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Mundell-Fleming Lecture: Contractionary Currency Crashes in Developing Countries

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To update a famous old statistic: a political leader in a developing country is almost twice as likely to lose office in the six months following a currency crash as otherwise. This difference, which is highly significant statistically, holds regardless of whether the devaluation takes place in the context of an IMF program. Why are devaluations so costly? Many of the currency crises of the last 10 years have been associated with output loss. Is this, as alleged, because of excessive reliance on raising the interest rate as a policy response? More likely it is because of contractionary effects of devaluation. There are various possible contractionary effects of devaluation, but it is appropriate that the balance sheet effect receives the most emphasis. Pass-through from exchange rate changes to import prices in developing countries is not the problem: this coefficient fell in the 1990s, as a look at some narrowly defined products shows. Rather, balance sheets are the problem. How can countries mitigate the fall in output resulting from the balance sheet effect in crises? In the shorter term, adjusting promptly after inflows cease is better than procrastinating by shifting to short-term dollar debt, which raises the costliness of the devaluation when it finally comes. In the longer term, greater openness to trade reduces vulnerability to both sudden stops and currency crashes. [JEL F32, F33, F34]

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It is a great honor to give this fifth annual Mundell-Fleming lecture.

December 2004 is the tenth anniversary of the Mexican peso crisis of 1994. In retrospect, this crisis ushered in an eight-year series of highly visible devaluations in emerging markets, most of which proved highly costly to the countries involved. These currency crashes are the theme of my lecture.

Accordingly, I will begin by invoking neither Mundell nor Fleming, but another article from three decades ago: Richard Cooper's "Currency Devaluation in Developing Countries" (Cooper, 1971). This was one of the few major papers from that period to deal explicitly with the macroeconomics of developing countries. The weight of our attention over the last decade or two has shifted increasingly away from rich countries and toward developing countries, whether judged by the caseload of the staff at the International Monetary Fund or by working papers turned out by scholars in the field of international finance and macroeconomics. In part this reflects the extent to which lower- and middle-income countries have become increasingly integrated into world financial markets. Twenty years ago, for example, one would not have wanted to apply the Mundell-Fleming model's insights regarding international capital mobility to developing countries, because they didn't have much capital mobility. Indeed, I don't think the phrase "emerging markets" even existed then. But after the liberalizations and capital inflows of the early 1990s—and the crises of the late 1990s—we are applying to developing countries a wide variety of models and tools that were originally created with rich countries in mind. We have also created some new models and tools to try to capture what is different about developing countries.

I. Political Costs of Devaluation

I wish to start with a widely cited statistic from Cooper (1971, p. 28). He found that, in the aftermath of devaluations, nearly 30 percent of governments fell within 12 months, as opposed to 14 percent in a contemporaneous control group. This is an impressive fact, as demonstrated by the frequency with which other authors still cite it 33 years later. A citation count reveals that: Cooper's article has received 84 citations, with no downward trend over time—not as high as the two seminal papers that constituted the Mundell-Fleming model and thus gave this lecture its name, but still very healthy for a paper written so long ago.[1] So I expect to garner a lot of citations myself by updating Cooper's calculation!

Updating a Statistic on Leaders' Loss of Office

First we need to define a currency crash. Cooper counted anything more than 10 percent as a devaluation episode. But the world changed in the 1970s and 1980s, and depreciations of that magnitude have become commonplace. For a high-inflation

[1]Mundell (1963) and Fleming (1962) received 319 and 257 citations, respectively, over the same period, 1972–2003. This probably understates the contribution of the Mundell-Fleming model: many discussions of the model cite other works, or none at all.

country, one would not want to say that a new currency crisis occurs every month. So I use the following definition:[2]

- The devaluation must be at least 25 percent, on a cumulative 12-month basis.
- The devaluation must represent an acceleration of at least 10 percentage points, relative to the rate of depreciation in the 12 months before that.
- It must have been at least three years since the last currency crisis.

By these criteria, looking at a sample of 103 developing countries over the period 1971–2003, we found 188 currency crashes. In these countries, the person holding the position of chief executive changed within 12 months of the devaluation 27 percent of the time. The standard of comparison that we use normally is all other 12-month periods: the leader changed 21 percent of the time normally. Thus, devaluation increases by an estimated 32 percent the probability of the executive losing his or her job. The difference is statistically significant only at the 13 percent level.[3] However, it may be that countries that tend generally to instability are overrepresented in the crisis group, so that political turnover is more common in this group and is not necessarily the result of currency crises. If we narrow the standard of nondevaluation comparison periods to the set of countries that have experienced a currency crash *at some point* during the sample period, on the grounds that these are more comparable to the crisis episodes, we find that the increase in job loss among devaluers now becomes almost statistically significant at the 1 percent level.[4]

We then narrowed the window to a half year. Now the chief executive lost office 19.1 percent of the time, as opposed to 11.6 percent of the time otherwise. In other words, a currency crash increases the probability of a change in the top leadership within the following six months by 1.7 times. This time the difference is statistically significant not only at the 10 percent or 1 percent levels, but at the 0.5 percent level as well, regardless of whether the entire set of countries is used as the standard of comparison.

We also looked at whether the finance minister or central bank (CB) governor—whoever held the office of the country's governor of the IMF—lost his or her job. Here, even using the longer 12-month window (and even with only five years of data: 1995–99), the effect is statistically significant. In the year following a currency crash, the holder of this position changed 58.3 percent of the time. In other years during this period the rate of turnover was 35.8 percent. By this measure the finance minister or CB governor was 63 percent more likely to lose office. The difference is highly significant statistically (at the 0.001 level).[5]

When we segregate countries according to three income levels, we find that the phenomenon is chiefly one of middle-income countries. Within the class of poor countries, the increase in turnover of the leader is not statistically significant, and among rich countries there were no cases of a leader losing office within a year of a devaluation.

[2]The same as that in Frankel and Rose (1996).

[3]See Appendix 1, Part A. The source for the identity of the president, prime minister, premier, or other chief executive is http://rulers.org.

[4]See Appendix 1, Part B.

[5]See Appendix 1, Part C.

We also tried segregating countries according to three kinds of political structure: presidential democracy, parliamentary democracy, and nondemocracy. Our expectation was that we would find that the effect of devaluation on leadership turnover would be greater among parliamentary democracies than among presidential democracies. The logic was that in any given year the latter might not have a scheduled election, or, if they did, a term limitation might prohibit the incumbent from running for reelection. We found, instead, that the job-loss rate was much higher and more significant in the case of devaluations occurring in presidential democracies.[6]

We examined whether a loss of reserves equally as large results in job loss as often as a devaluation. Such episodes also tend to be unpleasant (often implying monetary contraction and recession; for example, Argentina in 1995 and 1999). Apparently they do not carry the same political costs: however their effect on leaders' job loss was not significant.

What is it about devaluation that carries such big political costs? How is it that a strong ruler like Indonesia's Suharto can easily weather 32 years of political, military, ethnic, and environmental challenges, only to succumb to a currency crisis?

Possible Sources of Political Costs of Devaluation

Currency crises are often accompanied by sharp recessions. Thus, an obvious interpretation, which we will consider further, is that leaders are punished by their constituents when the performance of the economy is poor. But before proceeding on the assumption that the loss of ministerial jobs is a reflection of unemployment and depressed activity throughout the economy, let us consider the possibility that the costs of a devaluation may be more political than economic. First, there is the possibility that elections cause currency crashes, rather than the other way around. Second, it could be that IMF programs or other austerity programs are unpopular in general and that the devaluations are an incidental aspect of this. Third, it could be that the leaders in question had made public promises in advance not to devalue and that they were punished for breaking these promises, regardless of subsequent economic performance.

What do I mean by the first possibility—that elections cause devaluations, rather than the other way around? It is striking in how many of the major crises of the 1990s, even though trouble began during the run-up to a major regularly scheduled national election, the worst speculative attack and currency crash came soon *after* the election. This describes Mexico in 1994, Korea in 1997, and Brazil in 1998–99. In an earlier era, one would have guessed that election-motivated macroeconomic expansion—the famous political business cycle—explained the need for a subsequent devaluation. But that explanation does not fit the experience of the 1990s. Macroeconomic expansion in these election campaigns was limited.[7]

[6]The breakdown by income and democratic structure is given in Parts D, E, and F of Appendix 1.

[7]The political business cycle literature observes that politicians are sometimes able to fool voters by aggressive macroeconomic expansion preceding the election, with costs borne later. But Brender and Drazen (2004) argue that this is primarily a phenomenon found in countries that have only recently made the transition to democracy. Voters eventually learn.

A better explanation is that devaluation is politically costly to leaders, and so in an election year they try to postpone it—hoping to get reelected, that the crash happens on their successors' watch rather than theirs, or that something will turn up in the meantime to improve the balance of payments.[8] A related hypothesis is that because a devaluation uses up scarce political capital, it is more likely to be undertaken by a new leader with a strong mandate, especially in a visible crisis, and especially if he can blame it on his predecessor. Edwards (1994, Table 5) reports that devaluations occur disproportionately often during the first two years after a transfer of government: 77.3 percent of devaluations among presidential democracies (that is, those with prescheduled elections) and 70.0 percent among parliamentary democracies. This is a topic worth exploring, but not here: my calculations about the frequency with which ministers lose their jobs in the year after a devaluation were careful to start the clock the day after the devaluation, so that cases in which the devaluation came soon *after* an electoral change are not included in the statistics.

The second possibility I mentioned is that devaluations are a proxy for unpopular IMF austerity programs or other broad reform packages. IMF-associated austerity programs have often resulted in popular unrest. For example, riots following food-subsidy cutbacks contributed to the overthrow of President Nimeiri of Sudan in 1985.[9]

One can test the proposition that devaluations are acting as a proxy for unpopular IMF austerity programs by conditioning our previous calculation on the adoption of IMF programs. We created a dummy variable to represent cases where an IMF program was initiated within three months on either side of the devaluation.[10] The IMF program variable does not seem to raise the frequency of leader job loss relative to devaluations that did not involve an IMF program. Thus, it is not surprising that conditioning on the IMF dummy variable has no discernible effect on the frequency of leader turnover: 21.05 percent of the time for the cases with an IMF program; 21.92 percent of the time for the ones without. In both cases, it is similar to the overall rate of job loss following devaluations (19.05 percent) in the complete sample and is still almost double the 11.6 percent rate in normal times.

That leaves the third noneconomic explanation, that the ministers in question have made public promises in advance not to devalue, and that they feel it necessary to resign or are punished for breaking these promises, regardless of subsequent economic performance. In many cases the commitment to the peg is explicitly reaffirmed by top policymakers and political leaders in the months immediately prior to the devaluation. Perhaps such ill-fated promises are made because the minister

[8]On governments' incentives to postpone devaluations until after elections, see Stein and Streb (1998 and 1999).

[9]In a study that looks at the role of IMF presence along with various measures of political instability in determining whether devaluations during the period 1950–71 were economically successful, Edwards and Santaella (1993) report nine cases of postdevaluation coup attempts. Lora and Olivera (2004) find that voters punish presidents for promarket policies and for increases in the rate of inflation, but not for exchange rate policies per se. For an earlier summary of the political consequences of IMF-type austerity programs, see Bienen and Gersovitz (1985).

[10]Whether Stand-By Arrangement, or other. See Appendix 2 for a list with dates. Part G of Appendix 1 reports the results.

is duplicitous or at least is ignorant of the speculative pressures he or she is up against. More likely they are too attached to the peg psychologically to let go; many of the currency crashes of the 1990s occurred in countries where governments had a lot invested in the peg, because exchange-rate-based stabilizations earlier had been the successful and popular means of ending a 1980s cycle of high inflation, even hyperinflation.

Perhaps it is even better to regard the public commitments as sincere expressions of a strong desire to maintain the peg. The ministers may realize that events could force the abandonment of the exchange rate policy, if speculative pressures accelerate and it develops that reserves are about to run out, leaving little other option. And they may realize that making an explicit statement beforehand increases the chances that they will have to resign if and when the peg is abandoned. But making the promise is a way of buying a bit of credibility, and buying some time. Specifically, it is a device for signaling that their determination to hold the line on the currency is so strong that they are willing to risk sacrificing their jobs.

