

CREDITOR PANICS: CAUSES AND REMEDIES

Jeffrey D. Sachs

Emerging market financial crises are characterized by an abrupt and significant shift from net capital inflow to net capital outflow from one year to the next. By this standard, we find 10 cases of significant financial crisis among the middle-income developing countries in the past four years: Turkey 1994, Venezuela 1994, Argentina 1995, Mexico 1994–95, Indonesia 1997–98, Korea 1997–98, Malaysia 1997–98, Philippines 1997–98, Thailand 1997–98, and Russia 1998.¹ It is the contention of this paper that such crises typically reflect a three-stage process that hits a developing country engaged in large-scale international borrowing.² In the first stage, the exchange rate becomes overvalued as a result of internal or external macroeconomic events. In the second stage, the exchange rate is defended, but at the cost of a substantial drain of foreign exchange reserves held by the Central Bank. In the third stage, the depletion of reserves, usually in combination with a devaluation, triggers a panicked outflow by foreign creditors holding short-term claims.

The trigger of panic, in most cases, is the devaluation itself, resulting from the exhaustion of reserves. The panicked outflow of short-term creditors leads to macroeconomic overshooting, characterized by sharp economic downturn, typically followed by a nearly equally sharp recovery. Various dimensions of the macroeconomy are involved in this overshooting: real GDP, the real exchange rate, real interest rates, net capital flows, and stock market valuations.

Cato Journal, Vol. 18, No. 3 (Winter 1999). Copyright © Cato Institute. All rights reserved.

Jeffrey D. Sachs is the Galen L. Stone Professor of International Trade at Harvard University and Director of the Harvard Institute for International Development.

¹For further details on many of these cases, see Radelet and Sachs (1998b).

²More detailed arguments along these lines in the case of Mexico can be found in Sachs, Tornell, and Velasco (1996a, 1996b) and in the case of East Asia in Radelet and Sachs (1998a and 1998b). Two important theoretical treatments of these crises are Chang and Velasco (1998a, 1998b), extended to an empirical discussion of East Asia in Chang and Velasco (1998c).

Some observers, such as the editorial page of the *Wall Street Journal*, have attributed these crises to currency devaluation, since the panics have almost always followed a devaluation of the currency. As a result, those observers have generally concluded that devaluations should be avoided at all costs, since the panics have almost all followed currency devaluations. I suggest a very different point of view: that it is not the devaluation but rather the *defense* of the exchange rate preceding the crisis that has often opened the door to financial panic. In my view, the devaluation by itself is not particularly harmful, and may well be beneficial even in the short term.³ The harm comes mainly, or perhaps entirely, from the depletion of foreign exchange reserves. The devaluation which follows the depletion of reserves usually alerts the market to the exhaustion of reserves, a state of affairs that is not fully apparent to many market participants before the devaluation takes place. When the devaluation occurs, short-term interbank credits in particular become subject to an abrupt, self-fulfilling loss of confidence. In summary, the devaluation signals the depletion of reserves; the depletion of reserves signals the inability of the central bank to act as a lender of last resort vis-à-vis foreign creditors; the short-term foreign creditors flee in panic; and the macroeconomy collapses as a result of the creditor flight. The rest of the paper describes this sequence of events and draws some policy conclusions from it.

Balance of Payments Crisis

The starting point of most emerging markets crises in recent years is a balance of payments crisis, that is, the exhaustion of foreign exchange reserves following the defense of a pegged exchange rate. In most cases, the sequence of events is as follows. First, macroeconomic shocks change the full-employment equilibrium ratio of tradeable goods prices (P_t) to nontradeable goods prices (P_n), a ratio we define as the real exchange rate $R (= P_t/P_n)$. Second, the gap between the prevailing R and the R consistent with "internal balance" (i.e., with full-employment equilibrium) leads to speculation against the currency. Third, reserves are depleted in the defense of the currency. Fourth, the depletion of reserves leads to a subsequent full-blown financial panic.

