen to put fiscal policy one column over, because there is some controversy and uncertainty regarding questions such as whether raising taxes to eliminate a budget deficit can be beneficial, and what effect fiscal expansion has on the overall balance of payments. I have put capital controls and the choice of exchange rate regime under "we have very little confidence what the right answer is," even though we have a lot to say about it. And I have put "how to restore investor confidence during a balance of payments crisis" under "we basically have no idea."

Now move to the top row, to illustrate the questions not relevant to the business of the IMF. At one end I have judged that we have no idea what is the right religion (if there is one), so that it is fortunate that this is clearly not relevant to the job of the Fund. At the other end, I have judged that it is clear that protecting human rights and the environment are good goals, and that we have a fairly good idea how to go about them, but they are equally outside the purview of the IMF, even if it is sometimes

1When I say "how sure are we about the right answer," I don't necessarily mean "how sure am I personally," but more "how much agreement is there among informed opinion."
hard to explain that to protesters. I have assigned labor rights a lower level of confidence than the environment, because I am not sure what I think of "right to work" laws, for example, or that I want to tell other countries at what age teenagers can start working or whether labor unions must be given the right to hold meetings on the company premises. Two years ago, I would have placed democratic elections in the far right, but after the recent elections in Mexico, the United States, Zimbabwe, Brazil, and Bahrain, I am no longer completely confident which electoral institutions translate into appropriate realization of the will of the people.

One could debate the precise placement in the table of many of these entries. But I mainly want to establish the simple idea that these issues can usefully be arranged along these two dimensions.

II. Deep Sources of Growth

By now the empirical literature on determination of countries’ levels of income and growth rates is so large that some have called for a halt. I disagree. I think we are still learning important things about why some economies perform better than others. Some of the relatively better established determinants are investment, education, trade, political stability, financial development, and economic freedom.

Perhaps the most interesting part of the current debate on growth is: what are the deeper determinants? Yes, policies regarding taxes, government spending, and tariffs help determine investment, education, and trade. But what are the deeper determinants of those policies? A recent paper by Dani Rodrik and coauthors poses the question well. In their view, there seem to be three emerging theories: geography, openness, and institutions. Each theory can be captured by some standard measures; but each has serious endogeneity problems that must be addressed. (Table 2 illustrates.) Let us consider each in turn.

(1) By now "geography" has (belatedly) made its way deep into the literatures on trade and growth in many different ways. So it is important to clarify here what sort of geography we mean. We are talking about the natural climate, biology, and geology—especially differences between the tropics and temperate zones, such as the presence of malaria and other debilitating tropical diseases, length of the growing season, and other climate effects. The presence of malaria can be partly endogenous: it was stamped out in Panama and Singapore, despite their tropical locations, by superior technology and social organization. Such instrumental variables as latitude, percent of land in the tropics, or average temperature have been used to capture the exogenous component of theory number 1.

(2) By openness, we mean international integration along several dimensions, but trade is the most important, and the most readily measured (ratio of trade to
Table 2. Deep Determinants of Growth

<table>
<thead>
<tr>
<th>Determinant</th>
<th>1. Tropical geography</th>
<th>2. Openness</th>
<th>3. Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures</td>
<td>Malaria and other diseases; length of growing season</td>
<td>Trade/GDP, tariffs; FDI</td>
<td>Property rights, rule of law</td>
</tr>
<tr>
<td>Sample endogeneity problem</td>
<td>Suppression of malaria</td>
<td>Imported investment or luxury goods; endogenous tariffs</td>
<td>Regulation and tax systems develop with income</td>
</tr>
<tr>
<td>Exogenous instrumental variables</td>
<td>Distance from equator, tropical area; temperature, rainfall</td>
<td>Gravity model: including remoteness, landlockedness, linguistic and historical links</td>
<td>European settler mortality rates; extractive industries (plantation crops and mining)</td>
</tr>
</tbody>
</table>


GDP). Trade and trade policies are both clearly endogenous. For this reason, Frankel and Romer (1999) proposed an instrumental variable for theory number 2: geographical suitability for trade as predicted by the gravity model, and it has been widely accepted. It includes such exogenous determinants of trade as remoteness from big trading partners, landlockedness, etc. New Zealand and Botswana are disadvantaged in trade; Belgium and Hong Kong are well situated.

(3) Finally, institutions. Rodrik, Subramanian, and Trebbi use as their measure of institutional quality an indicator of the rule of law and protection of property rights (taken from Kaufmann, Kraay, and Zoido-Lobaton, 2002). Acemoglu, Johnson, and Robinson (2001) use a measure of expropriation risk to investors. Acemoglu and others (2002) measure the quality of a country’s “cluster of institutions” by the extent of constraints on the executive. The theory is that weak institutions lead to inequality, intermittent dictatorship, and lack of any constraints preventing elites and politicians from plundering the country.6

Institutions, much like malaria and trade, can be endogenous. Many institutions—such as the structure of financial markets, mechanisms of income redistribution and social safety nets, tax systems, and intellectual property rights (IPR) rules—tend to evolve in response to the level of income. Furthermore, where measures of institutional quality come from survey ratings, the responses may be influenced by ex post awareness of a country’s level of economic performance. What is a good instrumental variable for institutions? Acemoglu, Johnson, and Robinson (2001) and Acemoglu and others (2002) introduce the mortality rates of colonial settlers. The theory is that, out of all the lands that Europeans colonized, only those where Europeans actually settled were given good European institutions. This theory is related to the idea of Engerman and Sokoloff (1997, 2002) that lands endowed with extractive industries and plantation crops (mining, sugar, cotton)

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6 A key early contribution was North (1994). This is by now a large literature. Other examples include Roll and Talbott (2001), for whom property rights is one of the most important variables.
developed institutions of slavery, inequality, class, dictatorship, and state control, whereas those climates suited to fishing and small farms (fruits and vegetables, grain, and livestock) developed institutions based on individualism, democracy, incentives, egalitarianism, and capitalism. In both papers above, Acemoglu and his coauthors chose their instrument on the reasoning that initial settler mortality rates determined whether Europeans subsequently settled in large numbers. The first item to point out to justify this otherwise idiosyncratic sounding instrumental variable is that there need not be a strong correlation between the diseases that killed settlers and the diseases that afflict natives, and that both are independent of the countries' geographical suitability for trade. The conclusion of Rodrik, Subramanian, and Trebbi is that institutions trump everything else—the effects of both tropical geography and trade pale in the blinding light of institutions. Nobody denies the important role of, say, macroeconomic stability; but the claim is that macroeconomic policies are merely the outcome of institutions. This is essentially the same result as found by Acemoglu and others (2002), Easterly and Levine (2002), and Hall and Jones (1999): institutions drive out the effect of policies, and geography matters primarily as a determinant of institutions.7

My own view is that some of the papers may overstate the effect of institutions by not conditioning on enough variables. Table 3 reports some recent results from Noguer and Siscart (2002), who condition on country size, and implement the gravity instrument with a comprehensive set of bilateral trade data. They find that, yes, institutions have a statistically significant effect on income per capita, but openness and tropical location retain their significant effects as well. Alcalá and Ciccone (2002) instrument for both trade and institutions and find that both significantly raise output per worker. Institutional quality works mainly via physical and human capital, while trade works through the efficiency of labor.

For the purposes of this panel, it doesn’t matter much whether the effect of institutions is merely one of several important deep factors or if, as these papers seem to claim, it is the only important deep factor. Clearly institutions are important.

Financial sector institutions are particularly relevant for the IMF. Here the series of papers by La Porta and others (1998) shows the importance of such institutions as protection of shareholders rights, and the possibility that they are deeply rooted in history and culture. The relevancy of the variables explored by La Porta and others to the IMF’s job is supported by the finding that they predict external crises in emerging markets, as in Mulder, Perrelli, and Rocha (2002).

The exogeneity issue is important, not just for econometrics, but also for the question of relevance for IMF strategy. An implication of this line of research is that it may be futile for the IMF to pressure a country into better economic policies, if those policies are dictated by deeply rooted institutions. Acemoglu and others conclude, “Distortionary macroeconomic policies are . . . part of the ‘tools’ that groups in power use in order to enrich themselves and to remain in power. But they are only one of many possible tools. . . . An interesting possibility implied by this perspective is a seesaw effect: preventing the use of a specific macro distortion will not necessarily cure the economic instability problems, since underlying

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7 Easterly and Levine just group openness together with other policies. Hall and Jones consider latitude a proxy for European institutions and don’t distinguish the independent effect of tropical conditions.
| Table 3. Effects of Trade, Tropics, and Institutions—Noguer-Siscart Estimates  
(Independent variable: log GDP per capita in 1985) |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Trade Share</strong></td>
</tr>
<tr>
<td>(instrumented)</td>
</tr>
<tr>
<td>0.79**</td>
</tr>
<tr>
<td>(0.33)</td>
</tr>
<tr>
<td><strong>Log Population</strong></td>
</tr>
<tr>
<td>-0.13**</td>
</tr>
<tr>
<td>(0.06)</td>
</tr>
<tr>
<td><strong>Log Area</strong></td>
</tr>
<tr>
<td>0.24**</td>
</tr>
<tr>
<td>(0.08)</td>
</tr>
<tr>
<td><strong>Latitude</strong></td>
</tr>
<tr>
<td>0.45</td>
</tr>
<tr>
<td>(0.23)</td>
</tr>
<tr>
<td><strong>Tropics</strong> (share of population)</td>
</tr>
<tr>
<td>-1.83**</td>
</tr>
<tr>
<td>(0.20)</td>
</tr>
<tr>
<td><strong>Distance to Equator</strong></td>
</tr>
<tr>
<td>1.52**</td>
</tr>
<tr>
<td>(0.65)</td>
</tr>
<tr>
<td><strong>Sub-Saharan Africa</strong></td>
</tr>
<tr>
<td>-1.07**</td>
</tr>
<tr>
<td>(0.27)</td>
</tr>
<tr>
<td><strong>East Asia</strong></td>
</tr>
<tr>
<td>-0.10</td>
</tr>
<tr>
<td>(0.23)</td>
</tr>
<tr>
<td><strong>Latin America</strong></td>
</tr>
<tr>
<td>0.42</td>
</tr>
<tr>
<td>(0.25)</td>
</tr>
<tr>
<td><strong>Institutions</strong></td>
</tr>
<tr>
<td>1.27**</td>
</tr>
<tr>
<td>(0.40)</td>
</tr>
<tr>
<td><strong>Sample Size</strong></td>
</tr>
<tr>
<td>89</td>
</tr>
<tr>
<td><strong>R²</strong></td>
</tr>
<tr>
<td><strong>RMSE</strong></td>
</tr>
</tbody>
</table>

Source: Noguer and Siscart (2002).
Notes: A constant was included in the regressions but not reported. Robust standard errors, 
including adjustment for constructed regressors, appear in parentheses. "**" indicates statistical signif­
ificance at 95-percent level.

Institutional problems may manifest themselves in the use of some other tool by 
politicians and elites to achieve their objectives.” They give the example of tools 
used by the coastal elite in Ghana to maintain their power at the expense of cocoa 
farmers in the interior, through such policies as an overvalued exchange rate and 
the cocoa marketing board. If the IMF succeeds in preventing Ghana from having 
an overvalued exchange rate, the elite instead suppresses the price of cocoa paid 
to farmers in other ways.

“Is European settlement destiny?” Rodrik, Subramanian, and Trebbi, make the 
point that even though settler mortality is a good instrument for institutions, insti­
tutions can be determined by many other things as well and have been even in the 
past, and so there is no reason why they can’t be changed in the future. Acemoglu, 
and others do not disagree, having no wish to be predestinationists.
The point is important. The identification of an exogenous instrument that works historically should not stop one from working for beneficial changes in a country’s institutions that depart from geographic and historic destiny. Similarly, even when one has to take institutions as given, one should be aware of the wider context but shouldn’t refrain from working for beneficial changes in policy.

III. The Role of the IMF

The subtitle of this panel discussion is “The Role of the IMF.” I see the issue of institutions coming up under four headings of IMF activities: technical assistance, the new FSAP and ROSC activities, program conditionality, and the question of prolonged use of Fund resources.

Technical assistance to national governments is clearly relevant, such as help building better national statistical systems or the work of the IMF Institute. The Financial Sector Assessment Program (FSAP) helps countries develop better institutions for regulating banks and other financial markets. I gather that it now goes beyond general “capacity building,” and that FSAP missions typically visit just before Article IV missions, so that the results can be discussed at that time, and incorporated in the Article IV report, and sometimes in subsequent IMF programs as well. The same is true of Reports on Observance of Standards and Codes (ROSC) missions as well, especially regarding fiscal transparency.

Let us go directly to the issue of structural conditionality of IMF programs, wherein lies the heart of the debate. During the course of the 1990s there was an expansion in coverage or scope of IMF conditionality, from macroeconomic policies in the last row of the table, to structural policies, which, roughly speaking, is the second to last row. Perhaps in the “heat of action” during the East Asia crisis there was an expansion into such areas as competition policy, which are now reverting to World Bank responsibility. Currently the IMF devotes attention and resources to financial sector institutional issues, in particular.

The expansion of IMF conditionality beyond macroeconomic policy has been widely attacked as an example of mission creep. My own view is that this expansion has been appropriate. Briefly speaking, even if you don’t buy the argument that structural flaws such as crony capitalism were the cause of the East Asia crisis, it seems clear that the IMF could not put a lot of money into Indonesia without taking steps to make sure that the money wouldn’t “end up in Swiss bank accounts.” Investor confidence was not going to be restored unless President Suharto signaled in a serious way a change in regime away from enrichment of his family and toward an economic system that would remain workable in the future. As international economic integration increases, the tension between regulation...
and national sovereignty increases, and an optimal trade-off for multilateral governance probably entails giving up a little of each, rather than hugging either corner of no regulation or no sovereignty.

This doesn’t mean we are ready for the IMF to dictate countries’ domestic policies on human rights or the environment. That would be too serious a violation of national sovereignty, and in any case these areas are the job of other multilateral institutions. But an expansion of authority at the margin, one step up, strikes me as about right. And the World Bank should probably be operating one row above that, especially along the right margin.

Implicit in the table is the principle that in deciding whether an issue area is an appropriate concern, the IMF should not ask only “how directly relevant is it to the balance of payments?” but also “how confident are we that we know the right answer?” I think we are more confident that spending on education is good for the economy than on whether encouraging bowling leagues and choral groups is. We are more confident that corruption is bad than that American accounting practices are necessarily superior to European practices.

Return to the bottom row of Table 1. What about the point that convincing a finance minister to sign a letter of intent specifying macroeconomic targets—or, for that matter, agreeing to structural reforms along the lines of banking regulation and corporate governance—is unlikely to accomplish much if his heart isn’t in it? Macroeconomic and structural policies may be merely the reflection of deeper institutional constraints. In the old days, IMF staff would say that an important function of the Fund was to “take the heat politically” for tough policy decisions that the local finance minister might well understand to be necessary but could not enact domestically. It helped to be able to blame the unpopular policy on the IMF. And they would say it with a bit of pride. Thinking has shifted. Now the mantra is no longer “use the IMF as an excuse for reform,” but “the country has to take ownership of reform.” This is good as far as it goes. Certainly it is infinitely better to have the local politicians take ownership of a given reform package than not. But it begs the question of how to get them to do it.

My suggestion would be that it may be appropriate to start thinking more systematically about when to cut off perennial borrowers, particularly countries that have consistently failed to meet their agreed targets. The goal should be to move the long-run system toward a higher marginal reward for countries that are taking steps in the right direction, which means withholding support from those who are not. The judgment of which countries are in which category should not be based solely on overall economic performance, nor on how many times they have missed their program conditions, nor even on whether the country has been subjected to adverse developments beyond its control, such as an adverse trend in its terms of trade. I want to suggest that it may also be appropriate, at the stage of judging repeat users, to think about the broad institutional setting. If a country is undemocratic, corrupt, and chronically prone to spend resources on the military rather than health and education, then that may be a reason to conclude that a recurrent budget deficit

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*Note: The subject of corruption was almost taboo at the IMF two decades ago, but this has changed. There is by now a lot of work on the effects of corruption and transparency. See, for example, Gelos and Wei (2002) and Wei (2000).*
or overvalued currency indeed has deeper causes. The appropriate strategy for the international community may be to give up on that country for a while.

The IMF and other multilateral institutions cannot determine when the social and political conditions will be right in the country for a new sweeping reform movement. But they can offer would-be reformers grounds for hope that they will be given more help than would bad actors who are their domestic competitors. Of course, the kind of help that is appropriate to give is very different for the IMF than it would be for G-7 governments, aid agencies, or even the World Bank. Nevertheless, I am suggesting that it may be appropriate for the IMF to look at some non-traditional criteria, which could be termed institutional.

These same issues could be addressed in the context of the Poverty Reduction and Growth Facility. I know that part of the intention behind the process that produces Poverty Reduction Strategy Papers is to insure a country-driven agenda of structural reforms. But I don't know much about how this has been working so far in practice.

The historical example of settler mortality rates highlights how long-lasting institutions can be and how infrequently and slowly they change in general. But notwithstanding historical influences, institutions can change, and sometimes quickly. Most institutional change happens at a time of national upheaval, such as the end of a war or the birth of an independent country. We have all been reflecting lately on how successfully Japan and Germany were remade after the end of World War II. The breakup of the colonial empires in the 1950s through 1980s offered another opportunity that some countries (e.g., Singapore, Hong Kong, Botswana, and Mozambique) seized much better than others. In the early 1990s, the ruins of the Soviet Union left an opportunity for building new institutions that, though it appeared frustratingly slow and erratic at the time, ten years later has begun to look better in many transition economies. Finally, today, such new countries as East Timor, Macedonia, and Afghanistan are open to advice on institutional design coming from the IMF and the rest of the international community, more than were the nations that become independent with the original breakup of the big colonial empires forty years ago.

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Remarks by Nancy Birdsall

A New Social Contract for Open Economies and the Implications for IMF Conditionality

I was inspired by the title of this panel to talk about the concept of a social contract, a crucial and too often neglected national institution. Specifically, I am going to address the need for what might be called an "open economy" social contract—that is, a social contract for developing countries participating in the global economy, and the implications for IMF conditionality.

I. A Social Contract for Open Economies

A social contract is the outcome of a collective decision, usually through a political process, in which members of the relevant groups bind themselves to collectively finance and provide certain investments and protections for themselves in their mutual interests. Typically, these investments and protections encompass health, education, employment, and old age security. A social contract mitigates the inherent injustices of unfettered markets where initial endowments of financial, human capital, and other assets are unequal. In that sense, a social contract can address inequality of opportunity. In addition, a social contract reflects and reinforces the capacity of societies to manage different economic interests, across income groups, as well as among ethnic groups, across regions, and so on.

Given that a domestic social contract has to be forged and sustained in the political arena, it needs to reflect the interests not just of the poor but of the large majority of members of a particular collectivity. A social contract is particularly important for emerging market economies, where the large majority of citizens, not just the poor, are vulnerable to the volatility and instability that seem to accompany the benefits of greater openness. As Dani Rodrik pointed out some years ago very well, more open economies spend more on social transfers. The most open economies in developed Western societies tend to have the deepest social contracts.

What does this notion of an open economy social contract have to do with the IMF? Is this IMF business? Doesn't it sound like World Bank business or Inter-American Development Bank business? The social contract implies redistribution, and the IMF is wary of redistribution. It sounds like politics, where the IMF does not belong. And what does it have to do with conditionality?

II. Is an Open-Economy Social Contract the IMF’s Business?

Let me suggest three reasons why supporting countries in forging and sustaining a social contract is so tied up with typical IMF business:

1. The first reason is that good fiscal policy, which is obviously at the heart of the IMF’s mandate, is the basic ingredient of a healthy, open economy social contract. Obviously, good fiscal policy affects job creation, and in most societies, this is the central issue for the great majority of people. It affects job creation insofar
as bad fiscal policy tends to crowd out the private sector by driving up interest rates and imposing on monetary authorities the burden of maintaining stability.

In addition, lack of fiscal discipline and any resulting buildup of public debt affects the ability of governments to be countercyclical and to protect various groups in the population—not just the poor, but the vulnerable middle-income groups, when times are bad. One of the big differences between East Asia and Latin America in their ability to protect their middle-income as well as poor citizens during the crises of the last decade has been that when East Asia went into its crisis, most countries had much less public debt than Latin American countries.

2. My second reason is the same. Good fiscal policy is the basic ingredient of a healthy social contract. But I make it a second point because I want to emphasize not just the average levels of taxes and expenditures, but the composition of the tax burden and the incidence of expenditures. What is the role of the IMF versus the World Bank in these areas? Sadly, that is not very clear.

Consider Argentina in the late 1990s. In the late 1990s, when Argentina was growing rapidly, I believe there was a sin of omission on the part of the international financial institutions. None of them—not the IMF, the World Bank, or the Inter-American Development Bank—was focusing on, and putting on the table for public discussion, the composition of expenditures and the formal burden of taxes in Argentina. Who was there, making transparent and more visible to a larger public that large expenditures were going to patronage, to political ends? Who was clarifying that the richest 10 percent of households in Argentina weren’t paying very much in taxes? (IMF research suggested that the average effective tax burden of those households was about 8 percent in the 1990s.) The IMF wasn’t there because the IMF leaves to the World Bank the issues of expenditure allocation and institutional strengthening. But the World Bank wasn’t there because the World Bank leaves to the IMF macroeconomic policy. Plus, the World Bank and the Inter-American Development Bank were busy with social programs, overlooking the reality that the social contract is about healthy fiscal policy, not just social programs per se.

Argentina illustrates that it makes little sense to pretend there is a simple distinction between good economic policy and good social policy, or to assess fiscal and monetary policy strictly and solely in terms of its effects on stability and efficiency, ignoring its implications for social cohesion.

3. A third reason is that the financial sector in open economies is IMF business, and what happens in the financial sector affects the capacity of societies, particularly in open economies and particularly in emerging markets, to manage the social contract. The structural problem is that financial sectors in emerging markets, because they are emerging markets, tend to be shallower and thus less resilient and less able to help manage what happens if there is either an external shock or some sort of internal policy shock or a natural disaster.

Now, I wanted to raise the financial sector to reemphasize that the social contract is not just about poverty and the poor. The middle-income working class households are particularly vulnerable to shocks that arise because of this problem of a relatively shallow financial sector. It is the middle-income households and working class households who are, in the end, the political bedrock of a social contract that works.
During the Asian crisis, it was actually not the poorest households who suffered the largest absolute or relative losses, but what I would call the "urban strivers" (the emerging, potential, incipient middle class in urban areas). In many emerging market economies, there are so many households so close to the poverty line that we have made a mistake, I think, in distinguishing between the poor and the rest. What we should be distinguishing between, especially in the case of Latin America, is the 10 percent of households that are at the top of the distribution, where household heads have post-secondary education, and all the rest. Median household income in a country like Brazil is only one-third of average household income. In Peru, households in the middle of the income distribution have surprisingly poor health indicators. It may surprise you to know that the infant mortality rate for the middle quintile of households in Peru is higher than the average infant mortality rate in Ghana.\(^1\) Median income in Brazil is so close to the poverty line (at $2 a day) that it is not surprising that when there are negative or positive shocks (a positive shock for Brazil with the "Real" program), you see big shifts in poverty head count up and down.

Behrman, Birdsall, and Szekely (2001) conclude that overall, the set of reforms during the 1990s in Latin America did not increase wage gaps between the skilled and unskilled workers, nor did they hurt the poor. However, among reforms (including trade liberalization, labor, tax reforms, and privatization) capital market opening and financial sector liberalization were most conducive to increasing wage gaps. That finding is consistent with the evidence presented in this conference by Kose, Prasad, and Terrones (2002) about how increasing financial openness is associated with rising relative volatility of consumption for a significant group of emerging economies.

Surely, the political popularity of Lula in Brazil represents the demand by the great majority of middle-income households in Brazil that are above but precariously close to the poverty line, for a new kind of social contract. Of course, that social contract would recognize that fiscal and financial discipline are critical to capturing the benefits of more open economies. But it would also recognize that those disciplines have to be managed in ways that are more explicitly "fair" and just. In its work on the financial sector, it seems to me the IMF must take into account and work with countries on managing the implications of financial liberalization (and of work-outs) for the social contract.

III. Conditionality: Implications for the IMF

Ownership by governments (and implicitly by societies) of reform programs is necessary for sustained success. Conditionality is certainly not a substitute for ownership, but in its defense I would say it can be a useful complement to ownership. The issue for the IMF is to focus not only on limiting the number and the domain of the conditions it negotiates, but to ensure that conditionality avoids undermining and indeed more often visibly strengthens societies' efforts to forge, sustain, and ultimately "own" their own social contract. That implies a mandate

\(^1\)For more on the characteristics of middle-income groups in Latin America, see Birdsall (2002).
for the IMF to assess not only the implications of its advice for the poor and changes in poverty, but also for the stability and sense of security of the great majority of developing countries' citizens, in short the implications of its advice and lending for modern open economy social contracts that reflect societies' sense of justice as well as hopes for growth.

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Remarks by Jeffrey Sachs

A key part of the message I want to deliver is that we need to avoid trivializing the complicated issue of institutions. Indeed, I am going to stress why it is so easy to get the issue of institutions wrong. Institutional reform is an area that is tougher than it looks, and the international community is not always on the right track in its particular focus and recommendations. Too often, it fails to account for, or even recognize, the deeper forces that lead to institutional failure.

I want to start with a general methodological observation. For a long time, certainly since Walras, economists have aimed to create economics in the image of classical physics; that was a great mission of general equilibrium analysis, and it obviously has produced very powerful results. However, I think we are finding more and more that economic analysis has to be even more like the science of ecology than physics. Like ecosystems, or living organisms, economies are complex, interdependent, and nonlinear systems. Such systems require a very special kind of analysis, and it is one in which I view the institutions debate as being embedded.

Maybe we can think of the institutions in a society like the organelles of a cell: the ribosomes, the mitochondria, and the other specialized units that perform specialized functions in an interconnected manner to keep the cell alive. One of the features of a complex interconnected system like a living cell is that when any one of those organelles is misfiring, the whole cell can die. Even if component A is failing, the root cause may be component B. A medical analogy applies, since human
bodies too are complex systems. When the body is misfiring, the doctor has to make a differential diagnosis. It is not good enough to say that the heart stopped beating, and therefore, the person has a cardiac problem. Maybe the heart stopped beating because it stopped being profused with oxygen, as a result of suffocation. The cardiac problem is secondary to a respiratory problem, which must be solved first.

Macroeconomists often fail to make this kind of differential diagnosis. When an economy is collapsing, we try to isolate the problem in the places we know best, whether that is the budget or the tax policy or the exchange rate. We have endless debates about manipulating macroeconomic variables, when the deeper problems in the system—the organelles that are misfiring—may be rooted in completely different institutions, whose failure is being transmitted throughout the entire system, and therefore manifesting itself as a macroeconomic problem as well. In that case, the macroeconomic failures are symptoms, not the primary causes of social and economic collapse.

There is another point about living systems that is particularly important for the world's poorest countries. Complex living systems are open energy systems, as Schrödinger told us 50 years ago. They require energy inputs to achieve a high level of organization and to combat entropy. In prosaic terms, societies need to be fed. When these systems don’t have enough energy input, enough to cover the needs of basal metabolism, the cell collapses. The same thing is true with some of the poorest societies in the world. They cannot survive physically right now at the low level of productivity of their internal economic systems, and there is not enough “energy” (in the form of foreign aid, foreign exchange earnings, external loans, or other transfers) coming from the outside.

The result is literally mass death in a lot of impoverished places in the world, which we talk about prosaically as macroeconomic crises. For instance, Southern Africa is a region of mass death right now, as a result of AIDS, drought, poor governance in some of the countries (but not others), and resulting social disorganization. It is not merely a macroeconomic crisis. We have to understand that if we are going to get this right.

I. What Is the Range of Interesting Institutions to Deal With?

Because of the complexity of social organization, we cannot limit our institutional view to just a few chosen institutions, such as commercial law, or the budget, tax, and monetary institutions. Critical social institutions also include the systems for delivering safe drinking water, energy, sanitation and waste disposal, education, health services, and the production and diffusion of scientific knowledge. When any one of these institutions breaks down, it puts the rest of the society at risk. The economy loses productivity, and the “energy” inputs needed to maintain a high degree of social organization are lost. A fiscal or banking crisis may result, leading to a generalized collapse of economic activity.

Now, why do I go on about this perhaps trivial point? Because, as I’ve already emphasized, we are sometimes really barking up the wrong tree when we are trying to understand what is going on in a country. We go straight to the tax policy or the exchange rate, and we think we are doing something, when the problems are
really much deeper, perhaps in the failure of the health sector, or the power sector, or the education sector.

Let me turn again to the poorest countries. The IMF has been in the business of large-scale involvement with the poorest countries for almost 20 years, since the first structural adjustment lending in the 1980s. The record of performance in a large number of those countries is dismal. I’m not saying that things would have been worse or better without the IMF, only that with the IMF the situation has been far from satisfactory. In large parts of sub-Saharan Africa, the past two decades have been marked by a continuation of economic crisis, falling living standards, environmental degradation, and of course the spread of pandemic diseases, led by AIDS. I would argue that this dismal record reflects the fact that the IMF, and the international community more broadly, did not have a realistic diagnosis of what was happening in those countries, and therefore, the focus of reform efforts did not get to the core of the problems.

For the countries that I am dealing with in sub-Saharan Africa, the problem is one of insufficient energy input. These societies, I will stress again, are literally dying. Food productivity is too low to provide the necessary metabolic inputs at the household level. Infectious diseases are rampant. Energy is mobilized unsustainably by chopping down the forest. Macroeconomic balance in these circumstances, brought about by tight budgets and hard monetary constraints, will stabilize prices but will not stop millions of people from dying of disease. Macroeconomic stabilization in the face of mass suffering is not sufficient. These countries desperately need an infusion of help, of real help, of a much larger amount than is in play right now.

The Managing Director makes this point all the time these days, but it is not operationalized in the IMF programs and what the Board reviews when it considers the plight of these countries, and how we talk about these countries in the Article IV consultations. In none of these documents is there a realistic assessment of what would be needed institutionally to make these societies function. This is a severe shortcoming, since we continue to get societal crises that are absolutely out of control.

There are other countries, the Andean countries for example, where again, the basic problems are not macroeconomic. Some of the basic problems today reflect the profound economic costs of being 12,000 feet above sea level, particularly in landlocked regions. Those geographical problems are really serious—the Andean countries have among the highest transport costs in the world, and this makes it very difficult for them to attract export-oriented industries other than in a few high-value primary commodities: oil, gas, gold, copper, and, of course, cocaine.

Drug trafficking to serve the U.S. demand is a phenomenally important part of the real life of Bolivia, Peru, Colombia, increasingly Ecuador, and other countries in the region. The level of corruption that it causes, the distortions of the macroeconomic environment, the inability to run other, normal functions is profound. Militarization of that crisis, backed by the United States, solves little. But we don’t talk about the real things—and as a result we have a whole region that remains in profound crisis.

For a lot of emerging markets, we also talk about superficial matters, not the deeper issues. When we talk about Argentina, for example, we talk endlessly about the exchange rates, provincial budget deficits, and corruption. I think that in the final
analysis, these problems do not get at the core of what is wrong in Argentina. Argentina, it strikes me, is a society that has lacked yet another set of missing institutions—the institutions of science, technology, and higher education. When Argentina reached a relatively high level of income, around $10,000 per person, future economic growth depended on making the transition away from primary commodities (and foreign loans) to a knowledge-based economy. That would have required a set of public and private institutions to promote science, technology, and higher education. Alas, it was not to be. Argentina’s budget deficits were a symptom of its chronic lack of competitiveness. And the fixed exchange rate regime of the 1990s was inconsistent with an otherwise technologically stagnant economy.

Yet when Argentina was told about the Washington Consensus, it was not told that the consensus includes major investments in science and technology. It was told only to privatize, not to invest public funds in raising the technological sophistication of the economy. Nobody mentioned, it seems, that the “free market” U.S. invests more than $100 billion per year of federal budgetary funds in science and technology programs.

II. What Should (or Should Not) the IMF Do in This Context?

Given that key underlying problems in Africa are problems of disease, geography, soil infertility, energy insufficiency, and the like, I used to think that the best decision for the IMF would be to get out of African lending altogether. These problems are obviously not at the core of IMF expertise. Yet the IMF decided to “stay in” Africa, to try to help. With that decision, however, comes a much greater responsibility. The IMF simply must do a better job of differential diagnosis, that is, a much better job of understanding that the roots of extreme poverty lie in terrible problems of disease, climate, geographical isolation, and other related factors.

I am not saying that the IMF should quickly form a malaria research group on 19th Street. I am saying, instead, that the IMF has a much greater responsibility to mobilize expert knowledge—from the World Health Organization, UNICEF, the World Bank, elsewhere—in order to be responsible and accurate in its differential diagnosis. And what difference would that make in practical programming terms? Here’s the nub of the issue.

When the IMF says that the financing gap for country “X” is so-and-so, that judgment has got to be against a standard. The standard has been, roughly speaking, the following: “Here is what the donors are going to provide you in loans, grants, and debt relief. Now you have to live within your means. And since inflationary financing is not effective for long-term growth, you have to tighten the budget and monetary policy sufficiently to achieve price stability.”

What I am saying is that the international system can no longer stop at that point, because the results can be disastrous. We have to put the financing gap calculation in a different perspective, by asking what the country needs in external help in order to achieve the internationally accepted development goals, for example, of controlling disease, reducing hunger, cutting child mortality rates, and so forth. And if that’s not possible within a macroeconomic framework as currently funded by external donors, then it is the IMF’s responsibility, actually, to go back
to the donors and say that there is a true financing gap. The financing gap is not the gap to fill some notional balance of payments target that leaves millions of people dying each year. The financing gap is the donor financing that is needed to achieve the development goals that the international system has adopted, specifically the Millennium Development Goals. Identifying that kind of development financing gap requires a deeper knowledge of what the underlying problems are in impoverished societies wracked by crisis. It requires enough knowledge of AIDS, malaria, TB, drought, soil infertility, and the like, to get to the core of the society’s basic needs, with donor help when necessary.

In the end, the role of the IMF in the poorest countries, and it could be a critical and magnificent role indeed, is to assess the macroeconomic framework that can produce economic development, not merely a framework to produce price stability. And for that, the Executive Board and staff of the IMF will need to become closer partners with the specialized U.N. agencies that can help to assess the needs in health, environment, energy, water and sanitation, and other critical underpinnings of long-term and sustainable economic development. By addressing the deeper forces that shape economic development, the IMF will be far more successful in promoting long-term economic development, and will find itself spending less time having to battle the macroeconomic symptoms that reflect more fundamental development challenges.

Remarks by Guillermo Ortiz

I. Institutions: Their Importance and Barriers to Their Change

According to Douglas North, institutions are, basically, the rules of the game of society, and they are the set of laws and practices sanctioned by custom and organizations that give a stable structure to the relationship between individuals and groups.

I would venture that most policymakers have a sense of which institutions work and which institutions don’t work in their own countries. Then we have to ask ourselves why is it that there is not a change either of agents, society, governments, and so on toward improving institutions. I think there are three basic reasons for that.

One of them is the weakness of the organizations that could manage change. Another reason is the existence of special interest groups. They are many times heavily entrenched in the institutions themselves and they are actively pursuing their own interests and do not allow for change.

The third reason is probably inertia. As you know very well, institutions develop from historical and cultural patterns. Some people would say—I hope I offend no one—that the institutions that colonial Spain left in Latin America are to some extent responsible for some of the difficult times that we have had over the past two centuries.
II. How Can International Institutions and Organizations Help Change Domestic Institutions?

International institutions can be very helpful to overcome the first problem—knowledge base; they can be somewhat helpful in overcoming the second problem—the existence of special interest groups; and they have absolutely no relevance to the third problem.

With respect to the first problem, it is obvious that the IMF, in particular, and the World Bank are like hubs of economic knowledge and experience. Every time an IMF or World Bank mission goes to a country to tackle a problem, there is experience acquired that can be processed and hopefully applied to other countries.

Membership in international organizations can really help strengthen institutions. For instance, the North American Free Trade Agreement (NAFTA) has been a tremendous force to create institutions in Mexico. The fact that you have a horizon for tariffs to be reduced, the fact that you have investment rules, the fact that you have clear mechanisms for solving controversies—all this has helped to create institutions. For example, the new foreign investment law was enacted in 1993 when the NAFTA was being negotiated, so that itself is important.

It is frequently argued that both central banks and finance ministries are effective only if their reputations are high. So there is a reputational component that is very important and that can be strengthened by positive action on the part of the Fund. In many cases, Fund programs actually strengthen the hands of domestic authorities, particularly, again, central banks and ministries of finance, and they help them to be somewhat isolated from political pressures.

Another important impact, for example, is the role of international watchdogs. For example, the OECD recently published a report on education in member countries. Mexico got pretty bad marks and that spurred a national debate, easing the creation of an Institute for the Evaluation of Education, formed with the broad participation of the teachers’ union and so on.

Another point that I would like to underline is the issue of transparency. The work on standards and codes, financial sector assessment programs, and so on has been extremely useful in many countries, including Mexico.

Finally, of course, the Fund and international organizations can finance the domestic building of institutions.

III. Can International Organizations, on Occasion, Do More Harm Than Good?

There is a fine line between providing a useful spur to help mobilize domestic support for reform and meddling in domestic affairs on the other hand. The difference between constructive incentives and meddling is a thin one. This discussion is not new and it relates to the whole question of ownership. Therefore, I think it is very important, both in terms of the substance and of the form, how the Fund and international organizations interact with domestic authorities.

One of the main risks that international organizations run into is the flip side of the expertise that they accumulate in their, let’s say, connection with all the
countries. They have expertise in a vast number of countries, but they really lack in-depth expertise in a single country. And since institutions often interlock, it is very difficult to see how pushing, for example, in one direction will affect other economic and social interactions.

IV. Final Thoughts

Two additional points deserve to be mentioned. The first is related to the Sovereign Debt Restructuring Mechanism (SDRM). I think that it is very laudable, of course, that the Fund has launched the discussion on the SDRM to try to smooth the relations between different agents, creditors and debtors, in a country. However, I think that the form and timing of these efforts in the framework of pretty strong opposition on the part of issuers and the international financial community is something odd, and one has to reflect on it.

The final point is that it is as important to create institutions as it is to preserve them, so one of the important roles of the Fund when it assists a country is to avoid a breakdown of the institutions. The tragedy of Argentina, I think, more than anything is the total breakdown of existing institutions. In countries where the Fund has been effective—Mexico, Brazil, and so on—it has helped to preserve and strengthen institutions. In the case of Mexico, as part of our 1995 program we took this issue of transparency very seriously at the central bank, and this was an important element in enhancing, let’s say, the working and the credibility of our institutions.
Toward a Statutory Approach to Sovereign Debt Restructuring: Lessons from Corporate Bankruptcy Practice Around the World

PATRICK BOLTON

This paper provides an overview of key elements of corporate bankruptcy codes and practice around the world that are relevant to the debate on sovereign debt restructuring. It highlights that there are four components common to most bankruptcy reorganization institutions: a stay on debt collection efforts to prevent a costly run for the assets, broad enforcement of absolute priority, majority voting among creditors on the proposed reorganization plan, and new higher priority financing to keep the firm going while its liabilities are restructured. The paper goes on to argue that these components ought to be present in some form in any sovereign debt restructuring procedure even if important differences exist between corporations and sovereign states. [JEL F34, G34]

The IMF's (2001 and 2002) recent proposals for the introduction of a sovereign debt restructuring forum to facilitate the resolution of sovereign debt crises, led by Anne Krueger, the First Deputy Managing Director of the IMF, draw an important analogy between corporate bankruptcy and sovereign debt restructuring. These proposals build on policy reassessments following the Mexican crisis of 1995 (e.g., the Rey Report, 1996) and, more importantly, the Asian crisis of 1997. They also build on perceptive early policy proposals by academics, most notably Oechsli (1981) and Sachs (1995) (see Rogoff and Zettelmeyer, 2002, for a survey of the different proposals).

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The Mexican and Asian crises revealed two major problems with the established policy approach toward emerging market balance of payments crises: IMF programs providing temporary bailouts to financially stricken member countries. Even if a policy of granting massive financial aid could succeed, as it did for Mexico, it was likely to increasingly strain the IMF’s own financial resources. In addition, a policy based mainly on bailouts was likely to result in careless future lending (the so-called “moral hazard” in lending) if it had not already done so.

To address these problems a change in orientation has been proposed to allow for debt renegotiations and for more “private sector involvement” (e.g., the Rey Report, 1996). This change of policy direction reached a culmination point when proposals for a sovereign debt restructuring mechanism (SDRM) were recently aired by Anne Krueger (2001, 2002). These proposals do not call for a radical shift away from existing policies based on IMF programs but rather for the addition of a last-resort debt reduction option to a policy based mainly on bailouts.

