

The Mexican Economic Crisis: Alternative Views

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Few economic events succeed in capturing the sustained attention of both economic practitioners—policymakers, business economists, and press commentators—and academic economists. The ongoing economic crisis in Mexico is one of those events. Since the crisis broke out in December 1994, it has been the subject of innumerable newspaper and magazine articles as well as a large number of academic papers. Most of the nonacademic analyses have tried to answer a question posed by the *Wall Street Journal* on July 6, 1995: “How could so many smart people on Wall Street, in Mexico City, and in Washington have been so blind to so many warnings?” This question captures the conventional wisdom about the crisis, which is that it was the inevitable result of fundamental imbalances in the Mexican economy—imbalances that should have been obvious to informed observers and could have been corrected by relatively simple (though not necessarily painless) adjustments in Mexican economic policy. Most of the academic papers on the crisis have tried to identify the imbalances and the associated policy errors and to explain how and why they produced a crisis.

We believe that many of these explanations for the Mexican economic crisis, both academic and nonacademic, are based on questionable assumptions and dubious analysis. The principal purposes of this article are to identify some of the major problems with the “conventional view” of the crisis and present an alternative view that seems more consistent with the evidence.

Why look at alternative explanations? Economic science has not yet advanced to the point of being able to identify a single, generally accepted explanation for most major economic issues or events. Understanding the

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differences between alternative explanations for economic events is important for policymakers, who must try to design policies that will address the problems posed by these events. Frequently, the policies that are likely to be successful if one explanation is correct are very different from those that will succeed if another explanation is closer to the truth.

Of course, alternative explanations that seem very different from each other may in fact have a number of common elements. For example, the alternative account of the Mexican economic crisis presented in this article resembles the conventional account in suggesting that the crisis may have been caused, at least in part, by fundamental factors and may have been aggravated by mistakes in government policy. However, the causal factors we identify and the policy mistakes we expose are quite different from the ones emphasized by most analysts. The article concludes by laying out some changes in Mexican economic and financial policies that might make future crises less likely. While a few of these changes are similar to ones proposed by other commentators, some of the most important recommendations have not been included in the advice the proponents of the conventional view have offered the Mexican government.

The Mexican Economic Crisis

Prior to December 1994, the Mexican government based its international economic policy on a strategy of exchange rate pegging.¹ This strategy committed the government to keeping the dollar value of the Mexican peso inside a preannounced target zone and forced it to intervene in the foreign exchange market whenever market forces threatened to push the peso exchange rate out of the zone. These interventions involved buying or selling financial assets payable in dollars or other internationally convertible currencies. (The stock of these assets held by the government at a given point in time constitutes its foreign exchange reserves.) When the dollar value of the peso threatened to fall below the lower boundary of the target zone, the Mexican government sold dollar-denominated assets in exchange for pesos, an action that increased the demand for pesos and prevented their dollar price from falling further.²

A serious problem for exchange rate pegging strategies is that if the market forces pushing the exchange rate lower are sufficiently strong and persistent, the government's rate-defending asset sales eventually ex-

haust its foreign exchange reserves. This is precisely the situation that Mexico faced in the last two months of 1994, when the bottom dropped out of the peso market. The Mexican government intervened aggressively to try to keep the peso exchange rate from falling and by mid-December had sold \$11 billion worth of reserve assets. Finally, on December 20 Mexico devalued the peso by 15 percent. Unfortunately, this action served only to increase the pace of the reserve losses, and two days later the Mexican government felt compelled to give up its exchange rate targeting policy and allow the peso to float against the dollar and other currencies. The peso immediately began a rapid and dramatic depreciation. By early January, its dollar value was almost 40 percent lower than it had been in mid-December.

For Mexico, the devaluation of the peso marked the beginning of a severe and persistent economic recession. By the end of 1995, Mexican real (inflation-adjusted) GDP had fallen by 7 percent, and the unemployment rate had increased from a precrisis level of 4 percent to approximately 7 percent.³ A large number of private firms have failed, and the Mexican government has been able to pay its debts only because of financial aid from the International Monetary Fund (IMF) and the governments of the United States and Canada (\$25 billion dollars' worth to date). Domestic and foreign confidence in the prospects for the Mexican economy has been shaken severely.

Conventional Explanations for the Crisis

Exchange Rate Policy. Many analysts believe that the Mexican economic crisis had been building for several years. According to this view, Mexico's large and persistent current-account deficits, which rose from \$14.6 billion in 1991 to \$28.8 billion in 1994, indicated that the Mexican peso was substantially overvalued. This overvaluation, it is argued, had to be corrected, and the longer the corrective measures were put off, the harsher and more destabilizing they eventually had to be. The blame for the overvaluation is typically placed on the Mexican government's policy of pegging the peso exchange rate (see above). Authors such as Jeffrey Sachs, Aaron Tornell, and Andrés Velasco (1995) and Rudiger Dornbusch and Alejandro Werner (1994) argue that pegging an exchange rate as part of an economic stabilization program makes sense only for a short period of time; otherwise, "accumula-

tion of real appreciation . . . would *ultimately* risk the success of the stabilization” (Sachs, Tornell, and Velasco, 1995, 9; italics in original).