³Even less harmful than a discrete devaluation is a gradual depreciation of the currency in response to macroeconomic shocks. Thus, Australia, Canada, Chile, and New Zealand all weathered a terms-of-trade deterioration in 1998 through a gradual and relatively uneventful depreciation of their currencies. Since their exchange rates were floating, and all four countries had ample foreign exchange reserves, the depreciation of the currency did not trigger a financial panic in any of the four cases.

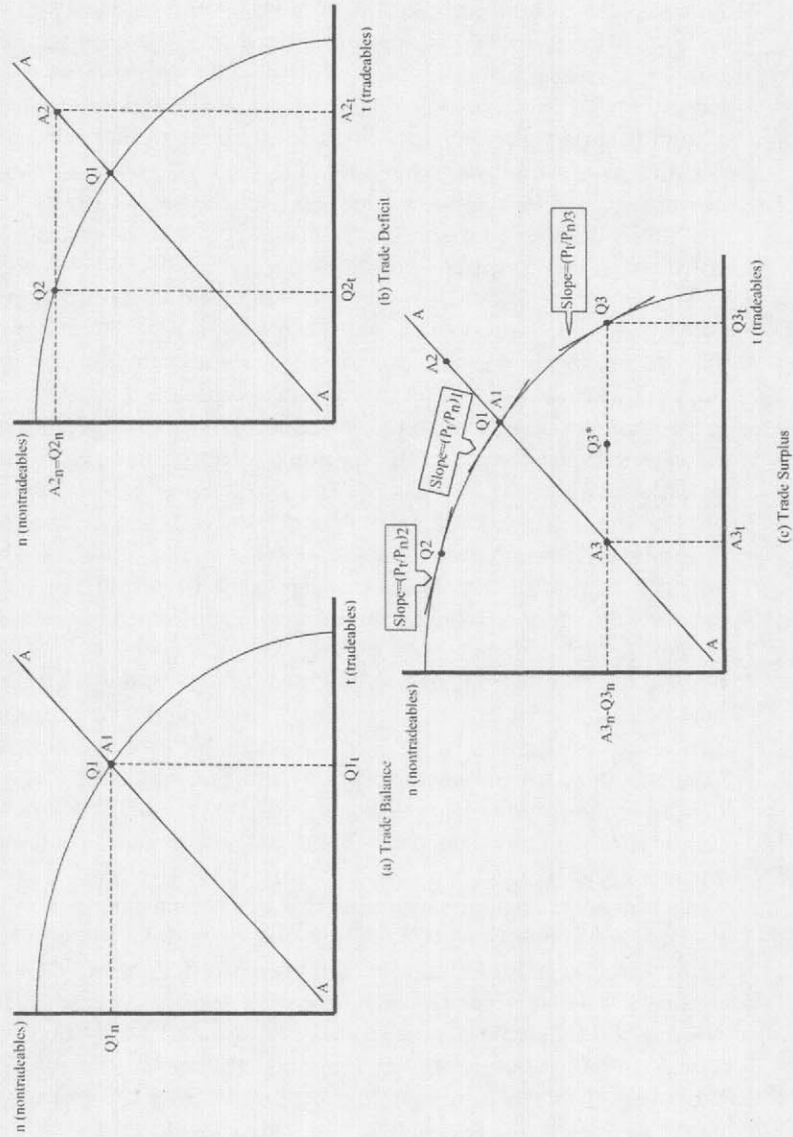
We know from standard macroeconomic theory that the real exchange rate consistent with internal balance appreciates (P_t/P_n falls) when the following events occur: (1) a terms of trade improvement; (2) a reduction of world interest rates, leading to increased net capital inflows; (3) a liberalization of the capital account that leads to capital inflows; (4) a reduction of country risk, leading to increased capital inflows; (5) fiscal expansion; (6) other positive wealth effects (e.g., a natural resource discovery); (7) liberalization of the domestic financial system that permits increased flows from savers to investors, thereby boosting domestic investment spending; and (8) a rise in investment as the result of increased confidence about future productivity. The real exchange rate consistent with internal balance depreciates (P_t/P_n rises) when the converse conditions apply.