The ideas for the establishment of an SDRM draw an important analogy with Chapter 11 of the U.S. Bankruptcy Code. They suggest that a financially distressed sovereign nation should be allowed to declare a standstill on debt payments and to put itself under the protection of an international bankruptcy forum. To be sure, the analogy is not perfect. For example, creditors cannot easily foreclose on a sovereign’s assets. Despite important differences, this paper will argue that the history of U.S. corporate bankruptcy law and the varied practice of corporate bankruptcy around the world contain useful insights for the policy debate on sovereign debt restructuring.

Not all corporate bankruptcy codes around the world are equally relevant and some may have no relevance at all. Nevertheless it is useful to look into corporate bankruptcy practice outside the United States to get an idea of where the greatest differences lie and why. Thus, the main contribution of this paper is to bring in other countries’ bankruptcy experience as well as the history of U.S. corporate bankruptcy, which is particularly enlightening, and to draw a few lessons for the relevance of a statutory SDRM relative to less intrusive proposals such as collective action clauses.

I. The Corporate Bankruptcy Reorganization Problem and U.S. Bankruptcy Law

As many commentators have pointed out, Chapter 7 of the 1978 code, which regulates how a bankrupt firm’s assets should be liquidated and how the proceeds from liquidation should be divided up between creditors, is not particularly relevant for sovereign debt restructuring, as sovereign states never get liquidated. Accordingly, the discussion below focuses entirely on the reorganization part of corporate bankruptcy.

A Brief Historical Overview

U.S. bankruptcy reorganization law grew out of so-called “equity receiverships.” These were designed to deal with the numerous railroad failures that arose at a time when the United States did not have any formal bankruptcy institutions. When a railroad failed in the 1850s, it could not turn to the states or the federal...
government for a rescue, as there was little political support at the time for bailouts. The railroads had to turn to courts, which gradually transformed a procedure designed to close down and liquidate a debtor’s assets into a full-fledged reorganization procedure preserving the going-concern value of the railroad. There were five important steps in this transformation:

- In an effort to preserve the liquidation value of the firm, courts were led to also try to maintain the railroad’s going-concern value. It was easy to see that there was not much value in selling track piecemeal.
- Preservation of the going-concern value required the appointment of a “receiver” to run the failed railroad while liabilities were being restructured; it also required a de facto stay on individual creditor suits.
- Investment banks formed bondholder committees to represent dispersed bondholders in restructuring negotiations. To obtain maximum leverage these banks encouraged bondholders to give the committee proxy rights. When there were multiple issues and multiple committees a super-committee was formed, which formally purchased the railroad in a liquidation sale and worked out a reorganization deal. The new shell company would then distribute new claims to the old bondholders in accordance with the terms agreed upon by the reorganization committee.
- While this negotiation process was ongoing, railroads needed new funds to keep running and pay suppliers. Initially the new financing was provided by the existing claimholders (shareholders, creditors). Eventually this form of lending was transformed into what became known as “debtor-in-possession” (DIP) financing.
- Despite investment banks’ best efforts there were always “hold-out” bondholders who refused to deposit their bonds with the creditor committee. The courts’ initial response to this hold-out problem was to specify a minimum bid (or “upset price”) in the formal liquidation sale. Bondholders who did not want to exchange their old bonds for new ones under the proposed restructuring terms could exchange their old claims for cash at that price. Generally the upset price was set at sufficiently low levels to make it unattractive to sell. Later, the practice evolved and reorganization deals often excluded unsecured creditors altogether, induced shareholders to contribute more cash in exchange for a stake in the reorganized railroad, and otherwise divided up the spoils among secured creditors. The Supreme Court put an end to this practice in *Northern Pacific v. Boyd* in 1913 by spelling out for the first time the outlines of an absolute priority rule: shareholders should not be entitled to any new claims if creditors had not been paid in full. In an interesting twist, later practice found an imaginative interpretation of the absolute priority rule, requiring that both unsecured creditors and shareholders pay cash to be able to participate in the reorganized firm (see Skeel, 2001).

The creation and evolution of equity receiverships is interesting because it highlights the role of the key features of modern reorganization law that are taken for granted today, such as the stay on individual lawsuits, the creation of creditor committees, and the importance of DIP financing. It also points to an interesting way of dealing with holdouts, which may be relevant for sovereign debt restructuring. Holdouts must either sell their claims for cash at a low price or agree to the exchange terms negotiated by the creditor committees. Equity receiverships
also illustrate that the creation of a super-committee is necessary when many different bond issues are involved.

Interestingly, the early model of equity receiverships, in which a receiver appointed by bondholders ran the failed railroad, was later transformed into a debtor-in-possession model, with managers obtaining court approval for preemptive reorganizations before bondholder committees could step in and appoint a trustee to run the railroad.

The Great Depression brought major changes to this basic template with the Chandler Act of 1938 (and the Trust Indenture Act of 1939). In response to widespread criticism of the generous fees bankers and lawyers obtained in some reorganization cases, as well as the length of the renegotiation process, it was felt that the judicial model of corporate reorganization did not provide adequate supervision of the negotiating parties and their lawyers. In other words, it was deemed that the people in charge of debt renegotiations under the existing model were not always acting in the best interest of all parties involved and that greater court supervision was required. Thus, a new administrative model was introduced under Chapters X and XI of the Chandler Act.

In contrast to the later equity receiverships, under which management remained in control of the distressed firm and negotiated a restructuring agreement with creditor committees, Chapter X mandated the appointment of an independent trustee to run the company. In addition, Chapter X removed the power to propose a reorganization plan from the debtor and gave it to the trustee. Severe restrictions were also placed on who could qualify as a trustee. Basically the trustee had to be an independent agent with no connection to the firm. Once a plan had been formulated by the trustee it first had to be approved by the bankruptcy court before creditors could put it to a vote. The new plan had to respect the absolute priority rule and the Securities and Exchange Commission (SEC) closely monitored the whole reorganization process. In short, the new bankruptcy reorganization code was designed to give an independent administrator a lot of power at the expense of the contracting parties (debtor and creditors) or their representatives, who were no longer trusted to come to an efficient reorganization solution. Relative to equity receiverships the new procedure involved a much more heavy-handed bureaucracy.

Anticipating that this rigid administrative approach would create incentives for the contracting parties to circumvent or avoid the new formal bankruptcy reorganization procedure, Congress went as far as passing the Trust Indenture Act of 1939, requiring the unanimous agreement of all bondholders to restructure a bond outside of bankruptcy court. Thus, only a bankruptcy court (under a Chapter X filing) could bind a dissenting minority to a reorganization plan.

The immediate effect of the new bankruptcy law was to encourage managers of publicly traded firms to avoid a bankruptcy filing under Chapter X at all cost. While the number of Chapter X filings in 1939 was over 500, and remained close to 300 in the subsequent two years, they remained around 100 per year until the replacement of the Chandler Act by the 1978 code. This small number of filings

1Another intention of the Trust Indenture Act was to provide greater protection to small bondholders against expropriation actions by the debtor acting collusively with a majority of bondholders (see Buchheit and Gulati, 2000).
was partly the result of greater efforts by firms to avoid financial distress altogether. But mainly the small number of filings under Chapter X was the result of firms' greater and greater ability to file under Chapter XI of the Chandler Act. The Chandler Act intended that all publicly traded firms file under Chapter X and smaller privately held firms file under Chapter XI. But no explicit formal restrictions were put on Chapter XI filings (except for the absence of secured lending). In contrast to Chapter X, under Chapter XI management retained control and there was no SEC oversight. Not surprisingly, publicly traded firms increasingly tested the gray area delineating the limits of Chapter XI filings. Over time larger and larger firms successfully filed under Chapter XI of the Chandler Act, which became the natural precursor for today's bankruptcy reorganization procedure under Chapter 11 of the 1978 code.

This very brief historical overview of U.S. bankruptcy reorganization law contains some useful lessons for the sovereign debt restructuring mechanism. Mainly it vividly illustrates how the institution of choice in corporate reorganization is a court supervised renegotiation procedure through which the debtor remains in possession of the firm while negotiations are ongoing. When firms had a choice between two alternative procedures, they showed that they preferred the procedure with a debtor in possession (Chapter XI of the Chandler Act) to that with an independently appointed trustee and regulatory oversight by the SEC.

In addition, U.S. bankruptcy history shows that a "spontaneous" creation of a bankruptcy-reorganization institution—equity receiverships—has three main elements: (i) a stay on individual debt-collection efforts and possibly a suspension of debt repayments; (ii) new financing to preserve the going-concern value of the firm; and (iii) delegation of negotiations to creditor committees and the possibility of binding a dissenting minority. All three elements appear to be important for an effective bankruptcy reorganization procedure and are also likely to be essential for a sovereign debt restructuring mechanism.

U.S. Bankruptcy Reorganization Under the 1978 Code

We have already described the underlying economic principles of bankruptcy reorganization that have given rise to equity receiverships. We now turn to a more detailed description of the reorganization process under Chapter 11 of the 1978 Bankruptcy Act.3

The right to file a bankruptcy petition resides mainly with the debtor. Although courts can reject a petition if the debtor has not acted "in good faith," they have (almost) never done so. Creditors can also file but only under very limited conditions. In particular, it must be the case that the debtor has defaulted on its debts. Creditors can also ask the court to deny the bankruptcy petition.

2Alternatively, equity receiverships can be characterized as a "contractual" bankruptcy solution that firms and their creditors could in principle opt out of, but choose not to.

3It has been argued that Chapter 9 may be a more appropriate analogy for sovereign debt restructuring, to the extent that it is designed to deal with financially distressed municipalities and, more generally, governmental entities. Chapter 9 is generally anchored in Chapter 11, but it gives more control over the restructuring process to the government entity and in this key respect may indeed provide a better template for sovereign debt restructuring than Chapter 11 (see Michael, 2003).
When the petition has been granted there is a general stay on debt-collection actions. In addition, interest payments (on all unsecured debt and most secured debt) are suspended. Once in Chapter 11, the debtor continues to run the firm and has the exclusive right to propose a plan of reorganization during the first 120 days (please see footnote 4). The court oversees the reorganization process but generally is not involved in running the firm on a day-to-day basis or in the elaboration of the reorganization plan. Major decisions such as new investment or asset sales and new debt issues are subject to court approval. Again, creditors have the right to object to new debtor-in-possession financing or asset sales. Creditors can also petition to liquidate the firm.

When a reorganization plan is proposed it is put to a vote. Approval of the plan requires approval by all creditor classes. Approval by one class requires that a majority of all creditors, owning at least two-thirds of the value of the debt in the class, to vote in favor. When one of the classes rejects the plan one or several new plans can be proposed by management and/or creditors. In the event that none of the new plans is approved by all classes it is still possible for the judge to confirm the reorganization through a “cram-down” procedure. This involves enforcing absolute priority in a way that classes ranked lower than the dissenting class do not get any new claims unless the dissenting class is paid in full. As dramatic as the cram-down may sound it has been rarely used in practice, at least initially. More recently, however, courts have been much more ready to go through a cram-down.

This completes the broad-brush description of the reorganization process under Chapter 11. Besides overseeing the renegotiation process courts are also responsible for other important and more technically involved decisions. An essential responsibility is to identify all assets and liabilities. This is often the most time-consuming part of bankruptcy proceedings. Courts also have the authority to void certain payments by the debtor prior to bankruptcy if the main motive behind these payments was to fraudulently prevent debt collection (or if these payments unfairly compensate one set of claimholders at the expense of other creditors).

Following the introduction of the new bankruptcy law in 1978 important new developments in corporate debt markets took place, which may have been responses to the new bankruptcy regime. The 1980s witnessed a sharp increase in corporate bond issues, the spectacular creation of junk bond markets, and the appearance of leveraged buyouts. While these developments have largely been seen as unrelated to bankruptcy reform they may actually have been facilitated by the new debtor-friendly law and may be directly attributable to the new regime. Prior to the 1978 Act, SEC guidelines pushed firms with public bond issues into the costly Chapter X procedure. Firms that had both equity and bond issues could file for the more debtor-friendly Chapter 11 procedure only on an ad hoc basis. After 1978, however, financially distressed firms with outstanding bond issues were assured of gaining protection under the new Chapter 11 proceedings and remaining in control while the firm’s debts were reorganized. The new law significantly reduced the cost of

4The court can appoint a trustee to oversee the firm’s operations and in rare cases has chosen to do so. It can also shorten the exclusivity period upon request of a creditor submitting an alternative plan or extend it. In the 1980s courts would often grant extensions to the exclusivity period, but more recently they have been much more reluctant to do so.
financial distress for the issuer and may have been an important factor behind the growth in the corporate bond market. There is no other country in the world in which corporations rely as much on bond issues. Even in the United Kingdom, corporate bond issues are only a small fraction of total corporate debt. The reason may again be the treatment of debtors and bondholders in bankruptcy. As will be explained below, U.K. bankruptcy law is heavily tilted toward protecting banks and may be as much of a disincentive to issue bonds as the Chandler Act.  

Some commentators have argued that the 1978 law may be too debtor-friendly and that it encourages firms that should be liquidated to prolong their life inefficiently in Chapter II. A number of empirical studies have found evidence that can be interpreted as corroborating this view. Thus, for example, systematic deviations from absolute priority in Chapter II reorganization plans have been documented (Franks and Torous, 1989). Also, several studies have found that close to 70 percent of firms that file for Chapter 11 end up being liquidated (Lopucki, 1983; White, 1984; and Flynn, 1989). But among larger firms this percentage drops to percent. Other studies have found that managers who are forced into bankruptcy by their creditors tend to file for Chapter II even though their firm is eventually liquidated (Lopucki, 1983). Finally, several studies have found that the average time spent in Chapter 11 is close to or over two years (Flynn, 1989; and Franks and Torous, 1989). More recent scholarship, however, suggests that the typical large-firm Chapter 11 case is considerably faster and generally lasts less than six months (see Baird and Rasmussen, 2002).  

Perhaps the main elements of Chapter II that are relevant for the SDRM are the timetable for proposing a reorganization plan and the voting procedure. By tightening the majority requirement and/or allocating the exclusive right to propose a plan, the SDRM can to some extent control the allocation of bargaining power between debtor and creditors. Another potentially important role for a sovereign debt restructuring body is the enforcement of absolute priority. Recently some economists and legal scholars have proposed a reform of Chapter II to make it more market-based. The main suggested change is to lift the exclusivity in making proposals and to allow for competing reorganization plans that creditors can choose from (see Aghion, Hart, and Moore, 1993). Again, to let creditors vote over competing plans would shift the bargaining power more in their favor. Finally, the expansion of corporate bond markets following the introduction of the 1978 Act highlights that both parties to the bond contract must have an interest in issuing bonds. A bankruptcy procedure that is too creditor-friendly or too costly discourages bond issues as much as a procedure that is too debtor-friendly.

Political Economy of U.S. Bankruptcy Law

Lessons can also be learned from the political history of U.S. bankruptcy legislation. If personal and corporate bankruptcy law is now generally accepted as an integral part of the legal and institutional arsenal underpinning an advanced market
economy, it has not always been this way. Even though the U.S. Constitution gave Congress authority to pass a federal bankruptcy law, there was no such law in place throughout most of the nineteenth century. The absence of a law was not merely due to a lack of interest in bankruptcy legislation or to a general perception that there was no need for any political intervention in debt contracts. It was also due to major ideological differences and conflicts between debtor and creditor interest groups on the basic orientation of a bankruptcy law as well as widespread skepticism on the efficiency of an administered insolvency procedure.

At least seven attempts to introduce bankruptcy legislation were made in Congress from 1789 to 1898. Each time legislative activity was prompted by a major economic crisis but bankruptcy laws were successfully enacted only when Republicans or their forerunners controlled both houses of Congress and the presidency. Economic crises called for debt relief whether at the state or federal level. Republicans were more closely aligned with interstate commercial and industrial interests and were more likely to respond to pressures to introduce bankruptcy legislation at the federal level. This happened four times, in 1800, 1841, 1867, and 1898. The first three laws were repealed within a few years of their adoption, in, respectively, 1803, 1843, and 1878 (see Warren, 1935; Domowitz and Tamer, 1999; Skeel, 2001; and Berglof and Rosenthal, 2002).

As Skeel (2001) and Berglof and Rosenthal (2002) have highlighted, bankruptcy was a very controversial and politically divisive issue with a strong ideological divide mostly between the Democratic left, which represented debtor constituencies and was in favor of state law, and the Republican right, which supported creditor rights and a federal law. The most favored option for the Republican right was an “involuntary” bankruptcy law giving only creditors the right to declare bankruptcy and thus initiate debt collection actions. At the other end of the political spectrum the Democratic left’s preferred law was a “voluntary” bankruptcy law giving only the debtor the right to declare bankruptcy and to seek protection from creditors. In the absence of any federal law several southern and frontier states, including Florida and Texas, enacted state laws, such as homestead exemptions or stay laws granting temporary or permanent relief, granting various forms of protections to indebted farmers and other debtors (see Bolton and Rosenthal, 2002, for a political economy analysis of these legislative actions following the panic of 1819). Representatives and senators from these states were particularly opposed to any Republican-sponsored efforts to introduce legislation at the federal level, which might repeal these protections.

Data on roll-call voting indicate that bankruptcy legislation occupied an important part of legislative activity in Congress in the first half of the nineteenth century. For example, as many as 68 out of 974 roll calls in the House of Representatives and 23 out of 822 in the Senate were devoted to the passing and repealing the 1841 law. Later in the century, however, bankruptcy became a less ideologically loaded issue as is reflected in the decline in floor activity (Berglof and Rosenthal, 2002). At last, at the turn of the century, a new Republican administration controlling both houses and the executive branch was able to pass a bankruptcy bill in 1898, but not without making significant concessions to debtor-oriented legislators by leaving states free to enact exemptions (Skeel, 2001).
The history of U.S. bankruptcy legislation draws attention to fundamental conflicts of interest between debtor and creditor interests, to important ideological divisions, and to major difficulties in building a majority in support of a law, which nevertheless after the fact has established its usefulness. While important political divisions remain today as to the orientation of personal bankruptcy, there has now been a consensus for a long time on the need for a bankruptcy law for both individuals and corporations. While similar ideological divisions on the necessity and orientation of a statutory sovereign debt restructuring procedure exist today, the day may well come when such a procedure is seen as an essential building block of the international financial architecture. However, it is likely that sufficient support for such a procedure may only be found if exemptions or opt-out clauses are introduced to mollify the most ardent opponent debtor countries.

Interestingly, there is one major difference in the politics of U.S. bankruptcy and the politics of the SDRM. While pro-debtor constituencies in the United States have long opposed bankruptcy law for fear of granting excessive powers to creditors, the opposition to an SDRM in debtor countries is based rather on the fear of excessive powers given to debtors to cancel or reduce their debts. Such powers would, it is feared, undermine debtor countries’ ability to commit to repay their debts and thus lead to higher borrowing costs.

Other Relevant Aspects of U.S. Bankruptcy Reorganization Practice

So far the discussion has centered on corporate debt restructuring under some form of court supervision. But there are at least three other aspects of the U.S. corporate debt restructuring practice that are potentially relevant for sovereign debt restructuring.

Workouts, bond exchanges, and prepackaged bankruptcy procedures

Chapter 11 only defines the rules of the end game of corporate debt restructuring, and most financially distressed firms that restructure their debts actually never end up in bankruptcy court. Before entering Chapter 11 firms attempt a workout or an exchange offer and often successfully restructure their debts that way. Some firms have gone as far as designing their own “prepackaged bankruptcy procedure” to be applied in a workout and, if needed, enforced in Chapter 11. That is, the court is only used to confirm the reorganization plan elaborated in the workout. This allows the parties to speed up negotiations. Prepackaged bankruptcy procedures typically last only a few months. Obviously, firms and their creditors attempt a workout first as a way of economizing on the significant costs and delays of a court-led restructuring. But also, in some cases, the reason for going through a prepackaged bankruptcy procedure is to attempt to waive the stay on retrieving collateral. The extent to which this can be achieved is, however, severely restricted.

Even though prepackaged bankruptcy procedures are cheaper, firms cannot avoid Chapter 11 completely. One reason is that when (junk) bonds are involved and exchange offers are necessary to restructure the debt outside Chapter 11 there is a significant risk that the restructuring will fail due to insufficient tendering
(and gaming by "vulture funds") in the exchange offer. This is true despite the fact that corporate exchange offers can impose a penalty on holdouts and partially "disfigure" their claims by giving higher priority ranking to the new claims over the old ones. For example, between 1977 and 1990 only 73 exchange offers were successful out of 156 cases of distressed bond issuers. Of those 73 at least 23 subsequently filed for Chapter 11 (Gertner and Scharfstein, 1991). Another reason why firms cannot avoid Chapter 11 entirely is that they may need to have a stay imposed to avoid a run on their assets, or they may need DIP financing.

Workouts and prepackaged bankruptcy procedures can also be envisioned in the sovereign context even if a sovereign debt restructuring body is in place. That is, the sovereign debt restructuring body should not necessarily be seen as crowding out market-based collective action procedures. The two procedures may well be complementary. An important issue for an international bankruptcy institution in this respect is whether debtors and their creditors should be allowed partially or fully to opt out of a court-led international debt restructuring procedure. Opt-outs of Chapter 11 are not possible as U.S. bankruptcy law is mandatory. But in the sovereign context it is possible and perhaps desirable to allow for opt-outs.

**Government bailouts**

A second relevant aspect of U.S. bankruptcy practice is the role of the government in the largest bankruptcy cases. The government is always an important party, as the corporation may owe taxes and, more importantly, the government has a stake in maintaining employment and economic activity. U.S. government authorities have intervened in some of the largest bankruptcy cases with the domestic equivalent of a rescue package. Intervention has ranged from simple guarantees on new debt to bailouts as in the case of Lockheed, Chrysler, and, more recently, the major U.S. airlines and insurance companies. As we shall see in Section II, intervention through bailouts has played an even larger role outside the United States, in countries like Japan or France.

To the extent that government bailouts can be granted even in the absence of any institutionalized mechanism and even in a framework where bankruptcy is the only institutional mechanism in place for the resolution of corporate debt crises, it is to be expected that similar bailouts will continue to be relevant in the sovereign context even when a formal international bankruptcy mechanism is in place. Such sovereign bailouts serve, if anything, a more important economic role in overcoming liquidity crises and contagion than domestic ones.

**Jurisdiction shopping**

A third relevant aspect of U.S. corporate bankruptcy practice is “jurisdiction shopping.” A corporation can file for bankruptcy in any state where it has its principal place of business. This means that any firm incorporated in Delaware but with corporate headquarters in another state has a choice between filing in that state or in Delaware. Since most large U.S. corporations are incorporated in Delaware they can engage in this form of jurisdiction shopping when they file for bankruptcy. Over the 1990s
Delaware emerged as the jurisdiction of choice for Chapter 11 filings, so much so that the Delaware bankruptcy court is increasingly unable to handle all cases. Why did Delaware emerge as the preferred jurisdiction and why does jurisdiction shopping make a difference at all given that bankruptcy is a federal matter? The answer seems to be that the Delaware court and legal profession is more efficient and expeditious. In particular, the Delaware court has shown that it is able to respond quickly to firms' needs for debtor-in-possession financing and promptly grants so-called first-day orders when new cash is needed to preserve the going-concern value of the firm.

A form of jurisdiction shopping could be contemplated under an international bankruptcy procedure as well. To encourage courts to respond to the needs of the contracting parties it may be desirable to allow for jurisdiction shopping, by, say, letting existing bankruptcy courts also handle cases of sovereign defaults. Thus, sovereigns and/or their creditors could file for bankruptcy protection in U.S. bankruptcy courts (say, New York or Delaware), in U.K. courts, or in an ad hoc sovereign debt restructuring body akin to the International Center for Settlement of Investment Disputes (as Schwarcz, 2000, has proposed). As always, an important issue with jurisdiction shopping concerns the bias that competition between jurisdictions might introduce. Is competition going to lead to a “race to the bottom” or a “race to the top”? Put differently, if the right to file for bankruptcy protection resides with the debtor, would jurisdiction shopping lead to excessively debtor-friendly courts? The allegation has been made about Delaware courts in their treatment of corporate bankruptcies, although there is no clear supporting evidence. If such a bias were seen to be a problem, it is always possible to let creditors and/or the IMF object to a particular choice of court.

II. The U.K.’s and Other Countries’ Bankruptcy Laws

U.K. Bankruptcy Reorganization Practice

As the brief overview of U.S. corporate bankruptcy law highlights, bankruptcy in the United States is governed to a large extent by statute. In contrast U.K. bankruptcy procedures are based much more on a contractual approach.

The dominant bankruptcy-reorganization procedure in the United Kingdom is the so-called administrative receivership. It is a creditor-controlled procedure with little if any court involvement. Under this procedure, a creditor who is generally the holder of a “floating charge” appoints a receiver. The floating charge is a form of collateral on the firm’s residual assets that have not otherwise been collateralized. Generally the floating charge holder is a large bank (or group of banks). The absence of court involvement and the power of the floating charge holder both make for a much quicker debt restructuring process than in the United States (see Franks and Torous, 2000). This is the main selling point of the United Kingdom approach to corporate bankruptcy. Another benefit that is sometimes mentioned is that debtors in the United Kingdom have stronger incentives to try to avoid bankruptcy.

In fact, a recent study by Ayotte and Skeel (2002) finds little evidence of a pro-debtor bias and, instead, stronger evidence of the greater efficiency of Delaware bankruptcy courts.
Thus, a fundamental difference between U.K. and U.S. practice is that in bankruptcy the debtor remains in possession in the United States but not in the United Kingdom. This key feature of U.K. bankruptcy practice, unfortunately, makes it much less relevant for the SDRM, as it is inconceivable to think of an SDRM without a debtor in possession.

The receiver can choose to liquidate or sell the firm immediately or to run and reorganize it before selling it later. The receiver’s main concern is to get maximum repayment on the debt of the floating charge holder. Any proceeds beyond the floating charge holder’s claims are distributed according to absolute priority to the other claimholders. If new financing is required to preserve the going-concern value of the firm while it is in receivership, this funding generally comes from the floating charge holder. Finally, following the sale of the firm as a going concern, the old management team often ends up back in charge as it often emerges as the highest bidder. U.K. law provides some safeguards to protect other creditors against the receiver’s actions. Despite these safeguards, however, receivership is widely seen as favoring the interests of the floating charge holder at the expense of other creditors and also at the expense of preserving the going-concern value of the firm. In short, U.K. receivership is biased in favor of liquidation. In contrast, U.S. bankruptcy is probably biased in favor of continuation.

Most small and medium-sized firms have a floating charge holder and are therefore restructured under administrative receivership when they are financially distressed. The largest firms, on the other hand, may not always have a floating charge holder. When that is the case, another bankruptcy reorganization procedure applies: administration. This procedure was introduced in 1985 as an alternative to straight liquidation, which was the almost inevitable outcome in the absence of a floating charge, and is seen as the U.K. counterpart of Chapter 11. The key difference between receivership and administration is that the bankruptcy court (or companies), rather than the main creditor, gets to appoint the administrator (or trustee). The debtor or a creditor can file for the appointment of an administrator. The administrator has the right to impose a stay on debt-collection actions and debt repayments for a limited period. The administrator can also raise new funds to preserve the going-concern value of the firm. A majority of creditors can object and vote to end administration at any time. A majority of creditors must also approve the reorganization plan proposed by the administrator.

Administration is rarely used even for large firms. A key reason is that even under administration, management is removed or wants to quit following a bankruptcy filing. The main creditors, bank syndicates, often prefer to avoid this outcome and therefore attempt to restructure the firm’s debts in an informal workout. This practice is known as the “London approach.” It is confined to bank lenders, conducted in secret negotiations, and generally involves both a temporary stay on bank debt payments and a pro-rata “haircut” (or percentage of the face value of debt that is forgiven). Unfortunately, given the informal and secret nature of these reorganizations, little systematic information is available about this practice (see, however, Armour and Deakin, 2001; and Armour, Cheffins, and Skeel, 2002).
Corporate Bankruptcy in Other EU Countries

Much of Continental European practice provides for the appointment of a receiver or trustee—as in the United Kingdom—to run or oversee the management of the firm in bankruptcy. However, relative to the United Kingdom, courts generally tend to be much more involved in supervising the firm. There is no analogue of administrative receivership and the powers of the floating charge holder in Continental Europe. Bankruptcy institutions tend to be more debtor-friendly and reorganizations generally take longer to resolve in Continental Europe than in the United Kingdom.

In France, the main stated objective in bankruptcy is to save the firm and to maintain employment. When a firm files for bankruptcy protection a heavily administrative procedure is initiated: (i) the commercial court appoints a receiver to oversee the firm’s management; (ii) the receiver represents the state and not the creditors; (iii) at the end of a period of observation that can last up to a year and a half, it is the receiver who decides whether to let the firm continue or to liquidate its assets; and (iv) it is also up the receiver to propose a reorganization plan. In short, the French model is, if anything, even more interventionist than Chapter X under the Chandler Act. It leaves little room for negotiation between the debtor and creditors and it puts much greater emphasis on protecting workers.

In Germany, bankruptcy reorganization is also based on an administrative model, with the court appointing an administrator to oversee or run the firm. Until 1999, when a new insolvency code was enacted, it was very rare for a firm to file for bankruptcy reorganization. There are two important reasons for this. First, the old reorganization law did not provide a stay on payments or on collection of secured assets. Second, the law required repayment of at least 35 percent of unsecured creditor claims. The new law aims to make reorganization a more attractive option and introduces a stay. It also removes the 35 percent minimum requirement on unsecured debt.

In sum, Continental European practice allows for more administrative involvement, as under Chapter X of the Chandler Act. Generally the debtor does not have as many protections as under current bankruptcy law in the United States. For that reason Continental European practice is perhaps less relevant for sovereign debt restructuring.

The Japanese Model

There are three different bankruptcy reorganization procedures in Japan—a formal corporate reorganization law and two so-called composition procedures. The most commonly used by far are the composition procedures. Interestingly, the reason why firms avoid the corporate reorganization institution is again that this procedure involves a heavy-handed administrative intervention as under Chapter X of the Chandler Act, on which it is based. In contrast, the composition procedures appear to be very flexible and if anything are even more tilted toward continuation than Chapter 11 in the United States. A unique feature of composition is that when a firm files for protection it must submit a reorganization (or composition) plan at the time of filing. Also, composition does not provide an automatic stay. Instead, firms themselves must apply for a stay and a suspension of
debt payments. The stay cannot be all-encompassing and does not cover secured creditors’ attempts to foreclose on their secured assets.

When a firm applies for composition the court appoints both an examiner to determine whether the firm is eligible for composition and a trustee to oversee the firm’s operations while the firm is in reorganization. Both a majority of unsecured creditors and a supermajority of claims at least equal to three-quarters of all unsecured claims must approve the reorganization plan.

Another unique feature of Japanese corporate debt restructuring is the practice by a substantial fraction of financially distressed firms filing for composition (up to 39 percent according to Eisenberg and Tagashira, 1996) of seeking the protection of a stay only as a temporary relief from creditors and pulling out before a reorganization plan gets approved. For the remainder of firms applying for composition, the rate of successful reorganizations is also significantly higher than in U.S. Chapter 11, again according to Eisenberg and Tagashira (1996). However, part of this difference may be due to the larger average size of firms applying for composition.

Perhaps one of the most relevant special features of Japanese composition for sovereign debt restructuring is the submission of a reorganization plan at the time of filing and the examination of the plan by a court-appointed examiner before protection is granted. Such a requirement for sovereigns seeking protection under a sovereign debt restructuring body could substantially accelerate renegotiation proceedings. It could also offer basic protections to creditors, with plans being rejected if they excessively favor one group of creditors at the expense of others. The IMF is in a natural position to play the role of an examiner, as it is the best repository of information about sovereign debtors and as its participation in sovereign debt restructuring is essential.

Corporate Bankruptcy in Other Asian Countries

The Asian crisis of 1997 has put the spotlight on bankruptcy institutions in the countries hardest hit by the crisis. These institutions generally appeared to be archaic, inefficient, and highly inadequate for handling the high volume of business failures produced by the crisis. As a result much, corporate debt restructuring has taken place outside the courts through workouts. Indonesia, Korea, and Taiwan have bankruptcy reorganization institutions that are closest to the Japanese model, with composition as the generally preferred procedure. In contrast, Malaysia and Thailand have institutions that are closer to the U.K. receivership model, with strong bias toward liquidation and protection of secured creditors. Not surprisingly, these latter countries have been able to handle liquidations more expeditiously and have relied less on potentially inefficient and politically influenced courts (Hussain and Wihlborg, 1999).

Latin American Bankruptcy Procedures

Argentina has the most up-to-date bankruptcy institution of all Latin American countries, with a new—and largely untested until the current crisis—inolvency law passed in 1995. The new reorganization procedure (concurso) is a unique combina-
tion of elements from bankruptcy laws of different countries. As under Chapter 11, it leaves the debtor in possession and provides for an exclusivity period during which the debtor can propose a reorganization plan. As under the old German law, however, the reorganization plan must compensate unsecured creditors for at least 40 percent of the face value of their debts. And, as under Japanese composition, the law requires the court to appoint a trustee to oversee the debtor’s management. Finally, unlike Chapter 11, the law grants an exclusivity period to creditor proposals after the initial exclusivity period has expired, without an agreed reorganization plan.

Brazil’s and Mexico’s bankruptcy laws are much more archaic, but major reform proposals are underway. In addition, courts are underfunded, inefficient, and sometimes corrupt. Moreover, debt collection can be undermined by weak enforcement of court rulings. Brazil’s reorganization procedure (concordata) leaves the debtor in possession and is extremely debtor-friendly in practice. In contrast, Mexico’s reorganization procedure (convenio) requires the court to appoint both a trustee to take over the firm’s management and a creditors’ committee to oversee the firm’s operation while debts are restructured. The procedure is also more heavily biased in favor of protecting worker claims by extending claims beyond wages due and giving worker claims a higher priority. An interesting unique feature of Mexico’s reorganization procedure is the specification of a sliding scale for creditor approval of a reorganization plan. The bigger the haircut the higher the supermajority required to approve the plan: for a haircut no larger than 25 percent only a simple majority is required and for a haircut between 25 and 55 percent a supermajority of 75 percent of claims is required (Rowat and Astigarraga, 1999).

Other Relevant Bankruptcy Practices

Some of the most recent institutional innovations in corporate bankruptcy have taken place in transition economies, not always to great effect. Most relevant for sovereign debt restructuring is the approach to corporate debt restructuring in Poland. The government encouraged firms to restructure their debts through out-of-court workouts, with the added incentive of diluting its tax claims if firms achieved a workable debt-for-equity swap. The Polish approach may be relevant for sovereign debt restructuring to the extent that it points to a potential role for the IMF and other multilateral lenders. By offering to let go of the seniority of its claims, conditional on a successful restructuring, the IMF could potentially increase the efficiency of a sovereign debt restructuring body.

Taking Stock

As this brief overview of corporate bankruptcy practice around the world indicates, there are three common underlying principles and three common elements to all bankruptcy reorganization procedures. The three general principles are that bankruptcy institutions are designed to:

7Noncollection of tax claims is also a common form of implicit DIP financing in the United States (see Baird and Rasmussen, 2002).
(i) Address a “common pool” or “run for the assets” and “race to the courthouse” problem arising when multiple creditors have conflicting claims on a distressed firm’s assets. Bankruptcy law aims to preserve the going-concern value of the firm and to avoid an inefficient breakup of the firm. In some countries the law’s stated objective also extends to the preservation of employment.

(ii) Enforce the payment of creditors according to “absolute priority.” Claimants with a security interest or higher priority get paid first and lower-priority claimants only get the residual value of the reorganized or liquidated firm. To be sure, there are deviations from the absolute priority rule but the overall stated objective remains the implementation of this rule.

(iii) Mandate the cancellation of all or most unpaid debts following liquidation of the firm to allow the bankrupt firm’s owners and managers the option to have a fresh start.

Together with these three general principles there are also three basic elements common to virtually all bankruptcy procedures: (i) a stay on part or all debt payments and collection actions to prevent a run on the firm’s assets; (ii) some form of DIP financing authorized by the receiver or the bankruptcy court to preserve the going-concern value of the firm; and (iii) if a reorganization is attempted, a debt restructuring agreement that is approved by some form of majority voting among creditors organized in different classes. The outcome of the vote is generally binding on the dissenting minority.

Beyond these common traits there are major differences, however. The various laws differ mainly in the extent of court or administrative involvement in the management of the bankrupt firm, the balancing of creditor and debtor interests, the representation of other stakeholders’ interests, the limits put on debtors’ liability, and the coverage of the debt standstill. In terms of administrative involvement, the United Kingdom and the United States stand at one extreme, with minimal court intervention in the management of the bankrupt firm while its debts are restructured. Almost everywhere else in the world there is greater court involvement and supervision. The United Kingdom also stands out in the extent of creditor protection its laws provide. Nowhere else do creditors have the powers of the floating charge holder in administrative receivership. However, Japan and, until recently, Germany also provide unusually strong protections to secured creditors. Countries like France and India (for large companies) provide unusually strong protections to other stakeholders, in particular to employees. Japan and, until recently, Germany also stand out in the limits they set on debt standstills and the exclusion of part or all secured debt from the court-imposed stay on debt collection efforts. Finally, the United States stands out in the generous debtor protections granted by some states through homestead exemptions.

This great diversity in legal rules raises at least three important questions for the future orientation of an SDRM:

(i) How deep should the administrative involvement in sovereign debt restructuring be? Should the decision to restructure be left to the debtor country and its creditors (as under U.S. bankruptcy law) or should a sovereign debt restructuring body have the authority to determine whether a debtor country
is eligible for restructuring (as under Japanese composition law and Chapter 9 of the 1978 Code in the United States)? Should the government in the debtor country remain in control (as under U.S. law) or should the international body appoint a receiver (as, say, under French law)?

(ii) How comprehensive should the debt standstill be? Should there be an automatic stay on all debt payments (as under U.S. law); possibly combined with capital controls; or should some debt payments be excluded from the standstill (as under Japanese and German law)?

(iii) How much involvement of other stakeholders, such as labor unions, chambers of commerce, or other business and social organizations, should there be? Should labor unions participate in debt restructuring only as representatives of a particular class of claimholders (as under U.S. and U.K. law) or should they have a larger managerial role?

III. The Sovereign Debt Restructuring Problem and the Case for a Statutory Approach

Recent proposals for the creation of a sovereign debt restructuring body are based on an important analogy between corporate and sovereign debt restructuring. We shall argue in this section that this analogy is imperfect, but that despite the important differences between sovereign and corporate debt a strong case can be made for a statutory approach to sovereign debt restructuring. The question is not whether an international debt restructuring body should be set up, but what the contours of a sovereign bankruptcy procedure should be. We shall argue that because of some key differences between sovereign and corporate debt, a sovereign bankruptcy statute may require major adaptations of a Chapter 11-type procedure.

The Imperfect Analogy Between Corporate and Sovereign Debt Restructuring

As appealing as the analogy with corporate bankruptcy may be, there are important differences between sovereigns and corporations that limit the applicability of institutions designed for corporations. Some specific features of sovereign lending tend to tilt the balance more in favor of the debtor than in the corporate context; others tend to tilt the balance in favor of creditors.

A key difference between sovereign debt restructuring and corporate bankruptcy is that sovereign states never get liquidated. Some commentators have argued that, as a result, sovereign debtors are too strong and that, unlike for corporations, it is the creditors that are in need of protection and not the debtor. The fact that a sovereign debtor cannot be liquidated may indeed have important consequences for how debt restructuring negotiations play out. What is the sanction for failing to reach an agreement that induces debtor and creditors to strike a deal in a timely fashion? There may

To be able to initiate a Chapter 9 proceeding the insolvent municipality must be authorized by State law to be a debtor under Chapter 9.
be a greater risk of prolonged negotiations. Deadline effects like the expiration of an exclusivity period for proposing a restructuring plan may be weaker than in the corporate context if there is no threat of liquidation disciplining the parties.

Another important difference is that in contrast to corporations, whose creditors are often able to impose a change in management team, sovereign governments cannot be replaced by their creditors following a default. It is also more difficult for sovereign lenders to impose conditions on governments that would make a debt restructuring more acceptable.

A further difference is that sovereigns do not have to protect themselves against creditors racing to grab the debtor's assets. In this respect, the going-concern value of a sovereign is more easily preserved and a stay on debt collection actions is less critical.

On the other hand, sovereigns are more vulnerable than corporations to capital flight, exchange rate, and banking crises. It is these risks, more than creditors' debt collection efforts, that threaten the going-concern value of the sovereign. These threats are not adequately addressed by a suspension of debt payments and collection actions. They may require instead a much wider standstill (including on bank deposits) and the implementation of capital controls. The analogy with corporate bankruptcy here has more to do with debtor-in-possession financing than with debt standstills.