How are overvaluation, trade deficits, and economic crises related? According to conventional macroeconomic theory, an overvalued currency produces current account deficits by making a country’s exports more expensive and its imports cheaper and also by artificially increasing the real value (at international prices) of incomes received in domestic money. The resulting trade deficits must be financed by foreign borrowing—borrowing that cannot go on forever because the overvaluation usually does not reflect any increase in the country’s ability to service its debts. Eventually, foreign lenders realize that the country’s aggregate borrowing path is unsustainable and become unwilling to roll over their loans. The result is a reserve outflow that is inevitably followed by a devaluation. The domestic price increases caused by the devaluation, combined with the sudden withdrawal of foreign funds, produce a severe recession.

In some sense, the Mexican exchange rate crisis actually began in March 1994, when political turmoil (discussed below) produced intense downward pressure on the market price of the peso and defending its exchange rate peg cost the Mexican government a substantial fraction of its foreign exchange reserves. The government’s unwillingness to devalue the peso during this episode has been frequently identified as a key factor leading to the crisis. Meanwhile, Mexico’s current-account deficit continued to widen: by December 1994, it had reached \$28.8 billion, which was 8 percent of the country’s GDP. (The comparable U.S. figure was 3 percent.) To many analysts, this large trade deficit was conclusive proof that peso overvaluation had made foreign goods far too cheap and that a severe adjustment was imminent.

In evaluating this diagnosis of the cause of the crisis, it is important to bear in mind that large current-account deficits and heavy foreign borrowing can have causes that do not involve currency overvaluation. For example, it is entirely possible for a developing country to run large current account deficits because it offers attractive investment opportunities and lacks enough domestic savings to fund these opportunities internally. As long as the investment projects are ultimately successful—as long as they produce returns large enough to service the foreign debts that provided the funding for them—both the trade deficits and the foreign debts can persist indefinitely.⁴ This possibility seems particularly relevant to the case of Mexico because the country’s recent economic reforms, com-

bined with the negotiation of the North American Free Trade Agreement (NAFTA), had led many U.S. analysts to conclude that it had become a very promising place in which to invest. According to the IMF, from 1990 to 1993 Mexico attracted \$91 billion in net capital inflows (1995, 53-55). Ratification of NAFTA in late 1993, moreover, may have produced a substantial increase in the availability of foreign funds.

Another problem with the conventional account of the crisis is that it is based on the rather woolly concept of “overvaluation.” More specifically, the conventional account is based on two possibly questionable premises: (1) that there is an equilibrium exchange rate with which the current exchange rate can be com-

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pared to determine whether the currency in question is overvalued and (2) that the value of this equilibrium exchange rate can be determined with some degree of accuracy. Many discussions of overvaluation seem to assume, with some circularity, that international macroeconomic equilibrium requires each country’s current account to be in balance so that a country’s currency is overvalued whenever the country has a current account deficit. Aside from the theoretical limitations of this assumption (see above), it is also questionable in practice: for several years during the early 1980s, for example, the U.S. dollar appreciated significantly against most other major currencies at a time when the United States was running current account deficits of unprecedented size.

Most other attempts to identify examples of overvaluation or measure their extent are based on the concept of “purchasing-power parity” (PPP). Purchasing-power parity is the principle that, other things being equal, a person with a given quantity of domestic currency should be able to purchase the same quantity of goods in the home country that he or she could purchase in a

foreign country if the domestic money were converted into foreign money at the current exchange rate. Suppose, for example, that an American with \$100 can use the foreign exchange market to convert the dollars into 500 pesos and can use these pesos to buy 20 percent more goods in Mexico than the \$100 would buy in the United States. In this scenario, the dollar is overvalued by 20 percent against the peso—or, equivalently, the peso is undervalued by 20 percent against the dollar. Presumably, this sort of undervaluation will produce both an increase in American purchases of Mexican goods and a decrease in Mexican purchases of American goods. If U.S.-Mexican trade were balanced initially, the result should be that Mexico would run a trade surplus with the United States.