We selected a subsample of 24 cases out of our total set of currency crashes. We chose roughly equal numbers of cases with and without subsequent premier changes.[11] We searched local newspapers for the 30 days preceding the devaluation for statements by government officials that could be construed as commitments not to devalue. We included assurances even if the language did not read as explicit or ironclad, because these are so often interpreted as promises.[12]

The sample size was small. But we found that when a member of the government (chief executive, finance minister, or central bank governor) gave assurances that there would be no devaluation and yet a devaluation did subsequently occur, the probability that the chief executive would lose his or her job within 12 months was 2/3. When no such assurances were reported, the frequency of job loss was only 7/18, despite the devaluation. In other words, whatever the credibility benefits of the promise ex ante, it almost doubles the likelihood that the leader loses office ex post. If we use the six-month horizon, then the relative effect is even stronger: the leader is more than twice as likely to be out on the street if the government had made a previous commitment than if it had remained quiet (0.50 versus 0.19). If we consider only cases where the chief executive is the one to have given the assurances, then the job-loss rate becomes 100 percent. But there were only 2 such cases, out of 24. Usually the dangerous task of making assurances is delegated to a cabinet member. (Details are reported in Appendix 3 for the 12-month horizon and in Appendix 4 for the 6-month horizon.)

Despite this suggestive outcome, to the effect that the "broken-promise" factor does indeed matter, it seems unlikely that the "broken-promise" effect is the sole rea-

[11]The other major criteria were that the country in question be represented by comprehensive microfiche files in Harvard's Widener Library of past newspapers and that the languages of those newspapers be either English, Spanish, Korean, or Arabic, the languages spoken by the research assistants working on this project. Appendixes 3 and 4 offer details of these cases.

[12]In at least one case (Syrian Arab Republic), the newspapers appear to have been so lacking in candor regarding the relevant exchange rate that they did not even bring up the subject.

son for devaluations to result in turnover at the top. After all, even among those cases where our newspaper search turned up no record of assurances in the month preceding the devaluation—either from the leader, finance minister, or central bank governor—22 percent of the leaders lost office within 6 months of the devaluation anyway and 39 percent lost within 12 months. These percentages are well above the 11.6 percent and 20.5 percent rates, respectively, of job loss in normal times. Evidently, the economic effects of devaluation also play an important role.

II. Does Devaluation Necessarily Mean Loss of Output?

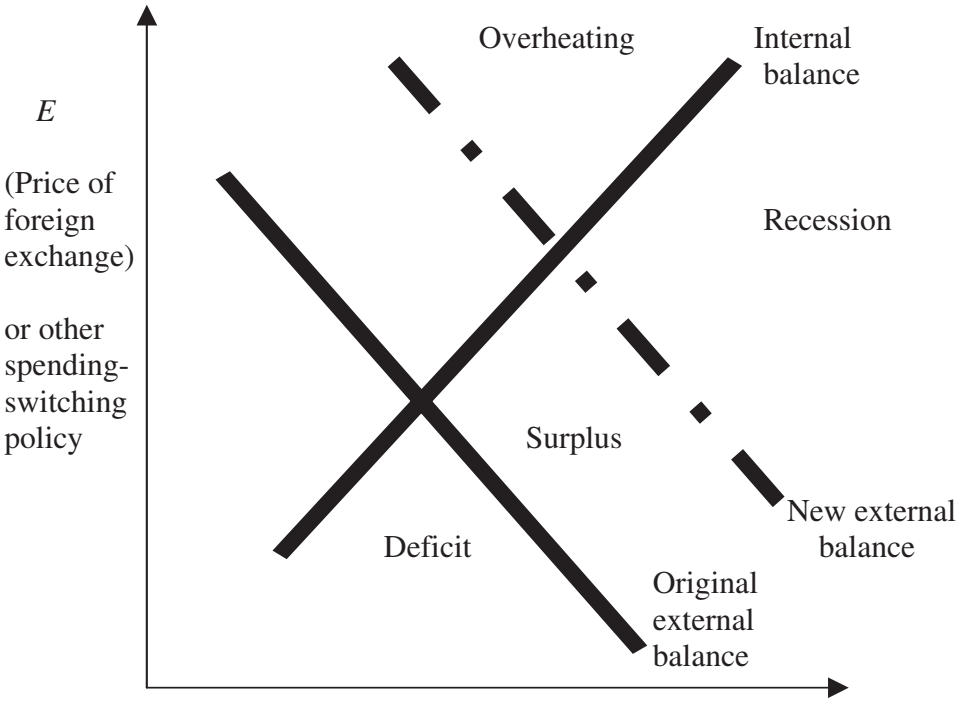
As already noted, the most obvious interpretation of why devaluations are so often associated with high political costs is that they are accompanied by painful recessions.[13] But why? After all, devaluations are supposed to increase competitiveness, increase production and exports of tradable goods, and reduce imports, and thereby boost the trade balance, GDP, and employment—hence the story of the British Chancellor of the Exchequer "singing in the bath" after the 1992 devaluation of the pound. Apparently, developing countries are different, or at least emerging market countries are. Figuring out why may amount to figuring out what aspect of these countries most requires us to modify the macroeconomic models generally applied to advanced economies.

One can argue that simultaneous monetary and fiscal austerity, banking failures, or the sudden stop in foreign lending itself are the true causes of these declines in economic activity. But this misses what, to me, is a key point. According to the standard textbook theories, when a country faces a sudden stop in capital flows, there exists some optimal combination of expenditure-reducing policies (monetary or fiscal contraction) and expenditure-switching policies (devaluation) that should accomplish adjustment to external balance (the new balance of payments constraint), without necessarily sacrificing internal balance (that is, without a recession). Why did all the countries in the East Asia crisis of 1997–98 suffer a sharp loss in output growth regardless of their mix of devaluation and expenditure reduction? The expansionary effect of the devaluation is supposed to make up for whatever contraction comes from other sources.

Consider a graphical representation with the interest rate and exchange rate (price of foreign currency) on the axes, as illustrated in Figure 1a. To satisfy external balance, there is an inverse trade-off between the two instruments. A devaluation and an increase in the interest rate are each ways of improving the trade balance—the latter by reducing expenditure—and so the more you have of one, the less you need of the other. (If external balance is defined as equilibrium in the

[13]Another possibility is that, even if there is no negative effect on GDP in the aggregate, the redistributional effects could be politically costly to the leaders. For example, a devaluation in an African country may benefit small rural coffee and cocoa farmers because the price of their product is determined on world markets, but they tend to have less political power than urban residents, who may be hurt by the devaluation. The problem with this theory is that there are so many examples that go the other way, where the producers of the tradable products (agricultural, mineral, or manufactured) tend to have *more* political power than the producers of nontraded goods.

Figure 1a. Attaining Internal and External Balance: Traditional Version



overall balance of payments, including the capital account along with the trade balance, the relationship is still downward-sloping, since a devaluation and an increase in the interest rate are both ways of making domestic assets more attractive to global investors.)

To satisfy internal balance, the trade-off is traditionally considered to be upward-sloping. An increase in the interest rate reduces the domestic demand for domestic goods, while a devaluation increases the net foreign demand for domestic goods. If you have more of one, you also need more of the other, to prevent excess supply or demand.

The existence of two independent instruments implies the possibility of attaining both targets simultaneously, at the intersection of the internal and external balance schedule. In the aftermath of an adverse shock in the foreign sector, the right combination of devaluation and monetary contraction will restore balance of payments equilibrium while maintaining real economic growth.

This is not always the way things actually work.[14] By now we have had enough experience with crises in emerging markets to realize that the traditional framework needs to be modified. The simple generalization seems to be that most developing

[14]Paul Krugman, "Latin America's Swan Song," at http://web.mit.edu/krugman/www/swansong.html.

countries that are hit by financial crises go into recession. The reduction in income is the only way of quickly generating the improvement in the trade balance that is the necessary counterpart to the increased reluctance of international investors to lend. External balance is a jealous mistress that can be satisfied only if internal balance is left wanting.

Critics of the IMF say that the recessions are the result of Fund policies, specifically, the insistence on austerity in country-rescue programs.[15] Some can be interpreted as arguing that there should have been more expenditure switching and less expenditure reduction—that the mix of a lower interest rate combined with a bigger devaluation would successfully maintain internal balance. But many of the devaluations in East Asia and elsewhere were very large as it was.

The critics often make the point that high interest rates are not in practice as attractive to foreign investors as the Mundell-Fleming model, for example, would suggest, because they carry increased probability of default. This is true. But in my view it is not the most important correction in the traditional framework. Even if interest rates do not have as big a positive effect on the capital account as our earlier models of high financial integration suggested, so that the graphical relationship may be flatter, I believe that the sign of the effect is still the same. Even if higher interest rates have no effect at all on capital inflows, their effect on the balance of payments still goes the same way, owing to the effect on spending. One cannot normally attract many investors by *lowering* interest rates. Therefore, the external balance line still slopes downward. Claims that high rates are damaging to the real economy willfully ignore the lack of an alternative, if the external balance constraint is to be met.

Where the traditional framework needs most to be modified is the relationship giving internal balance, not that giving external balance. By now the evidence seems strong that devaluation is contractionary, at least in the first year and perhaps in the second as well. We have long been aware of various potential contractionary effects of devaluation in developing countries. The same 1971 Cooper article that tallied job losses among ministers also listed six ways in which devaluation could be contractionary. By 1990, a total of 10 such effects had been identified in textbooks.[16]

Until the currency crashes of the 1990s, a mainstream view had been that any negative effects from a devaluation were before long offset by the positive effect of stimulus to net exports, so that by the second year, when the latter had gathered strength, the overall effect on output had turned positive.[17] Now, however, one must judge the negative effects as stronger than first thought, and the positive effects as weaker. Calvo and Reinhart (2000), for example, calculate that exports do not increase at all after a devaluation but are down for the first eight months. The export side, at least, was supposed to be unambiguously positive. Apparently, production is sometimes derailed by corporate financial distress, absence of trade

[15]For example, Radelet and Sachs (1998); and Furman and Stiglitz (1998).

[16]For example, the 5th through 9th editions of Ronald Caves, Jeffrey Frankel, and Ronald Jones, 2002, *World Trade and Payments.*

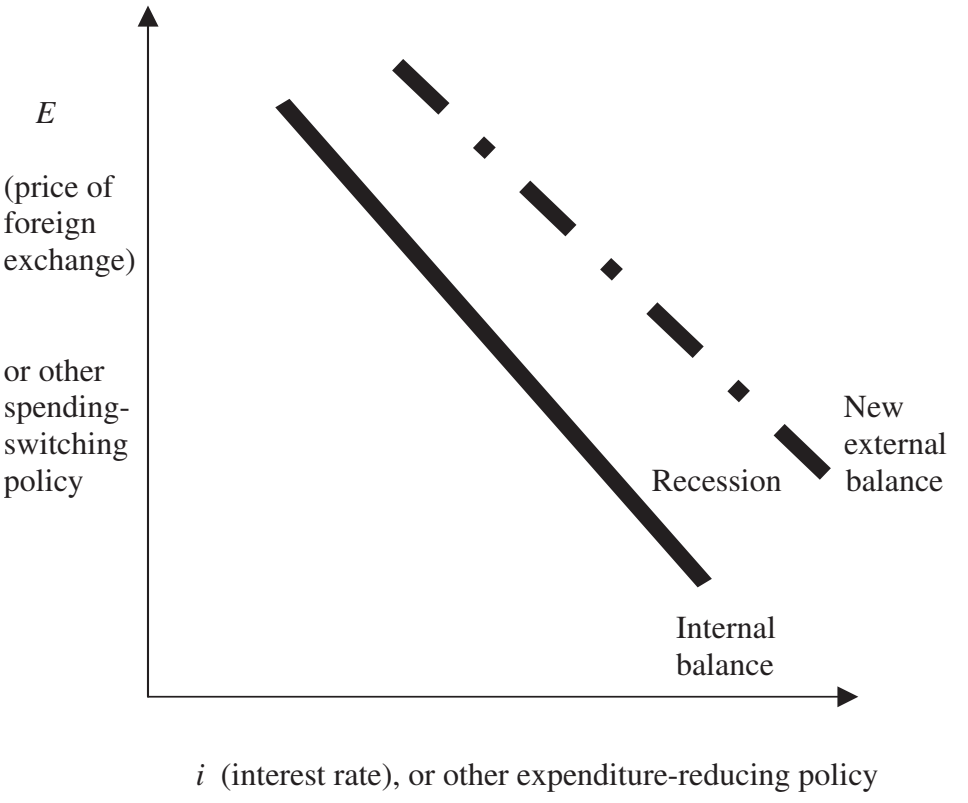
[17]Edwards (1986); and Kamin (1988).

credit, and increased costs of imported inputs, even when the production is for the purpose of export. Imports fall sharply; indeed, crisis-impacted countries have for this reason experienced sharp increases in their trade balances as early as two or three months after the crisis. But this is clearly a response to the unavailability of finance and collapse of income and spending, not to relative prices. In other words, it is expenditure reduction, not expenditure switching.