The preservation of a firm's going-concern value usually requires DIP financing to make sure that trade creditors remain on board. Such financing may be even more critical in the sovereign context for bank depositors as well as other trade creditors to continue to have confidence in the country. Standstills on withdrawals from bank deposits undermine the sovereign's entire payment system and destroy the sovereign's going-concern value when they are extended beyond a very short time period. Therefore, to the extent possible, such drastic measures should not be taken and instead the viability of the banking system should be maintained through some form of DIP financing.

To the extent that such DIP financing is not forthcoming, a sovereign debt crisis coupled with an exchange rate and banking crisis can result in substantially higher costs than a situation of financial distress for a corporation. It is the fear of these costs that induces sovereigns to meet their debt obligations and to postpone debt restructuring efforts.

Finally, another critical difference between sovereign and corporate debt restructuring is the presence of the IMF and other multilateral lending institutions. The IMF has a special role to play that has no counterpart in the corporate context, except perhaps the relationship banking role played by a corporation's main bank. The IMF can avoid or postpone debt restructuring by granting programs. It has information about the sovereign's creditworthiness that no one else has. It can also impose conditions on sovereign borrowers that no other institution or lender can. The IMF thus has a critical role to play in any sovereign debt restructuring. This role could range from provision of DIP financing (or "lending into arrears"), to overseeing and intervening in the debt restructuring process in the capacity of a trustee or administrator, or to playing the role of the judge granting protection and supervising bankruptcy court proceedings.
Contractual and Market Solutions

Many participants in sovereign bond markets and some issuing country govern­ments are wary of a heavy-handed statutory approach to sovereign debt restructur­ing and have expressed a strong preference for contractual or market-based solutions to sovereign debt restructuring. A common denominator among all oppo­nents to a statutory approach is the belief that an administrative intervention in sovereign debt restructuring is bound to be misguided, will undermine sovereign bond markets, and will raise the cost of borrowing. Beyond this common ideology, however, there are radically different perspectives, which are not easily reconciled. Many advocates of a contractual approach argue that it already delivers most of the benefits of a statutory approach (Roubini, 2002a, and 2002b). Other supporters argue the exact opposite: under laissez-faire, sovereign debt restructuring is likely to be highly inefficient ex post, but this is desirable from an ex ante perspective since it imposes discipline on the debtor country (Dooley, 2000).

Two contractual procedures are typically cited: exchange offers and collective action clauses (CACs). As we have already pointed out, an exchange offer is the only way of restructuring a sovereign bond issued under New York law. Indeed, under the 1939 Trust Indenture Act, any renegotiation of the payment terms of a bond issued in the United States requires unanimous agreement of all bondholders.9 This is virtually impossible to achieve and, therefore, the only way forward is to offer bondholders to exchange their old bonds for a new claim with longer maturity and/or higher priority. The exchange offer is conditional on a suf­ficient fraction of old bonds being tendered. The incentive to tender for any bond­holder ensues from the risk of seeing the old claims “disfigured” by the new claims, should the tender offer succeed.10

As Detragiache and Garella (1996) and Roubini (2002a, and 2002b), among others, have pointed out, exchange offers can be an efficient way of restructuring a distressed bond issue. Detragiache and Garella show that the ex post efficient outcome can be achieved under full information when all bondholders have sufficient­ly large holdings for their individual participation in the exchange to be able to affect the likelihood of success of the tender offer. Roubini argues that exchange offers combining carrots and sticks can successfully address the holdout problem and have proved to be successful in several instances.

However, Detragiache and Garella also point out that if bondholders are not all equally well informed about the long-run value of the old and new claims, then the ex post efficient outcome can no longer be achieved. Furthermore, they pro­vide an example in which a better outcome can be achieved with an alternative majority voting renegotiation procedure on whether or not to waive a seniority covenant of the bond issue. Similarly, Gertner and Scharfstein (1991) show that when ownership of a bond issue is widely dispersed, an exchange offer can only be successful if the new claim has higher priority than the old claim. Otherwise,

9Strictly speaking, the 1939 Trust Indenture Act only applies to corporate bonds, but generally a una­nimity clause is included in U.S. sovereign bond issues.
10The old claim can be disfigured if it drops in the priority ranking, if cross-default provisions are removed, or if the secondary market for the bond becomes highly illiquid (see Buchheit, Gulati, and Mody, 2002).
the best response for an individual small bondholder is to just hold on to the old claim. Thus, a potential problem for sovereign debt restructuring through exchange offers is that the offer may fail if the new claim is perceived to have equal priority to the old one. These observations raise the difficult issue of how absolute priority can be enforced for sovereign debt payments. In the absence of such enforcement, how effective can exchange offers ultimately be?

The recent successful completion of several exchange offers in the Ukraine, Pakistan, and Ecuador is often cited as providing support for such a market-based approach to sovereign debt restructuring (see Eichengreen and Ruhl, 2000, and Roubini, 2002a). It is argued that these successful exchange offers provide compelling evidence that the problem of coordinating dispersed bondholders and reducing the risk of free-riding can be adequately handled with exchange offers. However, two notes of caution are in order.

First, these exchange offers took place in small countries with extremely simple debt structures. For these countries, the IMF’s new stated policy, that it would not consider any bailouts without some concessions from other creditors and bondholders, may well have been credible. The ownership structure of these bonds may also have facilitated the exchange offer.

Second, in another instance in Russia in July 1998, a proposed exchange offer engineered by Goldman Sachs went seriously awry. Goldman Sachs failed to win sufficient support for its exchange offer of high-yield government short-term bonds (or GKOs) for longer-maturity lower-yield Eurobonds. The main apparent reason was that too many bondholders were banking on an IMF bailout and therefore saw no need to exchange their claims. The failure of this particular exchange offer was one factor that precipitated the Russian crisis (see Blustein, 2001). This latter episode provides a particularly vivid illustration of the potential critical weakness of market-based solutions like exchange offers. These solutions may not work well if the market expects that the debt crisis will be resolved with an IMF-led bailout. When exchange offers fail, or are postponed because they are expected to fail, the delayed debt restructuring increases the pressure for a bailout. As a result, market-based procedures may do little to reduce incentives to provide bailouts and thus may do little to reduce moral hazard in lending.

The other widely favored contractual solution involves CACs. These clauses allow for the renegotiation of the terms of a bond issue using a majority voting procedure among bondholders and currently apply mainly to bonds issued in London under English law. Typically, corporate or sovereign bonds issued in London provide for the appointment of a trustee to monitor the borrower and represent the interests of bondholders. The trustee and/or a group of bondholders can convene a meeting of bondholders and propose changes to the bond agreement. Roughly speaking, if at least 75 percent of the bondholders of an issue approve the changes, the renegotiation offer is accepted and binding on any dissenting minority (see Buchheit, Gulati, and Mody, 2002, for a description of a typical CAC).

Advocates of CACs argue that this form of creditor-initiated renegotiation sanctioned by majority voting provides most of the benefits a sovereign debt restructuring forum would offer (see Eichengreen, 2002; Taylor, 2002a and 2002b; Buchheit, Gulati, and Mody, 2002; and White, 2002). They argue that CACs forestall a race
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to the courthouse and that they solve free-rider and holdout problems, since the majority decision is binding on all holders of the bond issue. To be sure, even advocates of CACs recognize that a fully operational contractual procedure is not yet in place and that difficult open issues remain. They acknowledge that many existing sovereign bonds do not contain any such clauses and that important coordination problems remain across different bond issues and other sovereign debt claims. They believe, however, that the path of least resistance to reform is one of encouraging the widespread adoption of CACs and otherwise leaving sovereign debt restructuring to market participants. One often-invoked important tactical benefit of this course of action is that it would not require major changes to existing international treaties or to the IMF’s articles of agreement and that therefore this path to reform would meet minimal political resistance.

Interestingly, CACs could have been used in Pakistan and the Ukraine, but an exchange offer was preferred. Several reasons have been given for this choice, among them a concern that a meeting of bondholders might trigger acceleration of other outstanding debt and the perceived extreme caution of bond trustees, who are seen to be reluctant to propose reductions in bond repayments for fear of litigation. Whatever the case may be, this reluctance in making use of CACs suggests that this renegotiation procedure may not be as straightforward as it is made out to be.11

To recapitulate, one group of advocates of a contractual or market solution, which reflects to a large extent the opinions of market participants, argues that collective action problems among creditors are exaggerated, and to the extent that they do exist they can be adequately addressed with CACs or exchange offers. These proponents are united in their opposition to a statutory approach with other commentators, who hold, however, the strictly opposite view on the efficiency of a laissez-faire approach to debt restructuring (possibly augmented by collective action clauses). The latter commentators argue that widely held sovereign bonds are actually quite difficult to restructure, but that the ex post inefficiency of debt restructuring under laissez-faire is desirable from an ex ante perspective. The high cost of debt restructuring under laissez-faire is a necessary disciplining device to induce the sovereign debtor to repay its debts (see Dooley, 2000). This view is close to the position of some issuing-country governments, which are mainly concerned that a procedure that facilitates debt restructuring would undermine the commitment value provided by the current high restructuring costs and would therefore lead to higher ex ante costs of borrowing.12

The observation that higher ex post debt renegotiation costs impose greater discipline on the debtor and hence reduce the cost of borrowing is certainly well taken. It is debatable, however, whether sovereign debtors would pick an ex ante

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11Another proposed solution, which would avoid the creation of a sovereign debt restructuring body, is to prevent sovereigns from lifting sovereign immunity, as they have increasingly done (see Bulow, 2002). It is argued that the main advantage of this solution is that sovereign borrowers would thus be unable to over-borrow. With significantly less sovereign borrowing, debt crises would be much less prevalent and less costly, so that there would no longer be a need for a debt restructuring mechanism. As Roubini (2002a) has argued, however, it is debatable whether such a policy would have the intended effects.

12As Becker, Richards, and Thaicharoen (2002) show, there is no evidence that bond issues with CACs trade at a discount. That is not to say, however, that the introduction of a more effective renegotiation procedure will not have a negative impact on bond prices.
efficient level of debt renegotiation costs that optimally trades off ex ante costs of borrowing and ex post costs of financial distress. There are at least five reasons why sovereign debtors might choose to over-borrow by committing to excessively high ex post debt restructuring costs: (i) administrations that build up debt are typically no longer around when the time comes to repay and may not fully internalize the future costs of financial distress; (ii) governments have private goals besides the welfare of their country and may choose to borrow mainly for their own benefit even if this can impose heavy debt restructuring costs on their country; (iii) creditworthy countries may accept excessively high debt restructuring costs as a way of signaling their creditworthiness (Eichengreen, 2002); (iv) creditors may insist on high restructuring costs mainly as a way of guaranteeing a form of priority against other lenders; and (v) excessively high restructuring costs may be chosen as a way of encouraging ex post bailouts (see Bolton and Jeanne, 2002, and Bulow, 2002). For all these reasons, it is likely that equilibrium sovereign debt structures under laissez-faire would be excessively hard to restructure ex post.

As Haldane and others (2002) have shown, an important concern with sovereign debt structures that are difficult to renegotiate ex post is that they are more prone to debt rollover crises. If individual debt holders anticipate that there will be a long and costly restructuring phase following default, they will be less willing to roll over their debts. This is likely to result in both more frequent and more severe liquidity crises.

Another important caveat to the view that sovereign debt structures are deliberately designed to be hard to renegotiate as a way of disciplining borrowing governments is that debt restructuring costs alone are unlikely to be the main disciplining device anyway. The loss of reputation and the ensuing increase in the cost of future borrowing when debt repayments must be rescheduled are perhaps even more important deterrents. In addition, a sovereign debt crisis is likely to trigger a wider financial crisis, social dislocation, and a run on the country’s currency, which the sovereign borrower will be even more eager to avoid.

Finally, an unspoken concern that is also likely to unite all opponents to a sovereign debt restructuring body, whatever their views on the ex post efficiency of a contractual approach, is that by facilitating debt write-downs the sovereign debt restructuring body would also make it easier to hold back on IMF-led bailouts. Both borrowing governments and lenders benefit from potential bailout subsidies. In this respect it is not surprising that they would be opposed to a policy aimed at reducing this subsidy.

The Case for a Statutory Approach

Even if the analogy between corporate and sovereign debt restructuring is imperfect, it still provides valuable insights into the question of the advantages of a statutory approach relative to exchange offers or collective action clauses. As the overview of corporate bankruptcy practice in this paper underscores, there could be at least four fundamental aspects of corporate reorganization procedures that may not be adequately addressed by contractual or market approaches to sovereign debt restructuring.
First, as already alluded to, the contractual or market approaches that are currently envisioned do not guarantee a comprehensive restructuring agreement of all bond issues and other debt claims. Collective action clauses only apply bond issue by bond issue and it is unclear how a contractual debt restructuring process would play out in the presence of multiple issues and other debt claims. Similarly, the recent successful debt exchanges only involved one or two separate bond issues. Whether they would work successfully in the presence of a dozen or more issues is unclear and untested. One obvious concern with CACs when there are multiple debt claims is that the holders of any one bond issue may want to wait to see how restructuring plays out for other issues. There may be holdout behavior across issues and inefficient delays may ensue. Under the proposed contractual approaches there is no analog for the creditor super-committee found in equity receiverships when multiple corporate bond issues had to be renegotiated, and there is no way of compelling the renegotiation of all claims at once unless they are contractually connected through cross-default and debt-acceleration clauses. As Roubini (2002a) aptly points out, it is obviously always possible to broaden CACs to ensure proper coordination across debt claims “via the use of super-clauses, arbitration and other meta-clauses, [but] such a beefed-up contractual approach ends up becoming very close to a creditor-centered statutory one.”

Second, contractual and market approaches do not guarantee the enforcement of absolute priority. However, the enforcement of some form of priority is necessary to both implement an ex ante efficient level of borrowing and to facilitate exchange offers. Most sovereign bond issues contain pari passu clauses, guaranteeing equal priority with other debt claims. But equal priority does not eliminate a borrower’s incentive to dilute existing debt claims by adding new debt to the outstanding stock. To eliminate or further reduce such dilution, new debt issues would have to have lower priority than older debt claims in the event of a default. Similarly, the success of an exchange offer may depend critically on a higher-priority ranking of the new claim over the old one. By leaving debt restructuring to the market there is no clear way of guaranteeing that agreed upon priority arrangements will actually be enforced when a sovereign is financially distressed. As some prominent legal scholars on corporate bankruptcy have argued, the primary and only function of corporate bankruptcy procedure ought to be the enforcement of absolute priority (see Baird, 1986, and Bebchuk, 1988). By their logic, an important benefit of a statutory approach to sovereign debt restructuring would be possible enforcement of absolute priority and, in this way, the systematic introduction and enforcement of different priority rankings of sovereign debts.

Third, and perhaps most importantly, contractual and market approaches do not explicitly deal with DIP financing. As the discussion of corporate bankruptcy practice in Section I has emphasized, an essential part of corporate reorganization practice is the possibility of obtaining DIP financing to preserve the going-concern value of the firm. Indeed, Ayotte and Skeel (2002) have recently shown that Delaware

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13Scott (2002) raises similar concerns and argues that a statutory approach is the only way of ensuring a comprehensive debt restructuring agreement.

14Some leading scholars of international finance have even questioned whether IMF loans truly have higher priority over other debts.
bankruptcy courts’ efficiency in handling requests for DIP financing is a primary reason why many large distressed companies choose to file there. As we have already hinted at, DIP financing may be even more critical for sovereigns since they may be vulnerable to capital flight and exchange rate crises. In many ways, some form of DIP financing already takes place in the shape of IMF lending into arrears. However, under the current regime such lending is not directly tied to a debt restructuring agreement between the sovereign and its creditors. As a result, rather than facilitating a debt restructuring agreement such lending encourages creditors to delay completion of negotiations in the hope of benefiting from an IMF transfer (see Bulow and Rogoff, 1990). A major reason for the introduction of a sovereign debt restructuring forum is precisely to correct the incentives for lender moral hazard generated by IMF lending into arrears under the status quo.

Finally, a sovereign’s renegotiated debt obligations under contractual and market restructuring procedures may still leave the country with an excessively high debt burden. Creditors will trade off the efficiency benefits of debt reductions against the costs in terms of reduced expected debt repayments and, therefore, a debt restructuring procedure that is too creditor-friendly may result in inefficiently low debt forgiveness (see Helpman, 1989; and Ayotte, 2002). A statutory approach can be balanced to be more debtor-friendly should such an inefficiency be a concern.

A statutory debt restructuring procedure can also be designed to address other issues of potential concern, such as the risk of protracted negotiations under the contractual approach and uncoordinated legal actions by groups of creditors. By specifying a strict timetable for making restructuring proposals, a restructuring forum may be able to speed up negotiations. Similarly, by imposing a stay on litigation while negotiations are ongoing, the statutory approach can easily limit legal uncertainty and reduce the deadweight cost of litigation. Perhaps most importantly, under a statutory regime a unified case law will develop over time, which will gradually refine and improve the process of debt renegotiation.

A New Role for the IMF

In some early proposals on a statutory regime for sovereign debt restructuring it was suggested that the IMF might be a possible forum. But, as many critics of the idea have argued, one major drawback in having the IMF guide and supervise debt restructuring proposals is that it would not be a fully independent body and it would also be in the awkward position of being both judge and interested party. For these reasons, it would be desirable to set up a separate independent forum. Several suggestions have been made (see Schwarcz, 2000, and Rogoff and Zettelmeyer, 2002) for other candidate forums, but the analogy with U.S. corporate reorganization practice highlights the potential benefits to be obtained from allowing some scope for jurisdiction shopping. To the extent that some bankruptcy courts have developed expertise in handling large corporate reorganization cases, it may be worth exploring whether these courts could also supervise sovereign debt restructuring cases.

Even if an independent debt restructuring forum is created, the statutory approach will inevitably change the IMF’s role in sovereign debt crises. It may further enhance the IMF’s role in providing DIP financing or coordinating the supply
of DIP financing by other creditors. It may also enhance the IMF’s role in certifying the sustainability of a country’s debt. If a sovereign debt restructuring forum significantly reduces the costs of renegotiating the debt and if the high restructuring costs under laissez-faire partly serve the purpose of imposing discipline on the debtor, then it may be desirable from an ex ante efficiency perspective to exclude from the forum solvent countries that are unwilling to repay all their debts and are attempting to default strategically (see Bolton and Jeanne, 2002). The IMF has the greatest expertise available to make a determination on the solvency of a debtor, and the filing for bankruptcy protection may be made conditional on IMF certification. Similarly, the IMF may be well placed to monitor and enforce a restructuring agreement by making future access to IMF lending conditional on diligent enforcement of the restructuring agreement. One major potential drawback, however, in relying on the IMF to make such an assessment is that decisions whether to exclude a country from the SDRM, just as current decisions to extend an IMF program, are in danger of becoming highly politicized.

Political Constraints and Possible Transitory Regimes

One important reason why contractual and market solutions are favored by many commentators is the perception that a more ambitious statutory approach will not be available in the near future, as there are likely to be too many political obstacles to its implementation. Concretely, the imposition of standstills and the use of majority voting for debt restructuring proposals, which could be binding on a dissenting minority, require an amendment to the IMF’s articles of agreement. Such an amendment, in turn, requires the approval of 85 percent of member-country votes. Since the United States has more than 15 percent of the votes, this means that the U.S. Congress must approve the change and, so far at least, there is no indication that there would be sufficient political support for the SDRM in Congress. It is already apparent that Wall Street will resist a move toward a statutory approach to sovereign debt restructuring, even if it has the strong backing of the U.S. Treasury. Therefore, if the better and more ambitious reform is likely to be bogged down in political wrangling, why not explore less daring but more feasible options?

Again, the analogy with the political history of corporate bankruptcy in the United States may provide useful insights into building political support for the implementation of a statutory sovereign debt restructuring procedure. As we have highlighted, the ultimate successful passage of the 1898 Bankruptcy Act was due to a considerable degree to the willingness of Republican legislators to reach a compromise with the pro-debtor opposition to a federal bankruptcy law. One critical part

15The Financial Times of September 28, 2002, reported that “G7 officials, including those from the UK and Canada, emphasized that the second track, a judicial procedure to arbitrate between creditors in case of default, continued to be necessary as a back-up. Officials say that financial institutions led by their association, the Institute of International Finance, have played a tactical game of supporting CACs in the apparent hope of killing the plan for a judicial mechanism. Paul O’Neill, the U.S. treasury secretary, said on Thursday that picking just one element in the crisis-resolution package was equivalent to asking a carpenter to choose between hammer, saw and screwdriver” [italics added]. Interestingly, the SDRM is a political issue with some Republicans siding with “Main Street” against “Wall Street,” which appears to have had greater voice with the previous Democratic administration.
of the compromise was to leave authority to the states to enact more or less generous (homestead) exemptions. Similarly, one can envision reaching a compromise with debtor nations that have expressed strong reservations about the proposed new statutory regime by letting them opt out of part or all of the new procedure ex ante. Such an opt-out clause ought to satisfy debtor nations that are skeptical of the SDRM, but may still not placate Wall Street interests. The hope, of course, is that if the new procedure produces its expected benefits, the skeptics will be gradually turned around. Some commentators favor even stronger incentives and propose that debtor countries that agree to an SDRM procedure should have easier access to IMF programs (see Kenen, 200).

IV. Open Issues

Even if the outlines of a statutory approach sketched in this paper are compelling, many difficulties remain in defining the details of the procedure and in addressing economic issues specific to sovereign debt crises. The recent analyses and discussions of the SDRM—including this paper—have focused to a large extent on the parallel with Chapter 11 of the 1978 code and on the merits of a statutory approach. Relatively little research has yet been devoted to the many details of the actual operation of an SDRM and a number of important features of the procedure still need to be determined.

A first important feature that is not clear-cut is how bankruptcy protection will be triggered. Should a filing for protection be voluntary, that is, entirely under the discretion of the debtor or should it be left to the initiative of creditors, or both? Similarly, should the granting of protection be conditional on an assessment of the sustainability of the country’s debt or not? As we have argued above, it may be desirable from an ex ante efficiency perspective to make access to an SDRM procedure conditional on the insolvency of the debtor. But a number of ex post considerations may weigh against such a move. It is well recognized that the assessment of debt sustainability is currently more an art than a science. In addition, if access to a sovereign debt restructuring forum is conditional on being judged to be insolvent, then the announcement of a filing may have dramatic effects on capital markets.

A second critical design issue is the statutory time period permitted for working out a debt restructuring. Related to this issue is the question of who can make restructuring proposals to be put up for a vote. As we have seen, large corporate reorganization cases in the United States can last anywhere from three to four months to over two years. One would hope that a swifter resolution could be found in the case of sovereign debt restructuring. Part of the delay in corporate reorganization cases comes from the exclusivity period of three months given to the firm to come up with a reorganization proposal to be put to a vote. A quicker resolution might be available if the exclusivity given to the debtor were lifted and if competing offers were

16 To make the opt-out credible the sovereign should, of course, not be allowed to renge ex post. In other words, the SDRM should only be open to member countries that have signed the new articles of agreement.

17 Such incentives may be important as a countervailing effect to the potential lower cost of borrowing that might otherwise be available by opting out of the SDRM.
allowed, as Aghion, Hart, and Moore (1993) have suggested. Another reason why distressed corporations remain in Chapter II for a long time is that the cost of staying under the court’s protection and of dragging out negotiations may not be so high if the firm is able to operate normally. Unfortunately, there may be additional factors in the sovereign context, which could contribute to further delays. The debtor country may be going through a political crisis, or decision making may be paralyzed due to upcoming elections. There may also be substantial incentives to delay an agreement if more financial support can be squeezed out of the IMF and other multilateral institutions. It is also not at all obvious that a sovereign may be able to function normally while it is renegotiating its debts, even if it has access to DIP financing. It would, indeed, be especially important to come to a quick resolution, if along with the standstill the SDRM also required the imposition of capital controls or even limits on bank deposit withdrawals.

This latter point raises perhaps the most important and difficult design question for the SDRM. Should a financially distressed sovereign be granted an automatic stay on all debt payments when it is granted bankruptcy protection? Should it be allowed to impose capital controls and should it go as far as imposing a suspension of bank deposit withdrawals to avert a run on its banks? The recent crisis in Argentina has made abundantly clear that a suspension of bank deposit withdrawals is no panacea. It has seriously impaired Argentina’s payment system and has fatally damaged the reputation of Argentina’s banks. The crisis in Argentina has uncovered the Achilles heel of the policy of a temporary suspension of bank deposit withdrawals: such a policy is only likely to postpone a run on the banks to the moment when the suspension is lifted. As our overview of corporate bankruptcy reorganization around the world has brought to light, the automatic stay of a bankrupt firm is by no means a universal policy. Neither in Germany (until recently) nor in Japan is the stay on payments all-encompassing. Also, an automatic stay is not necessarily what one would expect to emerge as an optimal regulatory response based on first principles. Accordingly, an automatic standstill is not as clear-cut a benefit as has generally been assumed in the policy debate on the SDRM. There may be ex ante benefits in clearly isolating some debts as outside the reach of a standstill, for example. But most important of all, the experience in Argentina suggests that everything should be done to avoid a temporary suspension of deposit withdrawals.

If a sovereign debt crisis runs the risk of triggering a banking crisis with a run on bank deposits, then a more appropriate response may be to make sure that the central bank acts and can act as a lender of last resort. As is well recognized, the main problem with this policy prescription is that the central bank may not be in a position to act as a lender of last resort if the banking sector’s foreign currency liabilities exceed the country’s foreign currency reserves (as was the case in Argentina). One, admittedly unorthodox, way of addressing this problem, without imposing any suspension of deposit withdrawals, may be to allow banks to meet depositors’ demands for withdrawal of foreign currency deposits in local currency only, but at the going market exchange rate. Such a move could preserve the credibility of a lender-of-last-resort policy unless the banking sector is clearly insolvent. It also creates incentives for depositors to keep their deposits in the bank. Indeed, if the lender-of-last-resort policy is expected to give rise to inflation, then
the foreign currency deposits become a form of inflation-indexed deposits, as long as depositors keep their money in the bank. Admittedly, if the banking sector is clearly insolvent (foreign currency denominated liabilities exceed total asset values denominated in foreign currency), then some form of “haircut” may need to be imposed on depositors and some form of suspension may be needed while the restructuring plan is put in place. However, given the cost of such a move, it is important to investigate the feasibility of limited and short forms of suspensions, which would preserve the payment system. Also, unless a credible lender-of-last-resort policy is in place, the banking system will remain vulnerable to a run once the temporary suspension is lifted.

Closely related to the issue of the scope of a standstill is the question of the possible role of an SDRM in an emerging-market debt crisis like the Asian crisis in 1997, which was not mainly or only a sovereign debt crisis. As currently envisioned in the IMF proposals (IMF, 2001 and 2002) the SDRM would apply only to a sovereign debt crisis. But if IMF bailouts are also seen as an important response to balance-of-payments crises involving mainly private debt, shouldn’t the reach of the SDRM extend even to such crises? And if so, how? An interesting proposal by Buiter and Sibert (1999) and Kenen (2001), based on an augmented contractual approach, is to include collective action clauses allowing for an automatic rollover option of 90 days in all debt contracts, private and sovereign, to be triggered in the event of a crisis. Such a clause would undoubtedly help but is unlikely to be a sufficient response to emerging-market debt crises on the scale of that of South Korea.

V. Conclusion

A statutory debt restructuring procedure may yield substantial benefits over a contractual or market-based approach. It may encourage financially distressed countries to file early. It may reduce the costs of restructuring complex sovereign debt structures, involving multiple bond issues, bank loans, and other liabilities. It may also speed up the restructuring process, reduce the amplitude of the economic crisis that is likely to go along with a default, and, last but not least, provide elements of a fresh start for the distressed country.

These important benefits, unfortunately, may still pale in comparison with the economic dislocation costs that are likely to follow a default. The SDRM cannot realistically be seen as an alternative to current policy based on IMF bailouts. It is more appropriate to think of the SDRM and IMF programs as important complementary policy instruments, that is, the effectiveness of the SDRM is likely to be greater if the distressed country can also count on significant IMF programs. These programs can help the country rebound and return more quickly to its full production capacity. They also continue to have a role to play in preempting liquidity crises and in restoring confidence in volatile debt and foreign exchange markets. If the crisis following a default is likely to take the dramatic proportions seen in Thailand, Indonesia, or Argentina then the fear of default may be so great that much of the benefit of the SDRM will be wasted. Countries will continue to delay debt restructuring until it is far too late, even if they can get greater protection from creditors.
Thus, the ultimate success of the SDRM is likely to depend as much on how well the debt restructuring forum is designed as on the continuation and expansion of existing IMF policies based on bailouts. Similarly, the effectiveness of IMF programs in preventing and responding to crises will be enhanced if an SDRM is in place, which facilitates private sector involvement and makes it easier to reduce a country’s debt burden to more manageable levels.

REFERENCES


TOWARD A STATUTORY APPROACH TO SOVEREIGN DEBT RESTRUCTURING


Comment on
“Toward a Statutory Approach to Sovereign Debt Restructuring: Lessons from Corporate Bankruptcy Practice Around the World”

JEFFREY A. FRANKEL

The first three-fifths of Patrick Bolton’s paper surveys corporate bankruptcy practices in various major countries. Then the remaining two-fifths attempts to draw lessons for the SDRM initiative currently being pursued at the IMF and for competing proposals of other ways to ease debt restructuring in emerging-market crises. This well-written paper is a welcome contribution in two ways. In the first place, it is a very clear and concise exposition of bankruptcy practices. Most writings on the subject are impenetrable to nonspecialists, because they toss around terms like debtor-in-possession and cram-down without defining them, although there do exist a few other good papers that explain the basics. But they tend to focus exclusively on U.S. practice or, at most, U.S. and U.K. practice. So this comparative study is particularly useful, and would be even if it stopped at that. But there is a higher purpose.

SDRM: Background

The second, or higher, purpose is to offer some much-needed guidance in trying to figure out which of the competing proposals for an international version—a statutory approach such as the SDRM, a more market-based contracts approach such as debt exchanges and collective action clauses (CACs), or some combination of these—is preferable. Even for those who think they have the answer to that question, there are still a lot of details. There is hope that a history and comparative analysis of how different countries handle bankruptcy at the domestic corporate level can offer useful insights for these ongoing decisions at the global sovereign level.

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The biggest division is between bankruptcy practice in the United States and practice in the United Kingdom and elsewhere. At first, one might think that this issue of competing domestic standards is like many others: accounting standards, regulations for issuing securities, rules governing intellectual property rights (IPR) or drug testing and approval, or phytosanitary standards. In these cases, and many others, the United States often tries to persuade multilateral forums to extend the approach that it follows domestically to the international level. The motive can be either conviction that its way represents free-market virtue, lazy ignorance of competing standards, or conscious desire to give its firms a leg up (either because the domestic standard intrinsically suits its comparative advantage in some way, or just because its firms have already adapted to it and will thus be a step ahead of foreign firms, which will have to adjust). But the case of international bankruptcy procedures is not necessarily the same. The paper makes it clear that the SDRM is rooted in the tradition of the United States, and is an attempt to extend it to the global sovereign level. And yet the U.S. Treasury has not been very supportive of First Deputy Managing Director Anne Krueger’s proposal first made in a speech in November 2001, partly because of opposition from the U.S. investor community, which remains strongly opposed. The investment community, as represented for example by the Institute for International Finance (IIF), is now supporting instead the wider use of CACs. This would be an extension of the U.K. system, as CACs currently thrive under London law, not New York law.

It is worth briefly reviewing the background, for anyone who may not have followed this issue.1 Begin with what Jeffrey Sachs wrote in 1994 (and in his Princeton essay published in 1995). Any well-trained economist, when confronting a question like appropriate government intervention in debt crises of developing countries, will ask, “where is the market failure?” Sachs’ answer was that there is no international bankruptcy court to perform for the case of international debt difficulties (especially on the part of sovereign governments) the restructuring function that Chapter 11 fulfills for domestic U.S. corporate bankruptcy cases. Sachs proposed creating one. At the time, such proposals seemed hopelessly unrealistic.

As an indicator of how unrealistic the proposal was considered, I will quote from Barry Eichengreen’s 1999 IIE book (pp. 92–93), which surveys proposals for reform. He lists what he sees as the substantive drawbacks, and then goes on:

Above all there is the political question of whether the creditor countries would be prepared to vest such formidable powers in the hands of an international tribunal of officials, . . . Even the kind of limited scheme floated by the Canadian government . . . is patently unrealistic. And if it is unrealistic to think that the IMF or another international entity could be empowered to impose a standstill on payments, it is pure fantasy to suggest that the Fund could be given the power to impose settlement terms on debtors and creditors.

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1The subject has recently been surveyed by Rogoff and Zettlemeyer (2002). Roubini (2000, 2002) argues the case against.
To be sure, after the East Asia crisis hit, U.S. Treasury Secretary Robert Rubin called for fundamental reform of the financial architecture, and British Prime Minister Tony Blair even called for a “new Bretton Woods” (as President Clinton would have if his economic advisers hadn’t stopped him). But the steps that were taken by the G-7, G-22, and other bodies really amounted to tinkering with the plumbing more than changing the entire architecture. Then, in November 2001, Anne Krueger (2001a,b) proposed that the IMF host a sovereign Chapter 11, now called an SDRM. And in April 2002 she proposed a modified version (Krueger, 2002). At the IMF Annual Meetings at the end of September 2002, the major shareholders (G-10) approved IMF plans to draw up a detailed SDRM proposal, simultaneously with a more contract/market-oriented approach that envisions wider use of CACs.

The argument that the absence of an international bankruptcy procedure is the main identifiable market failure sounds plausible.

My own view is that the international financial community should either pursue this approach aggressively, to see whether it can be made to work, or, if not, should stop talking about reform of the financial architecture. I know of no other proposals that are both sensible in conception and sufficiently ambitious to merit the title “reform of the architecture.”

The U.S. Version of Corporate Bankruptcy Law

Patrick Bolton identifies three key elements of corporate bankruptcy and reorganization institutions, from the perspective of U.S. history in particular:

(i) a stay on individual debt-collection efforts and possible suspension of debt repayments (to solve the collective action problem of a “rush to the courthouse”);
(ii) debtor-in-possession financing, which receives seniority over existing claimants, with the objective of keeping the firm operating in the interim if there is long-term value that might be lost by premature dissolution of the firm; and
(iii) delegation of negotiations to creditor committees, with ways of preventing a dissenting minority from blocking a settlement, but ways that are sharply limited in the case of the United States. Each of these functions has possible analogues in international sovereign debt problems, but the fit is perhaps the closest in the case of the third. New York law requires that creditors give 100 percent approval to restructuring proposals outside of bankruptcy court. Attempts to restructure in such cases as Russia and Peru are seen as having been hampered by a minority of holdout creditors, and the goal of all these proposals is to prevent that from happening.

I was interested to learn of the theory that the heavy reliance of U.S. corporate finance today on bonds (rather than bank loans) might be attributable to their treatment in bankruptcy, particularly under the 1978 Bankruptcy Act. Bondholders are relatively well protected: A reorganization plan must be approved by each of the creditor classes (a two-thirds majority by ownership, within each). U.K. bankruptcy law, in contrast, gives greater protection to bank creditors.
Other Countries' Versions

In a final section the author concludes that U.S. corporate bankruptcy law and practice appear to be the most relevant for a comparison with sovereign debt restructuring.

The leading alternative to the U.S. system of bankruptcy by statute is the U.K. bankruptcy-reorganization procedure, called “administrative receivership.” Relative to the U.S. system, the British system tends to be creditor-controlled, to restructure debt more quickly, to avoid debtor-in-possession financing, and to favor liquidation, which makes bankruptcy less attractive to debtors. The U.K. system shares with the United States a low level of court involvement, compared to others. But I come away with the conclusion that the United Kingdom is less relevant as an alternative model of what an SDRM would look like than as a reminder of the system under which CACs thrive—a market-oriented alternative to SDRM.

The paper also reviews systems in other countries, rich and poor. We learn, for example, that Japan offers strong protection to secured creditors, as did Germany, at least until recently; France and India provide strong protection for workers and other stakeholders.

Lessons for SDRM?

Three big questions characterize an SDRM. They are: (i) how much administrative involvement should there be? (ii) how comprehensive should debt standstill be? and (iii) how much involvement should other stakeholders have?

There is a discussion, in Bolton’s paper of political economy, which is very welcome, as we economists too often ignore the politics in trying to design a system, or at most invoke some political constraints in ruling out some proposal. Bankruptcy procedures were very controversial in U.S. politics in the first half of the nineteenth century. Yet they eventually became well established. The instinctive response to the SDRM is similar to Eichengreen’s: “whatever its merits in theory, it will never be accepted in practice.” So the history of how bankruptcy proceedings developed domestically seems a promising source of insight into political barriers and how to overcome them.

Specifically, Bolton points to the exemptions or opt-out provisions that were granted to states to reduce resistance to a federal system. It sounds promising at first; “states’ rights” was the strategy that led all 13 former colonies to go along with the U.S. federal Constitution in the first place, and any attempts at global governance can be usefully informed by this precedent. But I fear the precedent may be less useful for an SDRM than at first appears.

In the first place, while farmers and other debtors were an important political constituency in nineteenth century America, developing countries unfortunately have little vote in the design of the international financial architecture.

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2Should the decision be up to the debtor country and creditors (as under U.S. law), or should the IMF or another body have to approve alone (as in Japan’s composition law and Chapter 9 of U.S. law)? Should the debtor country remain in control (United States) or appoint a receiver (as under French law)?
(I say this even though some large emerging-market countries have finally been given a seat in groups like the International Monetary and Financial Committee (IMFC), the G-20, and the Financial Stability Forum (FSF) and even though I think that on the trade side developing countries collectively for the first time do have some bargaining power in multilateral negotiations.) The greater obstacle that must be overcome as part of this, or any sensible, reform is more likely to be the U.S. Congress than debtor countries. The Congress is not in favor of giving up any sovereignty or approving any multilateral treaties of any sort these days. It is not likely to agree to amend the IMF Articles of Agreement in the way suggested, or to allow an international body to overrule U.S. securities laws and creditor protection.

In the second place, perhaps the most obviously bad aspect of U.S. bankruptcy law is precisely that some states retain provisions whereby residents declaring personal bankruptcy can keep such valuable property as expensive houses, and even racehorses. Currently, some top executives of scandal-ridden companies are reportedly engaged in crash projects to build luxury houses in Florida, as a way of safeguarding their wealth if they have to file for bankruptcy.

One place where I think I may disagree with the author is the subject of corporate debtors shopping for the most friendly jurisdiction. Bolton has suggested this may be a good feature of the U.S. system, which could be usefully adopted at the global sovereign level:

A form of jurisdiction shopping could be contemplated under an international bankruptcy procedure as well. To encourage courts to respond to the needs of the contracting parties it may be desirable to allow for jurisdiction shopping by, say, letting existing bankruptcy courts also handle cases of sovereign defaults. Thus, sovereigns and/or their creditors could file for bankruptcy protection in U.S. bankruptcy courts (say, New York or Delaware), in U.K. courts, or in an ad hoc sovereign debt restructuring body... (p. 51).

When it comes to most kinds of standards, say for accounting or securities, a possible drawback of a system that allows jurisdiction shopping is a "race to the bottom." The "pro" argument is that the competition will discipline those jurisdictions, giving them an incentive to maintain standards that are user-friendly and low in cost. This is what Bolton has in mind. Perhaps this works for corporate bankruptcy law; perhaps Delaware is indeed the popular state in which to incorporate because the Delaware court delivers timely and efficient bankruptcy proceedings. But it doesn’t strike me as a good idea. A court in Delaware or New York or Indiana is likely to be heavily influenced by the economic interests of residents of the United States. If the other side in a dispute consists of residents of far-off countries, their interests may not receive a fair hearing, even in fact, let alone in terms of the perceptions of the citizens of those countries. Raffer (1990) proposed that the international bankruptcy court should be located in a neutral country, a land that is neither an active lender nor borrower. Marcus Miller (2002) considers that neutrality argues in favor of locating a bond restructuring forum in any G-7 country other than the United States or the United Kingdom.
COMMENT ON "STATUTORY APPROACH TO SOVEREIGN DEBT RESTRUCTURING"

Differences Between Corporate and Sovereign Contexts

The author points out some differences between corporate bankruptcy and sovereign debt restructuring. The most important one is that sovereign states are not liquidated and governments are not replaced, at least not directly by creditors, as part of default proceedings. Even though Walter Wriston's famous statement that nations don't go bankrupt is generally said to have been proven wrong (in 1982) soon after it was made, it is true that sovereigns do not go out of business.3 As footnote number three in Bolton's paper mentions, Chapter 9 for municipalities may be a more relevant precedent for sovereign restructuring. I wonder why Chapter 9 is not cited more often in this context, and Chapter 11 less.