There are a couple of serious problems with this notion of overvaluation, however. First, the PPP principle applies, strictly speaking, only to internationally tradable goods or services that can be transported between countries at minimal cost and are not covered by tariffs (import taxes) or export subsidies. Many goods, and possibly most goods, do not meet these requirements. A person should not, for example, expect to be able to get haircuts in the United States for the same exchangerate-adjusted prices that he or she would pay in Mexico, as it is not really feasible for most Americans to travel to Mexican barbershops. A haircut is a classic example of a service that is essentially “nontradable.”⁵ And while the practical difficulties of international trade are less severe for automobiles than for haircuts, neither should people expect to be able to buy a U.S. car for the same price in Mexico as in the United States. Cars are heavy and expensive to transport, and the Mexican government imposes tariffs on imported automobiles.

A closely related problem with the PPP concept involves the fact that there are so many different goods whose prices often change in different directions or increase/decrease at different rates. The typical solution is to perform PPP calculations using price indexes based on the prices of standard baskets of goods and services in the relevant countries. However, both the items and the quantities in a country’s standard basket vary significantly from country to country, and many of the items in the baskets are either nontradable or quite costly to trade. Thus, the current consumer price indexes (CPIs) for the United States and Mexico may not be equal to each other, even if the two indexes have the same base year and the average inflation rates in the two countries have been equal since the base year, using an index based on a common basket of unambiguously tradable goods.

Perhaps the most widely used PPP-based approach to measuring currency values is “relative PPP,” which assumes that if prices rise faster, on average, in country A than in country B, then country A’s currency should depreciate at a rate equal to the annual inflation differential. In the case of the United States and Mexico, for example, from 1991 to 1993 the Mexican inflation rate, as measured by Mexico’s CPI, averaged around 10 percent higher than the U.S. inflation rate as measured by the U.S. CPI. According to the principle of relative PPP, the Mexican currency should have depreciated against U.S. currency at an average rate of 10 percent per year. The fact that the actual rate of depreciation averaged only 2.5 percent per year has led many analysts to conclude that the Mexican peso was becoming increasingly overvalued. (It should be noted, however, that during the year preceding the crisis—a period when many analysts began warning that Mexican currency was substantially overvalued—the peso depreciated against the dollar at a rate about 4 percent higher than the Mexican-U.S. inflation differential.)

The relative-PPP concept suffers from the same problems as conventional or “absolute” PPP, plus an important additional problem: relative PPP calculations for a period implicitly assume that the currencies in question were correctly valued at the beginning of the period. Suppose, for example, that Mexican currency was substantially *undervalued* in 1990. Then the fact that the peso depreciated against the dollar during 1991-93 at a rate lower than the Mexican-U.S. inflation differential may have reflected a gradual tendency for the peso’s dollar value to rise toward its “correct” level, rather than a tendency for the peso to become increasingly overvalued. Thus, unless the problem of measuring absolute PPP can be solved, it is impossible to place much faith in conclusions based on measurements of relative PPP.

Mexico’s central bank, the Banco de Mexico, employs an approach to relative PPP calculations that is based on guidelines developed by the IMF. The approach involves constructing a “real exchange rate” by comparing labor costs in Mexico with those in other countries. The following description of this approach is taken from one of the bank’s annual surveys of the Mexican economy:

Its aim is very simple: to compare developments in labor costs in one country with those of its trading partners, expressed in a common currency. . . . If labor costs in one country, adjusted for productivity, increase at a faster pace than its trading partners, then its real exchange rate ap-

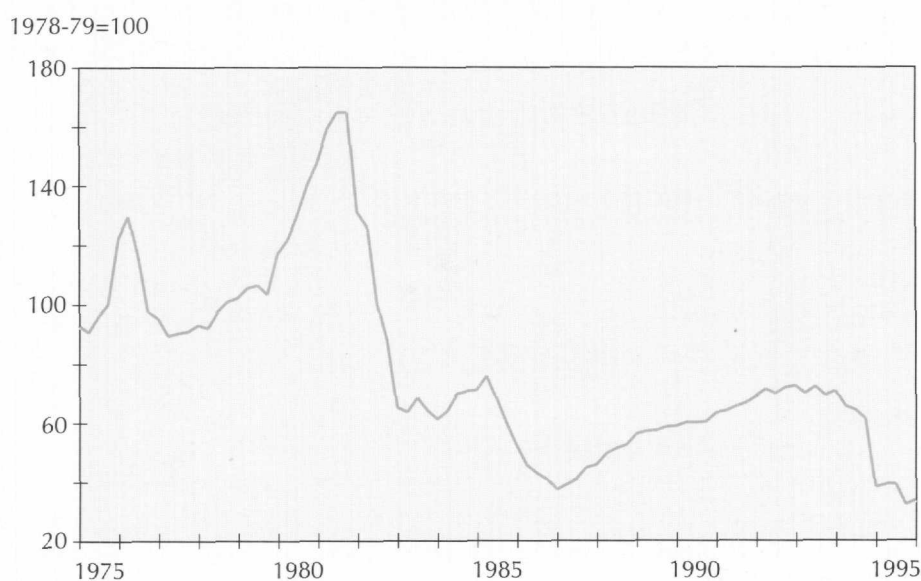
preciates and its external sector becomes less competitive. . . . The 1978-1979 average was chosen as the base period, since it was considered representative of a suitable position of balance for our external sector. Enough time had elapsed, since the 1976 devaluation, for us to reasonably assume that the margin of undervaluation that normally follows the initial stages of an exchange rate adjustment had disappeared. Additionally, exports of manufactured goods showed a healthy growth during this period and there was an upswing in international reserves. (1993, 97)