If devaluation is contractionary, then the internal balance line slopes down, not up (as illustrated in Figure 1b). Moreover, the slope may be disturbingly similar to the slope of the external balance line. It is hard to see where the two intersect, if they intersect at all. This means that it is hard to see what combination of policy instruments, if any, can simultaneously satisfy both internal and external balance, after an adverse shock has shifted the latter outward. The depressing conclusion is that there is no escape from recession. All policy instruments work via reduction in income in the short run—devaluation, fiscal contraction, and monetary contraction. Even structural policy reform, such as insisting that bad banks go under, may have a negative effect on economic activity in the short run.

Is the targets-and-instruments framework then no longer useful? I think the framework is still relevant during the period after a terms-of-trade shock or rever-

Figure 1b. Attaining Internal and External Balance: When Devaluation Is Contractionary



sal in capital flows (as reflected in a peaking of reserves) but before the speculative attack hits (as reflected in a very sharp devaluation, loss in reserves, or increase in interest rates). It can be hard to identify such an interval, especially at the time. But I have in mind the interval of a year or so preceding December 2001 in Argentina, July 1997 in East Asia, and December 1994 in Mexico. I call this interval the "period of procrastination," for reasons that will become clear below.

III. Why Is Devaluation Often Contractionary?

Of the many possible contractionary effects of devaluation that have been theorized, which are in fact responsible for the recessionary currency crashes of the 1990s? Several of the most important contractionary effects of an increase in the exchange rate are hypothesized to work through a corresponding increase in the domestic price of imports, or of some larger set of goods. Indeed, rapid pass-through of exchange rate changes to the prices of traded goods is the defining assumption of the "small open economy model," which has always been thought to apply fairly well to emerging market countries. The contractionary effect would then follow in any of several ways: the higher prices of traded goods would, for example, reduce real money balances or real wages of workers[18] or increase costs to producers in the nontraded goods sector.[19]

These mechanisms were not much in evidence in the currency crashes of the 1990s. The reason is that the devaluations were not passed through to higher prices for imports, for domestic competing goods, or to the Consumer Price Index (CPI) in the way that the small open economy model had led us to believe. The failure of high inflation to materialize in East Asia after the 1997–98 devaluations, or even in Argentina after the 2001 devaluation, was good news—a surprise that perhaps to some extent compensated for the unexpectedly sharp recessions. But it calls for some investigation.

The Decline in Exchange Rate Pass-Through in Developing Countries

Conventional wisdom has long been that pass-through is slower or less complete in large industrialized countries than in small developing countries. A number of authors have pointed out a further decline during the 1990s in the pass-through coefficient among industrialized countries. But most of the many econometric studies of pass-through, even those that examine a recent decline in the pass-through coefficient, have focused on prices of imports into industrialized countries, rather than into developing countries. Taylor (2000) proposed that a decline in pass-through of exchange rate changes into the CPI in the 1990s was due to a lower inflationary environment and looked at U.S. data. Gagnon and Ihrig (2004) extended this claim

[18]Diaz-Alejandro (1963) pointed to a transfer of income from (low-saving) urban workers who consume traded goods to (high-saving) rich owners of agricultural land.

[19]Increased costs to producers of nontraded goods could come from either higher costs of imported inputs, like oil, or higher labor costs if wages are indexed to the cost of living (see, for example, Corbo, 1985, for a discussion of Chile in 1981).

to a sample of 11 industrialized countries. Otani, Shiratsuka, and Shirota (2003) found a similar decline in pass-through for imports into Japan. Campa and Goldberg (2002) again found a decline in the coefficient in the 1990s but attributed it more to changing commodity composition than to a less inflationary environment.[20] Their data set also consisted solely of industrialized countries.

Only a few studies include lower-income countries. Choudhri and Hakura (2001) extend to a sample of 71 countries, including developing countries, the finding that a low-inflation environment reduced pass-through to the CPI in the 1990s. Borensztein and De Gregorio (1999) and Goldfajn and Werlang (2000) study the low pass-through of recent large devaluations in developing countries.[21] But these are all studies of influences on aggregate price measures, the CPI in particular, not on import prices. Few studies concentrate on imports of specific goods into developing countries. The difference is important because effects on price indices versus prices of specific imports are really two distinct conceptions of the word "pass-through." It is even more important because, as in the rich-country context, some authors have claimed that what appears to be slow or incomplete pass-through in developing countries can really be attributed to changes in composition with regard to product varieties.[22]

Table 1, taken from Frankel, Parsley, and Wei (2005), reports estimates for pass-through to prices of narrowly defined retail imports into 76 countries. Notice, first, confirmation of the conventional wisdom that pass-through has historically been higher in developing countries than in rich countries. As of the beginning of our sample period, 1990, the coefficient was 0.3 for rich countries and 0.8 for developing countries, with the difference highly significant statistically. (Figure 2, which illustrates the numbers on average during our sample period.) That these numbers fall below 1.0 cannot be attributed to compositional effects, as the eight goods are defined very narrowly: a roll of color film, a carton of Marlboro cigarettes, an issue of *Time* magazine, a bottle of Cointreau, and so forth.

Theories of slow or incomplete pass-through can be divided according to what sort of arbitrage barrier they posit as blocking the enforcement of the law of one price: barriers to international trade such as tariffs and transportation costs, or local costs of distribution and retail. The results in Frankel, Parsley, and Wei (2005) support both theories. Bilateral distance is a statistically significant determinant of the Error Correction Mechanism (ECM) term; that is, higher transport costs lead to slower pass-through to import prices. At the same time, a higher wage—the largest component of local distribution and retail costs—also shows up as a significant negative determinant of the pass-through coefficient.[23] Both determinants apply to rich

[20] It has been pointed out at least since Knetter (1993) that differences in pass-through coefficients could be attributable to differences in the composition of the price index, rather than to differences in pass-through that would show up for narrowly defined commodities.

[21] References to some further studies are given in Frankel, Parsley, and Wei (2005).

[22] Burstein, Eichenbaum, and Rebelo (2002) attribute the low observed pass-through in general price indices to the disappearance from consumption of newly expensive import goods and their replacement in the indices by inferior local substitutes.

[23] Table 1 applies only to prices of retail imports. But results for prices at other stages, reported in Frankel, Parsley, and Wei (2005), supply further evidence that both kinds of arbitrage barriers are opera-

Table 1. Determination of Pass-Through to Imported Goods Prices: Developing Countries Relative to Rich Countries (76 countries, 1990–2001)

Estimated Coefficient on	Rich	Δ Dev.
Change in exchange rate	0.310***	0.496***
	(0.075)	(0.101)
Change in exporter's price	0.108***	–0.023
	(0.025)	(0.042)
(Change in exchange rate) × trend	–0.025***	–0.026**
	(0.009)	(0.013)
Error correction term (ECM)	–0.091***	–0.105***
	(0.016)	(0.025)
ECM × trend	0.000	0.011***
	(0.002)	(0.003)
Number of observations	5,677	
Adjusted R-squared	0.324	

Source: Frankel, Parsley, and Wei (2005).

Notes: Dependent variable: change in retail import prices of eight narrowly defined commodities. The eight import commodities (given with their country of origin) are: Marlboro cigarettes (U.S.), Coca-Cola (U.S.), cognac (France), Gilbey's gin (U.S.), *Time* magazine (U.S.), Kodak color film (U.S.), Cointreau liqueur (France), and Martini & Rossi vermouth (Italy). Levels of significance are 5 percent (**) and 1 percent (***). For developing country coefficients, values in the "Δ Dev." column can be added to those in the "Rich" column.

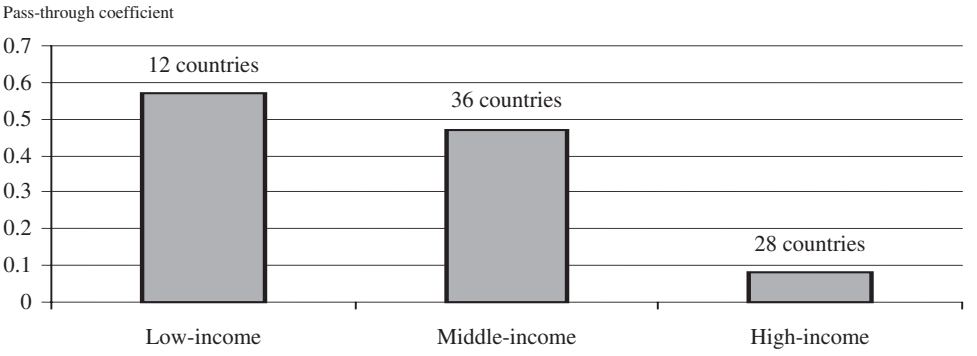
and poor countries alike. Size does not appear as a determinant in most of our results: small countries do not experience more pass-through than do large ones, a very surprising finding in light of "pricing to market" theories (that is, price discrimination by sellers).

For present purposes, the important points are that the pass-through coefficient fell significantly in the 1990s and that the speed of decline was twice as fast among developing countries as it was among rich ones (0.051 per year compared with 0.025).[24] The *speed* of pass-through, which is estimated in the form of an ECM term, also shows a significant downward trend for developing (not for rich) countries.

tive. On the one hand, pass-through is incomplete even for the prices of these imported commodities at dockside, which suggests that local distribution costs cannot be the only barrier to arbitrage—transport costs, tariffs, and other trade barriers must matter as well. In support of this conclusion, distance has an important effect, either reducing or slowing pass-through, at all four stages—dockside imports, retail, competitors' prices, and the CPI. On the other hand, pass-through behavior for retail imports is more like behavior for local substitutes than it is like imports at the dock, which suggests that tariffs and transportation costs cannot be the only barrier to arbitrage—local distribution matters too. In support of this conclusion, higher wages have a strong negative effect on pass-through to the local competitors' prices and the CPI.

[24] Taken literally, the estimated trend is strong enough to bring the pass-through coefficient to zero by 2006. This conclusion may to some extent be an artifact of the assumption of a linear trend that should not be extrapolated. But when we try a different functional form that allows the effect of time to asymptote to zero (the reciprocal of time), we get a similar result: the pass-through coefficient falls most of the way to zero during the sample period.

Figure 2. Pass-Through and Income, Average 1990–2001
(*Country grouping based on World Bank classification*)



Source: Frankel, Parsley, and Wei (2005)—prices for 8 narrowly defined commodities imported into 76 countries; effect of exchange rate change within one year.

Note: Pass-through for less developed countries is greater than for rich countries, historically.