The standard approach to real exchange rate determination is the “dependent economy model,” due originally to W. E. G. Salter (1959) and Trevor Swan (1960), as shown in Figure 1.⁴ The production possibility frontier PPF shows the range of tradeable and nontradeable goods that can be produced in the economy. The absorption schedule AA shows the level of domestic spending (absorption equals consumption plus investment) that falls on the two types of goods. The farther out on the AA schedule from the origin, the greater is the total domestic spending. When the economy is at point Q1, total absorption equals total production. Trade is balanced, with output and spending on tradeable goods given by the level $Q1_t$, and output and spending on nontradeable goods given by $Q1_n$. When absorption is at level 2, beyond the PPF, then the economy is running a trade deficit. Production takes place at point Q2, at which nontraded goods production and absorption is given by $Q2_n = A2_n$. Tradeable production is at point $Q2_t$, less than tradeables absorption $A2_t$. The difference, $A2_t - Q2_t$, measures the trade deficit. When absorption is at point A3, the economy is running a trade surplus. Production is at point Q3, with a trade surplus given by $Q3_t - A3_t$.

As is well known, the slope of the PPF at any point is equal to the real exchange rate, P_t/P_n . Thus, the real exchange rate is most depreciated at point Q3, and most appreciated at point Q2. The real exchange rate at point Q1 is in between these two cases. The key point is the following. For a given PPF, a rise of absorption leads to a real exchange rate appreciation. In essence, the rise of demand provokes an increase in spending on both tradeables and nontradeables. At a given real exchange rate, this leads to an excess demand for nontradeable goods, which in turn causes a rise in the relative

⁴A summary of this model may be found in Larrain and Sachs (1993: chap. 21).

FIGURE 1
PRODUCTION, ABSORPTION, AND THE REAL EXCHANGE RATE



price of nontradeables—that is, a real appreciation. (The increased demand for tradeables is met by net imports, rather than by increased domestic production). Contrariwise, a fall of absorption requires a real depreciation, as the cutback of spending on nontradeables leads to a reduction of the relative price of nontradeables.

A rise in absorption, leading to a real appreciation, can arise in many macroeconomic contexts, as noted previously. In the typical case in Latin America, real appreciation has occurred in the aftermath of stabilization from high inflation. In the typical case in East Asia, real appreciation resulted from capital market liberalization. Consider first the “Latin American case” of ending high inflation. At the beginning of successful stabilization programs, P_t/P_n tends to decline. This occurs for several reasons. First, domestic investment spending recovers at the prospect of improved domestic productivity. The stabilization may also lead to a consumption boom, as a result of the elimination of the inflation tax (this occurred strongly in Argentina and Brazil). The banking sector becomes remonetized, often through the repatriation of flight capital. This remonetization restarts domestic bank lending. Additionally, the stabilization may trigger a reduction in the risk premium on international lending to the country, thereby increasing net capital inflows. In the “East Asian case,” capital account liberalization (which occurred in the early 1990s in Thailand, Korea, the Philippines, and to an extent in Malaysia) led to a rise in absorption and a real appreciation. The opening of the domestic banking sector to international borrowing caused domestic real interest rates to fall and provoked a large inflow of lending from abroad, thus financing a substantial increase in investment spending as a percent of GDP.

In both Latin America and East Asia, the policy changes also included liberalization of the domestic banking system (e.g., a reduction of reserve requirements, an end of interest rate ceilings, and a liberalization of entry into the banking system). These changes also contributed to a rise in domestic absorption.