One would think that the knowledge that the debtor can't ultimately be put out of business would shift bargaining power from the creditor to the debtor (as noted in Bolton's paper). The standard countervailing aphorism to Wriston's statement is, "If you owe your banker $1 million, you have quite a problem; if you owe your banker $1 billion, he has quite a problem." This doesn't seem to be the way it works in practice, however. Debtors in fact have the most to lose. For some reason, debtor countries almost never explicitly default, telling the world they have no intention of paying, despite the apparent advantages of doing so. Perhaps it is those on the creditor side of the table who in fact have the greater bargaining power, because they are going to return to nice warm homes, whatever happens, while those on the debtor side may experience economic hardship (or jail, in some recent cases of ministers from Argentina to Korea to Indonesia).

Bolton lists as a further difference that sovereigns do not have to protect themselves against creditors racing to grab the debtor's assets. I have a question here. I remember that in the early 1980s, a constant fear was that a miffed creditor would get a court order and "attach assets": a Brazilian ship in a U.S. port, an Argentine plane at a U.S. airport, or Mexican oil in a U.S. pipeline. The standard creditors' scramble for assets seemed a real danger, from what the lawyers told us. Indeed, such fears were listed as one of only several possible incentives that prevented countries from declaring outright default. And yet it never happened, neither in the debt crisis of the 1980s, nor in those of the 1990s. Does anyone know why?

Opponents of an SDRM

When considering a proposed major change in law, it is standard to ask for testimony from those most affected. In the case of the SDRM, that would be the creditors and lenders. It is interesting that both groups are on record as being opposed. Lenders, of course, view it as a recipe for making default more common, at their expense. They also object to letting the IMF have seniority (which it de facto already has).4

3There was a time when countries could lose their sovereignty as a result of debt default. In 1876, when Egypt defaulted on its debt—much of which had been incurred in the construction of the Suez Canal—Great Britain and France took charge of the country's finances; British troops eventually occupied Egypt, in 1882, and ended up staying for 72 years. Presumably, those times are long past.
4For example, Credit Suisse First Boston (2002).
While the immediate goal is to make restructuring run more quickly and more smoothly, I would say that the larger goal is to avoid the need for sharp recessions as part of the adjustment process and to do it without a large increase in the size of IMF loans—ideally, with a decrease in the size of IMF loans relative to recent large packages—for moral hazard and political reasons. If the IMF subsidy component were indeed reduced, it does not strike me as implausible that the net effect might be negative on the lenders, at least in the short run. If so, the IIF is doing its job in representing the interests of the creditors.

A number of borrowing governments are also opposed, and this is a more interesting observation. The stated reason is that to make ex post restructuring easier, and make default more frequent would reduce the ex ante availability of financing, in particular by raising the risk premium. I am not convinced by this line of argument. True, the total amount of financing going from high capital/labor (K/L) countries to low K/L countries is currently already less than the first-best return-equating optimum, and in that sense a reduction in capital flows would have a first-order negative effect on global economic welfare. But given the severity of the recurrent crises, in terms of lost output, it seems to me that we have been living in a third-best world (or worse). I know that in the Michael Dooley (2000) view, recessions are a necessary device to assure creditors that debtors will not default lightly, thus making international finance possible. But surely we can do better than that.

A reduction in the amount of debt may actually be desirable, a move from third best to second best, if it can be done in a way that is not too distortionary. I am not like some who favor a gratuitous increase in exchange rate volatility to discourage foreign currency borrowing, and I think that capital controls are a complicated matter, more likely to be abused than to be used intelligently. Nevertheless, if a reduction in the volume of flows occurs as a side effect of a plan that substitutes an orderly restructuring for the recession mechanism, then I don’t see this as a clear drawback. In other words, maybe a moderate reduction in capital availability is not such a bad outcome. The goal in architecture design should be to get some of the benefits of international capital markets, without periodic collapses in real economic activity. Surely a system that depends on loss of reputation as a deterrent to default is better than a system that depends on collapses in economic activity to accomplish the deterrent, and this is true even if the deterrent is triggered only infrequently.

There are other counterarguments, such as political infeasibility and the fact that, as currently envisioned, the SDRM applies only to governments defaulting on international obligations, which was not the main problem in most recent crises. But these arguments do not suggest that trying to launch an SDRM would do any harm. At worst it would have no effect.

Why, then, are borrowers opposed? Is it possible that if the question were posed to the borrowers collectively, they would be more supportive? When they speak as individual countries, they are afraid of the stigma they would suffer if they favored the SDRM (i.e., they fear the international community would suspect they anticipate default). Do the emerging-market groupings have any voices in the international financial forums who are not first and foremost ministers for particular countries who worry that their views will come back to haunt their home countries?
Lenders opposed, borrowers opposed—that would seem to be everyone involved. Is the IMF then wrong to propose an SDRM, and are G-10 governments wrong to support it? Lenders and borrowers don’t in fact exhaust the list. Citizens of borrowing countries (workers, taxpayers) and of lending countries (exporters, taxpayers) are also on the list of stakeholders, and they stand to benefit a lot if a way can be found to resolve debt problems without collapse of the country’s economic activity.

One would think that “G-10” includes the Bush administration. Footnote 15 in Bolton’s paper says, “Interestingly, the SDRM is a political issue with some Republicans siding with ‘Main Street’ against ‘Wall Street . . . .’” The implication is that the Bush administration supports the SDRM, but I don’t think it is clear what the position of the administration is. Its rhetoric has been variable on the SDRM, as in the area of international finance more generally. John Taylor, U.S. Treasury Undersecretary for International Affairs, has been ambivalent, at best, or outright opposed. In October 2002, a few days after the IMF/World Bank Annual Meetings, then CEA Chairman Glen Hubbard said the SDRM might not be necessary if market players could construct their own private debt re scheduling forum, a remark that was interpreted as encouraging Wall Street opposition. There is no reason to think the private market could on its own achieve a debt rescheduling forum.

The Alternative of Market Mechanisms

Coming out of the crises of 1997–98 there appeared to have been widespread agreement that some improvement on the regime as it stood ten years ago was necessary. Bolton’s paper discusses two “contractual” approaches: exchange offers (Roubini), which work under New York law, and CACs (Eichengreen), which to date have only worked under London law. It is often argued that bonds, the dominant financing vehicle of the 1990s, couldn’t be restructured as easily as loans, the dominant vehicle of the preceding cycle, because there are so many disparate bondholders. But people forget how many banks there actually were in the 1982 debt crisis, how heterogeneous they were, and how difficult it was to keep them all on board with packages that required them to “voluntarily” roll over their loans.5 There were more similarities between the two cycles than most people realize. If the resolution of the debt crisis in the 1980s had been speedy or without large economic losses, then the shift in the composition of finance would be a key point. As it is, it never worked very well when judged by the ultimate test: the decade of lost growth. So any reforms that make restructuring work better would be desirable.

The proponents of exchange offers (including Roubini, for example, in a paper jointly authored with me) argue that they have been used effectively in some recent cases: Ukraine, Pakistan, and Ecuador. (And furthermore, CACs could have been used, as the instruments explicitly allowed for them, but an exchange offer was preferred.6) Thus, it is argued, no major changes are needed. Bolton responds that these were small countries for which “the IMF’s stated policy, that it would not

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5Also, while the crises of Mexico in 1994–95 and Thailand in 1997 were primarily related to securi ties, banks were still important in Korea in 1997 and Turkey in 2000.

6Frankel and Roubini (2003).
consider any bailouts without some concessions from other creditors and bondholders, may well have been credible.” An exchange offer failed in Russia in 1998, precipitating the full-fledged Russian default/devaluation. The explanation was that Russia, for geopolitical reasons, was the quintessential moral hazard play, that investors thought they could do better than the exchange offer because the IMF would have to bail Russia out. But if that was indeed the problem, then the fact that the IMF and the G-7 did ultimately pull the plug must have had a salutary effect on future investor calculations of this sort, which could support the Roubini claim that exchange offers are good enough. Furthermore, geopolitics were also relevant in Pakistan and Ukraine. Nevertheless, I am not sure that we should not be satisfied with the way the current system is working.

The proposal to expand the use of CACs, as an important reform in the international financial architecture, has been around for quite awhile. Eichengreen and Portes (1995) and the Rey Report (Group of Ten, 1996) were proposing greater use of CACs even before the Mexican peso crisis of December 1994. Debtors have been said to be reluctant to ask for CACs, for the same reason they are reluctant to support an SDRM: the stigma. For quite awhile, the recommendation was that G-7 governments should take the lead and issue bonds with such contracts, and only their refusal was holding things up. But both the Canadian and U.K. governments have now issued bonds with CACs. Initially they did little to generate enthusiasm in emerging markets. But in April 2003, Mexico and Brazil announced new bond issues carrying CACs.

Bolton gives four drawbacks to contractual or market approaches: (i) what happens to any other bonds and claims, beyond the specific bonds covered by CACs and exchange offers; (ii) enforcement of priority; (iii) DIP financing; and (iv) the high debt burden that remains even after restructuring. Fischer (2002, pp. 31-35) lists drawbacks with the current system of market-based private sector involvement (PSI), including difficulty of enforcing “voluntary” restructuring, and finds that the most profound difficulty is the absence of an accepted framework, like the proposed SDRM, wherein a debtor, in extreme circumstances, can impose a payments suspension while working to restore viability.

The solution may be to pursue SDRM simultaneously with market alternatives such as CACs because it is compatible to have both in effect simultaneously; CACs are thought to be easier to put in place, so there is a case for starting with them; and having discussions over the SDRM in process creates an incentive for the private financial community to pursue CACs as a preferred alternative.
COMMENT ON “STATUTORY APPROACH TO SOVEREIGN DEBT RESTRUCTURING”

REFERENCES


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International Financial Integration

PHILIP R. LANE and GIAN MARIA MILESI-FERRETTI

In recent decades, foreign assets and liabilities in advanced countries have grown rapidly relative to GDP, with the increase in gross cross-holdings far exceeding the size of net positions. Moreover, the portfolio equity and foreign direct investment (FDI) categories have grown in importance relative to international debt stocks. In this paper, we describe the broad trends in international financial integration for a sample of industrial countries and seek to explain the cross-country and time-series variation in the size of international balance sheets. We also examine the behavior of the rates of return on foreign assets and liabilities, relating them to "market" returns.

International financial integration is increasing. Capital account restrictions have been lifted in many countries, other barriers to investing overseas are also being dismantled, and the level of activity in international financial markets has increased markedly over the last decades. This paper studies the dynamics of international financial integration using data on the level and composition of foreign assets and liabilities for a set of industrial countries. More specifically, we do the following:

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(i) Characterize the salient features of the increase in international financial integration during the past two decades;

(ii) Relate the growth in foreign asset and liability positions to potential "drivers" of integration (lifting of policy restrictions, increases in goods trade and output per capita, domestic financial developments, privatization programs, tax policy); and

(iii) Study the behavior of rates of return on external assets and liabilities and relate them to differences in portfolio composition.

With regard to the first point, we address several questions. Has the composition of country portfolios systematically changed over time? To what degree does the increase in external assets and liabilities reflect valuation effects due to the stock market boom of the 1990s? What are the relative contributions of valuation changes (such as stock market and currency fluctuations) and new capital flows in determining gross international investment positions?

With regard to the second point, we ask whether the time-series and cross-sectional patterns in the levels and composition of cross-holdings can be systematically related to factors such as the increase in world trade in goods and services and rising income levels, as well as to "policy events" such as capital account liberalization, privatization programs, domestic financial liberalization, and other regulatory changes.

With regard to the third point, we have documented in previous work the existence of substantial differences in rates of return on external assets and liabilities across countries (Lane and Milesi-Ferretti, 2002a and 2002b). For example, rates of return on assets have systematically exceeded those on liabilities for the United States, so that the U.S. investment income position stayed positive for a number of years even when the net foreign asset position had turned negative.

Rates of return matter since they are the channel through which international investment positions provide risk sharing. The associated international transfers also are important in determining the trade balance and the real exchange rate. Moreover, the dynamics of asset and liability stocks depend on capital gains and losses in addition to new capital flows. This is especially important for countries holding large portfolio equity and foreign direct investment (FDI) portfolios that may take most of their returns in the form of capital gains, which do not affect investment income flows, rather than yields (which do). In this paper, we study the dynamic behavior of rates of return, the links between rates of return on the international investment position and various financial market returns, and the interrelations between domestic and foreign real rates of return and real exchange rate fluctuations.

This work has clear relevance for policymakers. Stocks of foreign assets and liabilities represent an important global linkage—shocks in country A have an impact on country B via revaluation and other wealth effects. This is stabilizing to the extent that the international balance sheet hedges domestic risks, but potentially raises volatility if external investments leverage domestic positions. In addition, identifying the sources of growth in world asset trade can contribute to an understanding of its sustainability and likely future trends. In this regard, growth that is related to the once-off elimination of barriers to asset trade will not persist but rather represents the transition to a higher level of activity. In contrast, growth
that is linked to positively trending variables such as output per capita and goods trade can be predicted to continue into the future.

In our previous work, we have explored the determinants of net foreign asset positions along the time-series dimension (Lane and Milesi-Ferretti, 2002a). However, we have largely examined other components (e.g., debt-equity ratios for foreign liabilities) in a purely cross-sectional manner (Lane and Milesi-Ferretti, 2001a, 2001b). Lane (2000) provides some evidence on the change in gross cross-holding positions over time for the Organization for Economic Cooperation and Development (OECD) countries but does not try to explain the panel dynamics. The available time-series data have increased substantially in recent years, with countries now reporting data on their external portfolios in much greater detail.

In terms of empirical work on international financial integration, some other authors have looked at related questions. Bekaert and Harvey (2000) have attempted to date the integration of emerging market stock exchanges into the global market, using an asset price model. Henry (2000), Levine and others (2000), Edison and others (2002), Edison and Warnock (2003), and O'Donnell (2002), among others, have looked at the impact of international financial integration on various indicators. Obstfeld and Taylor (2002) provide a wide-ranging historical overview, including analysis of the long-run changes in gross asset trade. For Europe, Adam and others (2002) explore a wide range of measures of international financial integration. Finally, we note that such a study of the “growth in world asset trade” is complementary to the recent literature on the growth in world trade (Hummels, Ishii, and Yi, 2001; and Yi, 2003).

The empirical literature on the rates of return earned on foreign assets and liabilities is very small. Bond (1977), Sorensen and Yosha (1998), and Lane (2001) study the behavior of investment income flows but not the contribution of capital gains and losses, while Sorensen, Yosha, and Wu (2002) also provide some indirect evidence on the role of portfolio equity holdings in international risk sharing. Lane and Milesi-Ferretti (2002a, 2002b) provide some initial evidence on the behavior of overall rates of return.

I. Data Issues and Broad Trends

We study international financial integration using data on countries’ portfolios of external assets and liabilities—the so-called international investment position (IIP). These data summarize total holdings by domestic residents of financial claims on the rest of the world and nonresidents’ claims on the domestic economy. Following the methodology of the Balance of Payments Manual 5 (IMF, 1993), external liabilities are divided into five main categories: foreign direct investment (FDI), portfolio equity investment, portfolio debt investment, other investment, and derivatives. Assets are instead divided into six categories: the same five as liabilities, plus official reserves. Table I summarizes country and period coverage for the main categories of external assets and liabilities. The main data source is the International Monetary Fund’s Balance of Payments Statistics, but we also made use of data from national sources. A web data appendix describes data sources in more detail.
Data Issues

The methodologies used to construct data on external assets and liabilities can differ both across and within countries. For the purpose of cross-country comparisons, one particularly important factor is the methodology used to estimate the stock of FDI and portfolio equity investment and, in particular, whether these stocks are evaluated at book or market value. Only a few countries (United States, France, and Sweden) provide estimates of the stock of FDI both at book and market value. Other countries provide only one set of FDI estimates, most at book value (Australia and Netherlands use market value). For portfolio equity investment, most countries provide estimates at market value (Canada, which uses book value, is the exception). Generally, book value estimates understate the market value of the underlying assets and liabilities.

With regard to the time-series dimension, problems can arise because of within-country changes in the classification of certain types of assets or liabilities. For example, for the earlier years of the sample, portfolio debt investment

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Table 1. External Assets and Liabilities: Data Availability

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Start</th>
<th>End</th>
<th>FDI Start</th>
<th>End</th>
<th>Portfolio Equity Start</th>
<th>End</th>
<th>Portfolio Debt Start</th>
<th>End</th>
<th>Other Investment Start</th>
<th>End</th>
</tr>
</thead>
</table>
holdings are included in other investment holdings in the United Kingdom. More generally, the breakdown of external assets and liabilities in different categories is available only partially, especially for the earlier years of the sample.

When studying the individual dynamics of external holdings and rates of return, we have strived to use a data set as homogeneous as possible, taking into account both structural breaks and methodological differences in the calculation of assets and liabilities. Nevertheless, heterogeneities in the data unavoidably remain—as we proceed, we point out the implications of such data problems for our analysis.

**Broad Trends**

A summary volume-based measure of international financial integration is:

$$IFIGDP_{it} = \frac{(FA_{it} + FL_{it})}{GDP_{it}},$$

where $FA$ and $FL$ refer to the stocks of aggregate foreign assets and liabilities, respectively.\(^2\) Figure 1 plots the evolution of this ratio over the period 1983–2001 for a set of industrial countries. This ratio has increased by 250 percent over this period, with a marked acceleration during the 1990s.\(^3\) This increase in financial linkages has not been uniform across countries: Figure 2 shows a rise in dispersion in this ratio across countries over this interval.

Since international trade in debt instruments may be driven by special factors, we also consider an equity-based measure:

$$GEQGDP_{it} = \frac{(PEQA_{it} + FDIA_{it} + PEQL_{it} + FDIL_{it})}{GDP_{it}},$$

where $PEQA$ (L) and $FDIA$ (L) are the stocks of portfolio equity and FDI assets (liabilities). In other words, $GEQGDP$ is an indicator of the level of equity (portfolio and FDI) cross-holdings. Figure 3 shows that the growth in this ratio has been even more rapid than for $IFIGDP$—it more than tripled over 1983–2001.

One possible reason for this rise in international financial cross-holdings is the increase in international trade, which has also been substantial in recent decades. However, Figures 4 and 5 show clearly that the increase in financial openness dwarfs the increase in goods trade. Figure 4 shows the $IFI$ and $GEQ$ measures as ratios to exports plus imports rather than GDP ($IFI_{TRADE}$, $GEQ_{TRADE}$).

Both ratios show substantial increases over the period: in the aggregate, international asset trade has grown far more rapidly than goods trade by this measure. Figure 5 illustrates that this finding holds at the individual country level, by showing the relation between the percentage change in the financial openness to GDP

\(^2\)See also Lane (2000) and Obstfeld and Taylor (2002). The latter discuss the relative merits of this indicator versus other price-based measures of integration, as do Adam and others (2002).

\(^3\)The decline during 2001 reflects the steep fall in world stock markets.
Figure 1. Evolution of International Financial Integration, 1983-2001

Note: Figure 1 plots the aggregate sum of external assets and liabilities over aggregate GDP. Countries in the sample are the United States, United Kingdom, Austria, Belgium, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, and Spain.

Figure 2. Dispersion in Level of International Financial Integration, 1983-2001

Note: Figure 2 plots the standard deviation of IFIGDP ratio. Countries in the sample are the United States, United Kingdom, Austria, Belgium, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, and Spain.
Philip R. Lane and Gian Maria Milesi-Ferretti

Figure 3. International Equity Integration, 1984-2001

Note: Sum of FDI and portfolio equity assets and liabilities, aggregated over sample countries, divided by aggregate GDP. Countries in the sample are the United States, United Kingdom, Austria, Belgium, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, and Spain.

Figure 4. International Integration: Finance Versus Trade

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ratio and the percentage change in the trade openness to GDP ratio during the period 1991–2001. Only for Canada (which measures portfolio equity at book value and therefore underestimates external assets and liabilities) and Japan trade has openness increased more than financial openness.

In theory, international financial integration may simply reflect financial deepening: in industrial countries, financial assets and liabilities increased much faster than GDP over the past two decades, and the share of external assets and liabilities in total financial holdings may thus have remained unchanged. Unfortunately, the availability of financial balance sheets is limited, both along the cross-sectional and the time-series dimension. Nevertheless, available data for the United Kingdom (since the early 1980s) and Belgium and Italy for the second half of the 1990s show clearly an increase in the ratio of external financial holdings over total financial holdings (Figure 6).

Another piece of evidence suggesting that increased international financial integration is more than the reflection of financial deepening comes from data on portfolio equity holdings. Figure 7 shows that the ratio of portfolio equity holdings by foreigners to stock market capitalization has increased over the past ten years. Note that this ratio underestimates the increase in foreign equity holdings because it excludes the “controlling shares” of companies that are classified as FDI.

*Kraay and others (2000) calculate a measure of national net wealth, using estimates of physical capital stocks. However, measuring gross assets and liabilities is an even more onerous task. See also Obstfeld and Taylor (2002).
Figure 6. External Versus Total Financial Holdings

United Kingdom, 1987–2001

- Share of external financial assets
- Share of external financial liabilities

Source: Office of National Statistics.

Belgium

Source: Banque de Belgique.

Italy

Source: Bank of Italy, Financial Accounts.
In a similar vein, we next investigate the degree to which the value of international portfolios is related to the boom in equity valuations during the 1990s, rather than an increase in capital flows. Table 2 reports the change in external assets and liabilities between end-1995 and end-2000 (as a ratio of GDP in 2000), cumulative capital outflows and inflows during the same period, and, as residual, the part of the change in the external position not explained by capital flows. The table shows clearly the remarkable increase in the size of country external portfolios and the magnitude of the underlying gross capital flows. The increase in external diversification is particularly high in financial centers such as Switzerland and the United Kingdom, and small open economies such as the Netherlands and Scandinavian countries, and is much faster than in previous years. Indeed, compared with the previous five-year period (1990–95), gross capital flows more than doubled, both in absolute terms and as ratios of GDP.

A second notable fact is the importance of capital gains and losses in explaining the dynamics of the external position. These are primarily due to exchange rate fluctuations and changes in stock market values, which were substantial during this period. In our sample, a remarkable case is Finland, where the increase in the market value of its equity liabilities (in particular Nokia, a stock widely held by non-residents) implied an increase in external liabilities unexplained by new inflows of over 100 percent of its GDP. The impact of capital gains and losses on the net external position, which can be derived by subtracting column (6) from column (3), is even more substantial (in relative terms) than the impact on gross positions.
Table 2. Change in External Assets and Liabilities, Cumulative Capital Flows, and Capital Gains, 1995–2000  
(Ratios of 2000 GDP)

<table>
<thead>
<tr>
<th>Country</th>
<th>(1) Change in External Assets</th>
<th>(2) Cumulative Capital Outflows</th>
<th>(3)=(1)−(2) Impact of Capital Gains</th>
<th>(4) Change in External Liabilities</th>
<th>(5) Cumulative Capital Inflows</th>
<th>(6)=(4)−(5) Impact of Capital Gains</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>27.8</td>
<td>23.8</td>
<td>4.0</td>
<td>36.4</td>
<td>34.8</td>
<td>1.6</td>
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<tr>
<td>United Kingdom</td>
<td>144.1</td>
<td>145.2</td>
<td>−1.2</td>
<td>145.5</td>
<td>149.0</td>
<td>−3.5</td>
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<tr>
<td>Austria</td>
<td>53.7</td>
<td>70.9</td>
<td>−17.2</td>
<td>57.9</td>
<td>84.8</td>
<td>−26.9</td>
</tr>
<tr>
<td>Denmark</td>
<td>76.1</td>
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<td>−8.1</td>
<td>60.0</td>
<td>85.3</td>
<td>−25.3</td>
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<tr>
<td>France</td>
<td>51.1</td>
<td>68.4</td>
<td>−17.3</td>
<td>64.3</td>
<td>55.1</td>
<td>9.1</td>
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<tr>
<td>Germany</td>
<td>49.9</td>
<td>72.2</td>
<td>−22.3</td>
<td>53.6</td>
<td>74.9</td>
<td>−21.4</td>
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<tr>
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<td>40.9</td>
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<tr>
<td>Norway</td>
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<td>59.2</td>
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<tr>
<td>Sweden</td>
<td>69.5</td>
<td>43.0</td>
<td>26.5</td>
<td>57.4</td>
<td>38.1</td>
<td>19.3</td>
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<tr>
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<td>208.1</td>
<td>201.4</td>
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<td>Japan</td>
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<td>4.0</td>
<td>3.1</td>
<td>−0.1</td>
<td>−7.4</td>
<td>7.3</td>
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<tr>
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<td>180.4</td>
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<td>−1.7</td>
<td>53.1</td>
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<tr>
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<td>Spain</td>
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<td>64.8</td>
<td>−12.2</td>
<td>51.6</td>
<td>69.2</td>
<td>−17.6</td>
</tr>
</tbody>
</table>

With FDI at market value

<table>
<thead>
<tr>
<th>Country</th>
<th>(1) Change in External Assets</th>
<th>(2) Cumulative Capital Outflows</th>
<th>(3)=(1)−(2) Impact of Capital Gains</th>
<th>(4) Change in External Liabilities</th>
<th>(5) Cumulative Capital Inflows</th>
<th>(6)=(4)−(5) Impact of Capital Gains</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>34.6</td>
<td>23.1</td>
<td>11.6</td>
<td>47.2</td>
<td>37.4</td>
<td>9.9</td>
</tr>
<tr>
<td>France</td>
<td>80.5</td>
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<td>55.1</td>
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<td>Netherlands</td>
<td>135.4</td>
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<td>163.7</td>
<td>88.3</td>
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<tr>
<td>Sweden</td>
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<td>87.1</td>
<td>97.0</td>
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<tr>
<td>Australia</td>
<td>19.7</td>
<td>17.4</td>
<td>2.3</td>
<td>22.0</td>
<td>39.0</td>
<td>−16.9</td>
</tr>
</tbody>
</table>

Note: The change in external assets (liabilities) is the difference in gross external assets (liabilities) between end-2000 and end-1995 (end-1996 for Portugal) as a ratio of 2000 GDP. The impact of capital gains is the difference between the change in external assets (liabilities) and cumulative capital outflows (inflows) between 1996 and 2000 (1997–2000 for Portugal), also as a ratio of 2000 GDP.

II. Analysis of International Investment Positions

This section discusses theoretical determinants of international financial integration and conducts a simple econometric analysis aimed at identifying the key factors driving international asset trade.

Conceptual Issues

A natural benchmark in thinking about the level of international asset cross-holdings is the allocation that would hold under complete global financial market integration with no cross-border transactions costs. In such a world, each country would hold a very high level of foreign assets and liabilities, in line with full diversification. As a crude approximation, a country representing 1 percent of the world...
endowment would hold 99 percent of its wealth overseas and, in turn, 99 percent of its domestic tradable assets would be held by foreigners.⁵

Although the world is still far from this idealized state, it is logical to relate the cross-country and time-series variation in international portfolios to the corresponding dispersion in the (implicit and explicit) barriers to full integration and in the gains to international diversification. The level of international asset trade will also depend on the “tradability” of domestic assets: factors that reduce domestic transaction costs also facilitate cross-border asset trade.

Martin and Rey (2000, 2001) provide theoretical models that address some of these issues. In their framework, investors are risk averse, the number of financial assets is endogenous, assets are imperfect substitutes, and cross-border asset trade entails transactions costs. Under these assumptions, a reduction in international transactions costs stimulates an increase in the demand for (and supply of) assets and an increase in asset prices, leading to higher cross-border diversification.

As such, our empirical strategy is to identify a set of country characteristics that may influence the benefits to and costs of international asset trade. Most obviously, we consider the impact of controls on cross-border capital movements. If controls are binding, the level of international asset cross-holdings should increase if the capital account is liberalized.

Second, we investigate the connection between trade in goods and services and trade in assets. Goods trade may matter for several reasons. First, much goods trade directly entails corresponding financial transactions (e.g., trade credit and export insurance). Second, following Obstfeld and Rogoff (2001), there is a close connection between the gains to international financial diversification and the extent of goods trade: trade costs create an international wedge between marginal rates of substitution and hence limit the gains to asset trade. Third, goods trade and financial positions are jointly determined in some situations, as is often the case with FDI, given the importance of intra-firm intermediates trade. Finally, openness in goods markets may increase the willingness to conduct cross-border financial transactions, reducing financial home bias (a “familiarity” effect).⁶

Income per capita may also influence the propensity to engage in international asset trade. To the extent that higher income per capita is associated with lower risk aversion and international investments are perceived as riskier than domestic alternatives, it may also raise international asset trade. If participation in foreign asset markets involves fixed costs (e.g., learning costs), this may provide another reason why international cross-holdings might rise with income levels. The Martin-Rey framework also naturally delivers such a positive relation.

The size of the domestic financial sector plausibly facilitates international asset trade in several ways.⁷ Domestic financial intermediaries that also distribute international assets offer a local channel through which investors can gain foreign exposure.

⁵See Obstfeld and Rogoff (1996, Chapter 5) for a textbook review of the theory of international financial trade.
⁶For Ireland, Honohan and Lane (2000) show that the bilateral pattern of goods trade explains the bilateral pattern of portfolio equity investment very well.
⁷At this point, we are not attempting to establish lines of causality. Some other studies in fact have tried to make a link running from external liberalization to domestic financial development. See, for example, Klein and Olivei (2000).
Exposure to domestic financial markets may also increase the desire for international diversification. On the liability side, an extensive financial infrastructure is attractive to foreign investors. However, a substitution effect may also operate: by necessity, domestic agents will have to invest on foreign markets if the domestic financial sector is underdeveloped. The quality of domestic financial regulation may also be important: foreign investors will stay away from markets that do not protect their interests.

Tax policy may also influence the level of international cross-holdings. Firm assets may be shifted to countries with low corporate income tax rates. Moreover, such a regime will also attract international financial intermediaries engaged in offshore financial transactions. In addition, at a household level, high tax rates on investment income will stimulate the growth of offshore savings vehicles, if overseas investments can be more easily hidden from domestic tax authorities.8

These factors may not have uniform effects on the different components of the international balance sheet. For instance, if the greatest barriers to trade have been with respect to more complex and riskier assets (i.e., portfolio equity and FDI), then we may expect cost-reducing steps to have a larger impact on these components.

The Empirical Specification

In line with the discussion in the previous subsection, we attempt to empirically identify the factors underlying the changing scale of international financial integration over time and across countries. Given the lack of firm theoretical priors and the sparse prior literature, this is intended to be an exploratory exercise.


\[ \Delta(\text{IFIGDP}_{it}) = \alpha_i + \gamma X_{it} + \beta Z_{it} + \varepsilon_{it}, \]  

where we relate the growth in international financial integration to a set of country- and time-varying determinants, \( X_{it}, Z_{it} \). We first-difference the data to take into account the nonstationarity of the levels of \( \text{IFIGDP} \) and some of the regressors.9 We allow for a country-specific intercept, to allow for country-specific trends in the level of financial integration.10 Accordingly, we conduct fixed-effect least squares estimation (with White-corrected standard errors).

We begin in Table 3 by examining \( \text{IFIGDP} \). In Table 4, we restrict attention to the volume of asset trade in portfolio equity and FDI (\( \text{GEQGDP} \)). Finally, in Table 5 we examine the determinants of the composition of international balance sheets, as measured by the shares of equity instruments (both portfolio and FDI) in foreign assets and liabilities (\( \text{GEQSHARE} \)).

The first variable we include in the list of regressors is a capital account liberalization index, \( \text{EXTLIB} \). It is the period-average value of an index of capital...

---

8See also Grilli (1990). This can directly create two-way financial trade if foreign loans can be raised on the back of these offshore assets. For instance, such round-tripping was popular in Ireland during the 1980s.
9That is, we look at the change in the average value of \( \text{IFIGDP} \) between 1978–81 and 1982–85.
10We also tested for time fixed effects but these were jointly insignificant.
INTERNATIONAL FINANCIAL INTEGRATION

account restrictions, ranging from 0-4, with a score of 4 indicating complete liberalization. It is based on data constructed by Grilli and Mielei-Ferretti (1995) and updated by Mody and Murshid (2002). To allow for gradual adjustment in stocks to the lifting of controls, we lag this variable in the regressions: the average value in 1978-81 is used for the time period 1982-85 and so on.

Our second regressor is trade openness, defined as the sum of exports plus imports relative to GDP (TRADE). Our third regressor, the (log) level of GDP per capita, is included to allow for a systematic relation between cross-border financial activity and the level of development. We also consider three indicators of domestic financial development, potentially an important factor in driving international asset trade: the ratio of liquid liabilities to GDP (FINDEPTH); the ratio of stock market capitalization to GDP (STKCAP); and the ratio of cumulative privatization revenues to GDP (CUMPRIVAT). The latter is included to address whether the sale of state-owned assets has been an important driver of international financial integration. All of these variables are in the set $Z_i$ and are included in the specification in first differences.

For a subset of 14 countries, we also explore the role played by corporate tax policies, by including in the regression a measure of the average effective corporate income tax rate (TAXRATE). A favorable tax regime may stimulate FDI flows and also encourage financial transactions between host and parent companies: this variable is also first-differenced. Finally, we also include a dummy variable for the introduction of insider-trading laws (PROTECTION). The insider-trading variable, which is entered in levels, can proxy for the extent and quality of regulation of the domestic financial system.

Finally, we have also explored (but do not report) the impact of some other potential determinants, such as country size and telecommunications infrastructure: the former was always insignificant and did not alter the other results; the latter data are available for only a small number of countries.

Results

Table 3 shows the results in explaining $\Delta \text{FIGDP}$ for a range of specifications. In column (1), we just include the EXTLIB variable: it is positive and significant but...
explains only a small fraction of the variation in gross asset trade. Once we include other regressors, EXTLIB no longer has independent explanatory power.

We add TRADE to the specification in columns (2)–(7): it is positive and highly significant throughout, and it improves the overall explanatory power substantially. The average TRADE coefficient of 3.7 in columns (2)–(7) indicates a strongly leveraged association: a 10 percentage point increase in the trade to GDP ratio is associated with a 37 percentage point increase in IFIGDP.

In columns (3)–(7), we add GDP per capita to the set of regressors. It enters positively and is highly significant across the specifications: a 1 percent increase in GDP raises IFIGDP by 2.5 percentage points on average.

We add FINDEPTH and STKCAP to the set of regressors in columns (4)–(7). The point estimate for FINDEPTH is always positive and is marginally significant in column (7), while STKCAP is quite important throughout: there is a strong positive correlation between an open capital account and a large domestic stock market. The overall explanatory power of the specification rises to 0.69 once these variables are included. In part, of course, there is a mechanical relation in that rising stock market indices increase both STKCAP value and the value of foreign equity liabilities in IFIGDP.
Table 4. Panel Analysis of International Equity Integration, 1982–2001

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
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<tr>
<td>External liberalization</td>
<td>0.17</td>
<td>0.03</td>
<td>0.02</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.04</td>
<td>0.03</td>
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<tr>
<td></td>
<td>(3.69)**</td>
<td>(0.5)</td>
<td>(3.36)</td>
<td>(0.5)</td>
<td>(0.2)</td>
<td>(0.9)</td>
<td>(0.71)</td>
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<tr>
<td>Trade openness</td>
<td>2.35</td>
<td>2.96</td>
<td>1.10</td>
<td>1.53</td>
<td>1.45</td>
<td>1.33</td>
<td></td>
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<tr>
<td></td>
<td>(3.62)**</td>
<td>(4.88)**</td>
<td>(3.37)**</td>
<td>(4.58)**</td>
<td>(4.0)**</td>
<td>(3.37)**</td>
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<td>Log GDP per capita</td>
<td>2.15</td>
<td>0.99</td>
<td>1.56</td>
<td>1.82</td>
<td>1.8</td>
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<tr>
<td></td>
<td>(2.74)**</td>
<td>(3.65)**</td>
<td>(5.06)**</td>
<td>(4.98)**</td>
<td>(4.74)**</td>
<td></td>
<td></td>
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<tr>
<td>Financial depth</td>
<td>0.02</td>
<td>0.07</td>
<td>0.08</td>
<td>0.1</td>
<td></td>
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<tr>
<td></td>
<td>(0.48)</td>
<td>(0.84)</td>
<td>(1.96)</td>
<td>(1.3)</td>
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<tr>
<td>Stock market capitalization</td>
<td>0.92</td>
<td>0.93</td>
<td>0.94</td>
<td>0.94</td>
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<tr>
<td></td>
<td>(18.3)**</td>
<td>(17.4)**</td>
<td>(9.7)**</td>
<td>(9.52)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative privatization</td>
<td>-1.5</td>
<td>-3.32</td>
<td>-3.39</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(1.55)</td>
<td>(1.76)**</td>
<td>(1.82)**</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Corporate tax rate</td>
<td>0.04</td>
<td>0.09</td>
<td></td>
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<tr>
<td></td>
<td>(0.16)</td>
<td>(0.31)</td>
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<tr>
<td>Protection</td>
<td></td>
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<tr>
<td>Adjusted R²</td>
<td>0.12</td>
<td>0.31</td>
<td>0.41</td>
<td>0.89</td>
<td>0.9</td>
<td>0.87</td>
<td>0.87</td>
</tr>
<tr>
<td>Number of observations</td>
<td>72</td>
<td>72</td>
<td>72</td>
<td>66</td>
<td>59</td>
<td>46</td>
<td>46</td>
</tr>
</tbody>
</table>

Note: Dependent variable is first difference of GEQGDP (the ratio of foreign equity assets and liabilities to GDP). Fixed-effects panel estimation using averaged data for 1982–85, 1986–89, 1990–93, 1994–97, and 1998–2001. White-corrected r-statistics in parentheses. See text for definition of variables. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 confidence levels, respectively.

The cumulative privatization variable actually enters with a negative sign in columns (5)–(7), and is significant in the latter two regressions. This suggests that privatization may actually lead to a substitution away from foreign assets, which is especially plausible if the privatization process favors domestic investors.

The TAXRATE variable is included in columns (6)–(7), at the cost of a reduction in the number of observations. It turns out to be unimportant in explaining variation in the level of international financial integration. In addition, the PROTECTION variable is not significant in column (7).

We turn to the measure of cross-border equity holdings, GEQGDP, in Table 4. These are an increasingly important component of total international financial holdings, with their median value rising from 0.16 in 1982–85 to 0.36 in 1998–2001. Column (1) shows that EXTLIB has some limited explanatory power in explaining GEQGDP, but its individual significance is lost in columns (2)–(7). As in Table 3, TRADE is always highly significant: moving from column (1) to column (2) also increases explanatory power from 0.12 to 0.31. The average point estimate for TRADE is now 1.8, about half of its size in Table 3. Again, higher output per capita is significantly associated with an increase in external equities cross-holdings across columns (3)–(7).

Explanatory power sharply rises to 0.89 in column (4) once domestic financial market variables are included. STKCAP continues to exert a very strong positive influence: a 10 percentage point increase is associated with a 9.2–9.4 percentage
point increase in GEQGDP. The smaller point estimates as compared to Table 3 indicates that a higher value of STKCAP is also associated with a rise in debt cross-holdings. As in Table 3, the coefficient on CUMPRIVAT is negative, while neither TAXRATE nor PROTECTION is important. Overall, countries less open to trade, with shallow domestic financial markets, and large-scale privatization activities have smaller international cross-holdings.

We turn to the equity share in total external holdings (GEQSHARE) in Table 5.\textsuperscript{17} The results here are generally weaker than for the aggregate volume measures in Tables 3 and 4. Not surprisingly, STKCAP again exerts a significantly positive influence; the overall explanatory power also rises from 0.19 to 0.53 once the financial variables are included. Another notable finding is that FINDEPTH exerts a significantly negative influence on the equity share: a reasonable interpretation is that FINDEPTH disproportionately increases international trade in debt instruments. Finally, columns (6)–(7) show that CUMPRIVAT has a significantly positive impact on GEQSHARE: the contrast with the result in column (5) is entirely driven by the change in sample size, due to the lack of tax data for some countries.\textsuperscript{18}

\textsuperscript{17}In results not reported and available upon request, we also examined separately the equity ratios for the asset and liability sides of the international balance sheet and the ratio of portfolio equity liabilities to domestic stock market capitalization. For the latter, an increase in goods trade is associated with a rise in the ratio.

\textsuperscript{18}These are Denmark, Norway, Switzerland, Iceland, Australia, and New Zealand.
In summary, this section has investigated the covariates of the growth in international financial integration. We have shown that variables such as trade openness, GDP per capita, and stock market capitalization are quite successful in explaining the variation over time in the degree of international financial integration. Clearly, a future goal is to better establish lines of causality between these variables and our measures of external financial activity.