The results the Mexican central bank obtains using this approach illustrate the sensitivity of relative-PPP calculations to the choice of the base year. Although the bank's calculations confirm that the peso has appreciated in recent years relative to other currencies, they also suggest that by 1994 this appreciation had not yet succeeded in allowing the peso to regain the relative position it enjoyed during 1978-79.⁶ (See Chart 1, which tracks Mexico's relative unit labor costs against those of its major trading partners.) In the bank's view, the peso had indeed been undervalued in 1990 and earlier years and remained undervalued throughout the period preceding the recent crisis.

While the validity of the bank's choice of a base period is certainly debatable, it seems clear that its staff subjected the question to careful analysis—unlike many commentators who have used the peso's relatively low rate of depreciation during the early 1990s as the basis for casual criticism of the Mexican government's exchange rate management policies.

The economic importance of nontradable goods creates other problems for relative-PPP calculations. Suppose, for example, that a country's national income is growing faster than the incomes of other countries, perhaps because of a large inflow of foreign investment. If this country's markets are reasonably open to international trade, relative PPP can be expected to hold, at least approximately, for its tradable goods. The prices of its nontradables, however, are likely to be rising relatively rapidly: the rapid increase in domestic income will produce strong demand for nontradables, and this demand, unlike the demand for tradable goods, can be satisfied only out of domestic production. Because nontradable goods have substantial weight in national price indexes, the domestic CPI will rise faster than the CPIs of slower-growing countries. If the home country's exchange rate against these countries remains constant, the inflation differential will create the mistaken impression that domestic currency is becoming

Chart 1
Real Exchange Rate Based on Unit Labor Costs in the Manufacturing Industry, 1975-95



Source: Banco de Mexico.

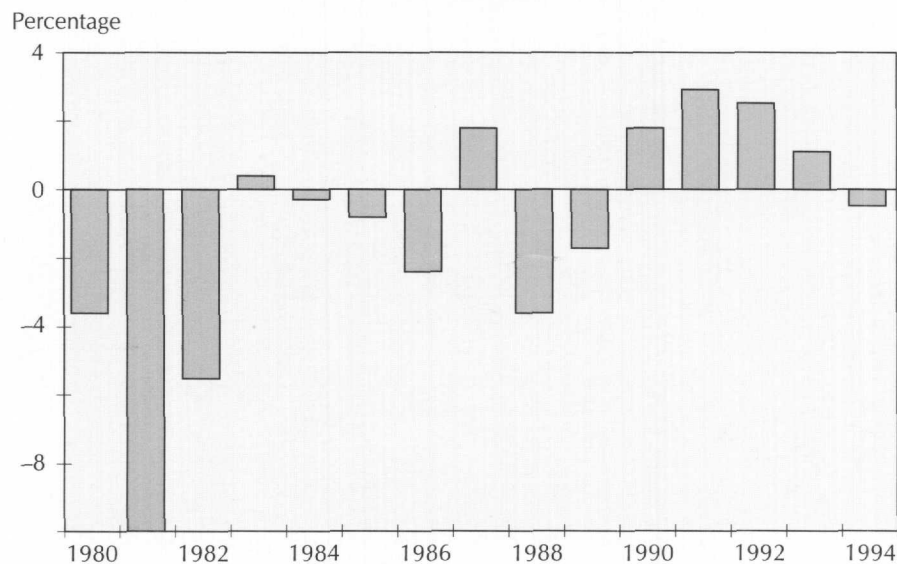
increasingly overvalued. It is worth noting, in this connection, that the 12.9 percent average inflation rate recorded in Mexico from 1990 to 1993 was disproportionately due to nontradables: their prices rose at a 17.4 percent average rate while the prices of tradables rose at an average rate of only 8.8 percent. The average differential between the Mexican tradables inflation rate and the U.S. inflation rate was around 3 percent during this period. Subtracting the latter figure from the average rate of peso depreciation produces a relative-PPP-adjusted peso appreciation rate of only 5.8 percent, compared with the 14.4 percent rate yielded by a calculation based on Mexico's overall inflation rate.⁷