One might wonder if this estimated decline in the pass-through coefficient during the 1990s is an indirect reflection of an asymmetry whereby pass-through of depreciation is greater than pass-through of appreciation, or a threshold effect whereby large devaluations result in proportionately less pass-through. We have found in extensions that the answer is "no"; the trend remains even after controlling for the big devaluations.[25]

One would expect pass-through to prices of domestically produced goods or the general CPI to be (even) lower than to prices of imports. Our paper also reports results for other local price measures, and this is indeed the pattern they show (Figure 3). Tariffs and distance both contribute significantly to low pass-through to the CPI. But pass-through to prices of local substitutes and to the CPI both show the same downward trends over the sample period as does pass-through to import prices. The difference in coefficient trends between poor and rich countries is even greater for pass-through to the CPI than it is for import prices. This is important, in the present context, because most of the potential contractionary effects of devaluation require that pass-through extend beyond import prices alone, to include pass-through to locally produced goods or the CPI.

What can we say about the reasons for the decline in pass-through? As noted, one hypothesis proposed by others is declining long-run inflation rates. This factor turns out to be particularly relevant in the case of explaining the downward trend in pass-through to developing country CPIs.

[25] The threshold effect, while significant, goes the wrong way: changes in the exchange rate above 25 percent are found to have proportionately larger pass-through effects, not smaller. We did find strong evidence of asymmetry. In fact, we cannot reject the hypothesis that appreciation is not passed through at all, suggesting downward price rigidity. This is an interesting finding. But the significant downward trend in the pass-through coefficient remains.

Figure 3. Exchange Rate Pass-Through to Domestic Prices

Source: Frankel, Parsley, and Wei (2005)—effect within one year, in 76 countries.
Note: Pass-through is greatest for prices of imports at dock, but less for retail and CPI.

Another possible explanation for the trend is rising labor costs in retail and distribution. We find that wages are a significant determinant of the pass-through coefficient. The wage hypothesis turns out to be particularly relevant in the case of explaining the downward trends in pass-through either to the prices of local substitutes or to the CPI. Controlling for wages reverses an estimated tendency for pass-through to the CPI to decline as a country's per capita income grows. A possible interpretation is that the role of distribution and retail costs in pricing to market becomes increasingly important as countries achieve higher incomes, owing to the Balassa-Samuelson-Baumol effect.

In any case, most of the decline in pass-through remains unexplained, despite the many contributing factors we estimated.[26] The strongest conclusion is simply that incomplete pass-through is another respect in which developing countries have become a bit more like rich countries, for whatever reason.

The Balance Sheet Effect

If the contractionary effects that rely on pass-through to higher goods prices do not explain the recessions that followed many of the 1990s devaluations, then what does? On the list of contractionary channels, the balance sheet effect is the one that has

[26] Another variable we looked at is long-run exchange rate variability. Here the influence could go either way. On the one hand, if exchange rate variability is another sign of monetary instability, like the inflation rate, it might be thought to contribute to faster pass-through; there is some support for this effect in the case of import prices in developing countries. On the other hand, Froot and Klemperer (1989), Krugman (1987), and Taylor (2000) have suggested that when exchange rate fluctuations are largely transitory, pass-through is lower, an effect supported in the case of pass-through to the CPI in developing countries. Indeed, an increase in exchange rate variability in the late 1990s can apparently explain fully the significant downward trend in the speed of adjustment of the CPI.

dominated in terms of attention from researchers, appropriately so. Domestic banks and firms had large debts denominated in foreign currencies, particularly in dollars. They might have been able to service their debt at the previous exchange rate, but they had trouble servicing it after the price of foreign exchange had gone up sharply. The results were layoffs and bankruptcies.[27]

There is plenty of evidence of the output cost associated with the balance sheet effect. Looking at the experience of the 1990s, Cavallo and others (2002) show that countries entering a crisis with high levels of foreign debt tend to experience large real exchange rate overshooting (devaluation in addition to the long-run equilibrium level) and large output contractions. Similarly, Guidotti, Sturzenegger, and Villar (2004) find evidence that liability dollarization worsens output recovery after a sudden stop in capital inflows. Céspedes (2004) finds that the interaction of real devaluation and external debt has a significant negative effect on output.

It is easier to point out the problem of "mismatch"—between the currency of denomination of a country's debts and the currency its firms earn—than it is to identify a cause, let alone a remedy. It is not enough to instruct firms to avoid dollar debts or to hedge them, because international investors are not very interested in lending to these countries in their own currencies. The result of following a rule to avoid borrowing in foreign currency would thus be to borrow less in total (which, admittedly, might not be such a bad outcome). Eichengreen and Hausmann (1999) have made the inability to borrow in local currencies famous under the name "original sin." The phrase is meant to imply that the problem is not the fault of the countries themselves, or at least not the fault of recent governments. But we need not accept that it is completely predetermined.[28]

IV. How Might Debtors Mitigate Contractionary Currency Crashes?

One need not dismiss the charge that international financial markets discriminate against developing countries in a number of ways in order to discuss the respects in which debtors have some responsibility for their own fate. Let us consider two. One respect is short run, and one is long run.

[27] The analytical literature on balance sheet effects and output contraction includes, but is not limited to, Aghion, Bacchetta, and Banerjee (2000); Caballero and Krishnamurthy (2003); Céspedes, Chang, and Velasco (2003 and 2004); Chang and Velasco (1999); Christiano, Gust, and Roldos (2004); Dornbusch (2002); Jeanne and Zettelmeyer (2005); Kiyotaki and Moore (1997); Krugman (1999); Mendoza (2002); and Schneider and Tornell (2001).

[28] One school of thought is that the choice of an adjustable peg regime, or other intermediate exchange rate regime, leads to dangerously high unhedged foreign currency borrowing. It is argued that a floating regime would force borrowers to confront the existence of exchange rate risk and thereby reduce unhedged foreign currency borrowing (see, for example, Eichengreen, 1999, p. 105). This sounds like an argument in favor of governments introducing gratuitous volatility, because private financial agents underestimate risk. But the models of Pathak and Tirole (2004); Jeanne (2005); Chamon and Hausmann (2005); and Chang and Velasco (1999) do it with only fundamentals-generated uncertainty and rational expectations. Hausmann and Panizza (2003) find empirical support only for an effect of country size on original sin, not for an effect of income level or exchange rate regime. Goldstein and Turner (2004) point out things countries can do to reduce currency mismatch.

Shifts on the Balance Sheet During the "Procrastination Phase"

The short-run question over which countries have some control arises during the interval I have called the period of procrastination. When foreign investors lose their enthusiasm for financing a country's current account deficit, the national policymakers must decide whether to adjust or to wait. Typically, they wait. Countries that had managed to keep dollar-denominated debt relatively low tended to switch the composition of their debt in that direction during the year or so preceding the ultimate currency crash, to entice skeptical foreign investors to stay in.

A prime example is Mexico in 1994. International enthusiasm for investing in Mexico began to decline after the beginning of the year. The authorities clung to the exchange rate target and delayed adjustment, hoping circumstances would turn around. Most obviously, during much of the year they ran down reserves, as shown in Figure 4. But an important second mechanism of delay was to placate nervous investors by offering them tesobonos (short-term, dollar-linked bonds) in place of the peso bonds (Cetes) they had previously held. Figure 5 shows the dramatic increase in dollar-linked debt during the year leading up to the peso crisis of December 1994. It seems likely that the magnitude of the Mexican recession in 1995 stemmed not just from the adverse balance sheet effects that have been so frequently noted, but particularly from the adverse *shift* in balance sheets that took place in 1994. A third mechanism of delay was a shift toward shorter maturities, illustrated in Figure 6.[29] And the fourth has already been noted, an explicit commitment to defend the peg.

These mechanisms are part of a strategy that is sometimes called "gambling for resurrection." What they have in common, beyond achieving the desired delay, is helping to make the crisis worse when it does come, if it comes.[30] It is harder to restore confidence after a devaluation if reserves are near zero and the ministers have lost personal credibility. Further, if the composition of the debt has shifted toward the short term, in maturity, and toward the dollar, in denomination, then restoring external balance is likely to wreak havoc with private balance sheets, regardless of the combination of increases in interest rate versus increases in exchange rate.

The lesson? Adjust sooner rather than later (which is, admittedly, easier said than done).

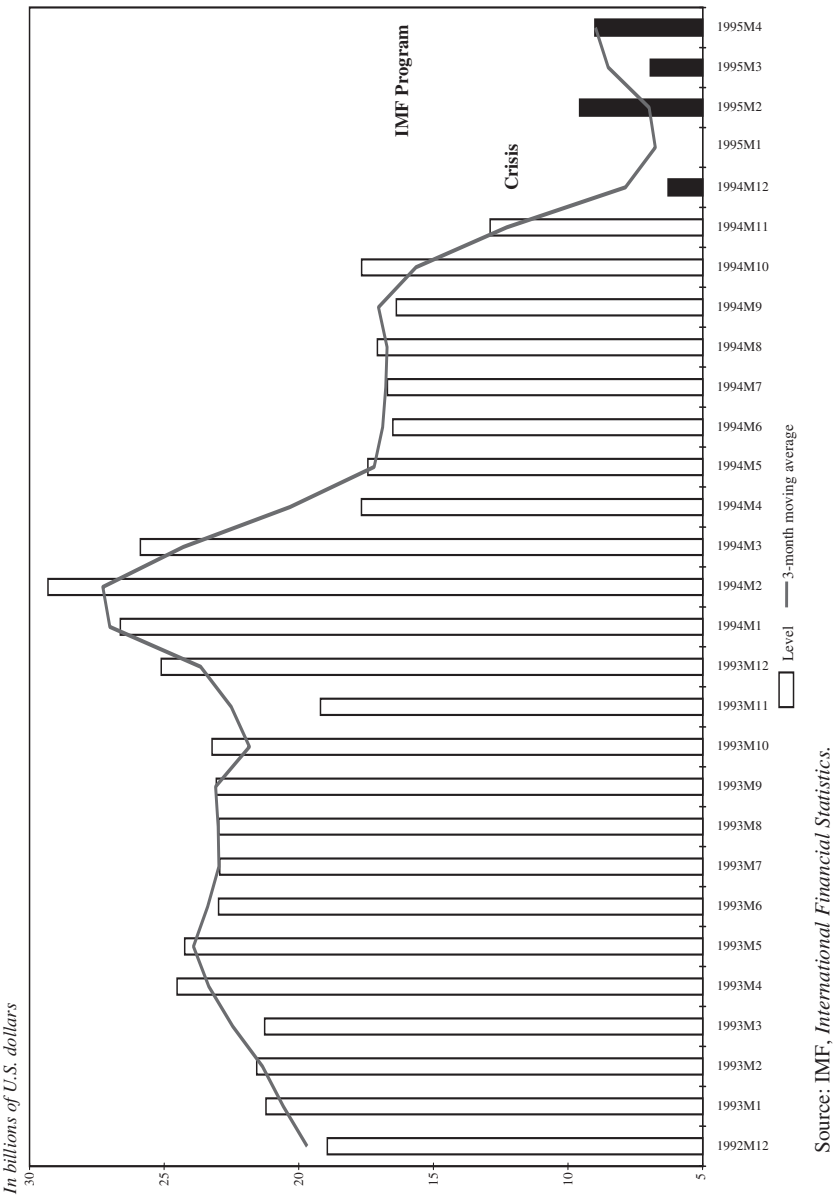
Openness to Trade Reduces Vulnerability to Currency Crises

One final question concerns an aspect of the structure of the economy that can be influenced by policy, but only in the long run: the degree of integration with respect to international trade. Broadly speaking, there are two opposing views on

[29] See Broner, Lorenzoni, and Schmukler (2004).