The boom in domestic absorption is typically transitory: the rapid rebuilding of the capital stock following a stabilization tends to be completed in a few years; the boom in net capital inflows abates; the remonetization of domestic banking systems is completed within a couple of years; and the initial consumption boom tapers off. *As a result, the pressures that lead to the initial real exchange rate appreciation at least partly reverse themselves, leading to pressures for real depreciation.* In a gradual (an optimal) adjustment, we might expect absorption to rise and then to decline gradually. In practice, a financial panic may drive the economy from A2 to A3, with harrowing consequences.

This pattern of appreciation followed by market pressures for real depreciation seems to have been the pattern in Argentina, Brazil, and Mexico, as well as in the developing countries of East Asia. Latin American stabilization was followed by an initial real appreciation, consistent with increased domestic spending and capital inflows. After a few years, however, the spending boom and capital inflows tended to abate, putting downward pressure on the real exchange rate. In East Asia, foreign lending began to abate by the end of 1996 in several countries as the huge inflows of capital financed an investment boom—and incipient overcapacity—by the end of 1996.

As is well known, necessary adjustments to the real exchange rate can be met either by price movements or by nominal exchange rate movements, depending on the exchange rate regime. The traded goods price is given by $P_t = EP_t^*$, where E is the nominal exchange rate (in units of domestic currency per unit of foreign exchange) and P_t^* is the world (dollar) price of tradeable goods. The real exchange rate is then $R = EP_t^*/P_n$. An appreciation can be brought about through either a nominal appreciation (E falls) or a rise in the price of nontradeable goods. A depreciation can be brought about through either a nominal depreciation (E rises) or a fall in the price of nontradeable goods.

Experience teaches that an absolute decline in P_n is difficult to achieve in a short period of time. When the extent of needed real depreciation is large, therefore, financial markets tend to expect that policymakers will support the relative price change through devaluation (or market-driven depreciation) of the nominal exchange rate rather than by internal price deflation (i.e., the decline in P_n). Therefore, when P_t/P_n is low relative to the market's estimate of the value consistent with full employment, there will almost inevitably be widespread expectations of a nominal exchange rate devaluation (or depreciation, if the currency is simply allowed to float).

Widespread expectations of depreciation can be difficult to resist, since in almost any economy, currency in circulation plus bank money (M2) is considerably higher than foreign exchange reserves. This is the case even when foreign exchange reserves are sufficient to cover high-powered money (notes in circulation plus commercial banks' reserves at the central bank), as is the case of currency board arrangements. Suppose that M2 holders begin to convert their money into foreign exchange in expectation of devaluation, and suppose that the central bank defends the exchange rate, by buying high-powered money and selling dollars. Suppose that the money multiplier is mm ($= M2/Mh$), greater than 1. In principle, each unit of high-powered money withdrawn from the banking sector and converted into foreign

exchange results in the reduction of $M2$ equal to $1/mm$. In principle, the central bank only needs foreign exchange reserves greater than or equal to Mh , rather than $M2$, in order to be able to stave off a successful attack on the exchange rate, since the reduction of Mh will lead to a multiplied reduction of $M2$.

This assumes, however, that the central bank will force the banking sector to shrink outstanding loans by a *multiple* of the initial withdrawal of funds. In practice, such a contraction of loans quickly leads to illiquidity of the banks, and therefore to an incipient bank panic. In short, money multiplication (in which a unit increase of Mh leads to mm units of increase of $M2$) is not quickly reversible, since the bank loans are tied up in nonliquid assets that cannot immediately be called in by the banks. The result is that the central bank must provide liquidity to the banking system when net withdrawals are made from the banking system. As a result, if money holders begin to convert $M2$ into foreign exchange, the central bank will need reserves nearly equal to $M2$, rather than merely Mh , in order to be able to defend the currency. Very few central banks have sufficient reserves to cover a wholesale withdrawal of funds from the banking sector. (To hold such a high level of reserves would also involve large opportunity costs, since reserves typically earn less than alternative investment opportunities available to the economy).