Bad Fiscal or Monetary Policy. Another popular class of explanations for the Mexican economic crisis blames its outbreak on the malign effects of bad fiscal or monetary policy. At first glance, explanations of this sort seem rather puzzling. The most widely used indicator of the soundness of a country's fiscal policy is the size of its government budget deficit. By this indicator, Mexico appears to have been in fine shape (see Chart 2): its federal government reported budget surpluses from 1990 to 1993, and its deficit for 1994 was only 0.5 percent of GDP. Similarly, the most popular indicator of monetary policy soundness is a country's annual inflation rate. In Mexico, the annual inflation rate averaged

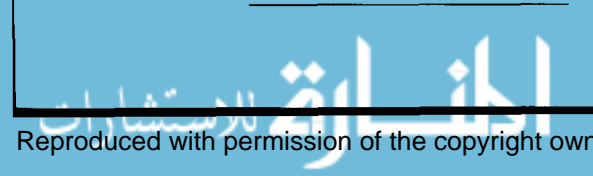
15.7 percent between 1990 and 1993, which is not high for a developing country. In addition, the rate of inflation had been declining over time, reaching 8 percent in 1993 and 7 percent in 1994.

Fiscal Policy. In the case of fiscal policy, some analysts argue that the budget numbers reported by the Mexican government were misleading and that the government was actually running substantial budget deficits. Sachs, Tornell, and Velasco comment that "in the wake of the crisis, it has become fashionable to claim that these numbers hide a part of the deficit, since starting in 1993 they omit the financial intermediation activities of state and development banks" (1995, 6). It should be noted, however, that in the long run the activities of these institutions increase government expenditures only if the loans are extended at below-market interest rates or are not ultimately repaid. Sachs, Tornell, and Velasco go on to point out that beginning in 1993 "development banks must by law have an 8 percent capitalization ratio, must hold reserves against bad loans and must lend to private banks on commercial terms" (6). Finally, even if all the funds raised by these institutions are charged against the government budget, the 1994 budget deficit would not have exceeded 4 percent of GDP. It is hard to accept a figure of this magnitude as an explanation for Mexico's financial

Chart 2
Public Sector Operational Balance in Mexico, 1980-94
(As a percentage of GDP)



Source: Federal Reserve Bank of Atlanta using data from Banco de Mexico.



meltdown. Deficits of this size are quite common among countries with relatively stable economies. The government of Italy, for example, regularly runs much larger budget deficits—8 percent of GDP in 1994.

Critics of Mexican fiscal policy also point to the fact that during 1994 the government issued a large quantity of tesobonos, which are dollar-indexed short-term bonds. It should be emphasized, however, that for the most part, the tesobonos did not represent new indebtedness but were simply a device for refinancing short-term, peso-denominated government bonds called cetes (see Chart 3). While the exchange rate depreciation that accompanied the crisis made this refinancing strategy very costly *ex post*, the issuance of the tesobonos was motivated by a desire to make a crisis less likely by increasing the confidence of foreign investors. It should also be noted that most of Mexico's short-term foreign indebtedness was private rather than public.⁸ There is no particular reason to believe that public-sector indebtedness played a prominent role in precipitating the financial crisis—though it was certainly the aspect of Mexico's economic predicament that received the most attention after the crisis.⁹

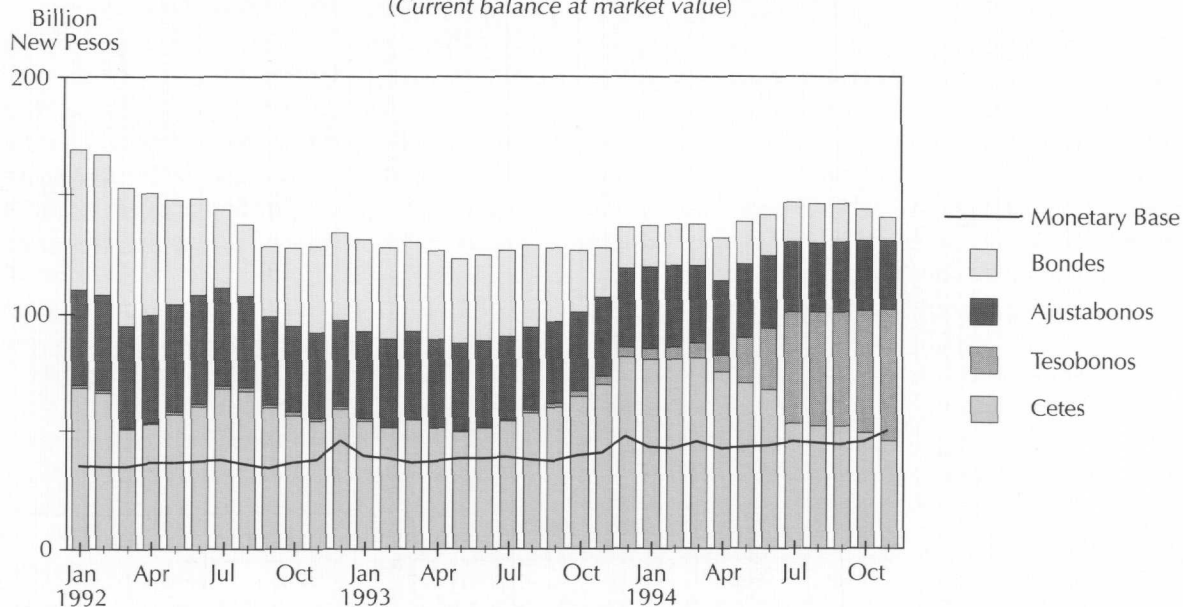
Monetary Policy. Was Mexican monetary policy too loose (or too tight)? There has been little criticism of the government's monetary policy decisions during