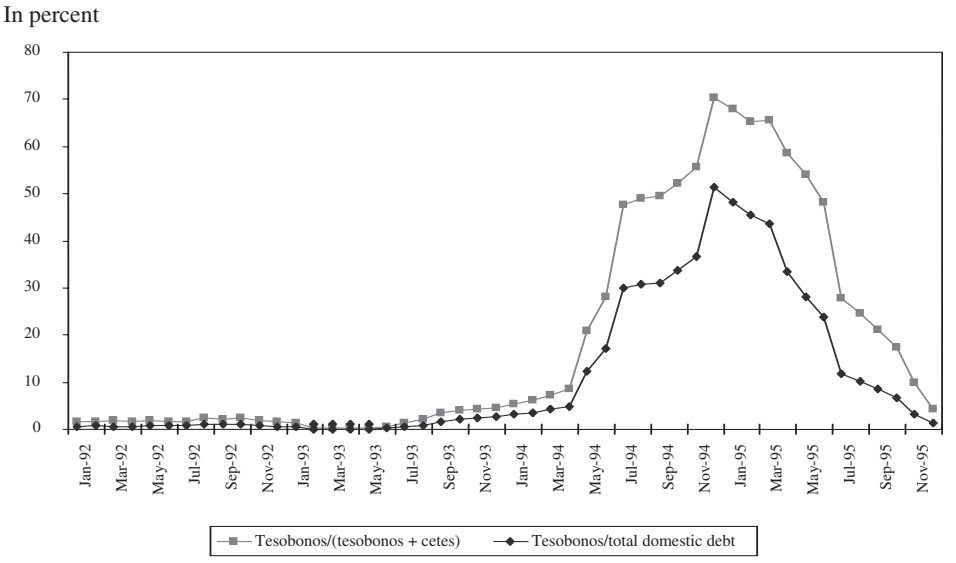
[30] This helps explain why the ratio of short-term foreign debt to reserves appears so often and so robustly in the literature on early warning indicators for currency crashes. Examples include Frankel and Rose (1996); Berg and others (1999); Goldstein, Kaminsky, and Reinhart (2000); Rodrik and Velasco (2000); Mulder, Perrelli and Rocha (2002); Frankel and Wei (2005, Table 2); and many other references given in those papers.

Figure 4. Evolution of Mexico's Reserves, from Sudden Stop to 1994 Currency Crash, January 1992–April 1995



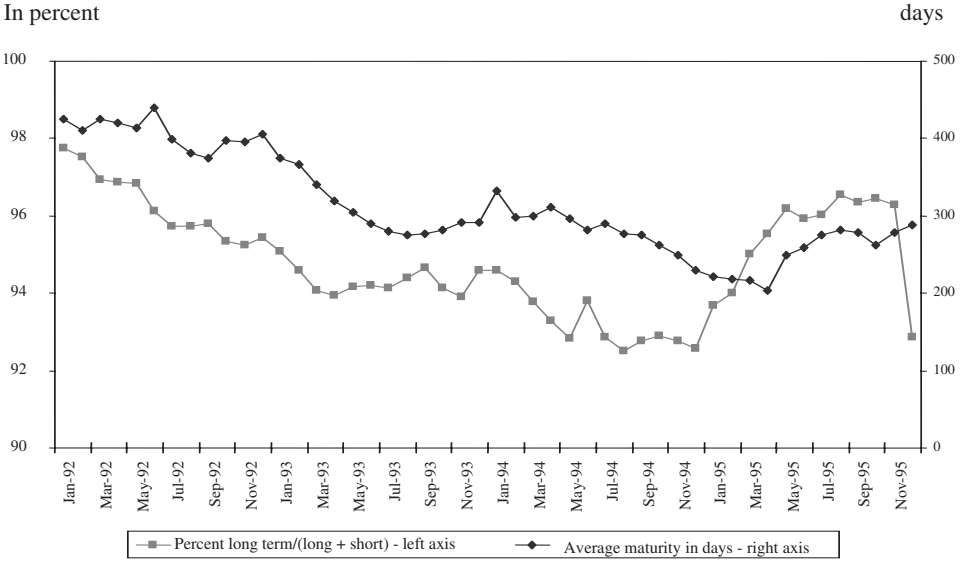
Source: IMF, *International Financial Statistics.*

Figure 5. Evolution of Mexican Debt According to Currency Denomination, 1992–95



Source: Mexican Ministry of Finance and Public Credit.

Figure 6. Evolution of Mexican Debt According to Maturity, 1992–95



Source: Mexican Ministry of Finance and Public Credit.

the relationship between a country's openness and whether it is prone to sudden stops or currency crashes. The first view is that openness makes a country more vulnerable to sudden stops. A country highly integrated into world markets is more exposed to shocks coming from abroad. The second view is that countries that are open to international trade are *less* vulnerable to sudden stops. If the ratio of trade to GDP is structurally high, it is easier to adjust to a cutoff in international financing of a given magnitude. I will describe a new test of the relationship between trade openness and vulnerability to sudden stops to help choose between the two hypotheses. Such tests have been done before, but usually without taking into account the possible endogeneity of trade. The incremental contribution here is to use the gravity instrument for trade openness—which aggregates geographically determined bilateral trade across a country's partners—to correct for the possible endogeneity of trade.

The view that trade openness makes countries more vulnerable to crises comes in a number of forms. One variant is that a weakening in a country's export markets is sometimes the trigger for a sudden stop in capital flows, so that a high-trade country is more vulnerable. Another variant notes that sudden stops in finance often extend to a loss in trade credit—especially for imports, but sometimes even for exports—and that the resulting shrinkage in trade is more painful if trade was a larger share of the economy to begin with. A third variant says that *financial* openness raises vulnerability to sudden stops, and openness to trade in practice goes hand in hand with openness to financial flows.[31] In the limiting case, a country that is in autarky with respect to trade must have a net capital account of zero owing to the balance of payments adding-up constraint. Regardless of the specific reasoning, the notion that globalization leads to crises is a generalization that appeals to many.

The view that openness to trade makes countries *less* vulnerable also comes with a number of different specific mechanisms that have been proposed. Eaton and Gersovitz (1981) and Rose (2002) argue that the threatened penalty of lost trade is precisely the answer to the riddle, "Why do countries so seldom default on their international debts?" Strong trade links are statistically correlated with low default probabilities. International investors will be less likely to pull out of a country with a high trade-to-GDP ratio, because they know the country is less likely to default. A higher ratio of trade is a form of "giving hostages" that makes a lending cutoff less likely.

Another variant of the argument that openness reduces vulnerability takes as the relevant penalty in a crisis the domestic cost of adjustment, that is, the difficulty of eliminating a newly unfinanceable trade deficit. The argument goes back at least to Sachs (1985, p. 548). He suggested that Asian countries were less vulnerable to dislocations than Latin American countries in the international debt crisis of the 1980s—despite similar debt-to-GDP ratios—because they had higher export-to-GDP ratios. The relatively worse preformance observed in Latin America was due

[31] For example, because much trade needs multinational corporations, which in turn need to be able to move money across national borders, or because it is harder to enforce capital controls if trade is free. Aizenman (2003); and Aizenman and Noy (2004).

to the lower availability of export revenue to service debt. More recently, Guidotti, Sturzenegger, and Villar (2004) make a similar point by providing evidence that economies that trade more recover fairly quickly from the output contraction that usually comes with the sudden stop, while countries that are more closed suffer sharper output contraction and a slower recovery.

Consider first a country that faces a given cutoff in financing and must adjust without nominal or real exchange rate flexibility. The adjustment must then come through a reduction in spending. To achieve a $1 billion improvement in the trade balance, the contraction has to be $ (1/*m*) billion, where *m* is defined as the marginal propensity to import (in a Keynesian model) or the share of spending that falls on tradable goods (in a tradable/nontradable model). The lower *m* is, the more painful the adjustment. Whether output itself falls depends, of course, primarily on whether wages and prices are flexible. But even in a full-employment world, sharp reductions in consumption are not enjoyable.

Consider, second, a country that does have the option of nominal and real exchange rate flexibility. In traditional textbook models, if the adjustment is achieved in part through nominal and real depreciation, rather than exclusively through expenditure reduction, the country can accommodate the tougher new financing constraint without necessarily suffering a recession. This is true even if a relatively large devaluation is required to generate the necessary improvement in the trade balance. But since the emerging market crises of 1994–98, as we have already noted, economists have increasingly emphasized the contractionary balance sheet effect: if a country's debts are denominated in foreign currency, the balance sheets of the indebted banks and corporations are hit in proportion to the devaluation. If the economy is starting from a high ratio of trade to GDP, the necessary devaluation need not be large, and therefore the adverse balance sheet effect need not be large. But if the economy is not very open to trade to begin with, the necessary devaluation, and the resulting balance sheet impact and recession, will be large. Again we arrive at the result that whether the necessary adjustment will be large and painful depends inversely on openness.

The balance sheet version of the openness story is modeled formally by Calvo, Izquierdo, and Talvi (2003) and Cavallo (2004). Both have in mind the example of Argentina, which has traditionally had a low ratio of trade to GDP and has suffered some of the worst sudden stops.[32] But the hypothesis that openness to trade reduces a country's vulnerability to sudden stops transcends any one formal model, causal link, or country example. The same is true of the opposing hypothesis, that openness *raises* a country's vulnerability. It would be useful to be able to choose empirically between the two competing hypotheses.

I will report new results—from Cavallo and Frankel (2004)—for two questions. (1) What is the effect of openness on vulnerability to sudden stops implemented by a probit model measuring the probability of a sudden reduction in the magnitude of

[32] Others who have argued that Argentina's low trade-to-GDP ratio helps explain why it was such a victim of the global sudden stop after 1999 include Calvo, Izquierdo, and Mejía (2004); Calvo and Talvi (2004); Desai and Mitra (2004); and Treasury Secretary Paul O'Neill, who once reportedly said it was unsurprising the Argentines had lost the confidence of investors, because they don't export anything.

net capital inflows, following closely the definition of Calvo, Izquierdo, and Mejía (2004)?[33] (2) What is the effect of openness on vulnerability to currency crises, implemented by a probit model representing the probability of a sudden increase in exchange market pressure, which is in turn defined as the percentage depreciation plus percentage loss in foreign exchange reserves? In addition to analyzing the probit model of this exchange market pressure definition of a currency crisis, as in Frankel and Wei (2005), we also looked at the output loss subsequent to a crisis.

There is no reason, a priori, why something (openness) that makes the consequences of sudden stops better (less contractionary devaluations) should also necessarily make them less frequent, or that something that makes the consequences worse should also make them more frequent. Indeed, some theories are based on the notion that the worse the consequences, the less often it will happen. But in our results the effects turn out to go the same way, regardless of which concept of performance is used.

Calvo, Izquierdo, and Mejía (2004) and Edwards (2004a and b) are among the empirical papers that find that openness to trade is associated with fewer sudden stops. On the other hand, Milesi-Ferretti and Razin (1998 and 2000) find that openness helps trigger crises and/or sharp reversals of the current account. Most of these papers use the trade-to-GDP ratio as the measure for openness to trade.

A critic might argue that the trade-to-GDP ratio is endogenous. One way in which trade openness could be endogenous is via income: countries tend to liberalize trade barriers as they grow richer—in part because their mode of public finance gradually shifts from tariff revenue to income taxes or Value Added Tax (VAT). A second way is that trade liberalization could be part of a more general reform strategy driven by a proglobalization philosophy or "Washington Consensus" forces. Other aspects of such a reform program, such as privatization, financial liberalization, or macroeconomic stabilization might affect the probability of crises, and yet an Ordinary Least Squares regression analysis (OLS) might inappropriately attribute the effect to trade. A third way that trade openness could be endogenous is that experience with crises—the dependent variable—may itself cause liberalization, via an IMF program. Or it might have the opposite effect, if a country's response to a crash is disenchantment with globalization and the Washington Consensus. A fourth way in which trade openness could be endogenous is through the feedback between trade and financial openness.

How can the endogeneity of trade be addressed? We use gravity estimates to construct an instrumental variable for trade openness, a methodology developed by Frankel and Romer (1999), in the context of the effect of trade on growth, and updated in the Frankel and Rose (2002) data set.

The results reported in Table 2 show that openness reduces vulnerability to sudden stops rather than increasing it.[34] Not only does this relationship hold up when we move from OLS to instrumental variables, but it appears stronger. The degree of trade openness is a powerful predictor of these capital account shocks: moving from

[33] To the best of my knowledge, the increasingly popular expression "Sudden Stops" was first used by Dornbusch, Goldfajn and Valdes (1995). The first analytic approach to the problem of sudden stops is Calvo (1998).

[34] A more complete set of results is reported in Cavallo and Frankel (2004).