III. Analysis of Rates of Return

In this section, we investigate the rates of return earned on foreign assets and liabilities. First, we describe the broad patterns in the data. Second, we ask whether the rates of return on foreign assets and liabilities are well tracked by various market indices. Third, we examine whether the pattern of international investment indeed contributes to risk diversification. Finally, we explore the co-movement between local and foreign real rates of return and real exchange rates.

Conceptual Issues

Consider the ex post real return (on foreign assets or liabilities) in domestic currency and in U.S. currency. For country \( i \), these are statistically linked by the rate of bilateral real appreciation vis-à-vis the United States:

\[
\left(1 + r^{us}_{it}\right) = \left(1 + r^*_i\right) \times \frac{rer_i}{rer_{i-1}},
\]

where \( r^{us}_{it}(r^*_i) \) is the real return in U.S. dollars (domestic currency) and \( rer \) is the bilateral Consumer Price Index (CPI)-based real exchange rate between the domestic currency and the U.S. dollar. Let us consider the determinants of local currency real returns. Statistically, the aggregate return on the (asset or liability) position is a weighted sum of the returns on the various components of the investment position:

\[
r_{it} = \sum_j \omega_j r_{ijt}.
\]

It follows that the aggregate rate of return depends on (i) the returns in each investment category and (ii) the proportions invested in the different components. We can model the former as depending on some common country component, plus an idiosyncratic factor, to the extent that the investment pattern deviates from overall market patterns:

\[
r_{ijt} = r^*_{ijt} + \mu_{ijt}.
\]

For example, the return on portfolio equity liabilities will equal the return on the domestic stock market index if foreign investors just "hold the market" but will

---

19 For instance, if a country allocates its equity investment across countries in proportion to relative stock market capitalizations, the rate of return on foreign equity assets would just follow a global market index.

20 In this setup, we assume time-invariant weights for convenience.
differ if foreign investors choose a different portfolio composition. Similarly, the return on foreign portfolio equity assets will deviate from the return on a "global" stock market index to the extent that a country pursues an idiosyncratic investment strategy for the foreign component of its portfolio.

In addition, we consider the co-movement between the rate of return on foreign assets and various domestic financial returns:

$$r_{it}^{FA} = \alpha_i + \beta r_{it}^{M} + v_{it}$$

If $\beta = 1$, holding foreign assets provides no diversification against fluctuations in domestic financial returns. The weaker the positive co-movement, the greater the scope for risk sharing.

Third, we consider the relations between domestic- and U.S. dollar-based ex post real returns and the real exchange rate. Go back to an approximation of the identity (4):

$$r_{it}^{US} = r_{it} + dre_{it}$$

where $dre_{it}$ is the rate of real appreciation vis-à-vis the United States. If returns were entirely driven by domestic factors (orthogonal to exchange rate movements), the domestic real return and the real exchange rate would be uncorrelated and real exchange rate movements would fully pass through into dollar real returns. If instead returns were entirely driven by external factors, the correlation between the dollar real return and the real exchange rate would be zero and real exchange rate movements would fully pass through into domestic real returns.

Data Issues on Rates of Return

In previous work (Lane and Milesi-Ferretti, 2002a, and 2002b) we documented the importance of differences in rates of return for explaining the dynamics of net external positions. Three basic stylized facts emerged from the analysis: first, rates of return on foreign assets differ if foreign investors choose a different portfolio composition. Similarly, the return on foreign portfolio equity assets will deviate from the return on a "global" stock market index to the extent that a country pursues an idiosyncratic investment strategy for the foreign component of its portfolio.

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An interesting general question, which is outside the scope of this paper, is how real exchange rate movements influence ex post returns. (Of course, in terms of ex ante returns, expectations of real exchange rate movements will drive a wedge between domestic and foreign returns but this link may be broken by ex post shocks.) The relation depends on whether returns on assets/liabilities are primarily based on domestic or external factors. The mechanics are most direct in the case of an unindexed nominal asset, where the impact of exchange rate movements on ex post returns depends on whether it is denominated in domestic currency or foreign currency. Similarly, the domestic currency return on an unhedged foreign currency nominal asset or liability is negatively related to real appreciation. For positions denominated in domestic currency, there is no mechanical relation. On the one side, real appreciation may proxy for good fundamentals (if not captured elsewhere in the regression) and so be associated with high domestic currency returns; real appreciation also boosts profits by lowering the costs of imported inputs if these are priced in foreign currency. On the other hand, real appreciation may reduce returns by a loss of competitiveness, or by lowering the terms of trade if local currency pricing in good markets prevails.
of return on both assets and liabilities tended to be high, easily exceeding countries' growth rates; second, cross-country differences in rates of return were substantial; and third, some countries exhibited substantial differences between returns on external assets and liabilities. One classic example is the United States, which according to IIP data has been a debtor country since 1989 but whose investment income position turned negative only in 1998.

In this section, we attempt to explain the behavior of the rates of return on foreign assets and liabilities. We use IMF balance of payments statistics data on interest earnings and payments on external holdings, together with data on international investment positions and on capital flows, to construct measures of yields and rates of return on external assets and liabilities as well as, where possible, on their subcomponents. We then assess the degree to which these yields and returns can be explained by "market rates" of return, which we construct using information on the composition and geographical allocation of external assets and liabilities.

Let investment income receipts in U.S. dollars related to asset-type X in year \( t \) be \( IC_t^X \) (where \( IC \) stands for income credit) and investment income payments be \( ID_t^X \) (where \( ID \) stands for income debits). We define the U.S. dollar yield on assets as

\[
y_c^X = \frac{IC_t^X}{XA_{t-1}}
\]

and the yield on liabilities as

\[
y_d^X = \frac{ID_t^X}{XL_{t-1}},
\]

where \( XA(XL) \) are the country's stocks of external X-type assets and liabilities, respectively.

The year \( t \) capital gain on asset \( X \) is given by the difference between the change in the stock of \( X \) between \( t \) and \( t-1 \) and the underlying flow \( x \) during year \( t \), divided by the initial stock of \( X \):

\[
k_c^X = \frac{XA_t - XA_{t-1} - x_t}{XA_{t-1}} \quad \text{and} \quad k_d^X = \frac{XL_t - XL_{t-1} - x_l_t}{XL_{t-1}}.
\]

Finally, the nominal rate of return on assets is \( ic_t^X = (1 + y_c^X)(1 + k_c^X) - 1 \) and on liabilities \( id_t^X = (1 + y_d^X)(1 + k_d^X) - 1 \). Real yields and real rates of return are obtained by deflating nominal U.S. dollar returns by the U.S. rate of inflation. Nominal and real rates of return in domestic currency are obtained using the same methodology, but with all variables measured in domestic currency.\(^{24}\)

The data difficulties in undertaking this type of study are substantial. These relate in particular to measurement error problems for balance-of-payments-derived yields and rates of return, and to lack of information concerning the currency composition of external assets and liabilities. We discuss these difficulties in turn.

Measurement error problems in deriving yields and rates of return from balance of payments data can arise from several sources:

\(^{24}\)Stocks are converted into domestic currency using the end-of-period exchange rate and flows using the period-average exchange rate, following the balance of payments convention.
• Reclassification of external assets and liabilities items between different categories. For example, in Swedish data for 1997 securities issued abroad by residents—previously recorded as "other investment" liabilities—were reclassified as portfolio debt liabilities.

• Recording of interest receipts and payments in balance of payments accounts. For example, several countries classify investment income data in only two categories, FDI and "other," where the second category also includes income on portfolio assets. In addition, in a few countries interest receipts and payments appear to be overestimated for some years.25

• Valuation of FDI and portfolio equity holdings. Most countries record FDI stocks at book value, but a few use market values. Using the former will imply in general higher FDI yields (because the outstanding stock of assets is smaller) but lower capital gains. The problem for the valuation of portfolio equity assets and liabilities is less severe, because most countries record these stocks at market value (the exception being Canada).

• Breaks in the data series for the variables used in the calculations. These breaks may relate to changes in the methodology of estimation (for example, from book to market value).

Problems in constructing "benchmark" portfolios arise because of the scarcity of data on the currency composition of external portfolios, as well as on the geographical allocation of external assets.26 In general, constructing benchmark yields and rates of return is easier for external liabilities than it is for external assets. For example, domestic stock market returns provide a reasonable benchmark for returns on portfolio equity liabilities. Benchmark yields and returns on debt instruments are more difficult to construct, in the absence of information on the currency of denomination. Taking into account these constraints, we have proceeded as follows:

• For portfolio equity liabilities, we use as a benchmark for returns (measured in U.S. dollars) the total returns index from the domestic stock market, constructed by Morgan Stanley Capital International (MSCI).

• For portfolio equity assets, we make use of two alternative indices.
  (a) The MSCI world stock price index—a valid proxy for capital gains if all countries allocate their external equity holdings in shares reflecting the world portfolio. Clearly this index cannot contribute to explaining cross-country heterogeneity in rates of return on portfolio equity assets, except for countries with a significant weight in the world index, such as the United States, the United Kingdom, and Japan.

25These problems, which seem to affect gross rather than net investment income nows, may relate to the recording of receipts and payments associated with derivatives' operations or with nonresident transactions. These entail higher recorded interest receipts and payments, classified in either the portfolio or the "other investment" categories. Examples include the data for Denmark (1991–1997), France (1990–1993), and Japan (1991–1995).

26Significant progress in this area has been made in recent years. For example, the 1997 IMF Portfolio Survey (IMF, 1999) provides data on the geographical allocation of portfolio investment assets for 29 countries. A new, more comprehensive survey is currently being conducted. Also, countries such as Australia, Sweden, and the United States provide data on the currency composition of external holdings.
(b) The weighted average of stock returns on individual markets, as reported by MSCI, where the weights reflect the country’s allocation of portfolio equity assets reported in the IMF 1997 Portfolio Survey.

- For FDI liabilities, we use the same indices as for equity liabilities.
- For FDI assets, we construct the rate of return by using a weighted average of stock returns on individual markets, where the weights reflect the geographical allocation of FDI assets as reported by the OECD.
- For debt liabilities, which include portfolio debt and other investment, we use domestic bond returns from Global Financial Data. We also compare yields with domestic short-term and long-term interest rates (from the OECD database).
- For debt assets, we construct several indices:
  (a) A weighted return and yield on a foreign bond portfolio, where weights are obtained from the 1997 IMF Portfolio Survey, bond returns from Global Financial Data, and interest rates from the OECD.
  (b) A weighted yield on a foreign debt portfolio, where weights are obtained from Bank for International Settlements (BIS) data on the geographical allocation of bank assets and interest rate data are from the OECD. With the BIS data, we are also able to take into account the fraction of foreign loans that are denominated in domestic currency versus foreign currency.

These indices can help us shed light on the degree to which rates of return and yields on external assets and liabilities can be explained by market developments and investment patterns. Obviously, even if the rate of return on individual asset categories, such as debt and portfolio equity, were the same for all countries, cross-country differences in overall rates of return might still arise because of differences in the composition of country portfolios. Indeed, one important “candidate” for the explanation of the stylized facts listed at the beginning of this section is the increasing importance of portfolio equity and FDI stocks in international portfolios. The increase in world stock market values during the 1990s has implied substantial capital gains and rates of return on these assets, thus potentially explaining the high measured rates of return on external assets and liabilities. Differences in countries’ external holdings of equity-type instruments can also account for cross-country heterogeneity in rates of return.

Finally, differences between yields on external assets and external liabilities can be due to the different weight in the two categories of equity-type instruments. Most of the return on equity and FDI instruments comes through capital gains, and yields are relatively small. However, investment income flows (that enter in the current account) include only yields, but do not include capital gains. As a result, all things being equal, yields on external assets will tend to be higher in countries with more debt-type instruments in their portfolios.27 A corollary of this observation is that the current account is becoming less and less indicative of changes in countries’ external positions, since it ignores such valuation changes.

27 For example, Italy is a creditor country whose investment income payments are higher than receipts. This is accounted for by the fact that Italy’s external assets have a larger share of equity-type instruments than Italy’s external liabilities.
Empirical Specification

In order to understand the time-series behavior of rates of return on foreign assets and liabilities, we consider the specification

$$r_{ij}^{BOP} = \alpha_i + \gamma * r_{ij}^M + \varepsilon_{ijt},$$

where $\alpha_i$ is a country fixed effect, $r_{ij}^{BOP}$ is the rate of return on a given category of the international investment position, as calculated from the balance of payments data, and $r_{ij}^M$ is an estimated rate of return on some observable market portfolio.\(^{28}\)

As was outlined in the previous subsection, we consider two market portfolios in tracking the returns on foreign portfolio equity assets: (a) the MSCI world stock return index and (b) an index based on the portfolio weights reported in the 1997 IMF Portfolio Survey.\(^{29}\) We use the national domestic stock market return index in tracking the rate of return on foreign portfolio equity liabilities.

To explain the rate of return on FDI assets and liabilities, we again use the MSCI return indices. For FDI assets, we also use partner countries' stock market returns, weighted using relative shares in overseas FDI positions, as reported in the OECD International Direct Investment Statistical Yearbook. We use the national domestic stock market return index in tracking the rate of return on foreign portfolio equity liabilities.

We aggregate data from the portfolio bond and other debt categories into a single aggregate rate of return on debt. As explained in the previous subsection, for foreign debt assets we consider a weighted index of bond returns, based on bond holdings as reported in the 1997 IMF Portfolio Survey, with bond returns on ten-year government bonds taken from Global Financial Data.

We also consider the yields on the debt component. For the yield on debt assets, we consider two sets of portfolio weights: (i) bond weights from the IMF portfolio survey and (ii) weights based on the geography of cross-border bank assets, taken from the BIS.\(^{30}\) We use long-term interest rates, based on OECD data—results are analogous if we use an average of short- and long-term rates. For debt liabilities, we track yields and returns with the long-term domestic interest rate and the domestic bond return, respectively.\(^{31}\)

We also investigate whether the returns on foreign assets provide diversification against variation in domestic financial returns. The specification is

\(^{28}\)The equation allows for a non-unitary coefficient on the market return index, since the market return and the omitted idiosyncratic element may be correlated.

\(^{29}\)For the United States and United Kingdom, we use the MSCI indices that exclude these countries, respectively. With respect to the IMF Portfolio Survey, we calculate portfolios on the basis of investment positions in six major markets: the United States, the United Kingdom, Japan, France, Germany, and Italy. These portfolio shares only refer to end-1997: we make the heroic and obviously imperfect assumption that these weights are good indicators for the other years in our sample.

\(^{30}\)For the latter, we know the relative proportions of lending in domestic currency versus other currencies. Accordingly, the yield on foreign assets depends on the domestic interest rate and on the weighted average of foreign interest rates.

\(^{31}\)Since some debt liabilities are contracted in foreign currencies, this will be an imperfect approach. Of course, this consideration is much more important for emerging market economies, not included in this paper.
where \( r_{ij}^{\text{BOP,FA}} \) is the return on some category of foreign assets and \( r_{ik}^{M} \) is the return on some category of foreign liabilities.

Finally, we address the relation between rates of return and real exchange rate movements. As discussed in the previous subsection, the co-variation between real returns in home currency and foreign currency depends on their correlations with real exchange rate fluctuations. For this reason, we report these correlations:

\[
\rho(r_t^H, r_t^{US}); \rho(r_t^H, d\text{currency}_t); \rho(r_t^{US}, d\text{currency}_t). \tag{11}
\]

Results

As a prelude to the investigation of returns on individual investment categories, we first show that the aggregate returns on foreign assets and liabilities depend on the composition of the international balance sheet between equity and nonequity components. Figures 8 and 9 plot average returns and the share of equity in the external portfolio over 1997–2001 for a cross section of countries. In both cases, the figures show a strongly positive relation between the equity share and the average return—a larger equity share is associated with a higher return. Second, in terms of data properties, we record in Figures 10 and 11 that returns are substantially more variable than yields for both foreign assets and liabilities, providing the example of the United States. Plots for other countries are similar.

In terms of time-series behavior, Tables 6A and 6B report fixed-effects regressions over 1982–2001, for the specification given in equation (9), for foreign assets and foreign liabilities, respectively. Columns (1) and (2) of Table 6A consider the returns on portfolio equity foreign assets. The MSCI world return index explains the dynamics of these returns quite well. Adjusting for geographical differences in overseas investment patterns (column 2) does not improve performance. A possible explanation is that the geographical weights are based on end-1997 positions, and therefore this index may be compromised due to time-varying portfolio weights; in addition, foreign investors may hold equity baskets in a given country that differ in composition from the country's broad market index.

Columns (3)–(4) repeat these exercises for returns on FDI assets at book value, and columns (5)–(6) for returns on FDI at market value. Again, the explanatory power of the MSCI index is as good as the geographically weighted index—as expected, both track returns on FDI at market value much better than returns at book value. Column (7) shows that the weighted foreign bond return explains about one-fourth of the overall variance in debt asset returns. Both weighted interest rate measures track the yield on foreign debt assets quite closely (columns 8 and 9).

\(^{32}\)This approach is simplified by the assumption that dollar real returns are a good representation of the "external" market.

\(^{33}\)The countries are Australia, Canada, Finland, Germany, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. Canada was dropped from the equity regressions, since it measures its foreign equity assets only at book value. Other countries were excluded due to data limitations.
Figure 8. Rate of Return on Foreign Assets and Equity Share
(Average, 1997-2001)

Figure 9. Rate of Return on Foreign Liabilities and Equity Share
(Average, 1997-2001)

Note: Averaged data over 1997-2001. Correlation between portfolio equity share and rate of return is 0.60 for external assets, 0.80 (0.59 excluding Finland) for external liabilities.
Figure 10. United States: Rates of Return and Yields on Foreign Assets, 1983–2001

Return on foreign assets

Yield on foreign assets


Date

Figure 11. United States: Rates of Return and Yields on Foreign Liabilities, 1983–2001

Return on foreign assets

Yield on foreign assets


Date

Note: Graphs plot nominal U.S. dollar returns and yields on foreign assets and liabilities, with FDI at market value.
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Note: Panel regressions with country fixed effects (r-statistics in parentheses). ** and *** indicate statistical significance at the 0.05 and 0.01 confidence levels, respectively. See text for definition of variables.
We turn to the returns on foreign liabilities in Table 68. Column (1) shows that the return on foreign portfolio equity liabilities co-moves strongly with the domestic stock market index return and this specification has high explanatory power. This close relationship is a demonstration of international risk sharing in action: selling shares to foreign investors hedges the risk of fluctuations in domestic equity returns. Once again, the domestic stock return explains returns on FDI at market value (column 3) much better than returns on book-value FDI (column 2). In regard to debt liabilities, domestic bond returns explain over a third of returns on debt liabilities (column 4), and the yield on foreign debt liabilities is well tracked by domestic interest rates (column 5).

The analysis of returns on foreign assets is further extended in Table 7 by comparing returns on foreign assets to domestic market returns. We consider the aggregate return on foreign assets in columns (1)–(2). The first specification shows that the return on foreign assets positively and significantly co-varies with the domestic stock market, but the elasticity is quite low and the explanatory power limited. Hence, holding foreign assets provides some diversification against fluctuations in the local stock market. Column (2) shows that the domestic bond return is also positively correlated with the aggregate return on foreign assets, but with an elasticity well below one-half, which is again consistent with a diversification contribution from foreign assets.

We turn to the subcomponents of the overall foreign asset position in columns (3)–(5). Column (3) shows that domestic stock returns are significantly positively correlated with returns on foreign portfolio equity assets (there is a substantial global component to stock market performance), but the point estimate of only 0.4 again signals the benefits of diversification. The correlations between returns on foreign portfolio equity assets and domestic debt (column 4), foreign debt assets
and domestic debt (column 5), and yields on foreign debt holdings and domestic debt (column 6) are of the same order of magnitude.

Finally, we turn to the relation between domestic- and foreign-currency ex post real returns and exchange rates in Table 8. In column (1), we report the correlations between domestic- and foreign-currency real returns on aggregate foreign assets. The mean correlation is actually negative: an increase in the local-currency real return is typically associated with a fall in the dollar real return, demonstrating the importance of exchange rate shifts in delinking real returns across countries. As shown in column (2), domestic real returns are lower during periods of real appreciation. As noted earlier, this could be due to several mechanisms but it is consistent with the returns on at least some foreign assets being driven by external factors. Column (3) shows a very strong positive correlation between dollar real returns on foreign assets and the real exchange rate, suggesting that at least some of the returns on foreign assets are driven by domestic factors.

The correlation patterns on the foreign liability side are shown in columns (4)–(6). As shown in column (4), there is essentially no correlation between domestic and dollar real returns on foreign liabilities. The negative (positive) correlation between domestic (dollar) returns and the real exchange rate is also very high, in line with the pattern on the foreign asset side, and is consistent with a role for both foreign and domestic factors in determining returns on foreign liabilities.

In summary, this section has provided an exploratory analysis of rates of return and yields for foreign assets and liabilities. Market indices co-vary significantly with these returns, but for certain asset categories there are substantial unexplained residuals. More precise information on cross-border investment patterns would be helpful in this regard. International cross-holdings appear to provide diversification

Philip R. Lane and Gian Maria Milesi-Ferretti
against fluctuations in domestic market returns. Finally, the dynamics of real exchange rates implies that the properties of real returns are very different for home and foreign investors.

### IV. Conclusions

Our goal in this paper has been to highlight some empirical features of the growth in international cross-holdings of foreign assets and liabilities. In addition to describing the broad trends, we have identified growth in goods trade and stock market capitalization as two key co-variates of the growth in the scale of international balance sheets. Sorting out the lines of causality among these variables provides challenges for both theoretical and empirical researchers.

We have also analyzed the properties of the rates of return on foreign assets and liabilities. The standard modeling assumption of a common “world interest rate” on international investments is not supported by the data, which show rates of return varying over time and across asset classes. Better information on the composition of international portfolios would allow a more detailed investigation of this topic but we believe that the international investment position data provide a useful and fresh perspective on the international diversification literature. The study of higher-frequency data on rates of return would also be useful in modeling the international transmission of business cycle shocks.
REFERENCES


Comment on “International Financial Integration”

CHARLES ENGEL*

Lane and Milesi-Ferretti gather data on assets and liabilities of 18 OECD countries. The data are classified by type of asset—debt instruments and equity instruments (either portfolio or foreign direct investment). To some extent the data allow them to classify changes in asset and liability positions that occur because of capital flows versus changes in valuation. With this data, Lane and Milesi-Ferretti undertake two types of empirical examinations. First, they look at the correlation of international asset positions with various “explanatory variables,” such as the degree of financial restrictions, the depth of the financial market, the openness to international trade, etc. Then they examine returns on the various classes of assets (debt, portfolio equity, and FDI), in an attempt to measure from the returns the degree of diversification that is being offered by international investments.

My comments come in two categories: brief comments about the data and comments about how to interpret the findings. The latter set of comments is broken into two parts, the first relating to the regressions describing asset and liability positions and the second relating to the empirical work on rates of return.

The Data

Lane and Milesi-Ferretti, in a series of papers, have performed an enormous service to researchers in international finance and macroeconomics. The truth is that the data that are easily available to researchers are not generally very useful. For example, as relates to this paper, usually our economic models point to changes in net asset positions as a variable of economic interest. But balance of payments data do not tell us that variable. The balance of payments data only tell us about flows of assets, not about valuation changes.

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I think the problem arises because the decisions about how to record international financial data were made in a different era of international finance models. In the IS-LM-BP era, capital flows are what mattered. The asset-market approach to international finance made it clear that capital flows were not so important, but the data collection methods never caught up. When I look at my current portfolio, I notice that I have a much smaller position in international equities than I did three years ago. That occurred because of valuation changes, not because I sold foreign equities. Certainly the value of my holdings—the price per share—matters, but the IS-LM-BP approach gives it no place at all. Indeed, under some new approaches, it is only the value of holdings that matters, and not the number of shares. Clearly Lane and Milesi-Ferretti are providing numbers that are useful, and the study of these numbers is useful.

Earlier work by Lane and Milesi-Ferretti has already shed light on important issues. For example, one finding, to which they refer a couple of times in this paper, is that the rate of return on foreign assets held by Americans has been much greater than the rate of return on U.S. assets held by foreigners. So they note that while the U.S. net asset position turned negative in 1989, it was not until 1998 that the net returns on investment turned negative. Rich Clarida, Assistant Secretary for Economic Policy at the U.S. Treasury, recently referred to this finding in an op-ed piece in the Financial Times to support his contention that the current account position of the United States is not a serious economic problem.

These data are not clean. It would be helpful if Lane and Milesi-Ferretti were to go into more detail in describing exactly how dirty it is. One thing that would help is more information about the data, and how they are collected. The main source of the data is the IMF's Balance of Payments Statistics, but the IMF in turn relies on national statistical agencies. What procedures do each of these 18 countries follow to collect these data? What are the pitfalls? Are there any ways to cross-validate the data? Can the data collected here be compared to that in other recent related data collection efforts?

An example of the type of concern I have is in Table 2. That table shows the change in external asset and liability positions for each country from 1995 to 2000 and breaks up the change into parts attributable to capital flows and parts attributable to capital gains. The striking thing is that in the top half of the table, almost all of the capital gains are negative. This is during a period in which the U.S. and European stock markets were experiencing unprecedented booms. Apparently, though the paper does not explicitly state this, the data are measured in U.S. dollar terms. So the strengthening of the U.S. dollar reduces the value of securities denominated in other currencies.

It is also true that the top panel only contains data when FDI is measured at book value. The numbers for capital gains in the bottom half, where FDI is measured at market value, are almost all positive. Still, some of the numbers are puzzling. To take a simple example, why would Canada have suffered negative capital gains on its foreign asset holdings? Surely a large part of those holdings is in the United States. The U.S. stock market boomed, so portfolio equity gains should be positive. Moreover, the U.S. dollar held nearly constant relative to the Canadian dollar. How could the number be negative? In this case, I believe the explanation
stems from two things: First, the authors note that Canada is the one case where portfolio investment is measured at book value. Second, there was a slight strengthening of the U.S. dollar. It is not completely apparent to me that these two factors account for the negative capital gains. It is precisely this lack of transparency that needs to be remedied.

**Economic Meaning**

In Section II, Lane and Milesi-Ferretti examine the determinants of the extent of international financial integration, as measured by the sum of external assets and liabilities divided by GDP (which they call IFIGDP). Their data are for 18 countries, for the 1982–2001 period. They average data over four-year subperiods, so the time-series dimension of their panel is 5.

The real question is what do these regressions really tell us? Let me begin with the regressions meant to explain IFIGDP.

While the authors mean these to be descriptive relationships, and admit they are not causal, it is not clear to me what we can learn from these regressions. Let me give an example. We find that IFIGDP is significantly related to their measure of external account liberalization, when the volume of trade for the country is not taken into account. But when that variable is introduced, external liberalization becomes statistically insignificant and its coefficient estimate falls essentially to zero. What does that mean? Literally, holding the volume of trade constant, there is no relation between the measure of financial integration and the measure of external liberalization. Does this mean that external liberalization does not account for any of the movements in the levels of foreign assets and liabilities?

I do not believe it does, but Lane and Milesi-Ferretti cannot refrain from drawing that conclusion, despite their caution that these regressions are not causal. They refer to the "explanatory power" of the variables included in the regression, and they tell causal stories for why each variable is included.

Continuing with my example, though, should we conclude that external liberalization does not explain the increase in IFIGDP? The answer must be no, because in order to answer that we need to know what causes the other variables in the regression to vary across observations. In this case, the volume of trade may actually be simply a better measure of capital account liberalization than the external account liberalization index. That is, EXTLIB surely is an imperfect measure of how easily capital account transactions can be made. Perhaps the openness to trade is more closely correlated with capital market openness than is EXTLIB.

Another example is the role of the variable measuring stock market capitalization. The biggest variation in stock market capitalization must be cross-sectional rather than time series, because some countries such as the United States have very extensive equity markets. But surely there are some deep historical and institutional factors that explain both the openness of U.S. markets to external investments and the depth of their equity markets. The two variables are different measures of the same phenomenon.

I doubt Lane and Milesi-Ferretti disagree with that observation, but my point is simply that I am not sure how interesting these covariates are because of the
interpretation problems. Watching Hamlet performed in the nude might be "interesting," but not because it would lead to a greater understanding of Shakespeare's play. Here, it is "interesting" that the coefficient on external liberalization goes to zero when the trade and stock market capitalization variables are introduced, but is this anything other than a curiosity?

Some economic structure would be helpful in deciding how to conduct these unstructured exercises. An example of how this comes in is the decision of how to scale the variables. The dependent variable is foreign assets plus liabilities scaled by GDP. In some ways (as the authors note) it is no wonder that stock market capitalization is so strongly correlated with this variable. Foreigners can only hold large amounts of a country's equities if the country has a lot of equities to sell. A country with few equity listings inevitably will have a low value for foreign holdings of its equities. If we were building an economic model in which depth of equity markets were going to explain something about external holdings, I would guess that the variable we would end up trying to explain is foreign equity holdings as a fraction of total market capitalization. So what might be especially useful are regressions that have foreign equity liabilities divided by stock market capitalization as the dependent variable. Is that related to the depth of equity markets?

My observation about the regressions on asset market returns is similar: some have economic interpretations, some do not. It would be useful to distinguish between them.

Table 6A illustrates this observation. In columns 1 and 2, Lane and Milesi-Ferretti use real return on portfolio equity as the dependent variable. This is a measure of each country's return on its holdings of foreign equities. It is constructed from the IMF data on asset positions and from data on balance of payments flows.

In column 1, real return on portfolio equity is regressed on the MSCI world stock price index. This can be interpreted as a measure of the return on the "market"—defined in a global sense—portfolio. If real return on portfolio equity moves closely with the world stock price index, it perhaps indicates that countries hold well-diversified portfolios. In fact, Lane and Milesi-Ferretti find that the coefficient in such a regression is 0.71, and the adjusted R-squared is 0.63, which does seem to indicate balance portfolios. (This may simply represent the fact that U.S. equities are large in the MSCI world stock price index, and large in country indexes.)

But the next regression in Table 6A seems to have an entirely different purpose. There, real return on portfolio equity is regressed on a variable Lane and Milesi-Ferretti call "Stock Return." That variable is defined as "the weighted average of stock returns on individual markets, as reported by MSCI, where the weights reflect the country's allocation of portfolio equity assets as reported in the IMF 1997 Portfolio Survey." In other words, it is measuring exactly the same thing that real return on portfolio equity is trying to measure—the return on each country's portfolio of equities. It uses an entirely different measure of returns from an entirely different data source. So regression (2) is simply a cross-check for measurement error. I think that is a very valuable exercise, but its interpretation is completely different from the interpretation of regression (1).

Indeed, I thought the economic findings in this section were quite interesting—it appears that foreign equity holdings provide some measure of diversification of
risk. But the measurement error cross-check is a little bit dispiriting. The coefficient and R-squared are about the same as in regression (I), where real return on portfolio equity is regressed on the world index. That makes it seem as though the measurement error is fairly large and calls into question the usefulness of the economic regressions as measures of diversification.

Conclusion

Lane and Milesi-Ferretti are doing great work. They should keep it up, and the IMF should give them a lot of financial backing for this project. The data they are trying to collect is absolutely essential if we are to understand international capital markets. There needs to be more focus on measuring asset values and asset returns. We need a new commitment to measuring international capital market statistics as we had after World War II. Economists and financial experts should guide decisions about what data are collected and how they are assembled.

Examples of the types of data refinement that are needed are (1) country portfolios (that is, how are the total assets and liabilities of each country divided among the foreign country positions?); (2) returns on each component of these portfolios; (3) asset flows (we need to find better ways to measure the flows, so that the difference between current account measures and capital account measures of asset flows is reduced); and (4) asset positions of different sectors within each economy (for example, much has been made recently about the need for better information on the foreign-currency-denominated liabilities of the banking sector).

From Lane and Milesi-Ferretti we have already learned the value of data that give economists better measures of variables of interest, but we have also learned the weaknesses of what can be derived from current data collection efforts.
Financial Integration and Macroeconomic Volatility

M. AYHAN KOSE, ESWAR S. PRASAD, and MARCO E. TERRONES

This paper examines the impact of international financial integration on macroeconomic volatility. Economic theory does not provide a clear guide to the effects of financial integration on volatility, implying that this is essentially an empirical question. We provide a comprehensive examination of changes in macroeconomic volatility in a large group of industrial and developing economies over the period 1960–99. We report two major results: First, while the volatility of output growth has, on average, declined in the 1990s relative to the three earlier decades, we also document that, on average, the volatility of consumption growth relative to that of income growth has increased for more financially integrated developing economies in the 1990s. Second, increasing financial openness is associated with rising relative volatility of consumption, but only up to a certain threshold. The benefits of financial integration in terms of improved risk-sharing and consumption-smoothing possibilities appear to accrue only beyond this threshold.

International financial integration is believed to have two major potential benefits—improving the global allocation of capital and helping countries to better share risk by reducing consumption volatility. Given their relatively low levels of physical capital and their inherently greater volatility, developing economies, in particular, seem to have the most to gain from this process of integration. As policymakers in developing economies evaluate the benefits and risks

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of financial integration, understanding its implications for growth as well as volatility has taken on great importance.

There has been a rigorous debate about the impact of financial integration on growth. The evidence on the long-term benefits of financial globalization suggests that, notwithstanding the crises that have wracked some of them, more financially integrated economies have done better, on average, than less-integrated economies in terms of improvements in per capita income and standards of living. Moreover, several recent papers have examined various dimensions of the causal link from financial integration to growth. Although many of these studies conclude that financial integration does generate growth benefits, this relationship is not always found to be strong or robust.

There has also been an intensive discussion about the impact of financial integration on macroeconomic volatility. However, this discussion seems to be relatively uninformed since the available empirical evidence on the effects of financial integration on volatility is far more limited. The objective of this paper is to shed some light on this issue by studying the impact of international financial integration on macroeconomic volatility. In this context, we address three questions: First, what are the implications of economic theory for the effect of financial integration on volatility? Second, what are the dynamics of macroeconomic volatility over time and across different groups of countries? Third, is there an empirical link between the degree of international financial integration and volatility?

Understanding the dynamics of macroeconomic volatility has recently come to the fore for a number of reasons. First, a burgeoning literature that has documented a negative relationship between volatility and growth (see Ramey and Ramey, 1995) implies that volatility has first-order effects on welfare, even for developing economies where growth has traditionally been the major concern. Second, more recently, a number of papers have documented the declining volatility of output in the United States and most industrial economies since the mid-1980s and examined the sources of this change (see Blanchard and Simon, 2001, and McConnell and Perez-Quiros, 2000). It is of obvious interest to examine if the phenomenon of declining volatility in the mid-1990s is limited to industrial economies. Third, the welfare implications of volatility in developing economies have been highlighted by episodes of extreme volatility—that is, crises—in a number of developing economies in the 1980s and 1990s. While developing economies have continued to become more open to trade, the more dramatic change over this period has been the surge in the volume of financial flows from the industrialized countries to developing countries. Hence, a natural question is whether rising financial integration of developing economies by itself has an impact on volatility.

In the next section, we review the results of some recent theoretical and empirical studies focusing on the relationship between economic integration and volatility. The message of this section is twofold. First, economic theory does not provide

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2 Prasad, Rogoff, Wei, and Kose (2003) provide a review of this literature and report that developing countries can get large welfare gains from international risk-sharing. Pallage and Robe (2003) report that welfare gains associated with consumption smoothing are quite large in several African countries.
a clear guide to the effects of either trade or financial integration on macroeconomic volatility. Hence, this is essentially an empirical question. On the other hand, a number of standard models do suggest that, under general conditions, financial integration should be expected to lead to a decline in the relative volatility of consumption.

In order to examine the effects of financial integration, we begin with a broad-brush classification of developing economies into two groups: more financially integrated economies (MFIEs) and less financially integrated economies (LFIEs). We first study the volatility of output and consumption in these two groups and in industrialized countries. In order to explore how different sources of volatility affect the ability to smooth consumption in response to a given realization of shocks, we also analyze the volatility of consumption relative to that of output.

We then present an overview of changes in macroeconomic volatility over time. While the volatility of output growth has, on average, declined in the 1990s relative to the three earlier decades, we find that, on average, the volatility of consumption growth relative to that of income growth has increased for MFIEs in the 1990s. This is precisely the period when financial integration, as measured by financial flows to and from these economies, increased substantially. Notice that our use of a measure of the volatility of consumption relative to that of income implies that this result can not be explained away as just a consequence of some of these economies having undergone crises during this period.

After documenting these basic results, in Section IV we conduct a systematic empirical analysis to examine what factors, either macroeconomic or structural, are associated with both the level of relative consumption volatility and its evolution over time. One of the main results of this analysis is that financial openness, as measured by gross capital flows as a ratio to GDP, is associated with an increase in the ratio of consumption volatility to income volatility, contrary to the notions of improved international risk-sharing opportunities through financial integration. However, this relationship is nonlinear. Once the level of gross capital flows crosses a particular threshold, it appears to have a negative effect on this ratio. Indeed, industrial economies, which typically have much larger gross capital flows (as a share of GDP), appear to have benefited the most from this form of financial integration, at least in terms of the relative volatility of consumption.

I. An Overview of Theoretical and Empirical Studies

Understanding the impact of financial and/or trade integration on macroeconomic volatility has remained a major challenge for both theoretical and empirical studies. This section provides an overview of the theory and available empirical evidence about the effects of trade and financial integration on volatility. While our main focus is on the impact of financial integration, we also study the implications of trade integration for macroeconomic volatility considering that recent research makes a convincing case about the complementary nature of trade integration and financial integration (see IMF, 2002).

3The criteria used to make this distinction are discussed in Prasad, Wei, and Kose (2003). The MFIEs largely comprise what are traditionally referred to as “emerging markets.” The Data Appendix provides a listing of both groups of countries in our sample.
Theory

A cursory review of the literature suggests that the theoretical impact of financial integration on business cycle volatility is ambiguous. Mendoza (1994) employs a stochastic dynamic business cycle model and finds that quantitative changes in the volatility of output and consumption are quite small in response to the changes in the degree of financial integration. He also finds that when shocks are larger and more persistent, the volatility of output increases with the degree of financial integration. Baxter and Crucini (1995) find that the volatility of output increases while the volatility of consumption (and the relative volatility of consumption) decreases with rising financial integration. The difference between the changes in the volatility of output and consumption is mostly due to the wealth effects and the interaction of these effects with the risk-sharing implications of different asset market structures.

The theoretical impact of trade integration on macroeconomic volatility depends greatly on patterns of trade specialization and the nature of shocks. If trade openness is associated with increased interindustry specialization across countries and industry-specific shocks are important in driving business cycles, the result could be a rise in output volatility (see Krugman, 1993). If these shocks are highly persistent, then they could increase the volatility of consumption as well. However, if increased trade is associated with increased intraindustry specialization across countries, which leads to a larger volume of intermediate inputs trade, then the volatility of output could decline (see Razin and Rose, 1994). These results indicate that the impact of trade integration on volatility is also ambiguous in theory.

Some recent studies consider the impact of financial openness on macroeconomic volatility using dynamic stochastic sticky-price models, which are based on the Redux model of Obstfeld and Rogoff (1995). Sutherland (1996), Senay (1998), and Buch, Dopke, and Pierdzioch (2002) consider the importance of monetary and fiscal policy shocks in the context of such models. The results of these studies suggest that the impact of financial integration on the volatility of output and consumption depend on the nature of shocks. In the presence of monetary (fiscal) policy shocks, the volatility of output increases (decreases) while the volatility of consumption decreases (increases) as the degree of financial integration increases.

The relationship between financial openness and macroeconomic volatility could also be affected by the structural characteristics of developing countries, which make them more vulnerable to shocks originating in other countries. First, limited diversification of exports and imports make some of these countries particularly susceptible to sudden fluctuations in terms of trade and foreign demand shocks. Using dynamic small open economy models, Kose (2002) finds that terms of trade shocks can explain a sizable fraction of volatility, and Senhadji (1998) shows the important role played by the foreign demand shocks.

4Kose and Yi (2003) discuss the implications of trade integration on the dynamics of business cycles.
5Lane (2001) and Sarno (2001) provide surveys of the rapidly growing research program that employs sticky-price models.
FINANCIAL INTEGRATION AND MACROECONOMIC VOLATILITY

Second, sudden changes in the direction of capital flows are able to induce boom-bust cycles in developing countries, most of which do not have deep financial sectors to cope with the highly volatile capital flows. Aghion, Banerjee, and Piketty (1999) and Caballero and Krishnamurthy (2001) construct models that establish theoretical links between low financial sector development and high output volatility. Moreover, sudden changes in world interest rates might cause substantially large business cycle fluctuations in highly indebted countries.6

Third, country size is an important factor and developing economies are relatively much smaller than industrialized countries. Head (1995) and Crucini (1997) show that productivity fluctuations in large industrialized countries can have a significant impact on the dynamics of business cycles in small open developing countries. Kose and Prasad (2002) find that both terms of trade shocks and foreign aid flows are particularly important in accounting for highly volatile macroeconomic fluctuations in small states (defined as countries with a population below 1.5 million), which seem to exhibit higher degrees of trade and financial openness than do other developing countries.