the years immediately preceding 1994; in fact, the Mexican government has been widely praised for achieving steady declines in the inflation rate and making constructive changes in the Mexican financial system. These changes included reducing reserve requirements drastically, privatizing the country's commercial banks, and allowing private banks to be purchased by foreigners.

Critics of Mexican monetary policy focus on 1994 itself, arguing that policy was too loose during this critical year. In March 1994, Luis Donaldo Colosio, the presidential candidate of the governing Institutional Revolutionary Party, was assassinated. This event made foreign investors nervous about Mexico's short-run political stability and temporarily reduced the volume of foreign portfolio (indirect) investment. The Mexican government has been criticized for allegedly covering this loss of foreign money by selling reserve assets and expanding domestic credit, rather than by increasing domestic interest rates in an effort to restrain domestic loan demand and attract additional foreign funds. Since Mexican interest rates rose substantially after the March crisis, however, it is far from clear that this criticism is either accurate or justified.¹⁰

It is worth noting that raising interest rates may not always make monetary policy "tighter," in the sense of

Chart 3
Structure of Domestic Government Debt in Mexico, January 1992–October 1994
 (Current balance at market value)



Source: Federal Reserve Bank of Atlanta using data from Banco de Mexico.

tending to produce lower inflation. Thomas Sargent and Neil Wallace (1981) point out that when real interest rates in a country exceed its real growth rate, higher interest rates increase the cost of refinancing the government's debt and may eventually force it to respond by increasing the money growth and inflation rates in order to increase government revenues from currency creation. If people understand this situation, moreover, increases in current interest rates can lead them to expect higher inflation in the future, and this expectation can drive up the current inflation rate. At the time of the March 1994 crisis, real interest rates in Mexico were already substantially higher than the country's real growth rate, so it is possible that more aggressive interest rate increases could actually have been counterproductive.

Alternative Explanations

Borrowing Constraints. We believe that both Mexico's exchange rate policies and its fiscal and monetary policies have been overemphasized as possible causes of the financial crisis it experienced in late 1994. In a recent paper, Andrew Atkeson and José-Víctor Ríos-Rull (1995) adopt a similar view, arguing that Mexico's financial crisis could have occurred even though its exchange rate was not overvalued and its precrisis monetary and fiscal policies were credible in the sense of being potentially sustainable in the long run. In the formal model Atkeson and Ríos-Rull present, the trade deficits Mexico runs before the crisis are a rational response to the desire of its people to achieve large increases in domestic investment without giving up large amounts of current consumption. Because the investments in question are productive in nature, the debts accumulated in the course of financing them can be serviced in the long run. However, the amounts that Mexico's private and public sectors can borrow are limited by externally imposed "credit constraints." When the country's private or public borrowers reach the limits of these constraints, they can no longer increase their indebtedness, even if the new debts in question are perfectly sound. Mexico's trade account must henceforth be balanced, and if it wishes to increase domestic investment further it can do so only by reducing its purchases of consumption goods. According to Atkeson and Ríos-Rull, the Mexican financial crisis broke out because Mexico reached these borrowing limits in late 1994.

While the analytical approach employed by Atkeson and Ríos-Rull has many appealing features, we are not convinced that they have offered a useful explanation for the Mexican financial crisis. Perhaps the biggest problem with the approach is its reliance on an externally imposed credit constraint. Atkeson and Ríos-Rull offer a number of possible explanations for the existence of such constraints. They speculate, for example, that these constraints may be imposed by investors who recognize the difficulties of enforcing debt collection in developing countries. The problem, of course, is that this sort of explanation explains too much: whenever a country suffers a financial crisis, the crisis can always be explained by assuming that the country has reached the limits of its borrowing constraints. In addition, there seems to be little evidence indicating that the doubts investors may have had about Mexico's continued ability to service its debts were caused by concern about the size of those debts, as opposed to concern about Mexico's overall political stability or the ability of its government to defend its pegged exchange rate.