Table 2. Effect of Openness (Trade/GDP) on Vulnerability to Sudden Stops and Currency Crashes

	To Predict Sudden Stops[1]		To Predict Currency Crashes[2]	
	Ordinary probit	IV	Ordinary probit	IV
Trade openness$_t$	**−0.53**	**−2.45**	**−0.57**	**−1.73**
	(0.259)**	(0.813)**	(0.269)**	(0.918)*
Foreign debt/GDP$_{t-1}$	**−0.080**	**0.196**	**0.23**	**0.59**
	(0.217)	(0.275)	(0.231)	(0.373)
Liability dollarization$_{t-1}$	**0.316**	**0.591**	**0.027**	**0.18**
	(0.195)	(0.256)**	(0.249)	(0.234)
Exchange rate rigidity			**0.13**	**0.22**
			(0.094)	(0.113)*
CA/GDP$_{t-1}$	**−4.068**	**−7.386**	**−0.272**	**0.66**
	(1.297)**	(2.06)***	(1.392)	(1.455)
ln reserves in months of imports$_{t-1}$			**−0.26**	**−0.37**
			(0.082)***	(0.099)***
Constant	**−2.544**	**−1.73**	**−0.99**	**0.304**
	(0.63)***	(0.723)**	(0.749)	(0.786)
Number of Observations	**778**	**1,062**	**557**	**841**

Source: Cavallo and Frankel (2004)

Notes: Robust standard errors reported in parentheses. *** = statistically significant at 1 percent. ** = statistically significant at 5 percent. * = statistically significant at 10 percent. Estimation performed with regional dummies and year fixed effects. IV is the gravity-based instrumental variable for trade openness from Frankel and Romer (1999) and Frankel and Rose (2002).

[1]Calvo, Izquierdo, and Talvi (2003), definition.

[2]Frankel and Wei (2005), definition.

Argentina's current trade share (approximately .20 of GDP) to Australia's average trade share (approximately .30 of GDP) reduces the probability of a sudden stop by 32 percent. The results for openness are the same when we seek to explain currency crashes. Trade protectionism does not shield countries from the volatility of world markets, as proponents might hope. On the contrary, less trade openness leads to greater vulnerability to sudden stops and currency crashes. In fact, out of the set of controls we tried, openness is the only variable that is virtually always statistically significant.[35]

V. Conclusion

There are thus at least two ways of seeking to minimize vulnerability to sudden stops, devaluations, and associated economic contractions: keeping the economy open to trade and keeping balance sheets strong by avoiding a shift to short-term dollar debt as a means of procrastination. This lecture began by noting the frequency

[35]The current account deficit as a share of GDP is always highly significant in the probit regressions to determine sudden stops, and liability dollarization sometimes is, but not in the currency crash equation. The reserve-to-import ratio is always highly significant in the currency crash regression and sometimes foreign debt-to-GDP and nominal exchange rate rigidity are as well, but not in the first equation.

with which political leaders and ministers lose office after a devaluation. But seeking to hold on to political viability is presumably the precise reason governments often procrastinate and feel they have to postpone adjustment to balance of payments deficits and instead run down reserves, shorten the maturity of the debt, and borrow in dollars. So the openness strategy may be the most robust option in the long run, politically as well as economically.

APPENDIX 1.

Currency Crashes and Frequency of Changes of Policymakers in Developing Countries

There are 103 countries in the sample.

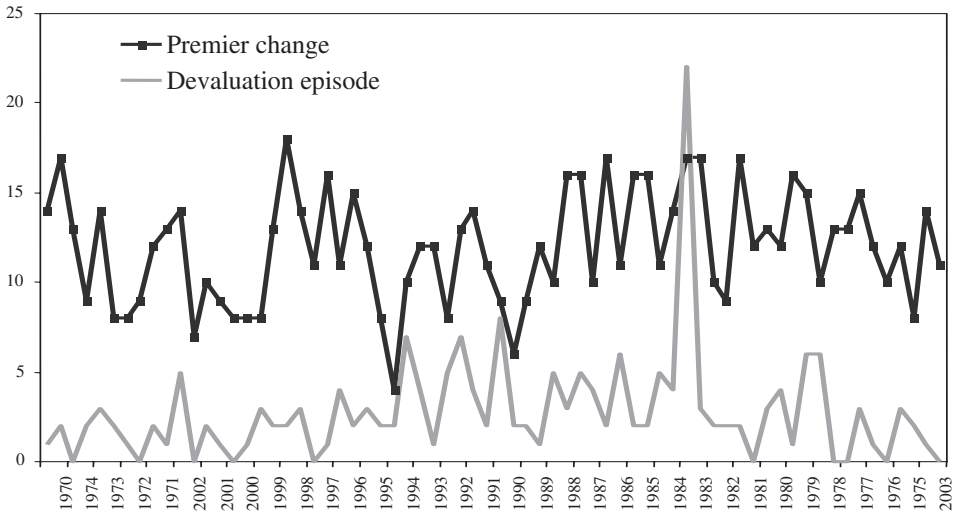
A. Change in Premier or Chief Executive: One-Year Horizon, 1970–2003

	12-Month Period Following a Devaluation	All Other 12-Month Periods
Change observed	51	679
	(27.1 %)	(20.5%)
No change observed	137	2,635
	(72.9%)	(79.51%)
Total	188	3,314

P-value for the difference is **0.126.**

Graph of number of episodes of devaluations and number of premier changes over time. Developing Countries—Six-month period

Number of Currency Crash Episodes and Premier Changes Across the World (1970–2003)



Note: The correlation between the two series is **18.1 percent**.

B. Change in Premier or Chief Executive: One-Year Horizon, 1970–2003

	12-Month Period Following a Devaluation	All Other 12-Month Periods
Change observed	41	459
	(29.1%)	(21.4%)
No change observed	100	1,683
	(70.9%)	(78.6%)
Total	141	2,142

Note: "Own turnover"—The reference set is only those developing countries that have experienced a currency crash at some point. *P*-value for the difference is **0.013.**

C. Change in Premier or Chief Executive: Six-Month Horizon, 1970–2003

	6-Month Period Following a Devaluation	All Other 6-Month Periods
Change observed	36	812
	(19.05 %)	(11.6%)
No change observed	153	6,192
	(81.0%)	(88.4%)
Total	189	7,004

Note: *P*-value for the difference is **0.004;** *t*-statistic is **2.71.**

D. Change in Premier or Chief Executive: Six-Month Horizon, 1970–2003

	6-Months Period Following a Devaluation	All Other 6-Month Periods
Change observed	31	492
	(22.0%)	(11.5 %)
No change observed	110	3,792
	(78.0%)	(88.5%)
Total	141	4,284

Note: "Own turnover"—reference set is only for those developing countries which have experienced currency crash at some point. *P*-value for the difference is **0.002.**

E. Change in Finance Minister or Central Bank Governor: One-Year Horizon.

	When a Devaluation Occurred	All Years
Change of Governor observed	14	212
	(58.3%)	(35.8%)
No change of Governor observed	10	380
(41.7%)	(64.1%)	
Total	24	592

Note: The data pertain to the IMF Board of Governors membership from 1995–1999, inclusive. The probability of the IMF governor of a country changing is 1.63 times larger when there was a currency crash. *T*-statistic is **3.56.** *P*-value is **0.001.**

F. One-Year Horizon, Change in Premier or Chief Executive by Income Level

(1) Rich Countries

	1-Year Period Following a Devaluation	All Other 1-Year Periods
Change observed	0	212
	(–)	(28.3%)
No change observed	0	536
	(–)	(71.7%)
Total	0	748

(2) Middle-Income Countries

	1-Year Period Following a Devaluation	All Other 1-Year Periods
Change observed	29	508
	(29.3%)	(20.2%)
No change observed	70	2,012
	(70.7%)	(79.8%)
Total	99	2,520

Note: *P*-value for the difference is **0.342.**

(3) Poor Countries

	1-Year Period Following a Devaluation	All Other 1-Year Periods
Change observed	22	171
	(24.4%)	(16.8%)
No change observed	68	845
	(75.6%)	(83.2%)
Total	90	1,016

Note: *P*-value for the difference is **0.204.**

G. Six-Month Horizon, Change in Premier or Chief Executive by Income Level

(1) Rich Countries

	6-Month Period Following a Devaluation	All Other 6-Month Periods
Change observed	0	235
	(–)	(15.7%)
No change observed	0	1,261
	(–)	(84.3%)
Total	0	1,496

(2) Middle-Income Countries

	6-Month Period Following a Devaluation	All Other 6-Month Periods
Change observed	22	581
	(22.2%)	(11.5%)
No change observed	77	4,459
	(77.8%)	(88.5%)
Total	99	5,040

Note: *P*-value for the difference is **0.022.**

(3) Poor Countries

	6-Month Period Following a Devaluation	All Other 6-Month Periods
Change observed	14	195
	(15.6%)	(9.6%)
No change observed	76	1,837
	(84.4%)	(90.4%)
Total	90	2,032

Note: *P*-value for the difference is **0.174.**

H. Changes in Leadership According to Political System

(1) One-Year Horizon, Change in Premier or Chief Executive by Income Level and Political System

		Low-Income Countries	Middle-Income Countries	All Developing Countries
Presidential	Job losses	11	23	34
	(job losses/ devaluations)	(31.4%)	(38.3%)	(35.8%)
	Devaluations	35	60	95
Parliamentary	Job losses	0	3	3
	(job losses/ devaluations)	(0.0%)	(15.8%)	(14.3%)
	Devaluations	2	19	21
Non-democracy	Job losses	10	4	14
	(job losses/ devaluations)	(18.9%)	(20.0%)	(19.2%)
	Devaluations	53	20	73
All Developing Countries	Job losses	21	30	51
	(job losses/ devaluations)	(23.3%)	(30.3%)	(27.0%)
	Devaluations	90	99	189

(2) Six-Month Horizon, Change in Premier or Chief Executive by Income Level and Political System

		Low-Income Countries	Middle-Income Countries	All Developing Countries
Presidential	Job losses	7	18	25
	(job losses/ devaluations)	(20.0%)	(30.0%)	(26.3%)
	Devaluations	35	60	95
Parliamentary	Job losses	0	1	1
	(job losses/ devaluations)	(0.0%)	(5.3%)	(4.8%)
	Devaluations	2	19	21
Non-democracy	Job losses	7	3	10
	(job losses/ devaluations)	(13.2%)	(15.0%)	(13.7%)
	Devaluations	53	20	73
All Developing Countries	Job Losses	14	22	36
	(job losses/ devaluations)	(15.6%)	(22.2%)	(19.0%)
	Devaluations	90	99	189

I. Change In Premier, Controlling for Start of an IMF Program (Within 3 Months on Either Side of a Currency Crash)

This table summarizes the statistics of devaluations, job loss, and IMF programs in the 1990s and 2000s.

	Premier Change Occurred Within 6 Months	Premier Change Did Not Occur Within 6 Months	Total
Cases with an IMF program	4	15	19
	(21.05%)	(78.95%)	
	(20.00%)	(20.83%)	
Cases without an IMF program	16	57	73
	(21.92%)	(78.08%)	
	(80.00%)	(79.17%)	
Total	20	72	92

The *t*-test below compares the probability that devaluation leads to a premier change within six months when there is an IMF program (21 percent) with the probability of a premier change occurring within six months (in general). The *P*-value is much larger, at 20 percent.

Ha: diff < 0	Ha: diff = 0	Ha: diff > 0
$t = -0.8781$	$t = -0.8781$	$t = -0.8781$
$P < t = 0.196$	$P > \|t\| = 0.391$	$P > t = 0.804$

Comparing IMF and non-IMF devaluation cases, and the probability with which each leads to a change of leader within six months, shows that there is no significant difference between the two groups.

Ha: diff < 0	Ha: diff= 0	Ha: diff > 0
$t = 0.0803$	$t = 0.0803$	$t = 0.0803$
$P < t = 0.532$	$P > \|t\| = 0.937$	$P > t = 0.468$

When comparing the probability that devaluation *without* an IMF program leads to a change of leader within six months with the probability of premier change occurring within six months under normal circumstances, we find the former is significantly higher than the latter.