The main implication is that a concerted attack on the currency, one that involves—or could precipitate—a massive withdrawal of bank money, *is likely to succeed*, no matter what the resolve of the central bank. Markets understand this. Most currency pegs are therefore vulnerable to attack when the underlying real exchange rate is clearly overvalued relative to the level consistent with internal balance. Even if the government tries, through a heroic credit squeeze and sky-high interest rates (which reached overnight rates of 500 percent per annum during Sweden's ill-fated defense of its currency in 1992), the banking sector can easily crack before the defense establishes credibility. There are exceptions, no doubt. Perhaps Argentina and Hong Kong will prove to have a more credible peg, as a result of the institutional arrangements of the currency board system. Both economies have demonstrated the willingness to “walk through fire” to defend the peg; and both countries have implicit external backers of the currency regime (the United States and IMF in the case of Argentina; China in the case of Hong Kong). In any event, time will tell.

Creditor Panic

The essence of recent emerging markets crises is that the exchange rate defense, typically ending in a devaluation, has often been followed

by a rapid and ferocious withdrawal of credits by foreign investors. Thus, a current account deficit is not resolved by a return to current account balance but by a virulent swing of the current account into surplus. The crucial point is that it is financial market *panic*, not currency devaluation, which leads to the abrupt swing of the current account from deficit to surplus, and to acute damage to the emerging market and to the creditors.

In emerging markets, the domestic economy (including banks, non-financial enterprises, and government) is heavily indebted to foreign investors, including international banks, hedge funds, and other investment funds. Much of this debt is short-term (i.e., with maturity under one year), partly as a result of BIS regulations on capital adequacy that encourage short-term rather than long-term lending. Additionally, much of the debt has trigger clauses, such that repayment is immediately accelerated in the event of a contractual default by the debtor to *other* creditors (cross-default clauses). The borrowing, in general, has been converted into long-term, relatively illiquid investments. As a result, total short-term debt is often significantly greater than the available short-term assets that might be mobilized to repay creditors in the event of a withdrawal of new lending. As a rough measure, one could compare a country's short-term debts to international banks with the foreign exchange reserves held at the central bank, shown in Table 1. Steve Radelet and I found that when a nation's ratio of debt to reserves is greater than 1, that country has proven to be particularly vulnerable to a creditor panic (Radelet and Sachs 1998b).

The central bank's foreign exchange reserves are crucial since the central bank is widely, and rightly, understood to be the lender of last resort not only to the banks, but to the government and corporate sector as well, in the event of an external creditor panic. Suppose that foreign banks begin to withdraw credit lines from domestic banks, demanding repayment of outstanding loans. This immediately leads to financial distress in the banking system, since the banks have transformed the foreign loans into long-term investments. The bank may, to some extent, use liquid domestic assets to purchase dollars in the foreign exchange market, but even so, the bank is unlikely to have sufficient liquid assets on hand to meet a large-scale withdrawal of funds. Thus, the central bank will almost surely have to extend credit, either directly as foreign exchange loans, or as domestic credit which is then sold in the foreign exchange market. In the latter case, of course, the exchange rate will depreciate in the absence of official intervention.

Once foreign exchange reserves have been depleted, the central bank's lender-of-last-resort functions are deeply compromised, and

TABLE 1
SHORT-TERM DEBT AND RESERVES: SELECTED DEVELOPING COUNTRIES, 1994 AND 1997
(Millions of Dollars)