While the sources of recent financial crises in emerging market economies are numerous, a number of such crises have occurred following financial liberalization programs (see Kaminsky and Reinhart, 1999, and Glick and Hutchison, 1999). These crises have often coincided with a sudden loss of access to world financial markets ("sudden stops" à la Calvo, 1998) and resulted in highly volatile fluctuations in output and consumption. Mendoza (2002) and Arellano and Mendoza (2002) find that the possibility of sudden stops due to borrowing constraints does not induce any sizable changes in the volatility of output and consumption.

Review of the Empirical Evidence

Unlike the rich empirical literature focusing on the impact of financial openness on economic growth, there are only a limited number of studies analyzing the links between openness and macroeconomic volatility. Moreover, existing studies have generally been unable to document a clear empirical link between openness and macroeconomic volatility. Razin and Rose (1994) study the impact of trade and financial openness on the volatility of output, consumption, and investment for a sample of 138 countries over the period 1950–88. They find no significant empirical link between openness and macroeconomic volatility. Easterly, Islam, and Stiglitz (2001) explore the sources of macroeconomic volatility using data for a sample of 74 countries over the period 1960–97. They find that a higher level of development of the domestic financial sector is associated with lower volatility. On the other hand, an increase in the degree of trade openness leads to an increase in the volatility of output, especially in developing countries. Their results indicate that neither financial openness nor the volatility of capital flows has a significant impact on macroeconomic volatility. They argue that, since the financial sector

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6Blankenau, Kose, and Yi (2001) show that world interest rate shocks are able to explain a significant fraction of business cycle volatility in small open economies.

7The results by Karras and Song (1996) suggest that trade openness is positively associated with output volatility in 24 OECD countries.
transmits the impact of capital flow volatility to the real economy, the effect of capital flows is reflected in financial sector variables.\textsuperscript{8}

Buch, Dopke, and Pierdzioch (2002) use data for 25 OECD countries to examine the link between financial openness and business cycle volatility. They report that there is no consistent empirical relationship between financial openness and the volatility of output. Gavin and Hausmann (1996) study the sources of macroeconomic volatility in developing countries over the period 1970–92. They find that there is a significant positive association between the volatility of capital flows and output volatility. O’Donnell (2001) examines the effect of financial integration on the volatility of output growth over the period 1971–94 using data for 93 countries. He finds that a higher degree of financial integration is associated with lower (higher) output volatility in OECD (non-OECD) countries. His results also suggest that countries with more developed financial sectors are able to reduce output volatility through financial integration. Bekaert, Harvey, and Lundblad (2002) examine the impact of equity market liberalization on the volatility of output and consumption during 1980–2000. They find that, following equity market liberalizations, there is a significant decline in both output and consumption volatility. Capital account openness reduces the volatility of output and consumption, but its impact is smaller than that of equity market liberalization. However, they also report that capital account openness increases the volatility of output and consumption in emerging market countries. IMF (2002) provides evidence indicating that financial openness is associated with lower output volatility in developing countries.

II. Macroeconomic Volatility: Data Issues and Basic Stylized Facts

We first present some stylized facts concerning output and consumption volatility.\textsuperscript{9} Figure 1 plots the volatilities of per capita output and consumption growth against purchasing power parity–adjusted real per capita income levels (expressed relative to the United States), a measure of a country’s level of economic development. As anticipated, high-income countries tend to have lower output volatility than low-income countries. This negative relationship is even more pronounced in the case of consumption. Table 1 (column 1) shows the cross-sectional medians of the volatility of output and consumption growth over the full sample, 1960–99. As noted earlier, we split developing countries into two groups: MFIEs and LFIEs. The results line up as expected, with median volatility of output and consumption being lowest for the industrial country subsample and, among developing countries, for the MFIEs, which tend to be richer and more industrialized than the LFIEs.

Next, we refine the measure of income in two ways. First, we use GNP instead of GDP. Cyclical variations in net factor income flows, as reflected in GNP, would be expected to capture the effects of international risk sharing on national income. Second, we adjust output for terms of trade effects. Terms of trade shocks are

\textsuperscript{8}Denizer, Iyigun, and Owen (2002) also study the impact of financial sector development on the volatility of output, consumption, and investment and find that there is a robust negative relationship between the level of financial sector development and macroeconomic volatility.

\textsuperscript{9}Output is defined as per capita real GDP while consumption is per capita real private consumption. See the Data Appendix for a more detailed description of the dataset.
### Table 1. Volatility of Growth Rates of Selected Variables

(Percentage standard deviations; medians for each group of countries)

<table>
<thead>
<tr>
<th></th>
<th>Full Sample</th>
<th>Decade</th>
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<td>Industrial countries</td>
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<td>2.03</td>
<td>1.61</td>
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<td></td>
<td>(0.23)</td>
<td>(0.26)</td>
<td>(0.28)</td>
<td>(0.30)</td>
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<td>3.22</td>
<td>4.05</td>
<td>3.59</td>
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<td></td>
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<td>(0.37)</td>
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<td></td>
<td>(0.35)</td>
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<td>(1.01)</td>
<td>(0.69)</td>
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<td>2.16</td>
<td>1.98</td>
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<td></td>
<td>(0.31)</td>
<td>(0.27)</td>
<td>(0.25)</td>
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<tr>
<td>MFI economies</td>
<td>5.18</td>
<td>4.57</td>
<td>4.52</td>
<td>4.09</td>
<td>4.66</td>
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<td></td>
<td>(0.51)</td>
<td>(0.49)</td>
<td>(1.04)</td>
<td>(0.94)</td>
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<tr>
<td>LFI economies</td>
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<td>5.36</td>
<td>7.07</td>
<td>7.25</td>
<td>5.72</td>
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<td>(0.78)</td>
<td>(0.58)</td>
<td>(1.07)</td>
<td>(0.81)</td>
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<td><strong>Income (Q)</strong></td>
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<tr>
<td>Industrial countries</td>
<td>2.73</td>
<td>2.18</td>
<td>2.99</td>
<td>2.54</td>
<td>1.91</td>
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<td></td>
<td>(0.34)</td>
<td>(0.33)</td>
<td>(0.40)</td>
<td>(0.29)</td>
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<tr>
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<td>5.43</td>
<td>5.45</td>
<td>4.78</td>
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<td>LFI economies</td>
<td>7.25</td>
<td>4.42</td>
<td>9.64</td>
<td>7.56</td>
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<td></td>
<td>(0.84)</td>
<td>(0.53)</td>
<td>(1.24)</td>
<td>(0.81)</td>
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<tr>
<td><strong>Total Consumption (C+G)</strong></td>
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<tr>
<td>Industrial countries</td>
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<td>1.38</td>
<td>1.84</td>
<td>1.58</td>
<td>1.38</td>
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<td>(0.23)</td>
<td>(0.28)</td>
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<tr>
<td>MFI economies</td>
<td>4.34</td>
<td>3.95</td>
<td>4.19</td>
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<td></td>
<td>(0.47)</td>
<td>(0.51)</td>
<td>(0.54)</td>
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<tr>
<td>LFI economies</td>
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<td>4.85</td>
<td>6.50</td>
<td>6.34</td>
<td>4.79</td>
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<td>(0.56)</td>
<td>(0.55)</td>
<td>(0.93)</td>
<td>(0.91)</td>
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<tr>
<td><strong>Ratio of Total Consumption (C+G) to Income (Q)</strong></td>
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<td>Industrial countries</td>
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<td>0.75</td>
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<td>0.61</td>
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<tr>
<td>MFI economies</td>
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<td>0.92</td>
<td>0.74</td>
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<tr>
<td></td>
<td>(0.07)</td>
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<td>(0.12)</td>
<td>(0.11)</td>
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<tr>
<td>LFI economies</td>
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<td>0.95</td>
<td>0.68</td>
<td>0.82</td>
<td>0.84</td>
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<td></td>
<td>(0.08)</td>
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<td>(0.51)</td>
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</table>

Notes: MFI economies are more financially integrated, and LFI economies are less financially integrated. C+G refers to total consumption (private + public). The ratio in the bottom section is computed separately for each country and the numbers reported in the table are the within group medians of those ratios. Note that this is not the same as the ratio of the median of consumption growth volatility to the median of output growth volatility. Standard errors are reported in parentheses.
Figure 1. Output and Consumption Volatility

Note: Country abbreviations are defined in the Appendix.
commonly regarded as an important determinant of macroeconomic volatility, especially in small developing economies. Furthermore, such shocks tend to be highly persistent and can have significant effects on permanent incomes of these economies. Following authors such as Kraay and Ventura (2002), we incorporate terms of trade effects by adding to each country’s output its export price index times the share of exports to GDP minus its import price index times the share of imports to GDP.

This broader measure of income is substantially more volatile than output. Table I shows that the median standard deviation of income growth volatility for MFIEs is 5.44, compared to 3.84 for output growth. For LFIEs, the corresponding numbers are 7.25 and 4.67, respectively.

The utility of a representative agent in a national economy depends not just on private consumption (C) but also on government consumption (G). The cyclical properties of G could in fact influence the response of C to macroeconomic shocks. Hence, it would be more appropriate to consider the sum of C and G rather than just C. This could be particularly important for less developed economies as well as more open economies that tend to have higher ratios of G to Y.

Table I also shows that the median volatility of C+G growth is indeed lower than that of C. For instance, for MFIEs, the median percentage standard deviation of the volatility of C+G growth is 4.34, compared to 5.18 for C growth. For LFIEs, on the other hand, the comparable numbers—6.40 and 6.61, respectively—are not that different. In other words, total consumption is on average less volatile than private consumption for industrial countries and MFIEs.

The bottom of Table I shows the median of the ratio of the volatility of total consumption to that of income. This can be considered a measure of the efficacy of consumption smoothing, at the national level, relative to income volatility. This ratio is significantly lower for industrial countries than for developing countries, but is essentially the same, on average, for MFIEs and LFIEs.

III. Macroeconomic Volatility Over Time

We now present an overview of changes in macroeconomic volatility over time. Table I (columns 2–5) presents summary statistics for the volatility of output over each of the last four decades. For industrial countries, median output volatility rose in the 1970s, the period of the major oil shock and the end of the Bretton Woods regime. By the 1990s, however, median output volatility had declined to a level lower than that of even the relatively calm 1960s. There is a similar pattern of a sharp decline in output volatility in the 1990s for LFIEs. Interestingly, output volatility for the MFIEs increased slightly in the 1980s and then remained essentially unchanged in the subsequent decade. A similar pattern holds for the volatility of income although, as noted earlier, income volatility tends to be much higher than output volatility, especially for developing economies.

Footnotes:
10Conceptually, the flow of services from government expenditures would be the right measure to use. But data constraints force us to use total government expenditures as a proxy.
11Some recent studies also examine the time profile of the volatility of output and consumption of different groups of countries. For example, Osborn, van Dijk, and Sensier (2002) study the G-7 countries, and Kim, Kose, and Plummer (2003) examine the Asian emerging market countries.
Figure 2 shows mean output and income volatility for different groups of countries based on standard deviations of growth rates computed over a 10-year rolling window. Clearly, the choice of the cross-sectional average measure (mean vs. median) and the breakdown of the data in Table 1 into decade averages are not crucial to the results.

Table 1 shows the evolution of median volatility of the growth rates of private and total consumption. For industrial countries, there is a small decline in the volatility of consumption in the 1990s, relative to the two previous decades. For LFTEs, there is a particularly sharp and statistically significant decline in measures of consumption volatility in the 1990s relative to the 1980s and 1970s. The major difference is again for MFIEs, which actually experienced an increase in their median consumption volatility in the 1990s, although this increase is not statistically significant.

Figure 3, which plots mean volatility of private and total consumption for the three groups of countries, confirms these results and shows how consumption volatility for MFIEs and LFTEs has converged in the 1990s, with most of this convergence attributable to a decline in average volatility among LFTEs.

The obvious question at this stage is what these patterns imply for the relative volatility of consumption to income. As we have argued based on the analysis in the previous section, it is the volatility of total consumption relative to that of income that is the most relevant measure for analyzing the welfare effects, in terms of volatility, of financial integration. The bottom of Table 1 shows how this measure has evolved over the four decades.

A particularly interesting result is that the median relative volatility of total consumption to that of income has risen from the 1980s to the 1990s for MFIEs, precisely in the period when financial integration should have paid off in terms of better consumption-smoothing opportunities and, therefore, lower relative volatility of consumption for these economies. The increase in relative volatility is attributable to the decline in income volatility and the concomitant increase in consumption volatility.

Industrial countries and LFTEs, on the other hand, had virtually no change in their average relative volatilities from the 1980s to the 1990s. It should be noted that, even among industrial countries, gross capital flows surged after the mid-1980s. Thus, the effects of capital market integration appear to have had very different effects on different groups of economies. In particular, the divergence in the evolution of consumption and income volatility of MFIEs runs exactly counter to the notion that financial integration increases risk-sharing and consumption-smoothing opportunities.

In addition to averages, it is also of interest to see how this measure of relative volatility changed from the 1980s to the 1990s for individual developing economies. The top panel of Figure 4 shows that there are a number of MFIEs for which this ratio is significantly higher in the 1990s than in the 1980s. Countries like Argentina, Indonesia, and Turkey, on the other hand, appear to have fared better in terms of volatility in the 1990s than in the 1980s (our dataset ends in 1999—the subsequent developments in some of these countries would further support our observation). This figure clearly shows that our use of a measure of the volatility of consumption...
Figure 2. Output and Income Volatility

Industrial Countries

MFIEs

LFIEs

Note: Dotted lines are two standard error bands.
Figure 3. Consumption Volatility

Note: Dotted lines are two standard error bands.
relative to that of income implies that this result can not be explained away as just a consequence of some of these economies having undergone crises during this period. Among LFIEs, the picture is mixed. A number of Latin American countries such as Panama, Uruguay, and Ecuador appear to have experienced higher relative volatility going from the 1980s to the 1990s, while many African countries had a decline in relative volatility.

The descriptive statistics in this section, while interesting in terms of providing a broad characterization of volatility dynamics over time, are of course only suggestive. In addition, we have used a coarse disaggregation of countries based on their degree of financial integration. Even among these groups of countries, there are substantial differences in terms of the degree of financial integration and how this has evolved over time. Hence, we now proceed to a regression analysis of volatility dynamics.

IV. Regression Analysis

In this section, we provide a more formal regression analysis to understand the main determinants of macroeconomic volatility. In particular, we examine the roles of trade and financial openness in driving the cross-sectional and time series patterns of volatility. We use two measures of trade openness—a measure of restrictions on current account transactions and a standard trade openness ratio (ratio of imports and exports to GDP). To measure financial openness, we use an indicator of the restrictions on capital account transactions and also a measure of gross capital flows to GDP, where the latter is analogous to the trade openness ratio. The restrictiveness indicators can be considered as measures of de jure trade and financial openness while the flow measures capture de facto openness. This distinction is of particular importance in understanding the effects of financial integration as many economies that have maintained controls on capital account transactions have found them ineffective in many circumstances, particularly in the context of episodes of capital flight. We also consider potential nonlinear relations between macroeconomic volatility and the measures of trade and financial openness.

In the empirical analysis, we also include a number of variables drawn from papers that have examined various aspects of volatility. In addition to the measures of trade and financial openness, our core set of explanatory variables includes the level of per capita income, the standard deviation of the terms of trade, the ratio of M2 to GDP and the volatility of changes in this ratio, the levels and volatility of inflation, and the fiscal balance (impulse). We also explore the sensitivity of our results to the inclusion of a large number of other controls.

We eschew the use of fixed-effects estimators in order to avoid restricting the empirical analysis to within-country volatility. Most of the variation in our sample comes from the between-country component, which is of far more relevance for the issues that we are interested in. Instead of fixed effects, we include in the analysis

12The restrictiveness indicators are binary 0–1 variables, where 1 indicates the presence of restrictions. For the regressions, they are averaged over each decade for each country and can, therefore, take values between 0 and 1. See Prasad, Wei, and Kose (2003) for a discussion of these alternative definitions of trade and financial openness and their implications for empirical analysis.
Figure 4. Ratio of Total Consumption Volatility to Income Volatility

Note: Country abbreviations are defined in the Appendix.
numerous country-specific variables—reflecting economic and political structures and other relevant features—that are potentially important for explaining cross-country differences in volatility.

In our baseline regressions, we use data for each of the four decades in our sample. The dependent variable is the standard deviation of the growth rate of the relevant variable over each 10-year period. Correspondingly, the explanatory variables are 10-year averages of the underlying annual data or, in the cases of other variables, volatility measures constructed in a manner similar to the dependent variables. All of the regressions reported below include time effects (decade dummies). We first report OLS results and then, in order to control for the potential endogeneity of the openness measures, also look at instrumental variables (IV) estimates.

The first two columns of Table 2 show the results for output and income, respectively. For both these variables, trade openness appears to be positively associated with volatility, suggesting that more open economies are more vulnerable to external shocks. As expected, the coefficient is larger for the income measure, which includes the effects of terms of trade fluctuations. Capital account openness, as measured by the restrictiveness indicator, is associated with higher output volatility, but this coefficient is only marginally significant. The volatility of the terms of trade is an important determinant of output as well as income volatility. The ratio of M2 to GDP is often interpreted as a measure of financial deepening. Consistent with the results of authors such as Denizer, Iyigun, and Owen (2002), we find that financial sector development, as proxied by this measure, is in fact associated with lower output volatility. Variability of the fiscal impulse measure contributes at best weakly to aggregate volatility.

As discussed earlier, theory does not provide a clear guide to the effects of financial and trade integration on output volatility. On the other hand, at least in the case of financial integration, the implication of standard stochastic dynamic business cycle models is that, for a given level of output volatility, financial integration should provide an avenue for increased international risk-sharing and, by extension, lower consumption volatility.

The third and fourth columns of Table 2 show that trade openness has a positive effect on the volatility of private consumption as well as that of total consumption. This is presumably related to the earlier result that trade openness increases output and income volatility. Financial integration, as proxied by the restrictiveness variable, seems to have only a marginal effect on the volatility of either measure of consumption. Gross capital flows, on the other hand, have a positive effect on total consumption volatility at low levels of capital flows. Notice that the coefficient on the quadratic term (square of the gross flows measure) enters with a significantly negative coefficient. The implication of this result is discussed in more detail below.

Relative income has a strongly negative effect on consumption volatility. In other words, high-income countries appear to have much lower levels of consumption volatility than low-income countries, even though they do not have much lower output volatility. Other variables like financial deepening and the volatility of the M2/GDP ratio seem to affect consumption volatility in much the same way that they affect output and income volatility.
**Table 2. Panel Regressions—OLS**

<table>
<thead>
<tr>
<th>Dependent variable (volatility of growth rate of):</th>
<th>Output (Y)</th>
<th>Income (Q)</th>
<th>Consumption (C)</th>
<th>Total Consumption (C+G)</th>
<th>Ratio of (C+G) Volatility to Q Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current account restrictions</td>
<td>0.058</td>
<td>0.049</td>
<td>0.730</td>
<td>0.603</td>
<td>4.554</td>
</tr>
<tr>
<td></td>
<td>(0.387)</td>
<td>(0.575)</td>
<td>(0.630)</td>
<td>(0.461)</td>
<td>(6.160)</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.014**</td>
<td>0.059**</td>
<td>0.031***</td>
<td>0.018**</td>
<td>-0.385***</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.014)</td>
<td>(0.012)</td>
<td>(0.007)</td>
<td>(0.095)</td>
</tr>
<tr>
<td>Capital account restrictions</td>
<td>0.578*</td>
<td>0.213</td>
<td>0.930*</td>
<td>0.611</td>
<td>8.447</td>
</tr>
<tr>
<td></td>
<td>(0.335)</td>
<td>(0.471)</td>
<td>(0.557)</td>
<td>(0.450)</td>
<td>(6.092)</td>
</tr>
<tr>
<td>Financial openness</td>
<td>0.005</td>
<td>-0.030</td>
<td>0.071</td>
<td>0.054</td>
<td>1.107***</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.043)</td>
<td>(0.052)</td>
<td>(0.034)</td>
<td>(0.414)</td>
</tr>
<tr>
<td>Financial openness squared (divided by 100)</td>
<td>-0.015</td>
<td>-0.004</td>
<td>-0.100</td>
<td>-0.072**</td>
<td>-1.125***</td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
<td>(0.046)</td>
<td>(0.056)</td>
<td>(0.036)</td>
<td>(0.426)</td>
</tr>
<tr>
<td>Relative income</td>
<td>-1.050</td>
<td>-0.739</td>
<td>-1.476*</td>
<td>1.931***</td>
<td>-31.806***</td>
</tr>
<tr>
<td></td>
<td>(0.641)</td>
<td>(0.822)</td>
<td>(0.873)</td>
<td>(0.678)</td>
<td>(11.399)</td>
</tr>
<tr>
<td>Terms of trade volatility</td>
<td>6.381**</td>
<td>28.479***</td>
<td>20.229***</td>
<td>15.898***</td>
<td>-43.896</td>
</tr>
<tr>
<td>M2/GDP</td>
<td>-0.014**</td>
<td>-0.015</td>
<td>-0.035***</td>
<td>-0.026***</td>
<td>-0.286**</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.010)</td>
<td>(0.011)</td>
<td>(0.009)</td>
<td>(0.129)</td>
</tr>
<tr>
<td>Volatility of M2/GDP</td>
<td>0.344***</td>
<td>0.374**</td>
<td>0.544***</td>
<td>0.393***</td>
<td>3.703**</td>
</tr>
<tr>
<td></td>
<td>(0.114)</td>
<td>(0.158)</td>
<td>(0.163)</td>
<td>(0.131)</td>
<td>(1.767)</td>
</tr>
<tr>
<td>Average inflation</td>
<td>-0.238</td>
<td>0.161</td>
<td>-0.007</td>
<td>-0.270</td>
<td>-4.788**</td>
</tr>
<tr>
<td></td>
<td>(0.156)</td>
<td>(0.240)</td>
<td>(0.285)</td>
<td>(0.205)</td>
<td>(2.276)</td>
</tr>
<tr>
<td>Fiscal policy volatility</td>
<td>1.459*</td>
<td>-0.769</td>
<td>1.840</td>
<td>2.927</td>
<td>44.844**</td>
</tr>
<tr>
<td></td>
<td>(0.775)</td>
<td>(1.343)</td>
<td>(2.553)</td>
<td>(1.935)</td>
<td>(20.944)</td>
</tr>
<tr>
<td>R squared</td>
<td>0.29</td>
<td>0.59</td>
<td>0.41</td>
<td>0.45</td>
<td>0.26</td>
</tr>
<tr>
<td>Number of observations</td>
<td>264</td>
<td>264</td>
<td>264</td>
<td>264</td>
<td>264</td>
</tr>
</tbody>
</table>

Notes: The dependent variable is the standard deviation of the growth rate of the relevant variable over each 10-year period. C+G refers to total consumption (private + public). In the final column, the dependent variable is the ratio of the standard deviation of total consumption growth to that of income growth. The explanatory variables are 10-year averages of the underlying annual data or, in the cases of some variables, volatility measures (over each decade) constructed as the standard deviation of the growth rate of the relevant variable or the standard deviation of changes in the relevant ratios. All regressions include time effects (decade dummies). Heteroscedasticity-consistent robust standard errors are reported in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.
A more important criterion to judge the relevance of trade and financial integration for developing economies, in particular, is related to their effects on the ratio of consumption growth volatility to that of income growth volatility. The last column contains a regression of the ratio of the volatility of total consumption growth to that of income growth on the same set of independent variables. One interesting result is that trade openness has a negative effect on this ratio. Although trade openness increases both consumption and income volatility, the net effect is to reduce the relative volatility of consumption.

More importantly, the coefficients on the financial openness variables are now strongly significant—the coefficient on the linear term is strongly positive while that on the quadratic is negative. In other words, increasing financial openness is associated with rising relative volatility of consumption, but only up to a certain threshold. The coefficient estimates indicate that this threshold is approximately 49 percent (ratio to GDP). Economies with gross flows that amount to a higher fraction of GDP seem to start seeing some of the benefits of capital market integration in terms of improved consumption-smoothing possibilities. Indeed, these levels of gross capital flows as a share of GDP are typically experienced over sustained periods of time only by some industrial countries. It is also the case that relative per capita income is strongly negatively correlated with this ratio. Thus, even after controlling for the level of economic development, the level of capital market integration has a nonlinear effect on volatility.

Terms of trade volatility do not affect the relative volatility of consumption, although that is because this variable increases both consumption and income volatility. Domestic financial liberalization reduces not only consumption and income volatility but also the ratio of the two. Although our measure of financial deepening is not an entirely adequate one, the strength of this relationship shows how the depth of domestic financial markets has a crucial impact on volatility. We also note that, while the variability of the fiscal impulse measure does not directly affect either consumption or income volatility, it does have a positive effect on the ratio.

We explored the robustness of our results in a number of different dimensions. In the interest of brevity, these results are only briefly described here. Firstly, instead of decade averages, we constructed data based on a five-year period. This increases the number of observations for each country. Not surprisingly, the point estimates do indeed differ but the main coefficients of interest remained statistically significant and of roughly similar magnitudes as in Table 2. Secondly, we also experimented with the inclusion of numerous other policy and macroeconomic variables—the level and variability of government expenditures to GDP, variability of inflation, the
composition of output, etc. None of these had a significant effect on aggregate volatility and are, therefore, excluded from the baseline regressions.

A potentially more important concern about the OLS results is that the different measures of openness may be endogenously determined. For instance, an increase in domestic volatility could induce policymakers to impose capital account restrictions and thereby attempt to control the component of volatility attributable to volatile capital flows. Furthermore, the degree of volatility in a given country could influence the level of capital flows and, possibly, even that of trade flows, to that country. Statistical tests for endogeneity such as the Hausman test do not reveal any strong evidence of such endogeneity (see the bottom row of Table 3). Nevertheless, this remains a concern at a conceptual level. Hence, we also explored an IV estimation strategy. This approach also has the advantage of controlling for possible measurement error in the openness variables, which is a particular concern for the capital flow data. We use a broad range of instruments for the four openness measures (see notes to Table 3).

Table 3 contains IV estimates that can be compared with the OLS estimates in Table 2. There are some important differences relative to the OLS results. For instance, volatility of the fiscal impulse measure no longer seems to have a significant effect on the volatility of the macroeconomic aggregates shown in the table. In addition, the statistical significance of the trade openness measure is now limited to the regressions for income and the relative volatility of consumption (columns 2 and 5). Furthermore, financial deepening still has a negative effect on output and both private and total consumption volatility, but its effect on the relative volatility of consumption is no longer statistically significant.

Nevertheless, our core results about the effects of openness on relative volatility are preserved. In particular, two key results—the negative effects of trade openness on the ratio of consumption volatility to income volatility, and the nonlinear effect of financial openness on this ratio—are, if anything, strengthened by instrumenting them. The coefficients on the linear and quadratic terms indicate that the threshold at which financial openness begins to exert a negative effect on the relative volatility of consumption is about 50 percent (as a ratio to GDP), almost identical to the threshold derived from the OLS estimates. Overall, we view the IV results as broadly supportive of our main OLS results.

V. Conclusions

Assessing the benefits and costs associated with financial globalization requires a clear understanding of the impact of international financial integration on macroeconomic volatility. This paper has attempted to shed light on the effects

15The Hausman test is really more a test of the consistency of the OLS relative to IV estimates, but is often used as a test for endogeneity.

16The Sargan test, which was used to test the adequacy of the instruments, indicated that the null hypothesis that the instruments are uncorrelated with the error terms could not be rejected. Furthermore, the test confirmed that the instruments are validly excluded from the estimated regressions.

17Due to data limitations, our sample size shrinks by about 10 percent when we move to the IV estimation. We reestimated the OLS equations over this slightly smaller sample and did not find any major differences compared to the results reported in Table 2.
## Table 3. Panel Regressions—Instrumental Variables Estimates

<table>
<thead>
<tr>
<th>Dependent variable (volatility of growth rate of):</th>
<th>Output (Y)</th>
<th>Income (Q)</th>
<th>Consumption (C)</th>
<th>Total Consumption (C+G)</th>
<th>Ratio of C+G Volatility to Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current account restrictions</td>
<td>0.256</td>
<td>0.027</td>
<td>0.834</td>
<td>0.902</td>
<td>4.660</td>
</tr>
<tr>
<td>(0.525)</td>
<td>(0.684)</td>
<td>(0.784)</td>
<td>(0.640)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.039</td>
<td>0.130***</td>
<td>0.064</td>
<td>0.053</td>
<td>-0.722***</td>
</tr>
<tr>
<td>(0.026)</td>
<td>(0.031)</td>
<td>(0.044)</td>
<td>(0.037)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital account restrictions</td>
<td>0.184</td>
<td>-0.961</td>
<td>1.009</td>
<td>0.519</td>
<td>18.896***</td>
</tr>
<tr>
<td>(0.451)</td>
<td>(0.794)</td>
<td>(0.823)</td>
<td>(0.692)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial openness</td>
<td>-0.018</td>
<td>-0.340</td>
<td>-0.2295**</td>
<td>-0.2217***</td>
<td>-56.929***</td>
</tr>
<tr>
<td>(0.147)</td>
<td>(0.226)</td>
<td>(0.211)</td>
<td>(0.180)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial openness squared</td>
<td>-0.065</td>
<td>0.236</td>
<td>-0.026</td>
<td>-0.0322***</td>
<td>0.0028</td>
</tr>
<tr>
<td>(0.190)</td>
<td>(0.266)</td>
<td>(0.301)</td>
<td>(0.267)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative income</td>
<td>-0.339</td>
<td>1.183</td>
<td>-2.295**</td>
<td>-2.217**</td>
<td>-56.929***</td>
</tr>
<tr>
<td>(0.920)</td>
<td>(1.348)</td>
<td>(1.161)</td>
<td>(0.947)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terms of trade volatility</td>
<td>5.325**</td>
<td>27.864***</td>
<td>19.608***</td>
<td>15.505***</td>
<td>-23.238</td>
</tr>
<tr>
<td>(2.605)</td>
<td>(5.254)</td>
<td>(5.470)</td>
<td>(4.222)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2/GDP</td>
<td>-0.020**</td>
<td>0.017</td>
<td>-0.036**</td>
<td>-0.0323***</td>
<td>0.0028</td>
</tr>
<tr>
<td>(0.008)</td>
<td>(0.014)</td>
<td>(0.014)</td>
<td>(0.012)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volatility of M2/GDP</td>
<td>0.481**</td>
<td>0.460**</td>
<td>0.777**</td>
<td>0.590**</td>
<td>4.089</td>
</tr>
<tr>
<td>(0.157)</td>
<td>(0.223)</td>
<td>(0.284)</td>
<td>(0.243)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average inflation</td>
<td>-0.306</td>
<td>-0.111</td>
<td>0.093</td>
<td>-0.181</td>
<td>-1.355</td>
</tr>
<tr>
<td>(0.227)</td>
<td>(0.275)</td>
<td>(0.408)</td>
<td>(0.296)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiscal policy volatility</td>
<td>1.613</td>
<td>0.019</td>
<td>2.147</td>
<td>2.968</td>
<td>40.039</td>
</tr>
<tr>
<td>(1.023)</td>
<td>(1.412)</td>
<td>(3.143)</td>
<td>(2.391)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>235</td>
<td>235</td>
<td>235</td>
<td>235</td>
<td>235</td>
</tr>
<tr>
<td>Hausman test statistic</td>
<td>11.130</td>
<td>24.310</td>
<td>0.140</td>
<td>6.340</td>
<td>15.130</td>
</tr>
<tr>
<td>[0.68]</td>
<td>[0.04]</td>
<td>[0.75]</td>
<td>[0.96]</td>
<td></td>
<td>[0.37]</td>
</tr>
<tr>
<td>[0.111]</td>
<td>[0.12]</td>
<td>[0.34]</td>
<td>[0.45]</td>
<td></td>
<td>[0.35]</td>
</tr>
</tbody>
</table>

Notes: The dependent variable is the standard deviation of the growth rate of the relevant variable over each 10-year period. C+G refers to total consumption (private + public). In the final column, the dependent variable is the ratio of the standard deviation of total consumption growth to that of income growth. The explanatory variables are 10-year averages of the underlying annual data or, in the cases of some variables, volatility measures (over each decade) constructed as the standard deviation of the growth rate of the relevant variable or the standard deviation of changes in the relevant ratios. All regressions include time effects (decade dummies). The following variables were used as instruments: export proceeds restrictions, multiple exchange regimes, Reinhart-Rogoff exchange rate arrangements, world real interest rate (scaled by each country's export price index), share of oil exports in total exports, initial levels of relative income and trade openness (in 1960), shares of manufactures and agricultural production in GDP, fraction of a country's territory subject to tropical climate, access to sea, fraction of the population that lives in rural areas, and Bank's weighted conflict index. Heteroscedasticity-consistent robust standard errors are reported in parentheses. The symbols * , **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. The Hausman statistic tests whether there is a systematic difference between the coefficients of the IV regression and corresponding OLS regression. The Sargan test is for the validity of the instruments used in each regression. p-values are reported in brackets.
of financial integration on volatility. First, we have examined the implications of economic theory for the effects of financial integration on volatility. We have concluded that economic theory does not provide a clear guide to the effects of financial integration on output volatility. In our empirical work, we have found that the volatility of output growth has, on average, declined in the 1990s relative to the three earlier decades. More importantly though, the volatility of consumption growth relative to that of income growth has on average increased for MFIEs in the 1990s, during which financial integration, as measured by financial flows to these economies, increased substantially. Our findings also indicate that financial openness, as measured by gross capital flows as a ratio to GDP, is associated with an increase in the ratio of consumption volatility to income volatility, contrary to the notions of improved international risk-sharing opportunities through financial integration. However, this relationship is nonlinear. Once the level of gross capital flows crosses a particular threshold, it appears to have a negative effect on this ratio.

These findings illustrate the complex relationship between international financial integration and macroeconomic stability. Could one easily argue that crises that took place in several emerging market economies during the 1990s show that international financial integration increases macroeconomic volatility? Our simple answer is “no,” as the empirical evidence clearly shows that the volatility of output growth has, on average, declined in the 1990s relative to the three earlier decades. While financial openness seems to be associated with an increase in the ratio of consumption volatility to income volatility, once the level of gross capital flows crosses a particular threshold, it appears to have a negative effect on this ratio. In other words, developing countries need to be more, not less, integrated to the world financial markets to be able to reap the benefits of financial integration in terms of improved risk sharing. This conclusion requires further qualification as international financial integration is associated with a variety of risks. To minimize these risks, developing countries perhaps would need to implement sound macroeconomic and structural frameworks. For example, our findings emphasize the role of fiscal and monetary policies in driving macroeconomic volatility. In regards to structural reforms, our results suggest that the development of a domestic financial sector is critical as a high degree of financial sector development is associated with lower macroeconomic volatility.

We conclude the paper by laying out the agenda for extending the analysis in this paper. A first priority is to extend the scope of empirical work to provide a set of robust stylized facts that can help guide the theory. In this context, it is important to check systematically for threshold effects in the relationships between openness and volatility. Understanding the impact of openness on the dynamics of other major macroeconomic aggregates is also critical. The second, but equally important, priority is to develop a theoretical framework for understanding the linkages between openness and the dynamics of volatility that we have uncovered in this paper.
In this appendix, we describe the main variables used in the analysis and the main data sources. We also list the countries in the sample, along with the country groupings used in the analysis.

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real GDP, constant local currency units.</td>
<td>World Development Indicators (WDI)</td>
</tr>
<tr>
<td>Real income (adjusted for terms of trade), constant local currency units.</td>
<td></td>
</tr>
<tr>
<td>GDP at PPP rates, current international dollars.</td>
<td>Easterly and Sewadeh (2001)</td>
</tr>
<tr>
<td>Private consumption, constant local currency units.</td>
<td>WDI</td>
</tr>
<tr>
<td>General government consumption, constant local currency units.</td>
<td>WDI</td>
</tr>
<tr>
<td>Imports of goods and services, current and constant in U.S. dollars.</td>
<td>WDI, International Financial Statistics (IFS)</td>
</tr>
<tr>
<td>Exports of goods and services, current and constant in U.S. dollars.</td>
<td>WDI, IFS</td>
</tr>
<tr>
<td>Trade openness. Sum of exports and imports divided by GDP.</td>
<td></td>
</tr>
<tr>
<td>Capital inflows, percent of GDP. Sum of foreign direct investment, portfolio flows, and other investments.</td>
<td>IFS, Lane and Milesi-Ferretti (2001, 2003)</td>
</tr>
<tr>
<td>Capital outflows, percent of GDP. Sum of foreign direct investment, portfolio flows, and other investments.</td>
<td>IFS, Lane and Milesi-Ferretti (2001, 2003)</td>
</tr>
<tr>
<td>Financial openness. Gross capital flows (sum of capital inflows and outflows).</td>
<td></td>
</tr>
<tr>
<td>Terms of trade (1995=100).</td>
<td>IMF</td>
</tr>
<tr>
<td>Trade and capital account restrictions. Includes payment restrictions for current and capital account, export surrender requirements, and multiple exchange rates.</td>
<td>IMF</td>
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<td>Consumer price index (1995=100).</td>
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<td>Money and quasi-money (M2), percent of GDP.</td>
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<td>Government expenditures, total, local currency units.</td>
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Government revenues, total, local currency units. IFS
Ratio of government expenditures to revenues.

LIBOR interest rate, London, six months. IFS

Exchange rate arrangement, de facto. Reinhart and Rogoff

Population. WDI

Share of the population that lives in rural areas. WDI

Shares of manufactures and agricultural production in GDP. WDI

Weighted conflict index. Banks's Cross-National Time Series Data Archive

The sample comprises 76 countries—21 industrial and 55 developing. 18

**Industrial Countries**

Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Denmark (DNK), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Ireland (IRL), Italy (ITA), Japan (JPN), Netherlands (NLD), New Zealand (NZL), Norway (NOR), Portugal (PRT), Spain (ESP), Sweden (SWE), Switzerland (CHE), United Kingdom (GBR), and United States (USA).

**Developing Countries**

These countries are grouped into MFIEs (22) and LFIEs (33). 19

**MFIEs**

Argentina (ARG), Brazil (BRA), Chile (CHL), China (CHN), Colombia (COL), Egypt (EGY), Hong Kong (HKG), India (IND), Indonesia (IND), Israel (ISR), Korea (KOR), Malaysia (MYS), Mexico (MEX), Morocco (MAR), Pakistan (PAK), Peru (PER), Philippines (PHL), Singapore (SGP), South Africa (ZAF), Thailand (THA), Turkey (TUR), and Venezuela (VEN).

**LFIEs**

Algeria (DZA), Bangladesh (BDG), Benin (GEN), Bolivia (BOL), Botswana (BWA), Burkina Faso (BFA), Burundi (BDI), Cameroon (CMR), Costa Rica (CRI), Cote d’Ivoire (CIV), Dominican Republic (DOM), Ecuador (ECU), El Salvador (SLV), Gabon (GAB), Ghana (GHA), Guatemala (GTM), Haiti (HTI), Honduras (HND), Jamaica (JAM), Kenya (KEN), Mauritius (MUS), Nicaragua (NIC), Niger (NER), Nigeria (NGA), Panama (PAN), Papua New Guinea (PNG), Paraguay (PRY), Senegal (SEN), Sri Lanka (LKA), Syrian Arab Republic (SYR), Togo (TGO), Tunisia (TUN), and Uruguay (URY).

18We excluded from the analysis small countries (those with population below one million), transition economies, some oil producers, and other countries with incomplete or clearly unreliable data.

19Hong Kong and Panama were excluded from the regression analysis because of problems with data on capital flows.
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IS-LM-BP in the Pampas

LUIS FELIPE CÉSPEDES, ROBERTO CHANG, and ANDRÉS VELASCO

Emerging markets (sometimes endowed with fertile pampas) have limited access to world capital markets and suffer from original sin: they cannot borrow in their own currency. Does this mean that monetary and exchange rate policies have non-standard effects in such countries? We develop a simple IS-LM-BP model with balance sheet effects to study that question. Our answer: it all depends.

Most standard macro models of the open economy, such as the textbook IS-LM-BP model, treat financial markets and international capital mobility as perfect. In that world, only expectations of future returns, properly arbitrated, guide capital flows and investment; corporate balance sheets and current output levels are irrelevant.

There are many reasons to be doubtful about this approach. Much recent research provides reasons to believe that sovereign risk, limited and costly monitoring, and imperfect contract enforceability render international capital markets particularly prone to failure in the sense that agents cannot borrow all they want at the world rate of interest limited only by intertemporal solvency constraints. The problem is compounded by original sin, which prevents almost all emerging countries from borrowing in their own currencies. This leaves them exposed to currency and relative-price risk, making repayment even dicier.