Ha: diff < 0	Ha: diff = 0	Ha: diff > 0
$t = -1.901$	$t = -1.901$	$t = -1.901$
$P < t = 0.031$	$P > \|t\| = 0.061$	$P > t = 0.969$

APPENDIX 2.

IMF Country Programs, with Dates of Approval

Country	Program Type	Begin Date	Commitment Amount (Millions SDRs)	Drawn Amount (Millions SDRs)	Comments
Albania	Stand-By	8/26/1992	20	13.12	Cancelled prior to expiration date of 8/25/1993. Replaced by ESAF on 7/14/1993.
Algeria	Stand-By	6/3/1991	300	225	
Algeria	Stand-By	5/27/1994	457.2	385.2	Cancelled.
Algeria	EFF	5/22/1995	1,169.28	1,169.28	
Argentina	Stand-By	7/29/1991	780	292.5	Cancelled prior to expiration date of 6/30/1992.
Argentina	EFF	3/31/1992	4020.25	4020.25	Extended from 3/30/1995 to 4/30/1995 and then to 3/30/1996. Approved amount increased.
Argentina	Stand-By	4/12/1996	720	613	
Argentina	EFF	2/4/1998	2080	0	At time of approval, purchase schedule decided through 11/1998.
Argentina	Stand-By	3/10/2000	10585.5	3834.3	
Armenia	Stand-By	6/28/1995	43.88	13.5	Cancelled prior to expiration date of 6/27/1996.
Azerbaijan	Stand-By	11/17/1995	58.5	58.5	
Azerbaijan	EFF	12/20/1996	58.5	53.24	Extended from 12/19/1999 to 3/19/2000.
Belarus	Stand-By	9/12/1995	196.28	50	
Brazil	Stand-By	1/29/1992	1500	127.5	
Brazil	Stand-By	12/2/1998	10419.84	7869.15	Amounts exclude SRF drawing of SDR 2.6 billion.
Brazil	Stand-By	9/14/2001	2193	0	
Bulgaria	Stand-By	3/15/1991	279	279	Followed by another stand-by on 4/17/1992.
Bulgaria	Stand-By	4/17/1992	155	124	Approved after expiration of 3/15/1991 stand-by.
Bulgaria	Stand-By	4/11/1994	139.48	116.24	Approved amount increased in 9/1994.
Bulgaria	Stand-By	7/19/1996	400	80	Cancelled prior to expiration date of 3/18/1998. Replaced by another stand-by on 4/11/1997.
Bulgaria	Stand-By	4/11/1997	371.9	371.9	Replaced the 6/19/1996 stand-by.
Bulgaria	EFF	9/25/1998	627.62	523	
Cameroon	Stand-By	12/20/1991	28	8	

Cameroon	Stand-By	3/14/1994	81.06	21.91	Followed by another stand-by on 9/27/1995.
Cameroon	Stand-By	9/27/1995	67.6	28.2	Approved after expiration of 3/14/1994 stand-by.
Central African Republic	Stand-By	3/28/1994	16.48	10.71	
Chad	Stand-By	3/23/1994	16.52	10.32	
Colombia	EFF	12/20/1999	1957	0	
Congo, Rep of	Stand-By	8/27/1990	27.98	4	
Congo, Rep of	Stand-By	5/27/1994	23.16	12.5	
Costa Rica	Stand-By	4/8/1991	33.64	25.64	Extended from 4/7/1992.
Costa Rica	Stand-By	4/19/1993	21.04	0	
Costa Rica	Stand-By	11/29/1995	52	0	
Côte D'Ivoire	Stand-By	9/20/1991	82.75	33.1	
Croatia	Stand-By	10/14/1994	65.4	13.08	
Croatia	EFF	3/12/1997	353.16	28.78	
Croatia	Stand-By	3/19/2001	200	0	Precautionary arrangement.
Czech Republic	Stand-By	3/17/1993	177	70	
Czechoslovakia	Stand-By	1/7/1991	619.5	619.5	Extended from 3/6/1992. Followed by another stand-by on 4/3/1992.
Czechoslovakia	Stand-By	4/3/1992	236	36	Cancelled prior to expiration date 4/2/1993. (Czechoslovakia ceased to exist on 1/1/1993.)
Dominican Republic	Stand-By	8/28/1991	39.24	39.24	Followed by another stand-by on 7/9/1993.
Dominican Republic	Stand-By	7/9/1993	31.8	16.8	
Ecuador	Stand-By	12/11/1991	75	18.56	
Ecuador	Stand-By	5/11/1994	173.9	98.9	Approved amount increased in 11/1994. Cancelled prior to expiration date of 3/31/1996.
Ecuador	Stand-By	4/19/2000	226.73	113.35	
Egypt	Stand-By	5/17/1991	234.4	147.2	Extended from 11/30/1992.
Egypt	EFF	9/20/1993	400	0	
Egypt	Stand-By	10/11/1996	271.4	0	Precautionary arrangement.
El Salvador	Stand-By	8/27/1990	35.6	0	
El Salvador	Stand-By	1/6/1992	41.5	0	Followed by another stand-by on 5/10/1993.

(*continued*)

APPENDIX 2. *(continued)*

Country	Program Type	Begin Date	Commitment Amount (Millions SDRs)	Drawn Amount (Millions SDRs)	Comments
El Salvador	Stand-By	5/10/1993	47.11	0	Approved after expiration of 1/6/1992 stand-by. Extended from 3/9/1994. Amount increased 11/1994.
El Salvador	Stand-By	7/21/1995	37.68	0	
El Salvador	Stand-By	2/28/1997	37.68	0	Extended from 4/27/1998.
El Salvador	Stand-By	9/23/1998	37.68	0	
Estonia	Stand-By	9/16/1992	27.9	27.9	Followed by another stand-by on 10/27/1993.
Estonia	Stand-By	10/27/1993	11.63	11.63	Approved after expiration of 9/16/1992 stand-by. Followed by another stand-by on 4/11/1995.
Estonia	Stand-By	4/11/1995	13.95	0	Approved after expiration of 10/27/1993 stand-by. Followed by another stand-by on 7/29/1996.
Estonia	Stand-By	7/29/1996	13.95	0	Approved after expiration of 4/11/1995 stand-by.
Estonia	Stand-By	12/17/1997	16.1	0	Precautionary arrangement.
Estonia	Stand-By	3/1/2000	29.34	0	Precautionary arrangement.
Gabon	Stand-By	9/30/1991	28	4	
Gabon	Stand-By	3/30/1994	38.6	38.6	
Gabon	EFF	11/8/1995	110.3	60.67	Extended from 11/7/1998 to 3/7/1999.
Gabon	Stand-By	10/23/2000	92.58	13.22	
Georgia	Stand-By	6/28/1995	72.15	22.2	Cancelled prior to expiration date of 6/27/1996.
Guatemala	Stand-By	12/18/1992	54	0	
Haiti	Stand-By	3/8/1995	20	16.4	
Honduras	Stand-By	7/27/1990	30.5	30.5	Extended from 7/26/1991.
Hungary	Stand-By	3/14/1990	159.21	127.37	Cancelled prior to expiration date of 3/13/1991.
Hungary	EFF	2/20/1991	1114	557.23	Cancelled prior to expiration date of 2/19/1994.
Hungary	Stand-By	9/15/1993	340	56.7	
Hungary	Stand-By	3/15/1996	264.18	0	
India	Stand-By	1/18/1991	551.93	551.93	
India	Stand-By	10/31/1991	1656	1656	

Indonesia	Stand-By	11/5/1997	8338.24	3669.12	Approved under IMF's emergency procedures. Access increased 7/15/1998. Cancelled prior to expiration date of 11/4/2000.
Indonesia	EFF	8/25/1998	5383.1	3797.7	Prior SBA cancelled, replaced by EFF. EFF to cover remaining period of SBA. Cancelled before expiration date of 11/5/2000, replaced by EFF on 2/4/2000.
Indonesia	EFF	2/4/2000	3638	851.15	
Jamaica	Stand-By	3/23/1990	82	82	Followed by another stand-by on 6/28/1991.
Jamaica	Stand-By	6/28/1991	43.65	43.65	Extended from 6/30/1992.
Jamaica	EFF	12/11/1992	109.13	86.75	Extended from 12/10/1995 to 2/24/1996 and 3/16/1996.
Jordan	Stand-By	2/26/1992	44.4	44.4	Extended from 8/25/1993.
Jordan	EFF	5/25/1994	189.3	130.32	Approved amount increased in 9/1994 and 2/1995. Cancelled prior to expiration date of 5/24/1997. Replaced by another EFF 2/9/1996.
Jordan	EFF	2/9/1996	238.04	202.52	Approved amount increased from 200.8 in 2/1997.
Jordan	EFF	4/15/1999	127.88	36.54	
Kazakhstan	Stand-By	1/26/1994	123.75	74.25	Extended from 1/25/1995. Followed by another stand-by on 6/5/1995.
Kazakhstan	Stand-By	6/5/1995	185.6	185.6	Approved after expiration of 1/26/1994 stand-by.
Kazakhstan	EFF	7/17/1996	309.4	154.7	
Kazakhstan	EFF	12/13/1999	329.1	0	
Korea	Stand-By	12/4/1997	15500	14412.5	Approved under IMF's emergency procedures.
Kyrgyz Republic	Stand-By	5/12/1993	27.09	11.61	
Latvia	Stand-By	9/14/1992	54.9	54.9	Followed by another stand-by on 12/15/1993.
Latvia	Stand-By	12/15/1993	22.88	9.15	Approved after expiration of 9/14/1992 stand-by. Followed by another stand-by on 4/21/1995.
Latvia	Stand-By	4/21/1995	27.45	0	Approved after expiration of 12/15/1993 stand-by. Followed by another stand-by on 5/24/1996.
Latvia	Stand-By	5/24/1996	30	0	Approved after expiration of 4/21/1995. Followed by another stand-by on 10/10/1997. Precautionary arrangement.

(*continued*)

APPENDIX 2. *(continued)*

Country	Program Type	Begin Date	Commitment Amount (Millions SDRs)	Drawn Amount (Millions SDRs)	Comments
Latvia	Stand-By	10/10/1997	33	0	Approved after expiration of 5/24/1996 stand-by.
Latvia	Stand-By	12/10/1999	33	0	Precautionary arrangement.
Latvia	Stand-By	4/20/2001	33	0	Precautionary arrangement.
Lesotho	Stand-By	9/23/1994	8.37	0	Cancelled. Replaced by another stand-by on 7/31/1995.
Lesotho	Stand-By	7/31/1995	7.17	0	Approved after expiration of 9/23/1994 stand-by. Followed by another stand-by on 9/23/1996.
Lesotho	Stand-By	9/23/1996	7.17	0	Approved after expiration of 7/31/1995 stand-by.
Lithuania	Stand-By	10/21/1992	56.93	56.93	Followed by another stand-by on 10/22/1993.
Lithuania	Stand-By	10/22/1993	25.88	5.18	Approved after expiration of 10/21/1992 stand-by. Cancelled prior to expiration date of 3/21/1995.
Lithuania	EFF	10/24/1994	134.55	134.55	
Lithuania	Stand-By	3/8/2000	61.8	0	Precautionary arrangement.
Lithuania	Stand-By	8/30/2001	86.52	0	Precautionary arrangement.
Macedonia, FYR	Stand-By	5/5/1995	22.3	22.3	
Macedonia, FYR	EFF	11/29/2000	24.115	1.15	
Malawi	Stand-By	11/16/1994	15	12.72	
Mexico	Stand-By	2/1/1995	12070.2	8758.02	Extended from 8/15/1996. Initial amount approved 2/1/1995 and increased 6/30/1995.
Mexico	Stand-By	7/7/1999	3103	1939.5	
Moldova	Stand-By	12/17/1993	51.75	51.75	Followed by another stand-by on 3/22/1995.
Moldova	Stand-By	3/22/1995	58.5	32.4	Approved after expiration of 12/17/1993 stand-by.
Moldova	EFF	5/20/1996	135	87.5	
Mongolia	Stand-By	10/4/1991	22.5	13.75	Extended from 10/3/1992.
Morocco	Stand-By	7/20/1990	100	48	
Morocco	Stand-By	1/31/1992	91.98	18.4	
Nicaragua	Stand-By	9/18/1991	40.86	17.03	
Niger	Stand-By	3/4/1994	18.6	11.1	