Another problem with the Atkeson and Ríos-Rull analysis is that it does not explain the severity of the 1994 financial crisis. In their model, the borrowing country knows in advance that it is approaching its borrowing constraint. When it reaches the constraint, it calmly stops increasing its foreign indebtedness and begins cutting back its consumption. There is no need for dramatic declines in output or large increases in unemployment, and there is no reason for holders of previously incurred debts to refuse to roll them over. In fairness to Atkeson and Ríos-Rull, one could view their model as the precursor of a more sophisticated model in which the country does not know precisely when it will approach the borrowing constraint. This sort of model would presumably predict more economic dislocation after the limits of the constraint are reached. Nevertheless, the actual crisis created far more economic disorder than even a more advanced model of this sort would seem capable of generating.

Finally, the Atkeson and Ríos-Rull story implies that the financial crisis broke out in 1994 simply because this happened to be the year in which the total volume of Mexican foreign indebtedness reached the limits of the borrowing constraint. It is difficult to believe that it was simply a coincidence that the crisis occurred at the end of a year distinguished by the most serious political turmoil Mexico has experienced in at least a decade. The political troubles that broke out during 1994 play a key role in the alternative explanation for the Mexican financial crisis that is presented below.

Financial Panic. Our alternative explanation for the Mexican financial panic is inspired by the similarity between the recent economic crisis in Mexico and some economic crises in the U.S. historical experience. As is the case with most historical analogies, the similarity between these two sets of events is not perfect: some aspects of the historical U.S. situation were quite different from the situation facing modern Mexico, and some of the events that occurred in Mexico are outside the range of U.S. experience. In addition, the fact that economists do not completely understand the causes of the U.S. crises limits the degree to which the history of these crises can help explain the recent Mexican crisis. Nonetheless, the degree of similarity between the circumstances and events of the two types of crises seems substantial enough to make it useful to compare them. In addition, examining the successes and failures of efforts by U.S. policymakers to solve the problems posed by the U.S. crises can help identify policies that may or may not be successful in Mexico. Finally, the comparison helps emphasize the point that crises of the type that Mexico experienced are not unprecedented and are not the result of unique failings on the part of the Mexican government or unique weaknesses in the country's economy.

U.S. Financial Panics. During the late nineteenth and early twentieth centuries, the U.S. banking and financial system suffered recurrent crises that have become known as financial panics. A financial panic usually started because of the failure of one or more major commercial or financial institutions that were heavily indebted to one or more large banks. The banks had financed the bulk of their loans by issuing checking accounts, which are known formally as demand deposits. In the late nineteenth century, these deposits could be redeemed on demand in gold dollars or in notes that were convertible on demand in gold dollars. As soon as the holders of these deposits heard about the banks' loan problems, they would rush to teller windows to withdraw their funds in the hope of recovering their money before similar demands by other depositors exhausted the bank's funds and caused them to fail. Depositors of other banks would observe the runs and become concerned about the solvency of their own institutions. The runs might then spread from bank to bank, from city to city, and from region to region. During a financial panic, this pattern of contagion spread bank runs over all or a large part of the country.

A peculiar and distinctive feature of U.S. financial panics was "suspensions of payments."¹¹ Panics usually began, or gained momentum, in major U.S. cities—

most often New York, which was the country's principal financial center. When the banks in such a city were confronted by a wave of panic-induced runs, they recognized that attempting to meet the runs by selling assets would depress the asset market, causing them to take large losses or even driving them into bankruptcy. They typically responded by suspending payments—that is, by temporarily refusing to allow depositors to withdraw or transfer their funds.

While a suspension solved the immediate problems of the banks in the city that initiated it, it usually created problems for banks elsewhere. Suspensions were distressing to depositors because they lost access to

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their funds, wholly or partially, for a period that sometimes lasted weeks or months. As a result, if depositors believed that their banks were likely to suspend payments they would withdraw their funds as a precaution, even if they did not have any real concerns about the banks' solvency. Thus, fear of suspension replaced fear of bankruptcy as a force driving runs. For this reason, once a suspension occurred in a single major city it typically spread nationwide within a few days. The financial disruption these nationwide payments suspensions caused was very damaging to the economy and often produced (or at least contributed to the severity of) economic recessions or depressions.¹²

Financial panics were extremely frustrating to the nineteenth-century business community and to contemporary economic policymakers because the adverse consequences of panics seemed entirely out of proportion to the seriousness of the events that touched them off. The principal cause of this problem was that panics spread so rapidly. Once a panic got started, people were forced to make immediate decisions with little reliable information, and they often

found themselves responding less to their own judgments about the seriousness of situations than to their fears about how other people might respond. Thus, New York bank depositors who participated in runs often did so not because they believed that their banks were insolvent but because they feared that withdrawals by other panicky depositors would drive the banks into insolvency. Similarly, a suspension in New York would touch off a nationwide suspension not because the banks in other cities were concerned about their financial situations but because they feared that the events in New York would cause their depositors to become concerned about their situations. Many of their depositors, in turn, would withdraw their deposits when they heard about the New York suspensions because they assumed that other depositors would react by withdrawing their deposits, and so on.