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Policymakers fret a great deal over the potentially harmful balance sheet effects of devaluation. They were the main reason Argentina delayed changes in its peg—despite massive overvaluation and a deepening recession—until the economy collapsed along with the currency board. Similar concerns have been voiced in Uruguay and in less-dollarized Brazil. Allegedly, IS-LM-BP works differently in the pampas of these three countries, and in others like them.

We have developed several models of the open economy that embed financial-market imperfections in otherwise standard optimizing dynamic models. Here we present a particularly simple one, a variant of the textbook IS-LM-BP model. Though it has a simple graphical representation, this model permits us to pose a richer array of questions, and obtain more nuanced answers, than does the traditional perfect-capital-mobility approach. In fact, the standard model is simply a special case of our more general framework.

Capital market imperfections and balance sheet effects matter in two senses. First, they magnify the domestic real effects of adverse external shocks, such as a fall in export volumes or an increase in the world real interest rate. Second, devaluation may be expansionary (as in the standard model) or contractionary. The second result requires particularly strong balance sheet effects, arising from both high sensitivity of risk premiums and large inherited dollar debts. Then, and only then, does IS-LM-BP turn out to operate differently in the pampas.

I. The Model

Monopolistically competitive firms in the home economy produce differentiated goods using labor and capital. These goods are exported or sold to domestic agents. There is also a foreign good, which can be imported. Capital is made up of domestic and foreign goods, with Cobb-Douglas shares $\gamma$ and $1-\gamma$, and depreciates fully after one period. Prices and wages are preset for one period, but are free to adjust thereafter.

Labor and capital are supplied by distinct agents called workers and entrepreneurs. Workers work and consume an aggregate of the domestic and foreign good. Entrepreneurs own capital and also own the firms. In order to finance investment in excess of their own net worth, entrepreneurs borrow from the world capital market. As in Bernanke and Gertler (1989), the cost of borrowing depends inversely on net worth relative to the amount borrowed.

In what follows, all variables are in percentage deviation from the no-shock steady state. Start with the IS, which is standard:

$$y = \alpha_i i + \alpha_x x + \alpha_e e,$$

where $y$ is output of the domestically produced good, $i$ is investment, $x$ is the dollar value of exports, and $e$ is the real exchange rate (the value of the foreign goods in terms of the domestic good). The $\alpha$s are positive coefficients, which in turn are

---

1 With Cobb-Douglas shares $\gamma$ and $1-\gamma$.
2 Except for the world interest rate and the risk premium, which are just deviations (not percentage deviations) from the steady state.
combinations of the underlying preference and technology parameters of the model (see the Appendix for details). Under our assumptions, $x$ is exogenously given, while $e$ is endogenous (or at least influenced by monetary policy when prices are sticky). For a given $e$, the IS schedule slopes up in $(i, y)$ space.

Consider next the LM, which can be written as

$$
m = \beta_y y + \beta_e e - \beta_i i, \tag{2}$$

where $m$ is the value of money in terms of the domestic good, $\beta_y$ and $\beta_i$ are positive coefficients (all functions of underlying structural parameters), and $\beta_e$ may be positive or negative depending on whether the elasticity of money demand with respect to consumption expenditures is larger or smaller than one. The real exchange rate enters money demand because it is the value of monetary balances in terms of consumption that matters to the agents who hold it, and they consume both the foreign and the domestic good. Hence, a change in relative prices (a move in $e$) alters the home-good value of consumption and changes money demand as well. The reason money demand falls with investment is as follows: Holding other factors constant, money demand today depends inversely on consumption tomorrow (recall the standard Euler relationship), and consumption tomorrow is increasing in investment today.

Turn next to the BP. It contains the nonstandard features of the model, so we derive it in more detail. Begin with the investment demand equation

$$
i = -(p + \eta) + ye, \tag{3}$$

where $p$ is the world rate of interest and $\eta$ the country risk premium (both in units of the foreign good). This relationship can easily be derived from the standard rate of return international arbitrage equation (see the Appendix for details). As it stands, it has a simple intuition: investment is decreasing in the relevant international cost of capital (recall entrepreneurs borrow abroad to finance investment) and increasing in the current real exchange rate—because, all things being equal, a higher $e$ today means a lower expected real depreciation between today and tomorrow, and hence a lower cost of foreign capital, when measured in terms of the domestic good.

Crucially, the risk premium is endogenously determined and given by

$$
\eta = \mu [(1 - \gamma) e + i - n]. \tag{4}
$$

where $n$ is entrepreneurs' net worth (in units of the domestic good) and $\mu$ is a positive coefficient. Intuitively, the risk premium increases when the value of current investment is high (we can think of $(1 - \gamma)e$ as the price of the investment good in terms of the home good) and decreases with net worth. For a derivation of this relationship from an underlying contract environment with imperfect information and costly monitoring, see Cespedes, Chang, and Velasco (2000). Notice that capital markets are perfect if $\mu = 0$.

Finally, net worth is given by

$$
n = \delta_y y - \delta_e e, \tag{5}
$$

If this elasticity is smaller than one, then $\beta_e$ is positive, and vice versa. If it is exactly one, then $\beta_e = 0$. 

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where both $\delta$s are positive coefficients that increase with the initial stock of dollar liabilities relative to initial net worth. An increase in output raises the income of capitalists and therefore increases net worth. A depreciation of the (real) exchange rate increases the output value of debt repayments, because of dollarization of liabilities, and reduces net worth.

Substituting equation (5) into equation (4) we have

$$\eta = \mu \left[ (1 - \gamma + \delta_e) e + i - \delta_y y \right].$$

so that the risk premium unambiguously increases with $e$ and $i$ and decreases with $y$. Finally, substituting this into equation (3) we arrive at the BP curve:

$$i = -\left( \frac{1}{1 + \mu} \right) \rho + \left( \frac{\mu \delta_e}{1 + \mu} \right) y + \left[ \frac{\gamma - \mu (1 - \gamma + \delta_e)}{1 + \mu} \right] e.$$

Quite naturally, investment is decreasing in the world rate of interest. The other two terms are more novel. Investment increases with output only if capital markets are imperfect ($\mu > 0$), since higher output increases net worth and reduces the risk premium. Hence the BP curve slopes up in $(i, y)$ space for a given real exchange rate and shock to the world interest rate. If $\mu = 0$, the BP is horizontal.

Notice also that investment may be increasing or decreasing in the real exchange rate. Standard arbitrage forces described above push for an increasing relationship: a higher $e$ makes borrowing abroad cheaper. But the balance sheet effect pushes in the opposite direction: a higher $e$ means a higher value of debt payments and, hence, lower net worth and higher risk premiums. Notice that the balance sheet effect prevails when capital market imperfections are high (large $\mu$) and when the initial stock of dollar debt is high (large $\delta_e$). If the coefficient on $e$ is positive, we have a financially vulnerable economy. If the coefficient is negative, we have a financially robust economy. The size of balance sheet effects also matters for the slope of the BP curve. The stronger the balance sheet effects (the larger are $\mu$ and $\delta_e$), the larger the slope of the BP curve.

We solve the model diagrammatically under the regime of fixed (but adjustable) exchange rates. Because the home currency price is predetermined, a fixed nominal exchange rate makes the relative price $e$ also predetermined. For a given $e$, the intersection of the IS and BP curves pins down investment and output. In turn, the LM yields the level of money supply necessary for that particular equilibrium.4

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4We consider only the case in which the slope of the IS is larger than the slope of the BP. The opposite case is empirically odd, since it implies that an increase in the world interest rate or a fall in exports leads the economy to a boom in production and investment.

5Remember that these are percentage deviations from the no-shock steady state, holding prices and wages constant. Without nominal stickiness, output is exogenous (pinned down by the inherited capital stock and by equilibrium labor supply $l = 0$), the IS and BP pin down the equilibrium real exchange rate for a given output level, and the LM only determines the price level.
II. The Effects of External and Policy Shocks

Consider first the effects of a fall in current exports, depicted in Figure 1. The shock shifts the IS up and to the left, so that for each level of investment there is now a smaller corresponding output level. The new intersection is at point A, with lower investment and output than in the steady state. The output fall is as in the standard model with perfect capital markets and no balance sheet effects, but the fall in investment is not. In that model, a fall in exports today does not affect the profitability of capital tomorrow, and hence it leaves investment unchanged. That is what happens in our model in the special case $\mu = 0$, so that the BP curve is horizontal. Notice that with stronger balance sheet effects (larger $\mu$ and $\delta$) the BP becomes steeper, magnifying the adverse effects on both investment and output.

Consider next the effects of a one-period increase in the world rate of interest. In Figure 2, the shock shifts the BP down and to the right, so that investment is lower for each output level. The result is lower investment and output, as in point A. This is qualitatively as it would be in the standard model with perfect capital markets and a horizontal BP curve, but quantitatively there is a difference: for the same downward shift, the steeper the BP the larger the reduction in investment and output. The capital market imperfections and resulting balance sheet effects magnify the real effects of adverse interest rate shocks.6

Can monetary policy play a countercyclical role? To answer that question we look at the impact of a real depreciation, accommodated by monetary policy. Start with a financially robust economy. This is the case in which initial dollar debt is low with respect to net worth and the elasticity of the risk premium with respect to the ratio of investment spending to net worth is also low. A depreciation of the real exchange rate shifts the IS down and the BP up. This situation appears in Figure 3. Both output and investment unambiguously go up. This is just as in the standard model: real depreciation is expansionary, and it can be used to offset the real effects of adverse shocks.7

Turn next to the financially vulnerable economy. This is the case in which balance sheet effects are strong, that is, the initial level of debt is high and the elasticity $\mu$ is also high. Figure 4 illustrates the three possible situations. The IS still shifts down, but now the BP shifts down as well. The economy may settle in a point like A with higher output and investment (this is an economy that is vulnerable but not too much so); a point like B where there is a trade-off between investment and output; or a case like C where both output and investment decline. The last one is the case of unambiguously contractionary devaluation, and trying to use exchange rate and monetary policy for countercyclical purposes can only make matters worse.

The intuition of why devaluation can be contractionary is simple: with imperfect capital markets, balance sheets matter; if there are enough inherited dollar liabilities, the real depreciation worsens the balance sheet and increases the risk premium; in turn, this pulls down investment and aggregate demand; and if the

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6 The same is true of export shocks.
7 Notice the presence of financial imperfections in the determination of the size of the IS shift, as in expression. On the one hand, having $\mu > 0$ and large $\delta_1$ reduces the size of the vertical shift in the BP; on the other hand, a large $\mu$ increases the slope of the BP, which magnifies the equilibrium impact of any depreciation.
Figure 1. Fall in Exports

Figure 2. Increase in the World Interest Rate
standard demand-switching effects of devaluation are not sufficiently strong, the overall impact can be contractionary.

Again, notice that none of this could happen with perfect capital markets. In that case the BP is horizontal and shifts up after a real devaluation. The only possible outcome is an increase in both investment and output.

III. Conclusions

The analysis suggests that the currently fashionable conclusion that liability dollarization renders monetary policy useless, and fully justifies “fear of floating,” is much too simple. When balance sheet effects are not too strong, the model behaves qualitatively just like the standard one, though quantitatively the capital market imperfections magnify the effects of adverse external shocks. In that case, monetary and exchange rate policies have the same effects as in the textbook example.

With very imperfect international financial markets and large inherited dollar debts, matters are different. An unexpected real devaluation can depress both investment and output, justifying policymakers’ fears. The task ahead is to sort out when and how these circumstances arise. In previous work we have found that it takes unrealistically high steady-state debt ratios and risk premiums to generate the contractionary case, but researchers using more disaggregated models and alternative distributions for shocks may come to different conclusions. Putting imperfect credibility into the picture is also important: it is in short supply in the pampas, and it crucially affects the beneficial results of devaluation. Again, in a previous paper we found that imperfect credibility, even in the presence of balance sheet effects, does not overturn received wisdom on the desirability of flexible exchange rates and countercyclical monetary policy. But the issue surely remains open.

APPENDIX

For simplicity we assume only two periods, $t = 0, 1$, and focus on the effect of shocks only at the start of period 0.

Domestic Production

Production of each variety of domestic good is carried out by a continuum of firms acting as monopolistic competitors. These firms have access to a Cobb-Douglas technology given by

$$Y_{jt} = AK_j^\alpha L_j^{1-\alpha}, \quad 0 < \alpha < 1,$$

where $Y_{jt}$ denotes output of variety $j$ in period $t$, $K_j$ denotes capital input, and $L_j$ denotes labor input. Assume that workers’ labor services are heterogeneous. Input $L_j$ is a constant elasticity of substitution (CES) aggregate of the services of the different workers in the economy:

$$L_{jt} = \left[ \int_{0}^{1} \frac{\alpha}{\alpha - 1} \frac{L_j^\alpha}{L_j^{\alpha - 1}} dt \right]^{\alpha - 1},$$


where workers are indexed by \( i \) in the unit interval. \( L_{ji} \) denotes the services purchased from worker \( i \) by firm \( j \), and \( \sigma > 1 \) is the elasticity of substitution among different labor types. The minimum cost of a unit of \( L_i \) is given by

\[
W_i = \left[ \int W_i^{1-\sigma} \, di \right]^{\frac{1}{1-\sigma}}, \tag{A.3}
\]

which can be taken to be the aggregate nominal wage. The \( j \)th firm maximizes expected profits in every period. Profits are given by

\[
\Pi_j = P_j Y_j - \int W_i L_{ji} \, di - R_j K_j, \tag{A.4}
\]

where \( R_j \) is the return to capital, and profits are expressed in terms of the domestic currency (henceforth called *peso*), subject to the production function in equation (A.1) and the demand for its good

\[
Y_j^d = \left[ \frac{P_{ji}}{P_j} \right]^{\alpha} Y_j^d, \tag{A.5}
\]

where \( Y_j^d \) must be understood to include demand from domestic consumers and investors and foreign consumers. Cost minimization yields the demand for worker \( i \)'s labor:

\[
L_i = \left[ \frac{W_i}{W_i} \right]^{\alpha} L_i, \tag{A.6}
\]

where

\[
L_i = \frac{\int W_i L_{ji} \, di}{W_i}. \tag{A.7}
\]

Cost minimization also requires

\[
\frac{R_j K_j}{W_i L_i} = \frac{\alpha}{1-\alpha}. \tag{A.8}
\]

Finally, firms will set prices for their differentiated products as a constant markup over marginal cost. In the symmetric monopolistic competitive equilibrium, prices are set such that

\[
\varepsilon_{i,t} \left[ \frac{W_i L_i}{P_j Y_j} \right] = (1-\alpha) \left( \frac{P_{ji}}{P_j} \right)^{\alpha-1} \tag{A.9}
\]

where \( \varepsilon_{i,t}(z) \) denotes the expectation of \( z \) conditional on information available at period \( t \).

**Workers**

There is a continuum of workers, whose total "number" is normalized to one. The representative worker has preferences over consumption, labor supply, and real money balances in each period \( t \) given by

\[
\log C_t - \left( \frac{\sigma-1}{\sigma} \right) L^{\nu}_i + \frac{1}{1-\varepsilon} \left( \frac{M_t}{Q_t} \right)^{1-\varepsilon}, \tag{A.10}
\]

where \( \nu > 1 \) and \( \varepsilon > 1 \). The consumption quantity \( C_t \) is an aggregate of home and imported goods:

\[
C_t = \kappa (C_{ti}^h) (C_{ti}^p)^{1-\gamma}, \tag{A.11}
\]
where \( C^H_i \) denotes purchases of a basket of the different varieties of goods produced domestically, \( C^F_i \) purchases of the imported good, and \( \kappa = [\gamma (1 - \gamma)^{-1}]^{-1} \) is an irrelevant constant. Assume that domestically produced goods are aggregated through a CES function represented by

\[
C^H_i = \left[ \int_0^1 C^H_{ij} \, dj \right]^{\theta - 1}, \quad 0 > 1. \tag{A.12}
\]

Assume also that the imported good has a fixed price, normalized to one, in terms of a foreign currency, which we shall refer to as the dollar. Also, we assume that imports are freely traded and that the Law of One Price holds, so that the peso price of imports is equal to the nominal exchange rate of pesos per dollar.

Assume also that the only asset that workers can hold is money. Then, in every period \( t \), the \( i \)th worker's choices are constrained by

\[
Q_i C^H_i = P_i C^H_i + S_i C^F_i = W_i L_i + T_i - M_i + M_{i-1}, \tag{A.13}
\]

where \( P_i \) is the peso price of one unit of the basket of domestically produced goods, given by

\[
P_i = \left[ \int_0^1 P_1^{1-\theta} \, dj \right]^{\frac{1}{1-\theta}} \tag{A.14}
\]

and \( Q_i \) is the minimum cost of one unit of aggregate consumption, or CPI index:

\[
Q_i = P_i S_i^{1-\gamma}. \tag{A.15}
\]

Fiscal policy is as simple as can be: inflation tax revenues are rebated to workers through lump-sum transfers. Then,

\[
M_i - M_{i-1} = T_i, \tag{A.16}
\]

where \( M_i = \int_0^1 M_i \, dj \). This assumption ensures that, in the symmetric equilibrium, workers consume their nominal income:

\[
Q_i C_i = W_i L_i. \tag{A.17}
\]

Now, purchasing consumption at minimum cost requires

\[
\left( \frac{1 - \gamma}{\gamma} \right) C^H_i C^F_i = S_i \frac{E_i}{P_i}, \tag{A.18}
\]

where absence of the subscript \( i \) indicates that we have imposed symmetry in equilibrium. Additionally, we have defined \( E_i \) as the price of foreign goods in terms of domestic goods, or the real exchange rate.

Each worker will optimally supply labor to equate his marginal disutility of labor to its marginal return. Our assumptions on preferences then ensure that

\[
\varepsilon_{i-1} \{ L_i^* \} = 1 \tag{A.19}
\]

in equilibrium.

Now adopt the convention that no subscript indicates an initial period variable, while a subscript \( t \) indicates a final period variable. Money demands in periods 0 and 1 are given by

\[
\left( \frac{M}{Q} \right)^{\varepsilon} + \beta \frac{1}{C} \frac{Q}{Q_1} = \frac{1}{C} \quad \text{and} \quad \left( \frac{M_1}{Q_1} \right)^{\varepsilon} = \frac{1}{C_1}. \tag{A.20}
\]
Entrepreneurs

Entrepreneurs borrow from abroad in order to finance investment. They do it using dollar-denominated debt contracts which, due to imperfections in the financial markets, require paying a risk premium over the risk-free interest rate. Assume that entrepreneurs start with some inherited debt repayments, due at the end of the period, equal to $D$ in dollars. They also own a quantity $K$ of capital, which is used to produce the home good in period 0. After debt repayments, these entrepreneurs borrow from the world capital market in order to finance investment in excess of their own net worth.

Investment becomes capital in the next period and is produced by combining home goods and imports. For simplicity, we assume that capital is produced in the same fashion as in equation (A.11). Therefore, the cost of producing one unit of capital available in period 1 is $Q$. The entrepreneurs' budget constraint in period 0 is

\[ PN + SD_1 = QI, \tag{A.22} \]

where $N$ represents net worth, $D_1$ denotes the amount borrowed abroad in period 0, and $I = K_1$ investment in period 1 capital.

Net worth plays a crucial role because the interest cost of borrowing abroad is not simply the world safe rate $p$. Entrepreneurs borrow abroad paying a premium, $\eta$, above this risk-free interest rate. We assume that the risk premium is an increasing function in the ratio of the value of investment to net worth as in Bernanke and Gertler (1989). In particular, we assume the following functional form for this relation:

\[ 1 + \eta = \left( \frac{QI}{PN} \right)^\nu. \tag{A.23} \]

We assume that capital depreciates completely in production. In equilibrium, the expected yield on capital in dollars must equal the cost of foreign borrowing:

\[ \frac{R}{Q} = (1 + p)(1 + \eta) \left( \frac{S_1}{S} \right). \tag{A.24} \]

Given that entrepreneurs own local firms, the income that they receive is not only the payment to capital. They also receive the profits associated with the monopolistic power that each firm has. Entrepreneurs' net worth is

\[ PN = RK + \Pi - SD = PY - WL - SD, \tag{A.25} \]

where $\Pi$ reflects profits from the firms in pesos.

Equilibrium

Market clearing for the home goods require that domestic output be equal to demand. In period 0, the market for home goods will clear when

\[ Y = \frac{Q}{P} \left( I + C \right) + EX. \tag{A.26} \]

Notice that the term $EX$ stands for the home good value of exports to the rest of the world, where $X$ is exogenous.\(^6\)

\(^6\)This is similar to Krugman (1999) and can be justified by positing that the foreign elasticity of substitution across goods in consumption is one, and that the share of domestic goods in foreigners' expenditure is negligible. This last fact allows us to treat $X$ as exogenous.
Given that period 1 is the final period, there is no investment on it. Assuming that entrepreneurs consume only foreign goods, the market clearing condition for the second period is

\[ P_1 Y_1 = \gamma Q C_1 + E_1 P_1 X_1. \tag{A.27} \]

This last equation can be simplified further, since workers consume all their income each period:

\[ Y_1 = \tau E_1 X_1, \tag{A.28} \]

where \( \tau = [1 - \gamma (1 - \alpha) (1 - \theta^{-1})]^{-1} > 1. \)

**Linearization**

The next step consists in obtaining log-linear approximations around the equilibrium with no shocks. Start by noticing that equation (A.15) implies

\[ q_1 - p_1 = (1 - \gamma) (s_1 - p_1) = (1 - \gamma) e_1, \tag{A.29} \]

in both periods. Next derive equilibrium relations in period 1. The first relation is the log-linear version of equation (A.17),

\[ q_1 + c_1 = w_1 + y_1, \tag{A.30} \]

Equation (A.9) shows that wage income in period 1 is a fraction of the total revenue. Therefore,

\[ p_1 + y_1 = w_1 + l_1. \tag{A.31} \]

Combining these last three equations we obtain that

\[ c_1 = y_1 - (q_1 - p_1) = y_1 - (1 - \gamma) e_1. \tag{A.32} \]

Assuming no export shocks in period 1, the log-linear version of the market clearing condition for period 1 is

\[ y_1 = e_1. \tag{A.33} \]

Using these two equations together we obtain \( c_1 = \gamma e_1. \) Now, since under no shocks labor supply is fixed at one (recall the first-order condition for labor supply), we have \( y_1 = \alpha i. \) Combining this with (A.33) we have

\[ \alpha i = e_1. \tag{A.34} \]

Pulling together these results we arrive at

\[ c_1 = \gamma \alpha i. \tag{A.35} \]

We can now solve the model in the initial period. The log-linear version of the resource constraint in period 0 is

\[ \tau y + (1 - \tau) (q + c) = \lambda (q + i) + (1 - \lambda) (e + x), \tag{A.36} \]

where

\[ \lambda = \frac{\alpha Q i}{\alpha Q i + E X} < 1. \]

overbars denote no-shock values, and where, without loss of generality, we have set \( p = 0. \)

Given that capital is a predetermined variable in period 0, deviations of output from its no-shock equilibrium will be matched by changes in labor only:

\[ y = (1 - \alpha) i. \tag{A.37} \]
Log-linearizing equation (A.17) we have
\[ q + c = l \]  
(A.38)
since the nominal wage is preset. Combining these last two equations we have
\[ q + c = \frac{y}{1-\alpha} \]  
(A.39)
Replacing this last relation and equation (A.29) into (A.36) and reordering, we obtain the IS curve
\[ y = \tau[1 - \gamma(1 - \theta^{-1})]^\alpha \left[ \lambda + (1 - \gamma\lambda)e + (1 - \lambda)x \right]. \]  
(A.40)
which is equation (1) in the text. Now focus on the money market. Log-linearize money demand in each period, given by equations (A.20) and (A.21), which yields
\[ \varepsilon(m_l - q_l) = c_l \quad \text{and} \quad \varepsilon\omega(m - q) + (1 - \omega)(c_l + q_l - q) = c, \]  
(A.41)
where
\[ \omega = 1 - \beta \frac{QC}{Q_lC_l}. \]
Note that \( \omega \) is between 0 and 1 as long as the growth of nominal consumption is not too negative, which we assume from now on. Notice that \( \varepsilon^{-1} \) can be interpreted as the elasticity of money demand with respect to consumption expenditures. Using equations (A.35) and (A.39) to substitute out the consumptions, and rearranging, we have the LM schedule:
\[ m = \frac{y}{\varepsilon\omega(1 - \alpha)}(\varepsilon^{-1} - 1)(1 - \gamma)e - (\omega^{-1} - 1)e^{-1}\alpha i, \]  
(A.43)
which is equation 2 in the text. The final block of equations to be solved is the one associated with the entrepreneurs. The log-linear version of the arbitrage relation (equation (A.24)) is
\[ (r_1 - p_1) - q = \rho + \eta + e_i - s, \]  
(A.44)
while the log-linear version of A.8 is \( r_1 - p_1 = -i(1 - \alpha) \). Using this, (A.29) and (A.34) we have
\[ i = -(\rho + \eta) + \gamma e, \]  
(A.45)
which is equation (3) in the text. The log-linear version of the equation for the risk premium (A.23) is
\[ \eta = \mu(q + i - n), \]  
(A.46)
which, using (A.29), is equation (4) in the text. The log-linear version of the net worth equation (A.25) is
\[ n = \theta^{-1}[(1 - (1 - \alpha)(1 - \theta^{-1})]^\alpha(1 + \psi) \psi - \psi e, \]  
(A.47)
where
\[ \psi = \frac{ED}{N} > 0. \]
This is equation (5) in the text. Note that when \( \psi \) is large, initial debt is also large relative to net worth.
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Comment on
“IS-LM-BP in the Pampas”

MICHAEL DEVEREUX*

International macroeconomics has been profoundly affected by the emerging market crises of the 1990’s and the early part of this century. The crises have led economists to question conventional wisdom in many areas. For instance, the last few years have seen considerable revisionist thinking on the benefits of capital inflows, the primacy of fiscal imbalances in exchange rate crises, and the role of exchange rate adjustment in responding to external shocks.

Unfortunately, relatively little of this new literature has yet been absorbed into the language of policymaking. It is this deficit that the current paper attempts to correct. The authors have previously written a number of more technical papers exploring the effects of the “credit channel” in the macroeconomics of emerging market economies. This paper provides an exposition of the main messages of their papers in terms of a simple IS-LM-BP analysis, appealing to the universally known Mundell-Fleming apparatus. Unlike the Mundell-Fleming model, however, the present model does not lack microfoundations. But all the hard work is done in a lengthy appendix. The body of the paper is made extremely user-friendly, allowing readers to quickly absorb the main features of the model and then go on to do their own mental experiments within the framework. In terms of setting out an intuitive and elegant framework of analysis, the authors have been very successful.

While the main aim of the paper is to provide a textbook-friendly treatment of an open economy model with balance sheet constraints, a secondary aim is to evaluate if and how these constraints should alter our thinking about the benefits of exchange rate adjustment in emerging market economies.

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The paper combines features from a number of different literatures. From the open economy macro literature, it uses a sticky-price intertemporal model with endogenous investment dynamics. From the credit channel literature, it introduces financial frictions in the form of a risk premium that is sensitive to net worth relative to liabilities. From the crisis literature, it emphasizes the importance of foreign currency liabilities. The result is an integrated macro model in which the effects of a negative external shock operating through the effects on the endogenous risk premium can be examined. The results parallel those in Bernanke, Gertler, and Gilchrist (1999)—shocks tend to get magnified through the “financial accelerator” mechanism. In addition, the paper shows the possibility for a contractionary devaluation, if the negative effects of devaluation through increasing the risk premium outweigh the positive demand effects coming through an increase in competitiveness.

I. Is This the Right Picture?

Traditional textbook Mundell-Fleming analysis is done in interest rate output space. This paper also works in \( i - y \) space, but \( i \) is now investment, not interest rate. I find it somewhat easier to recast the model in a diagram with the risk premium on the vertical and output on the horizontal. Figure 1 shows how the IS and BP curves work under the “presumptive” case where the BP curve is flatter than the IS curve. Both curves are downward sloping, the IS curve because a fall in the risk premium reduces the real interest rate and raises investment and GDP. The BP curve slopes down simply because a rise in GDP increases net worth and reduces the risk premium. This perspective neatly shows the “magnification” effect introduced by the endogenous risk premium. At a given exchange rate, a rise in foreign demand shifts out the IS curve. In the standard analysis, this would raise demand and output at a given real interest rate. But in an economy where balance sheets matter, there is an endogenous fall in the risk premium, further stimulating investment and output.

This analysis can also easily illustrate the impact of a nominal exchange rate change. A nominal devaluation shifts both the IS and the BP curves upward. The devaluation is contractionary only if the BP curve shifts out by more than the IS curve. Unfortunately, the analysis of a floating exchange rate regime is not easy to do in the same diagrammatic terms. This is because the LM curve is also downward sloping in risk-premium/output space, and a movement in the exchange rate will shift all three curves simultaneously. This is true also of the \( i - y \) space analysis done in the paper. Since floating exchange rates seem like a natural starting point for policy evaluations with respect to emerging markets and balance sheet constraints, this limits the usefulness of the diagrammatic apparatus.

Finally, it should be noted that the model does admit some counterintuitive features. So far as it appears, there is no guarantee that the BP curve will actually cut the IS curve from below. It is possible for the BP curve to be steeper than the IS curve. In this case, it is an external demand expansion and is actually contractionary in output terms. While this outcome seems unlikely, it is not clear exactly what features of the model might allow this pathological case to be ruled out.

\(^1\)In fact, both loci should be centered at zero, but I find Figure 1 easier to interpret.
II. Is This the Right Model?

The key innovation of the model is to allow for an endogenous risk premium. The risk premium depends positively on the exchange rate and negatively on output. As in the Bernanke, Gertler, and Gilchrist approach, this risk premium behaves as a continuous function of the exchange rate and output. The risk premium therefore behaves smoothly in response to shocks to either variable. This is an appealing feature of the Bernanke and others model, because it allows them to do linear approximation and simulation. But I’m not convinced that this is a virtue for the analysis that the present authors want to do. This is because there is some reason to believe that the risk premium would behave very differently in the case of big shocks—i.e., a crisis time, than it would during normal times. Figure 2 illustrates HSBC bond spreads (in U.S. dollars) for Thailand, Korea, and Indonesia, beginning just after the Asian crisis. It is true that there seems to be a positive relationship between the exchange rate and the risk premium. But it is also striking that this relationship really only holds during the Asian crisis. In normal times, there seems to be little association between the two. It does not seem, from this figure, that the risk premium is a smooth function of the exchange rate.

How important is this distinction? Conceivably, it could be very important. Previous quantitative work by the authors (Céspedes, Chang, and Velasco, 2000), and also by Devereux and Lane (2001) suggests that, when calibrated to reasonable parameter values, the addition of the type of financial accelerator mechanism used in this paper, allowing for a smooth continuous risk premium, does not overturn any conventional wisdom about the benefits of exchange rate adjustment. The mechanism does magnify the response to shocks, but it does not nullify the role of the exchange rate in the adjustment process.
By contrast, alternative ways of modeling collateral constraints may lead to substantially different results. If credit constraints bind only occasionally, and with respect to large shocks, then it may benefit a country to try to stabilize its exchange rate to try to avoid these constraints. Mendoza (2000), and Aghion, Bacchetta, and Banerjee (2001) pursue this alternative approach. This modeling approach seems more consistent with the experience of emerging market economies. Crisis times are different from normal times. In a crisis, capital flows are subject to “sudden stops,” requiring a sharp turnaround in the current account, a large real exchange rate depreciation, and usually a big fall in GDP. Moreover, this seems to happen even in the absence of unusually large external shocks. The approach used in the present paper doesn’t seem able to generate the sudden-stop characteristic of crises, at least without very large shocks. This is not surprising in one sense. In the model of Bernanke and others, the risk premium is meant to capture moral hazard at the firm level. It is not clear that we can reinterpret the model to deal with systemic country risk exhibited during a crisis.

There may be alternative specifications of the risk premium, however, that would allow for the financial accelerator to work quite differently than in the present paper. One possibility is to pay more attention to the role of banks in investment financing in emerging markets. In the present setup, an exchange rate depreciation affects both the asset and liability side of entrepreneurs’ balance sheets. With foreign currency debt, an exchange rate depreciation increases liabilities. But because the exchange rate change (in the normal case) increases output, it increases net worth directly. In a recent paper, Choi and Cook (2001) develop a model quite similar to that of the present paper, save for the fact that investment financing is done by banks. Banks borrow in foreign currency and lend in domestic currency, in terms of noncontingent loans. In their framework, the effects of a devaluation are much less favorable, because there is no positive offset on banks’ balance sheets. The devaluation always reduces net worth. Choi and Cook show that a contractionary devaluation is the norm in their model.

Now I’d like to shift focus a little bit, away from the question of what type of collateral constraint is appropriate, toward the question of where the constraints should enter. In the present model, the balance sheet effects enter on the demand side. In response to a negative external shock, aggregate demand is lower than it would otherwise be, because there is a secondary increase in the risk premium, and investment falls. If constraints were only important on the demand side, then we would expect that a crisis event would be associated with a collapse in the output of domestic, or nontraded, goods but would not impinge directly on exportable, or traded, goods, since their production is limited only by world demand. In fact, during a crisis, the real depreciation following a current account reversal should lead to a fall in the real cost of production of traded goods, stimulating a boom in that sector.

The evidence tends to sharply contradict this, however. Figure 3 shows that for Thailand, Korea, and Indonesia, the Asian crisis led to sharp contractions in both traded and nontraded output, at least in the immediate aftermath of the crisis. This suggests that, to the extent that balance sheets were important, it was on the supply side rather than the demand side. Devereux and Lane (2002) develop an emerging market model in which balance sheet constraints limit the access to trade...
Michael Devereux

Figure 3a. Thailand

13.1

13.0

12.9

12.8

12.7

12.6

12.5 +--------------------,------\---------,--------------\------

Mar-97 Sep-97 Apr-98 Nov-98 May-99 Dec-99 Jun-00 Jan-01

Figure 3b. Korea

11.4

11.2

11.0

10.8

10.6

10.4

10.2 -Tradable

9.8

9.6

9.4

9.2

9.0

8.8

Tradable

Nontradable
credit that is available to exporting firms. As a result, a sharp devaluation may generate a fall in the output of traded goods. From anecdotal evidence during the Asian crisis, the problems associated with trade financing seem to have had an important role in the propagation of the crisis.

III. Conclusions

Overall, I think this paper makes a worthwhile contribution to the debate over the right way to think about macroeconomic policy in emerging markets. It is pitched at a level that makes the issues accessible to all. My ultimate concern is that it does not really contribute to our understanding of crises or "sudden stops." In emerging market economies, however, crises and sudden stops have dominated the macroeconomic environment over the last decade.

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Securities Transaction Taxes and Financial Markets

KARL HABERMEIER and ANDREI A. KIRILENKO

We consider the impact of transaction taxes on financial markets in the context of four questions. How important is trading? What causes price volatility? How are prices formed? How valuable is the volume of transactions? Drawing on the literature on market microstructure, asset pricing, rational expectations, and international finance, we argue that securities transaction taxes "throw sand" not in the wheels, but into the engine of financial markets. We conclude that transaction taxes can have negative effects on price discovery, volatility, and liquidity and lead to a reduction in the informational efficiency of markets. JEL G13, G14, H10

This paper argues that transaction taxes can have negative effects on price discovery, volatility, and market liquidity in securities markets. These effects can lead to a reduction in market efficiency and may contribute to increased asset price volatility.

Financial markets transform latent demands of investors into realized financial transactions. Securities transaction taxes (STTs) alter this transformation. Proponents of STTs argue that such taxes can reduce market volatility, help to prevent financial crises, and reduce excessive trading. Opponents believe that STTs are difficult to implement and enforce and that they can do great damage to financial markets.


†For example, Eichengreen, Tobin, and Wyplosz (1995) argue that "transaction taxes are one way to throw sand in the wheels of super-efficient financial vehicles."
This paper considers the impact of transaction taxes on financial markets in the context of four broad questions. How important is trading? What causes price volatility? How are prices formed? How valuable is the volume of transactions? These questions are at the core of the debate on the role of transaction taxes. Our arguments draw on research on market microstructure, asset pricing, rational expectations, and international finance.

Market microstructure studies suggest that trading is essential for price discovery—the process of finding market clearing prices. A large number of markets rely on dealers to provide price discovery as well as liquidity and price stabilization. Levying STTs on the dealers inhibits their ability to assist investors with the transformation of latent demands into realized transactions. The literature also finds that much of the volatility is caused by informed traders as their information is aggregated into transaction prices. Taxing financial transactions does not reduce the volatility due to "noise" trading. Rather, it introduces additional frictions into the price discovery process.

The literature on option pricing under transaction costs shows how frictions on the trading in one asset affects prices and volumes of that and other assets. Using a simple framework based on this literature, we demonstrate how volume can migrate to the assets that are not subject to the tax. We also argue that it is very difficult to design and implement a tax that does not favor one portfolio of assets over another portfolio with exactly the same payoff.

Recent studies on rational expectations question the traditional view that volume is just an outcome of the trading process and is not valuable per se. These studies find that volume can play an informational role. Consequently, if transaction taxes cause volume to migrate, then they can hamper the informational efficiency of markets.

International finance provides other interesting examples of volume fragmentation and market segmentation. Volume fragmentation can occur due to restrictions on trading of substitutable securities such as different classes of company shares. This leads to market segmentation and inefficient price discovery.

Many of the issues that arise in the debate over STTs are also relevant to the debate on controls on international capital flows. Indeed, a number of controls on capital flows have taken the form of STTs—for example, the Chilean unremunerated reserve requirement on capital inflows.

I. Literature on Securities Transaction Taxes

Opinion is divided on the merits of securities transaction taxes. Many proponents of STTs advance the following propositions:2

- The contribution of financial markets to economic welfare does not justify the resources they command. During a given time period, the resources that change hands in financial markets far exceed the value of the underlying or "real" transactions.

2See, for example, Tobin (1984), Summers and Summers (1989), Stiglitz (1989), and Eichengreen, Tobin, and Wyplosz (1995).
SECURITIES TRANSACTION TAXES AND FINANCIAL MARKETS

• Many financial transactions are highly speculative in nature and may contribute to financial or economic instability.

• Market instability, including crashes, enriches insiders and speculators, while the costs are borne by the general public.

• Financial market activity increases inequalities in the distribution of income and wealth.

• SITs can be an important and innovative source of revenue for the financing of development.

From this perspective, it is argued by some that governments ought to tax financial transactions in order to discourage destabilizing speculation that can threaten high employment and price stability, as well as to raise revenue. Higher rates—they argue—should be levied on short-term transactions, since these seem to benefit primarily market intermediaries and not “real” users. The massive volume of financial transactions in well-developed modern markets would—they reason—allow substantial revenue to be raised by imposing very low tax rates on a broad range of transactions. It is not surprising that a number of governments around the world have succumbed to this temptation, all the more so as such taxes have a certain popular appeal.

Opponents of SITs have more faith in the ability of markets to allocate resources efficiently without direct intervention from public policy. However, the opponents also lack a convincing argument to justify the volume of resources flowing through financial markets. In addition, numerous documented anomalies, as well as a history of market crashes, do not lend themselves easily to the idea that financial markets are fully efficient. Neither does the fact that market participants devote considerable resources to analyzing previous transaction prices and volumes. Thus, instead of showing that the allocation of resources to the financial sector is justified on efficiency grounds, or that observed market volatility is optimal, the opponents of SITs have focused on practical shortcomings of the taxes themselves.3

There are two dimensions to the difficulties in implementing SITs. First, if an SIT is applied in one financial market but not in others, the volume of transactions tends to migrate from the market that is taxed to markets that are not. Effective enforcement of SITs thus requires either a cross-market and perhaps even a global reach or measures to segregate markets. For example, tax authorities in one country may attempt to require payment of the tax on transactions made by their residents not only in financial markets within their own borders, but in other markets as well. Alternatively, they may impose controls on cross-border financial transactions, for example, the Chilean tax on capital inflows.

Second, since the composition of the assets used in financial transactions matters less than the distribution of payoffs over time and in uncertain states of the world, the tax base must be defined as a function of the final payoff rather than the assets employed. A securities transaction tax would be considered neutral if it did not favor one portfolio of assets over another portfolio with exactly the same payoff. Since payoffs can be replicated by portfolios consisting of different types of

3See, for example, Campbell and Froot (1995).
assets, the imposition of an STT can create a greater distortion than it is trying to mitigate. Instead of trading less because of the tax, investors may transact more in assets that are taxed at a lower rate or not taxed at all. As a result, real resources devoted to financial transactions may in fact increase rather than diminish following the imposition of an STT.