Nigeria	Stand-By	1/9/1991	319	0	
Nigeria	Stand-By	8/4/2000	788.94	0	
Pakistan	Stand-By	9/16/1993	265.4	88	Cancelled prior to expiration date 9/15/1994. Replaced by an EFF/ESAF in 2/1994.
Pakistan	EFF	2/22/1994	379.1	123.2	EFF and parallel ESAF replaced by a stand-by approved by IMF Board 12/13/1995. Three purchases made under EFF. Cancelled on 12/13/1995 prior to expiration.
Pakistan	Stand-By	12/13/1995	562.59	294.69	Extended from 3/31/1997. Amount increased 12/17/1996.
Pakistan	EFF	10/20/1997	454.92	113.74	This EFF approved along with an ESAF.
Pakistan	Stand-By	11/29/2000	465	150	
Panama	Stand-By	2/24/1992	74.17	54.57	Extended from 12/23/1993. Amount decreased from 93.68 in 12/1993.
Panama	Stand-By	11/29/1995	84.3	84.3	Approved amount increased from 69.8.
Panama	EFF	12/10/1997	120	40	
Panama	Stand-By	6/30/2000	64	0	
Peru	EFF	3/18/1993	1018	642.69	This arrangement followed by another EFF on 7/1/1996.
Peru	EFF	7/1/1996	300.2	160.5	Approved amount increased.
Peru	EFF	6/24/1999	383	0	Precautionary arrangement.
Peru	Stand-By	3/12/2001	128	0	Precautionary arrangement.
Philippines	Stand-By	2/20/1991	334.2	334.2	Extended from 8/19/1992 to 12/31/1992 and 3/31/1993. Amount includes augmentation of 70.
Philippines	EFF	6/24/1994	791.2	791.2	Arrangement extended from 6/23/97 to 7/23/1997, 12/31/1997, and 3/31/1998. Access increased 7/18/1997. Followed by another stand-by on 4/1/1998.
Philippines	Stand-By	4/1/1998	1020.79	545.66	Approved after expiration of 6/24/1994 EFF. Extended from 3/31/2000 to 6/30/2000. Then extended to 12/31/2000.
Poland	Stand-By	2/5/1990	545	357.5	

(*continued*)

APPENDIX 2. *(concluded)*

Country	Program Type	Begin Date	Commitment Amount (Millions SDRs)	Drawn Amount (Millions SDRs)	Comments
Poland	EFF	4/18/1991	1224	76.5	Cancelled prior to expiration date of 4/17/1994.
Poland	Stand-By	3/8/1993	476	357	Extended from 3/7/1994.
Poland	Stand-By	8/5/1994	333.3	283.3	Approved amount increased in 10/1994, then decreased to 333.3 in 9/1995.
Romania	Stand-By	4/11/1991	380.5	318.1	Followed by another stand-by on 5/29/1992.
Romania	Stand-By	5/29/1992	314.04	261.7	Approved after expiration of 4/11/1991 stand-by.
Romania	Stand-By	5/11/1994	320.5	94.27	Extended from 12/10/1995 and cancelled prior to expiration date of 4/24/1997. Replaced by another stand-by on 4/22/1997.
Romania	Stand-By	4/22/1997	301.5	120.6	Replaced the 5/11/1994 stand-by.
Romania	Stand-By	8/5/1999	400	139.75	Extended from 3/31/2000 to 5/31/2000. Then extended to 2/28/2001.
Russian Federation	Stand-By	8/5/1992	719	719	
Russian Federation	Stand-By	4/11/1995	4313.1	4313.1	Cancelled prior to expiration date of 4/10/1996.
Russian Federation	EFF	3/26/1996	13206.57	5779.71	Arrangement terminated on 3/26/1999 prior to 3/25/2000 end date.
Russian Federation	Stand-By	7/28/1999	3300	471.43	
Senegal	Stand-By	3/2/1994	47.56	30.91	Cancelled prior to expiration date of 3/1/1995.
Slovak Republic	Stand-By	7/22/1994	115.8	32.15	
Sri Lanka	Stand-By	4/20/2001	200	103.35	Precautionary arrangement.

Tajikistan	Stand-By	5/8/1996	15	15	
Thailand	Stand-By	8/20/1997	2900	2500	
Trinidad and Tobago	Stand-By	4/20/1990	85	85	Approved after expiration of 1/13/1989 stand-by.
Turkey	Stand-By	7/8/1994	610.5	460.5	Extended from 9/7/1995. Amount increased 4/1995.
Turkey	Stand-By	12/22/1999	8676	2843.8	
Ukraine	Stand-By	4/7/1995	997.3	538.65	Followed by another stand-by on 5/10/1996.
Ukraine	Stand-By	5/10/1996	598.2	598.2	Approved after expiration of 4/7/1995 stand-by. Extended from 2/9/97.
Ukraine	Stand-By	8/25/1997	398.92	181.33	
Ukraine	EFF	9/4/1998	1919.95	712.15	Approved amount increased 5/27/1999. Arrangement extended to 8/15/2002.
Uruguay	Stand-By	12/12/1990	94.8	9	
Uruguay	Stand-By	7/1/1992	50	15.97	
Uruguay	Stand-By	3/1/1996	100	0	Followed by another stand-by on 6/20/1997.
Uruguay	Stand-By	6/20/1997	125	114.2	Approved after expiration of 5/1/1996 stand-by.
Uruguay	Stand-By	3/29/1999	70	0	Precautionary arrangement.
Uruguay	Stand-By	5/31/2000	150	0	Precautionary arrangement.
Venezuela	Stand-By	7/12/1996	975.65	350	Only one purchase made as BOP position strengthened, creating pressure on public spending and sending program off track.
Vietnam	Stand-By	10/6/1993	145	108.8	Cancelled prior to extended date 12/31/1994 (original date was 10/5/1994).
Zimbabwe	EFF	1/24/1992	340.8	71.2	EFF cancelled prior expiration date 1/23/1995.
Zimbabwe	EFF	9/11/1992	114.6	86.9	
Zimbabwe	Stand-By	6/1/1998	130.65	39.2	
Zimbabwe	Stand-By	8/2/1999	141.36	24.74	

APPENDIX 3.

One-Year Horizon

In a sample of currency crashes, chief executives were 1.7 times as likely to lose their jobs over the subsequent 12 months if their government had said it would not devalue (⅔) than if it had not said so (7/18).

A. Promises by Premiers, Finance Ministers, Central Bank (CB) Governors

(1) Summary Table

	Changes in Premier	No Changes in Premier	Frequency of Change in Premier	Total Case Studies
Promise	4	2	2/3	6
No Promise	7	11	7/18	18
Total	11	13		24

(2) Background Table 1 (Changes in Premier)

Country	Month of Devaluation	Date of Premier Change	Presence of Promise (by whom)	Newspaper (date of report)
Argentina	03/75	03/24/75	No	*La Prensa*
Argentina	04/81	12/11/81	No	*La Prensa*
Argentina	04/89	07/08/89	Yes (CB governor)	*La Prensa* (03/31/89)[1]
Argentina	01/02	01/02/02	Yes (premier)	*La Prensa* (12/27/01)[2]
Korea	12/97	02/25/98	No	*Maeil Business Daily*
Mexico	09/76	12/01/76	No	*El Excelsior*
Mexico	02/82	12/01/82	Yes (premier and CB governor)	*El Universal* (02/06/82)[3]
Lebanon	08/90	12/24/90	No	*Al Hayat*
Sierra Leone	08/97	03/10/98	No	*Sierra Leone News*
Venezuela	02/02	04/13/02	Yes (CB governor)	*El Diario* (02/08/02)[4]
Syrian Arab Republic	01/88	11/01/ 88	No	*Al Ba'ath*

[1]"Central Bank Governor Jose Machinea denied yesterday that modifications to the exchange rate markets are under study and announced a monetary policy tightening through a strong increase in the interest rates in order to stop the increase of the dollar."

[2]"'We don't want to be slaves,' said the president [Alberto Rodriguez Saa] during an effusive speech at the CGT. There he made transcendental announcements that there will be neither devaluation nor dollarization; and that there will be a new third currency, the 'argentinian,' backed by the governmental real estate."

[3]"In a vibrant announcement the president [Jose Lopez Portillo] pointed out the most important aspects of the strategy to follow . . . The peso will keep floating and to compensate for its floating path it has been set compensatory tariff and license system. Romero Kolbeck [Banco de Mexico director] denied the rumor of a devaluation, the peso will keep floating . . . 'There is no chance for a devaluation for our currency and therefore the floating scheme will keep going,' said Gustavo Romero Kolbeck. 'If these rumors were true, that a devaluation is being structured then I wouldn't be here right now,' said a smiling Romero Kolbeck." The famous quotation that Lopez Portillo would "defend the peso like a dog" was evidentially made in a State of the Union address in August 1981, a year before the devaluation, and did not receive the newspaper attention contemporaneously that it did ex post.

[4]"Castellanos [president, Central Bank of Venezuela] claimed that the decision of the government to address the fiscal problem of the country and develop other public initiatives will allow the

(3) Background Table 2 (No Change in Premier)

Country	Month of Devaluation	Date of Premier Change	Presence of Promise (by whom)	Newspaper (date of report)
Chile	07/71	09/11/73	No	*El Mercurio*
Chile	03/75	03/11/90	No	*El Mercurio*
Chile	07/85	03/11/90	No	*El Mercurio*
Kenya	04/93	12/30/02	Yes (finance minister)	*Daily Nation* (03/23/93)[1]
Lebanon	01/85	06/01/87	No	*Al Anwar*
Nigeria	10/86	08/26/93	No	*Daily Times*
Nigeria	03/92	08/26/93	No	*Daily Times*
Peru	06/76	07/28/80	No	*El Comercio*
Peru	12/87	07/28/90	Yes (finance minister)	*El Comercio* (11/27/87)[2]
Uganda	06/81	07/27/85	No	*Uganda Times*
Uruguay	03/72	07/13/76	No	*El Dia*
Uruguay	11/82	02/12/85	No	*El Dia*
Zambia	10/85	11/02/91	No	*Zambia Daily Mail*

[1]"The Kenyan government went back to forex control. It rejected all IMF rules; Finance Minister Musalia Mudavadi said that Kenyan economy could no longer absorb further devaluation of the shilling." [Nonetheless, devaluation occurred on April 21].

[2]"Saberbein [minister of the economy and finance] said that the devaluation would be progressive *next year.* The exchange rate or the price of dollar would move along with wholesale prices during *the next year* as a clear export-supporting policy, for the aim is keep growing fostering external sector." [Despite Saberbein's statement the devaluation actually took place December 15].

B. Promises by Premiers

Summary Table

	Changes in Premier	No Changes in Premier	Frequency of Change in Premier	Total Case Studies
Promise	2	0	2/2	2
No Promise	9	13	9/22	22
Total	11	13		24

APPENDIX 4.

Half-Year Horizon

In a sample of currency crashes, chief executives were more than twice as likely to lose their jobs over the subsequent six months if their government had said it would not devalue (½) as if it had not said so (2/9).

A. Promises by Premiers, Finance Ministers, Central Bank Governors

Summary Table

	Changes in Premier	No Changes in Premier	Frequency of Change in Premier	Total Case Studies
Promise	3	3	1/2	6
No Promise	4	14	2/9	18
Total	7	17		24

B. Promises by Premiers

Summary Table

	Changes in Premier	No Changes in Premier	Frequency of Change in Premier	Total Case Studies
Promise	1	1	1/2	2
No Promise	6	16	6/22	22
Total	7	17		24

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