Country	June 1994			June 1997			Ratio: Debt-to-Reserves
	Short-Term Debt	Reserves	Ratio: Debt-to-Reserves	Short-Term Debt	Reserves	Ratio: Debt-to-Reserves	
Argentina	17,557	13,247	1.325	23,891	19,740	1.210	
Brazil	28,976	41,292	0.702	44,223	55,849	0.792	
Chile	5,447	10,766	0.506	7,615	17,017	0.447	
Colombia	3,976	7,718	0.515	6,698	9,940	0.674	
India	5,062	16,725	0.303	7,745	25,702	0.301	
Indonesia	18,822	10,915	1.724	34,661	20,336	1.704	
Jordan	647	1,291	0.501	582	1,624	0.358	
Korea	35,204	21,685	1.623	70,612	34,070	2.073	
Malaysia	8,203	32,608	0.252	16,268	26,588	0.612	
Mexico	28,404	16,509	1.721	28,226	23,775	1.187	
Pakistan	1,708	2,307	0.740	3,047	1,249	2.440	
Peru	2,157	5,611	0.384	5,368	10,665	0.503	
Philippines	2,646	6,527	0.405	8,293	9,781	0.848	
South Africa	7,108	1,755	4.050	13,247	4,241	3.124	
Sri Lanka	511	1,983	0.258	414	1,770	0.234	
Taiwan	17,023	90,143	0.189	21,966	90,025	0.244	
Thailand	27,151	27,375	0.992	45,567	31,361	1.453	
Turkey	8,821	4,279	2.061	13,067	16,055	0.814	
Venezuela	4,382	5,422	0.808	3,629	13,215	0.275	
Zimbabwe	704	534	1.319	731	447	1.635	

SOURCE: Radelet and Sachs (1998b: 15).

understood to be so. Even if the central bank extends domestic credit (of which there is no limit), the exchange market implications are likely to be dire in the event of a large, synchronized withdrawal of creditor claims. Indeed, such withdrawals will almost surely provoke not only a collapse of the exchange rate but a suspension of debt payments if foreign exchange reserves are depleted and the stock of short-term debts being withdrawn is large relative to trade flows.

In those circumstances (a depletion of foreign exchange reserves and a high level of short-term debt), the economy becomes vulnerable to a self-fulfilling run. Even if fundamentals are adequate to ensure long-term debt servicing without default, they are not adequate to guarantee short-run debt servicing in the event of a panic. Thus, a panic can unfold simply by the belief of creditors that it will indeed occur. In the past several years, such panics have been triggered mainly by three types of events: (1) the sudden discovery that reserves are less than previously believed; (2) unexpected devaluation (often in part for its role in signaling the depletion of reserves); and (3) contagion from neighboring countries, in a situation of perceived vulnerability (low reserves, high short-term debt, and an overvalued currency).

It is interesting and important to stress that currency devaluation, following a long defense of the exchange rate, has typically been the most important trigger of subsequent panic. This seems to be the result of several factors. First, many investors have been caught off guard by the devaluation even when it has been widely discussed. These investors seem, incredibly enough, to have taken at face value the solemn commitments of governments not to devalue. Second, the devaluations are often the signal that foreign reserves are lower than publicly announced up to that point. In Mexico in 1994, the late-December devaluation "revealed" the steep loss of reserves in early December 1994. In Thailand, the July 2, 1997, devaluation was followed by public announcements that the Thai central bank had a large book of forward dollar sales. Those dollar sales were not previously announced, and came as a large jolt to the market. In Korea, the December 1997 devaluation was the occasion for revealing that much of the central bank's announced foreign reserves were actually illiquid claims on Korean banks, the result of preceding unannounced deposits of the reserves in offshore Korean banks experiencing a run on interbank loans (in effect, the central bank had been making unannounced extensions of credit to offshore Korean banks). Speaking in the most general terms, the collapses of pegged exchange rate regimes have also been viewed as improper "breaches of faith" with foreign

investors, despite the fact that such devaluations were almost always the result of *force majeure* (i.e., the depletion of foreign reserves.)