Given the lack of a consensus on the theory, there have been many attempts to resolve the debate empirically. However, empirical studies undertaken so far have not been able to decisively resolve the debate on the effects of transaction taxes on financial markets.

Empirical research has encountered three major problems. First, the effects of taxes on prices and volume are hard to disentangle from other structural and policy changes taking place at the same time. Therefore, estimates based on the assumption that everything else in the economy is held constant are potentially biased.

Second, it is difficult to separate transaction volume into stable (or “fundamental”) and destabilizing (or “noise”) components. Thus, it is hard to say which part of the volume is more affected by the tax.

Third, it is hard to differentiate among multiple ways in which transaction taxes can affect asset prices. These ways include changes in expectations about the impact of the taxes, the cost of creating and trading in close substitutes not covered by the tax, and changes in market liquidity.

Empirical studies seek answers to three main questions. The first question is whether transaction taxes have an effect on price volatility. Roll (1989) studies stock return volatility in 23 countries from 1987 to 1989. He finds no evidence that volatility is reliably related to transaction taxes. Umlauf (1993) studies equity returns in Sweden during 1980–87, before and during the imposition of transaction taxes on brokerage service providers. He finds that the volatility did not decline in response to the introduction of taxes. Saporta and Kan (1997) study the impact of the U.K. stamp duty on volatility of securities’ prices. They also find no evidence of a relationship between the stamp duty and volatility. Jones and Seguin (1997) examine the effect on volatility of the introduction of negotiated commissions on U.S. national stock exchanges in 1975, which resulted in a permanent decline in commissions. They argue that this event is analogous to a one-time reduction of a tax on equity transactions. They reject the hypothesis that the lowering of commissions increases volatility. Hu (1998) examines the effects on volatility of changes in transaction taxes that occurred in Hong Kong, Japan, Korea, and Taiwan from 1975 to 1994, and does not find significant effects. Finally, Hau and Chevalier (2000) examine the effect on volatility of minimum price variation rules in the French stock market. They argue that minimum price variation rules result in a doubling of transaction costs for stocks priced above a certain threshold (500 francs). They argue that this is analogous to the application of a transaction tax on the stocks above the threshold. They find that the increase

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4Honohan (2003) gives a comprehensive overview of the difficulties in designing an optimal tax system for the financial sector.

5A collective volume published by the Catalyst Institute in 1995 reviews most of the empirical research on financial transaction taxes. Empirical studies since 1995 have sought to address similar issues by using other datasets.
in transaction costs results in "a statistically significant, but economically insignifi­
cant" reduction in the daily, weekly, and monthly return volatility.

The second question is whether transaction taxes affect trading volume. Umlauf (1993) reports that after Sweden increased its transaction tax from 1 percent to 2 percent in 1986, 60 percent of the volume of the 11 most actively traded Swedish stocks migrated to London. The migrated volume represented over 30 percent of all trading volume in Swedish equities. By 1990, that share increased to around 50 percent. According to Campbell and Froot (1995), only 27 percent of the trading volume in Ericsson, the most actively traded Swedish stock, took place in Stockholm in 1988. Hu (1998) examines 14 tax changes in four Asian markets and finds that differences in turnover before and after changes in the tax level are not statistically significant.

Thirdly, empirical studies seek to find out whether transaction taxes have an impact on securities' prices. Umlauf (1993) reports that the Swedish All-Equity Index fell by 2.2 percent on the day a 1 percent transaction tax was introduced and again by 0.8 percent on the day it was increased to 2 percent. Saporta and Kan (1997) find that on the day stamp duty in the United Kingdom was increased from 1 to 2 percent, the stock market index declined by 3.3 percent. Hu (1998) finds that on average the return on the announcement date is -0.6 percent in Korea and -1.6 percent in Taiwan, with the result for Taiwan being highly statistically significant.

One of the main reasons for the dispersion and inconclusiveness of results is the lack of appropriate data. Since the questions are essentially of the market microstructure-type, an ideal dataset would consist of transaction frequency data for individual financial instruments. In order to take revisions in expectations into account, the data should start well before the announcement of the transactions tax and include a sufficient number of observations following its imposition. Furthermore, in order to separate volume into meaningful categories, the data should be broken down according to the type of investor, for example, institutional investors, hedge funds, and mutual funds. In contrast, most empirical studies rely on weekly equity index returns.

II. The Swedish Experience

In order to illustrate the subsequent arguments, we devote this section to a brief description of the Swedish experience with STTs. The Swedish experiment lasted for more than eight years. The first measure was announced in October 1983 and the last one was abolished in December 1991. The analysis in this section is based on the studies by Umlauf (1993) and Campbell and Froot (1995).

The initiative to impose financial transaction taxes came from the Swedish labor sector in 1983. The labor sector did not claim that trading in financial markets led to inefficient outcomes. Rather, according to Umlauf (1993), in the opinion of the labor sector, "the salaries earned by young finance professionals were unjustifiable . . . in a society giving high priority to income equality," especially given the seemingly unproductive tasks that they performed. On this basis, the Swedish labor sector proposed to levy taxes directly on domestic brokerage service providers.
Despite the objections of the Swedish Finance Ministry and the business sector, popular support led to the adoption of taxes by Parliament. The taxes became effective on January 1, 1984. They were levied on domestic stock and derivative transactions. Purchases and sales of domestic equities were taxed at 0.5 percent each, resulting in a 1 percent tax per round trip. Round-trip transactions in stock options were taxed at 2 percent. In addition, exercise of an option was treated as a transaction in the underlying stock and, thus, was subject to an additional 1 percent round-trip charge. The tax coverage and rates reflected a popular perception about the "usefulness" of transactions in different financial instruments, with those involving equity options being the least "useful."

Continuing pressure from the labor sector compelled the Parliament to double the tax rates in July 1986 and broaden its coverage in 1987. Furthermore, following large losses in interest futures and options (most notably by the city of Stockholm, which lost SEK 450 million), the tax was extended to transactions in fixed-income securities, including government debt and the corresponding derivatives in 1989.\(^6\) The maximum tax rate for fixed-income instruments was set at 0.15 percent of the underlying notional or cash amount. In addition, the tax was designed to be "yield-neutral," with longer maturities instruments being taxed at progressively higher rates.

The revenue performance of the tax was disappointing. According to the Finance Ministry of Sweden, the government collected SEK 820 million in 1984, SEK 1.17 billion in 1985, and SEK 2.63 billion in 1986. This accounted for 0.37, 0.45, and 0.96, respectively, percent of the total revenue for the corresponding years. After doubling the tax rates, the government was able to collect SEK 3.74 billion in 1987 and SEK 4.01 billion in 1988. This accounted for 1.17 and 1.21 percent of the total revenue.\(^7\) Thus, a 100 percent increase in the tax rate resulted in a 22 percent increase in revenue.

Widespread avoidance was one reason for the weak performance of the tax. Foreign investors avoided the tax by placing their orders with brokers in London or New York. Domestic investors avoided it by first establishing offshore accounts (and paying the tax equal to three times the round-trip tax on equity for funds moved offshore) and then using foreign brokers.

The scale of avoidance was manifested by a massive migration of stock trading volume from Stockholm to other financial centers. Since the brokerage business is very competitive, finding a close substitute for brokerage services offshore was not very costly. According to Umlauf (1993), following the doubling of the tax, 60 percent of the volume of the 11 most actively traded Swedish stocks migrated to London. The migrated volume represented over 30 percent of all trading volume in Swedish equities. By 1990, that share increased to around 50 percent. According to Campbell and Froot (1995), only 27 percent of the trading volume in Ericsson, the most actively traded Swedish stock, took place in Stockholm in 1988.

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\(^6\) Officially, the extension of the tax to fixed-income instruments was supposed to achieve "neutrality" with the tax on equity transactions. See Campbell and Froot (1995).

\(^7\) By contrast, tobacco taxes accounted for 1.26 and 1.37 percent of the total revenue collected in 1987 and 1998, respectively.
Broadening the tax to fixed-income instruments resulted in a sharp drop in trading volume in Swedish government bills and bonds and in fixed-income derivatives contracts. Campbell and Froot (1995) estimate that during the first week of the tax, bond trading volume dropped by about 85 percent from its average during the summer of 1987 and trading in fixed-income derivatives essentially disappeared. This significantly undermined the ability of the Bank of Sweden to conduct monetary policy, made government borrowing more expensive, and eroded both popular and political support for the tax. Taxes on fixed-income instruments were abolished in April 1990. Taxes on other instruments were cut in half in January 1991 and abolished altogether in December 1991.


The Swedish experience highlights the following points. First, investors avoid the tax by finding or creating close substitutes. Since the brokerage business is very competitive, finding a close substitute for brokerage services offshore was not very costly. However, the markets do not necessarily move offshore, if close substitutes are available domestically. For example, trading in bonds did not move offshore, but shifted to debentures, forward contracts, and swaps. Second, markets suffer greatly following the imposition of the tax. Even very low tax rates on fixed-income instruments led to an 85 percent decline in volume in the first week after the tax was imposed compared to its pre-tax average. The fixed-income options market virtually disappeared. Third, after the removal of the tax, the trading volume gradually comes back across all previously taxed assets.

III. How Important Is Trading?

The Swedish labor sector believed that trading in financial markets is an essentially unproductive task. Just how important is trading? The answer to this question depends on how the trading is conducted. In Sweden, investors had to carry out financial transactions mostly through dealers.

However, trading does not have be conducted exclusively through dealers. It can be done through other mechanisms. For example, in continuous electronic auctions, buyers and sellers trade directly with each other, bypassing the dealers. Why didn’t such an auction develop in Sweden? In fact, under the law, transactions executed without dealers were exempt from taxes.

According to the market microstructure literature, under some circumstances, dealers offer services that cannot be provided by other types of market designs at lower cost. It is especially true for infrequently traded assets such as most of the Swedish stocks. Perhaps for that reason the order flow migrated not to another trading design but to dealers in London and New York.

Dealers provide several important services. They provide liquidity and assume substantial risks by contributing their own capital. Accordingly, they demand
adequate compensation for the provision of liquidity and the capital that they put at risk. The dealer's compensation is higher for illiquid assets.

In addition, dealers who act as market makers in particular securities must furnish competitive bid and offer quotations on demand and be ready, willing, and able to effect transactions in reasonable quantities at the quoted prices. In other words, a buyer does not have to wait or look for a seller, but can simply buy from a dealer who sells from his inventory. According to Pagano and Roell (1990), "this implies that, in contrast with what happens on auction markets, traders are insured against execution risk, i.e., the risk of finding few or no counterparties to trade." The dealer's compensation is higher for assets with a higher execution risk.

This highlights another important function that dealers play, namely, the provision of price stability. According to Madhavan (2000), "the presence of market makers who can carry inventories imparts stability to price movements through their actions relative to an automated system that simply clears the market at each auction without accumulating inventory."

The provision of liquidity, price discovery, and price stabilization requires inventory management. Inventory management is achieved through the buying and selling of securities. Hasbrouck and Sofianos (1993) examine a set of quote, trade, and inventory data for market makers (specialists) on the New York Stock Exchange. According to their data, the market maker's activity (both purchases and sales) averages to about 26 percent of the total transaction flow (also both purchases and sales). For the most frequently traded stocks, this number is 20 percent, while for the least frequently traded stocks, it rises to 38 percent. Thus, dealers become much more important as liquidity providers in less frequently traded stocks.

Inventory management can involve both customer and interdealer trading. When a competitive interdealer market is available, dealers can adjust their inventory without waiting for a public order flow to arrive. According to the empirical evidence, dealers trade in the interdealer market when they want to manage large inventory positions. Lyons (2001) suggests that interdealer trading in the foreign exchange market currently accounts for about two-thirds of the total volume. Hansch, Naik, and Viswanathan (1998) show that the average size of an interdealer trade on the London Stock Exchange is much larger than the average size of a trade with the general public. They also show that inventory levels at which dealers trade among themselves are about twice as large as those at which they trade with the general public. They find that 38 percent of the variation in interdealer trading is explained by variation in inventory levels. They conclude that "interdealer trading is an important mechanism for managing inventory risks in dealership markets."

Thus, trading is important. It helps manage risks. Dealers demand compensation for the services that they provide and the risks that they take. If trading becomes costly as a result of transaction taxes, dealers cannot manage their risks effectively. Accordingly, they become less willing to put their own capital at risk in order to provide liquidity. Investors cannot carry out their desired trades, their latent demands are not fully satisfied, and resources are not allocated to their best uses.

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8The statistics are calculated by taking the participation rates reported in the paper as a fraction of 50 percent, the rate that implies that the market maker is a counterparty to all trades.
IV. What Causes Volatility?

In the previous section we argue that trading is important. But can it also be the cause of volatility?

French and Roll (1986) conduct an empirical study of the variability of stock returns over trading and nontrading periods. Using data for all stocks listed on the NYSE and AMEX for the period 1963 to 1982, they find that on an hourly basis, the variance of stock returns is between 13 and 100 times larger when markets are open for trading than the variance when the markets are closed, depending on the definition of nontrading period.

They investigate three possible causes for the higher volatility during trading hours. First, higher volatility may be caused by the arrival of more public information during trading hours. Second, it may be caused by informed investors as their private information is incorporated into prices. Finally, higher volatility may be caused by the process of trading itself as prices fluctuate due to market frictions and transaction costs.

They also find that the process of trading accounts for at most 12 percent of the daily return variance. The rest of the variance is attributable to the arrival of public and private information during trading hours. While they cannot directly decompose the effects of public and private information on volatility, they conduct a test that suggests that most of the variability in stock returns can be attributed to the arrival of private information during trading hours.

Later studies relied on much more refined transaction-level data to further decompose transaction price volatility. Madhavan, Richardson, and Roomans (1997) develop a stylized, reduced-form model of price volatility and use transaction-level, intraday data on 274 NYSE-listed stocks during 1990 to estimate it.

They argue that price volatility can be explained by the variability of four components: public information, private information, transaction costs, and other market frictions (price discreteness). They estimate that the impact of public information accounts for 46 percent of volatility in the beginning of the trading day and 35 percent at the end. The impact of private information (including the interaction between cost and private information effects) drops from 31 percent in the morning to 26 percent at the closing of trading. Variability in transaction costs increases from 22 percent at the opening to 35 percent at the end of the trading day. Finally, price discreteness accounts for the remaining 1 to 4 percent at the beginning and the end of the trading day, respectively.

Transaction costs in the Madhavan, Richardson, and Roomans (1997) model capture dealers’ costs for supplying liquidity on demand. They include compensation for inventory costs, putting their capital at risk, and other transaction costs. The model implies that other things being equal, higher transaction costs increase volatility. If transaction costs also include transaction taxes, then introduction of STTs can result in higher rather than lower volatility of transaction prices.

V. How Are Prices Formed?

In perfect, frictionless markets, asset prices immediately reflect all available information. As the new information arrives, investors rebalance their portfolios of
assets. The rebalancing results in an updated set of prices. In the absence of transaction costs, the rebalancing can be done continuously and price discrepancies are eliminated instantaneously. However, in real markets, agents face transaction costs. The presence of even very small transaction costs makes continuous rebalancing infinitely expensive. Therefore, valuable information can be held back from being incorporated into prices. As a result, prices can deviate from their full information values.

The dissatisfaction with the assumption of continuous portfolio rebalancing was the starting argument for the literature on the replication of assets under transaction costs. The literature recognizes that continuous rebalancing is not feasible and formulates discrete rebalancing under transaction costs.

In this section, we study the impact of STTs on portfolio rebalancing and price formation.

A Simple Example

Consider a simple two-period example (following Hull, 1985). There are three assets in the market: a risk-free bond yielding 12 percent per year, a nondividend paying stock, and a call option on the stock. The starting price of each share of stock is equal to $20. After a year, we assume that the stock price will either have increased to $22 or fallen to $18, with equal probability. The strike price of the option at the end of the year is taken to be $21.

Simple option pricing theory can be employed to compute in what proportions a call option and a risk-free bond must be held in order to be equivalent to 100 shares of stock. As shown in the Appendix, on the assumptions given, this portfolio requires exactly 400 options (worth $0.63 each) and $1,747 of the bond.

But a 1 percent transaction tax on buying or selling the stock greatly lowers the value of the option, as a tax of $0.22 will have to be incurred twice if the option is exercised and the stock then sold. Working through the arithmetic reveals that the option is only worth $0.39 and that now 694 options must be bought (along with $1,728 worth of bonds) to match 100 shares.

If the transaction tax is also levied on option transactions, or on bonds, there is a further change in the required number of options in the portfolio to replicate the shares, but in these cases the changes are very small. Thus extending the transaction tax to all three assets certainly does not restore neutrality.

Note that even in this simple example, it is quite difficult to design and even more difficult to implement a tax that does not favor one portfolio of assets over another portfolio with exactly the same payoff (e.g., a stock versus a bond and a call option). A uniform transaction tax is not payoff-neutral. For a tax to be payoff-neutral, the tax rates must be such that a change in the value of a replicating portfolio is exactly equal to the change in the price of the underlying asset. In other words, the tax rates must depend on the “delta” of the replicating portfolio. Since in practice, “delta” changes as more information is revealed about the (unknown) underlying stochastic process, a payoff-neutral tax would have to be frequently adjusted. This would make it very difficult to implement.
A Generalized Model

Boyle and Vorst (1992) have generalized the simple two-period example to a multi-period case using a method proposed by Cox, Ross, and Rubinstein (1979), who assumed a dynamic price process according to which, during each subperiod of length $\Delta t$, the stock price increases by a factor $\Theta = \exp\{\delta \sqrt{\Delta t}\}$, with probability $p$; otherwise it decreases by the same multiplicative factor.

Boyle and Vorst show that, under simplifying assumptions, the call option can still be priced after the introduction of transaction costs by adding to the variance an amount fraction that is positively related to the rate of the transaction cost or tax and inversely related to the length of the rebalancing period.9 Specifically, if $\delta^2$ is the original variance, the modified variance, $\hat{\delta}^2$, is given by,

$$\hat{\delta}^2 = \delta^2 \left(1 + k \frac{2}{\delta \sqrt{\Delta t}}\right)$$

(1)

where $k$ is the rate of transaction cost.10

VI. How Valuable Is the Volume of Transactions?

According to the example presented in the previous section, demand for assets changes following the introduction of a transaction tax on a stock. The demand for derivatives goes up and the demand for both stocks and bonds decreases. Changes in demand translate into changes in the volume of realized transactions. Was anything lost as a result of this change in volume? Does it matter if transaction volume migrates to other instruments, markets, or countries? It does not, if the volume is not valuable. But how valuable is the volume of realized transactions?

According to standard rational expectations models with supply uncertainty, trading orders have both informational (or “signal”) and “noise” components. Without the noise, aggregate supply uncertainty is resolved, and prices adjust to their full information level. Otherwise, the informational component is aggregated into prices and the “noise” is left in volume. Consequently, volume is just an outcome of the trading process. It does not have any information about the fundamentals or the trading process and, therefore, lacks value.

According to this view, the migration of volume to other instruments, markets, or countries does not result in any loss of value or efficiency. It just means a reallocation of supply uncertainty. In other words, if transaction volume moves from Stockholm to London, investors in Stockholm become exposed to less uncertainty associated with “noise” trading and investors in London to more of it. Thus, if following the imposition of a transaction tax, volume migrates away from the taxed

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9 Reinhart (2000) argues that the introduction of STTs may also make asset prices more variable in the general equilibrium setting.

10 Leland (1985) develops an extension to the Black-Scholes continuous-time model and shows how to modify the variance in order to price call options in the presence of transaction costs. In Leland’s model, the variance increases in the presence of transaction costs, reflecting the discontinuous rebalancing of portfolios necessitated by transaction costs.
asset, the policymakers should perhaps just change their revenue projections and not worry about any fundamental market effects.

The long-held view that volume is not valuable per se has recently come under scrutiny. Blume, Easley, and O’Hara (1994) investigate the informational role of volume. In their model, the source of “noise” is not supply uncertainty, but the precision of private information about the signal. Prices aggregate information about the average level of private information. Trading volume contains information about the precision of individual private signals. Thus, volume does not just contain “noise,” but has a nontrivial informational role to play. Price-volume sequences are more informative than prices alone. This role becomes especially important for infrequently traded stocks that often do not get much analyst coverage.

In addition, Easley, O’Hara, and Srinivas (1998) investigate the informational role of transaction volume in options markets. They develop a model where informed traders can trade in stock or options markets. They empirically test the model and find that option volume data contain information about future stock prices. Thus, they conclude that “volume plays a role in the process by which markets become efficient.” Consequently, a migration of volume from the derivative market may also result in the loss of informational efficiency.

This new view represents a fundamentally different perspective on the role of volume. It can be summarized as saying that “volume matters.” The migration of volume results in lower informational efficiency of instruments and markets from which it migrated. If transaction taxes cause the volume to migrate, then they do affect the ability of markets to aggregate information and prevent a more efficient allocation of resources.

VII. Evidence from International Finance

The international finance literature provides examples of market segmentation and execution costs in different markets. Market segmentation can result from direct restrictions on foreign ownership, exchange and capital controls, and regulatory and accounting aspects including disclosure rules, settlement practices, and investor protection rights. Bekaert (1995) studies 19 emerging markets and finds that exchange and capital controls (and taxes that have a similar effect) as well as regulation and accounting practices are significant in explaining market segmentation. Restrictions on foreign ownership are apparently being circumvented by the closed-end country funds.

Domowitz, Glen, and Madhavan (2000) use a comprehensive database of execution costs (including transaction taxes) for 42 countries from September 1996 to December 1998. They use panel data techniques to study the interaction between cost, liquidity, and volatility across countries and through time.

They find that except for North America, explicit equity trading costs such as brokerage commissions, taxes, and fees account for about two-thirds of total execution costs. In the United States average explicit one-way trading costs are the smallest for the countries in their study, accounting for 8.3 basis points or a fraction of 2.2 percent of mean return (374 basis points) for the period 1990–98. In other words, a complete rebalancing of the portfolio once a year results in an aver-
The largest explicit cost of 106 basis points is in Ireland, which has a stamp duty of 1 percent. In Ireland, the explicit costs of turning over a portfolio of equities just once a year accounts for a full 25 percent of the annual mean return.

They also find that over time, with the exception of transition economies, costs have generally declined, and that higher trading costs are positively related to increased volatility and lower volume.

VIII. Securities Transaction Taxes and Controls on International Capital Flows

There is an important similarity between securities transaction taxes and controls on international capital flows. Such flows are the result of financial transactions that involve parties who happen to be on different sides of national borders. Such transactions can in principle be subject to general taxes on financial transactions or to taxes that specifically target cross-border transactions. Capital controls may differ substantially in the types of transactions they apply to: inflows versus outflows, short-term versus long-term, all markets or assets, or only a subset of them.\footnote{Ariyoshi and others (2000) provide a detailed review of the literature.}

The arguments in favor of capital controls overlap to some extent with those advanced in favor of domestic securities transaction taxes, notably in that they are often seen as a policy response to financial market imperfections arising from informational asymmetries and other microeconomic distortions. However, the debate on capital controls has more strongly emphasized their use in macroeconomic policy, as a means of reconciling conflicting monetary and exchange rate policy objectives, or in preventing and managing balance of payments and financial crises, either by seeking to discourage volatile short-term inflows that could later be reversed, or by seeking to stem outflows during a crisis.

Probably the best-known example of a tax on short-term international capital flows is the Chilean \textit{encaje}, or unremunerated reserve requirement on capital inflows. As with securities transaction taxes more broadly, there is evidence of substantial avoidance of this and other types of capital controls, which notably reduced their effectiveness and created various distortions in financial markets. More recently, Forbes (2002) shows that the Chilean tax on capital inflows increased financial constraints for small firms.

IX. Summary and Conclusions

This paper examines finance research relevant to assessing the impact of securities transaction taxes on financial markets. This research includes work on market microstructure, asset pricing, rational expectations, and international finance. We conclude that in most circumstances, transaction taxes can have negative effects on price discovery, volatility, and liquidity and lead to a reduction in market efficiency.
The arguments made in this paper may be summarized as follows. First, in dealership markets, trading facilitates the provision of liquidity, price discovery, and price stabilization. Trading also helps to manage risks. If investors cannot carry out their desired trades, their latent demands are not fully satisfied and resources are not allocated to their best use.

Second, price volatility can be explained by the variability of four components: public information, private information, transaction costs, and other market frictions. Other things being equal, higher transaction costs increase volatility. Consequently, the introduction of STTs can increase the volatility of transaction prices.

Third, a simple theoretical framework based on the literature on option pricing with transaction costs shows that following the introduction of a transaction tax, the demand for derivatives can increase substantially. Moreover, it is difficult to design and implement a tax that does not favor one portfolio of assets over another portfolio with exactly the same payoff.

Fourth, if transaction volume has an informational content, then a migration of volume would result in lower informational efficiency of instruments and markets from which it migrated. If transaction taxes are the cause of volume migration, then they can inhibit the informational efficiency of markets.

Finally, the international finance evidence on market segmentation and execution costs in different markets suggests that except for North America, explicit equity trading costs such as brokerage commissions, taxes, and fees account for about two-thirds of total execution costs. The conclusion was that higher trading costs, some of which are due to STTs, are positively related to increased volatility and lower volume. The paper also briefly summarizes similarities between securities transaction taxes and controls on international capital flows.

Transaction taxes can thus have a substantial effect on the transformation of investor demands into transactions. STTs can obstruct price discovery and price stabilization, increase volatility, reduce market liquidity, and inhibit the informational efficiency of financial markets.

**APPENDIX**

**Working Through the Numerical Example**

In order to compute the portfolios in Section V's example, we begin by choosing a number of shares $\delta$ so that holding that number of shares and selling 100 call options provides a risk-free portfolio, that is, one that has the same value whether the share goes up or down. Since the value of option at maturity when it is "in the money" is exactly $1 (since then the option allows the share to be bought at the strike price of 21 and sold at 22), $\delta$ must satisfy:

$$22 \delta - 100 = 18 \delta.$$  \hspace{1cm} (A.1)

The solution to this equation is $\delta = 25$. The value of this portfolio at the end of the year will be $18 \delta = 450$, which equals $437$ discounted to the present at 3 percent per year. This, then must be the value of the risk-free portfolio at the outset. Therefore, since the 25 shares will then cost $500$, we can conclude that the price of the 100 options is $500 - 437 = 63$. 

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Rearranging, we conclude that a portfolio consisting of 100 call options and $437 worth of bonds will exactly replicate the payoff on 25 shares. Equivalently, to replicate 100 shares requires exactly 400 options and $1,747 worth of bonds.

Suppose now that a transaction tax of 1 percent is introduced on all period-one transactions in the stock. Once more, when the stock price is equal to 22, the option gives a right to buy the stock at 21 and sell it at 22. But now this round-trip transaction is subject to transaction taxes. To buy the stock, the option’s holder must pay an additional $0.21 when buying the stock and $0.22 when selling it. Accordingly, the net terminal value of no call options is now just 0.57.

Let $\delta^*$ be the amount of stock in the risk-neutral valuation portfolio adjusted for the transaction tax. Then, subtracting 1 percent transaction tax from the price of the share in each case,

$$21.78\delta^* - 57 = 17.82 \delta^*.$$  (A.2)

The solution is now $\delta^* = 14.4$ and the value of the portfolio at the end of the year will be $17.82 \delta = 257$. The present value of this amount is equal to 249. Since the 14.4 shares will cost $288, the price of the 100 options is $288 - $249 = $39.

Rearranging, we conclude that a portfolio consisting of 100 call options and $249 worth of bonds replicates just 14.4 shares. In order to replicate 100 shares requires 694 options (plus $1728$ worth of bonds).

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Comment on
"Securities Transaction Taxes and Financial Markets"

KIRSTIN J. FORBES

The paper "Securities Transaction Taxes and Financial Markets" by Karl Habermeier and Andrew Kirilenko is an excellent overview of the literature and key issues related to securities transaction taxes (hereafter referred to as SITs). The paper does a particularly good job of linking arguments from very different strands of literature—ranging from work on market microstructure to corporate finance to international macroeconomics. The authors also do a very nice job not only summarizing arguments made in previous work, but critically assessing this work and pointing out some of its shortcomings and weaknesses. Largely as a result of this critical assessment, the paper presents a very strong argument—that SITs have substantial costs and minimal benefits. This dominant opinion provides a coherent framework that connects many of the different topics covered in the paper. This strong viewpoint is also a refreshing improvement on many surveys that make an effort to be so evenly balanced that a reader can be left wondering what to conclude.

Since I agree with the paper’s general conclusions, and since the paper does not develop any new models, datasets, or empirical results that usually provide substantial fodder for discussants, I take a slightly unusual approach in my comments. After a brief summary of the paper, instead of focusing on what the paper does do, my discussion focuses on a number of key aspects of SITs that are not covered in the paper. More specifically, I provide more substantiation for some of the arguments in favor of SITs (that are only eluded to briefly in the paper before

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being dismissed). Then I focus on a range of issues related to STTs, such as their potential to correct for negative externalities, their impact on asset prices, their variations across different instruments, their potential to cause hysteresis effects, and the need for further empirical work. Although including a thorough discussion of many of these additional topics is beyond the scope of the current paper, a better understanding of these issues is critical in order to form a more coherent and balanced assessment of STTs. These additional considerations would also make intriguing topics for future work.

I. Paper Summary

This paper begins with an extremely concise summary of the main theoretical arguments both for and against STTs. This discussion suggests that there are potentially valid arguments on both sides of the debate, and that solid empirical evidence is necessary to resolve which effects dominate in the real world. The paper then provides an equally concise summary of the empirical evidence both for and against STTs. The main “conclusion” is that this empirical evidence is extremely weak, limited, and inconclusive. Next, the paper provides a fairly detailed review of the Swedish experience with STTs—one of the examples used for some of the empirical studies. This case study helps solidify many of the theoretical arguments and claims made in the rest of the paper.

The next few sections of the paper carefully dissect several of the key arguments used to support STTs and show why they are invalid. First, previous work argued that STTs are useful policies to reduce unproductive trading. Instead, the authors argue, inter-dealer trading is important to manage risks and provide liquidity. Second, previous work argued that STTs could reduce asset price volatility. Instead, the authors argue, STTs would increase volatility. Third, previous work argued that STTs could reduce noise in asset prices and therefore improve price formation. Instead, the authors argue, even a small STT could cause prices to deviate substantially from their “full information” values. To solidify this point, they work through a simple model showing that STTs can increase the variance of prices. Fourth, previous work argued that STTs could reduce trading volume, which is beneficial if trading in financial markets is believed to be unproductive. The authors agree that STTs could reduce trading volume, but argue that lower trading volumes are actually undesirable and costly because they lower pricing efficiency.

The final sections of the paper touch on several issues related to STTs. More specifically, several paragraphs discuss market segmentation and execution costs in different markets. This section provides concrete examples of trading costs in the United States and Ireland. There are also several paragraphs linking the discussion on STTs with the much more extensive literature on taxes on international capital flows.

The paper ends with a very strong set of conclusions. STTs have negative effects on price discovery (i.e., prices become less informative). STTs have negative effects on volatility (i.e., raise volatility). STTs have negative effects on liquidity (i.e., reduce liquidity). STTs have negative effects on volume (i.e., reduce volume). Therefore, STTs reduce overall market efficiency and cause a misallocation of resources. There is no doubt where the authors stand on STTs.
II. The Other Side of the Argument

Although these strong arguments on the negative effects of STTs are convincing, the conclusions are so one-sided and clear that a reader can’t help but wonder: What am I missing? If STTs have so many substantial costs, yet no real benefits, why do so many countries use them? Why are different variants of STTs (such as the Tobin tax) frequently raised in international forums? Why do they garner so much support from a variety of groups? Although the authors briefly allude to several reasons why STTs gain sponsorship, some of these arguments merit further exploration before being dismissed so quickly. In particular, three arguments that deserve more careful discussion are STTs as a revenue source, as a political vehicle, and as a tool to promote equity.

The first argument, that STTs can be an important and lucrative income source, may be the most important reason why STTs exist and garner so much support. The volume and value of daily financial transactions is tremendous; rough estimates suggest that the value of global financial transactions is over 50 times greater than the value of global trade in goods and services. A minute tax on each of these financial transactions could generate a large sum of money. A recent paper by the OECD estimates that an STT of 0.5 percent that only applied to trading in foreign exchange markets could raise up to $1.5 trillion per year, “a sum out of proportion with that currently spent on overseas development assistance.”¹ A recent paper by the United Nations suggests STTs as a “proposal for innovative sources of finance.”² The paper estimates that a tax of only 0.1 percent on global currency transactions would yield revenue of about $132 billion to $264 billion per year (with the lower estimate adjusting for the reduced volume of transactions resulting from the tax). It is difficult to imagine any sort of feasible tax or revenue source that could provide these sorts of funds. Financial resources of this magnitude could be used to substantially improve the health, education, and productivity of developing countries around the world.

A critical component of this argument that STTs could be a valuable revenue source is the opportunity cost in terms of what other revenue options are available. Even though STTs may create distortions and lead to a misallocation of resources, most taxes share these traits. For countries that have become dependent on STTs as an important revenue source, removing this tax would mean a costly adjustment of spending reductions or raising revenues through other channels.³ Are the distortions created by an STT any worse than that from other taxes used to generate a comparable amount of revenue? It is impossible to answer this question by considering STTs in isolation. Instead, an assessment of a specific proposal for an STT should carefully consider what the tax revenue would be used for, and what is the alternative if an STT is not utilized. In other words, when considered in a general equilibrium framework, STTs may be a desirable policy for a country that requires revenue

¹ OECD (2002). Calculations are based on an average daily trading volume of $1.25 trillion over 240 trading days per year.
³ For example, the Taiwanese government projected that revenues from its STT of 0.3 percent would equal about NTS80 billion (Taiwan Economic News, 2001).
for a high-return project, and for which raising revenue through other sources would be even more costly than through an STT.

In addition to providing revenues, another major argument raised in support of STTs is political. For example, in the fall of 2001 several leading politicians in the European Union (including Lionel Jospin, then prime minister of France) supported a Tobin tax. A Tobin tax is a type of STT that only applies to foreign currency transactions. They viewed a Tobin tax as a "response to the challenges of globalization" and encouraged the European Union to form a study group to seriously consider this tax. Cynics viewed this debate as a "sop for protestors" instead of serious consideration of an STT, but even this cynical view is informative. Some people view STTs as a method of reducing the costs of financial integration and globalization. Politicians could use STTs as a method of appeasing the anti-globalization coalition, possibly in order to gain support for other policies they view as more effective.

Closely related to these political arguments in support of STTs is a belief that STTs could be a tool to promote equity. There is a widespread belief that the cost of STTs would mainly be paid by the wealthy and/or by speculators, while the costs of globalization are largely paid by low-income workers. For example, a United Nations study argues that "individuals and corporations selling foreign-exchange services or participating in foreign-exchange arbitrage and speculation ... will tend to bear a larger share of the burden..." of an STT. Although I have not seen any convincing evidence either supporting or refuting these claims, policymakers may view STTs as a relatively costless way to improve equity.

Although I fully agree with the authors that these arguments in support of STTs are not nearly as convincing as the arguments against STTs, some of these viewpoints (and especially the revenue-generating issue) do have some merit. If nothing else, they help clarify why, despite the substantial costs of STTs, they continue to garner some support. Therefore, the paper would be much stronger if it gave these "pro" arguments a fair representation, rather than simply focusing on the "cons" and leaving readers wondering if they were missing any critical points.

III. Additional Considerations

In addition to a more thorough discussion of the "pros" of STTs, the paper would also benefit from some discussion of a number of issues related to the use, design, and effectiveness of STTs. Many of these topics have not been discussed (to the best of my knowledge) in other work, so exploring these topics could provide important new insights. Many of these issues could also be important factors in determining the relative costs and benefits of STTs. Realistically, discussing all of these topics in depth is beyond the scope of the current paper, but they are important areas for future work.

One of these topics is if STTs could be used to adjust for negative externalities not incorporated in individual asset prices. More specifically, the paper develops a model that clearly shows how STTs could decrease demand for stocks/bonds and

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increase demand for derivatives. This is a simple application of the result that SITs will tend to shift demand from assets that are taxed to assets that are not taxed. Although this effect is generally viewed as a cost of SITs, could it be structured to be a benefit? For example, could SITs shift demand away from foreign currency bonds into domestic currency bonds (thereby alleviating the “original sin” challenge for many emerging markets)? Could SITs shift demand from short-to long-term capital inflows, or from portfolio flows to Foreign Direct Investment? Obviously, the desirability of any of these policies would first depend on proving that one asset (such as foreign currency bonds, short-term capital flows, or portfolio investment) actually generates significant negative externalities. But if this initial negative externality exists, could SITs be designed to adjust for the externality and more accurately align the private cost of an asset to its social cost?

A second topic that merits further investigation is how SITs affect the level of asset prices. Although the paper does an excellent job discussing how SITs could affect price discovery and volatility, there is only a brief discussion of any impact on price levels. Existing empirical evidence suggests that SITs could have a substantial negative impact on asset prices. For example, the finance literature has shown that assets with high transaction costs trade at low prices relative to their expected cash flows. Jones (2001) shows that the decline in transaction costs in the United States may have contributed to a fall of 1 percent in the equity premium. Forbes (2002) shows that the Chilean tax on capital inflows from 1991-98 (a form of an STT) increased financial constraints for smaller traded firms. Is there other evidence that STTs increase the cost of capital and/or increase financial constraints for certain types of firms? If so, this could be an important cost of SITs, and a cost that not only merits more careful attention, but which would further strengthen the paper’s arguments against SITs.

A third topic that would be a useful addition to the paper is a more thorough discussion of the different types of STTs and their advantages and disadvantages. The paper treats all STTs as one policy, but different types of STTs could have very different costs and benefits. For example, do taxes on purchases and sales have symmetric effects? Why do some countries have an STT that is a flat tax per transaction, while others have an ad valorem tax? Could STTs that are limited to certain types of transactions, such as a Tobin tax on foreign exchange transactions, have different effects than a broader STT on all transactions? What are the different costs and benefits of these various forms of STTs?

A fourth topic that merits some discussion is whether STTs have hysteresis effects. Could a country briefly adopt an STT—possibly for a short-term revenue emergency—and then end the tax with no long-term effects? Or does the adoption of an STT generate a permanent change in how a market operates? Although event studies are always subject to criticism since it is difficult to construct a counterfactual, there are several natural experiments that could provide evidence on whether STTs have hysteresis effects. For example, the paper mentions that after the Swedish STT was abolished, “some trading volume came back to Sweden.” But did the market recover to where it was before the tax? Was its longer-term development substantially slower than that of comparable markets in the region? Has the Chilean stock market recovered from its period with a tax on capital inflows? (Informal evidence suggests not.)
A final topic that would substantially improve the paper would be additional information on different countries' experiences with STTs. Although the paper does provide a few tidbits of information on STTs in the United States and Ireland, as well as more detailed information on the Swedish experience, it would be useful to include a table with summary information on STTs in a range of countries. In its simplest variant, a table could just include basic information on the size of the tax, the structure of the tax, and the amount of revenue raised in different countries. Even more useful would be some basic information on not only the diversity of STTs across countries, but information on the other market variables analyzed in the paper—such as trading volume, market liquidity, bid-ask spreads, etc. The paper makes a number of strong arguments about how STTs should affect these market variables. Granted, there are numerous other factors that will also affect market development and pricing in different countries, but it would substantially strengthen the paper's arguments if some of the raw correlations predicted in the discussion also apply in some basic cross-country comparisons. Of course, an even more convincing approach would be a thorough empirical analysis of how STTs affect each of the variables discussed in the paper—but that would inevitably merit a full paper in itself.

IV. Conclusions

To conclude, the paper by Habenneier and Kirilenko is an excellent resource for someone wishing to learn about STTs. The paper makes a strong and compelling case that STTs have a number of serious costs, but few significant benefits. In an effort to make this strong case, however, the paper does brush over some potentially valid arguments in favor of STTs (such as a revenue source if other tax options are even more distortionary). A more balanced representation of some of these counterarguments would make the paper more evenhanded and therefore more convincing. Moreover, there are a number of thought-provoking issues related to STTs that the paper does not discuss—and although many are realistically beyond the realm of one paper—these issues could be important when evaluating the desirability of STTs. If nothing else, these additional issues discussed above provide intriguing topics for future research.

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In statistical matter throughout this issue,
dots ( . . . ) indicate that the data are not available;
a dash (−−) indicates that the figure is zero or less than half the final digit shown, or
that the item does not exist;
a single dot (.) indicates decimals;
a comma (,) separates thousands and millions;
“billion” means a thousand million; and “trillion” means a thousand billion;
a short dash (−) is used between years or months (for example, 1998–99 or
January–June) to indicate a total of the years or months inclusive of the beginning and
ending years or months;
a slash (/) is used between years (for example, 1998/99) to indicate a fiscal year or a crop
year; and
components of tables may not add to totals shown because of rounding.

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