When the panic gains full force, the effects are devastating. The rational behavior of each short-term creditor is to demand repayment as rapidly as contractually possible and to suspend routine interbank lines that support letters of credit and other standard trade financing operations. Long-term fundamentals cease to play any role in investor thinking, since the logic of *sauve qui peut* dominates in a creditor scramble in which creditors are serviced on a first-come, first-served basis. The macroeconomic results are a huge overshooting: (1) debt is drawn down even when domestic investments (e.g., in working capital and letters of credit) have a rate of return vastly greater than the world cost of capital; (2) the real exchange rate depreciates sharply, far overshooting any real correction that needs to be made; (3) the current account swings wildly from deficit to outright surplus; (4) the banking system suffers illiquidity, and perhaps an ancillary panic by domestic savers; (5) market real interest rates soar to astronomical levels, as each borrower scrambles to mobilize funds to avoid default; and (6) partial default on foreign exchange obligations becomes almost assured. The key effects on macroeconomic contraction are the collapse of bank lending, leading to a collapse of trade and production, and the conversion of illiquidity into insolvency over the course of a few months, as loans become nonperforming—under the weight of reduced production and sales and the crushingly high interest rates on working capital.

The implications of a bank panic may be represented in a stylized way using the two-sector diagram. The abrupt withdrawal of credits forces the economy, dramatically, from A2 to A3. In the full-employment model, this causes production to shift from Q2 to Q3, with an attendant large depreciation of the real exchange rate. In practice, the accompanying financial distress forces the economy far inside the production possibility frontier, to a point like Q3*. Both tradeable and nontradeable production are much less than is consistent with full-employment equilibrium, since firms can not get working capital to maintain production at feasible levels.

Further Discussion of the Links of Balance of Payments Crisis and Creditor Panic

So far, I have told the story in a linear way: from overvalued exchange rate to balance of payments crisis to foreign creditor panic. This sequencing seems to represent an appropriate stylized description of recent crises. In theory, the linkages of balance of payments crises

and creditor panics can be considerably more complicated. The sequence of papers by Chang and Velasco (1998a, 1998b, 1998c) provide the clearest discussion of these issues yet available.

A complete theoretical account must recognize several distinct kinds of financial fragility. Panics can involve several types of motivations: fear of country-level illiquidity (total liquid foreign exchange liabilities exceed total liquid foreign exchange assets in the country); fear of banking collapse (total liquid liabilities of banks exceed total liquid assets); fear of exchange rate depreciation (expectations, perhaps self-fulfilling, of a capital loss on domestic-currency assets). Each of these fears can lead to a self-fulfilling outcome.⁵ Moreover, these concerns can interact in complex ways. I have argued that fears of a devaluation can lead to the conversion of domestic money into foreign money, thereby draining foreign reserves and opening the country to a creditor panic. Alternatively, the panic may start simply as a bank run, in which either foreign or domestic bank creditors, or both, withdraw their claims on the banks out of fear of banking-sector illiquidity. In that case, a financial panic can occur even without an overvalued currency. The central bank cannot save the banking system if the banks' foreign exchange liabilities exceed the foreign reserves available to the central bank (plus the liquid foreign exchange reserves held by the commercial banks).

In short, there are many paths to financial crisis. The one described in this paper, from overvalued currency to loss of reserves to creditor panic, is just one possibility. A plain-vanilla banking panic is another. Distinguishing among types of financial crises involves not only theoretical questions but empirical questions of considerable subtlety.

Policy Implications and Outstanding Issues

The main policy issues are: (1) how to prevent a balance of payments crisis that leads to a creditor panic; and (2) how to respond to a crisis that in fact occurs. On the first point, the logic of these crises points to three principal policies. *First, flexible exchange rates dominate pegged exchange rates in almost all cases*, since the central bank does not need to squander foreign reserves in a defense of an overvalued currency. Even the successful peggers, Argentina and Hong Kong, do not escape the implications of creditor panic. Argentina suffered a decline of 7 percent of GDP in 1995 in the wake of creditor panic. Hong Kong experienced an unprecedented decline of around 4 per-

⁵Specifically, there are multiple equilibria. If the fear becomes widespread, the feared outcome occurs, while if the fear is not widespread, then the outcome does not occur.

cent of GDP in 1998. *Second, short-term borrowing by domestic banks and government should be limited as a matter of prudential policy.* There is simply no excuse for allowing a high level of maturity transformation of foreign short-term loans into domestic investments. Limits on short-term borrowing by banks should fall under the heading of prudential standards rather than capital controls. And yes, foreign loans should be treated differently from domestic loans, since the ability of the central bank to be a lender of last resort on foreign borrowing is inherently limited. *Third, domestic banking regulation in the form of enhanced capital adequacy standards, and policies that encourage partial banking-sector ownership by foreign capital, take on special importance as ways of limiting vulnerability to foreign creditor panics.*

With regard to policies in reaction to creditor panics, it is clear that the IMF has failed to function as a true lender of last resort, and probably inherently so. The IMF loans are much too small to cover potential outflows and therefore have done little to stop creditor panics. Indeed, provocative IMF actions have probably contributed to the panics. Moreover, the IMF's expertise, political legitimacy, and power within debtor countries is too limited to justify greatly expanded lending programs. More generous IMF lending under such conditions would most likely exacerbate well-known and much debated problems of moral hazard and distributional inequities of current programs.

Remedies to creditor panic will therefore almost surely have to involve ways to improve the collective response of creditors to panic-prone situations, as in domestic bankruptcy law. This means finding mechanisms to achieve: (1) creditor standstills in the event of extreme financial distress hitting a national economy; (2) methods for raising fresh working capital in the midst of a creditor squeeze (analogous to debtor-in-possession financing under the bankruptcy law); and (3) methods for creditor-debtor bargains for stretching out loans, converting debts to equity, and writing down claims, in the event that a panic is followed by a solvency crisis.

There are many outstanding issues—both theoretical and empirical—that bear much greater analysis.

- Are creditor panics the result of perceived insolvency of the debtor institutions rather than mere illiquidity (as asserted in this paper)?
- Who are the creditors that actually pull the plug: international commercial banks, as seems to be the case on published data; international hedge funds and other nonbank financial institutions; domestic savers?

- To what extent do devaluations lead to financial crisis by signalling the depletion of foreign exchange reserves, or by provoking balance-sheet crises due to mismatches in assets and liabilities?
- What are the economic forces that lead to currency overvaluation, and can these be resolved through domestic deflation as well as nominal currency adjustments?

These and other questions need to be addressed if we are to improve the global financial architecture.

References

- Chang, R., and Velasco, A. (1998a) "Financial Fragility and the Exchange Rate Regime." NBER Working Paper No. 6469. Cambridge, Mass.
- Chang, R., and Velasco, A. (1998b) "Financial Crises in Emerging Markets: A Canonical Model." Federal Reserve Bank of Atlanta Working Paper No. 98-10 (July).
- Chang, R., and Velasco, A. (1998c) "The Asian Liquidity Crisis." Federal Reserve Bank of Atlanta Working Paper No. 98-11 (July).
- Larrain, F. B., and Sachs, J. (1993) *Macroeconomics in the Global Economy*. London: Harvester Wheatsheaf.
- Radelet, S., and Sachs, J. (1998a) "The Onset of the East Asian Crisis." NBER Working Paper No. 6680. Cambridge, Mass.
- Radelet, S., and Sachs, J. (1998b) "The East Asian Financial Crisis: Diagnosis, Remedies, Prospects." *Brookings Papers on Economic Activity*, No. 1: 1-91.
- Sachs, J.; Tornell, A.; and Velasco, A. (1996a) "The Collapse of the Mexican Peso: What Have We Learned?" *Economic Policy* 22: 13-56.
- Sachs, J.; Tornell, A.; and Velasco, A. (1996b) "Financial Crises in Emerging Markets: The Lessons from Mexico." *Brookings Papers on Economic Activity*, No. 1: 147-98.
- Salter, W.E.G. (1959) "Internal Balance and External Balance: The Role of Price and Expectations Effects." *Economic Record* (August): 226-38.
- Swan, T. (1960) "Economic Control in a Dependent Economy." *Economic Record* (November): 339-56.