Mexico's Financial Situation. In our view, the recent financial crisis in Mexico was similar, in many ways, to a nineteenth-century U.S. financial panic. In order to explore this similarity, it is necessary to describe a few key elements of Mexico's economic and financial situation during the period preceding the crisis.

To begin with, it is important to understand that during the late 1980s and early 1990s, Mexico had chosen (intentionally or unintentionally) a development strategy of externally financed growth. Because rapid economic growth requires large investments in plant, equipment, and technology, a key problem facing any developing country is how to obtain the funds necessary to finance these investments. Many of the biggest economic-growth success stories of the post-war period—Japan, Korea, and Taiwan, for example—chose internally oriented financing strategies. In these countries, most of the funds needed to finance domestic investments were provided (at least in the initial stages) by domestic savings.

Of course, internally based financing strategies require the citizens of the countries in question to save relatively large fractions of their incomes. In many Latin American countries, the average level of household income is so close to the subsistence level that it may be unrealistic to expect households to increase their savings rates significantly.¹³ In addition, the governments of these countries may be unable or unwilling to ask their citizens to sacrifice current consumption in order to finance investments whose rewards may not be evident for many years. Consequently, these countries have opted for externally based financing strategies—development strategies under which much of the funding for domestic investment comes from foreign lenders and investors. The funds to repay these

lenders and investors are expected to come out of the profits derived from the investment projects.

Mexico's externally based financing strategy allowed the share of its GDP devoted to domestic investment to rise from 20 percent to 23 percent from 1988 to 1992, despite the fact that private savings fell from roughly 18 percent of Mexican GDP to under 9 percent. Between 1990 and 1993, moreover, Mexico received \$91 billion in net capital inflows (IMF 1995, 53). Thus, in the years preceding the crisis an inflow of foreign funds allowed Mexico to enjoy substantial increases in both consumption and investment.

Another important characteristic of Mexico's financial situation was the fact that a large fraction of the funds it received from foreigners were provided on a short-term basis. In 1993, at the peak of the foreign-investment inflow, only 32 percent of the foreign funds went into the country's stock market and only about 13 percent was devoted to direct investment by foreign firms (Banco de Mexico 1995, 257). Most of the rest went into short-term debt issued by the Mexican government or by Mexico's commercial banks; the banks, in turn, used much of this money to make loans to Mexican firms engaged in investment projects. In addition, while the Mexican government was not running large budget deficits, it was responsible for servicing the country's national debt, which had been accumulated during the 1970s and 1980s. The magnitude of this debt had been reduced in recent years, but it remained quite substantial. And while much of the national debt was long-term in nature, a good deal of it took the form of short-term government bonds that had to be refinanced more or less continually. Banco de Mexico reports that in 1992 the average maturity of outstanding Mexican government bonds was slightly longer than 400 days, or just over one year (1994, 160). In 1993 the average declined to 300 days. It continued to fall in 1994, reaching 200 days by the end of the year. In addition, even in 1993, the year that marked the peak of Mexico's popularity with investors, Mexican borrowers made only 33 placements of long-term bonds (grossing \$3.8 billion) on international financial markets, and only six of these involved private borrowers.

The last characteristic of Mexico's economic situation that is directly relevant to this discussion is its exchange rate regime. As has already been noted, the Mexican government was committed to an exchange rate peg that required it to sell reserve assets in the exchange market whenever the peso's dollar value threatened to fall below a prescribed level. The fraction of Mexico's foreign debts that were denominated

in pesos had been increasing, and the exchange rate peg also provided assurance to foreign holders of these debts that exchange rate depreciation would not drastically reduce their dollar value. The reliability of this assurance was a key factor determining the amount of foreign funds that were available to Mexican borrowers.

A Mexican Financial Panic. It is now possible to develop the analogy between U.S. financial panics and the Mexican financial crisis. The precrisis Mexican banks can be viewed as analogues of the U.S. banks of the late nineteenth century. The Mexican banks had issued a large quantity of short-term liabilities to foreigners: these liabilities can be thought of as the analogues of the demand deposits that were issued by the nineteenth-century U.S. banks. Finally, the Mexican government's exchange rate pegging regime can be regarded as analogous to the legally required convertibility of nineteenth-century demand deposits. Just as demand-deposit convertibility guaranteed nineteenth-century depositors that the value of their deposits was fixed in terms of gold, the exchange rate peg guaranteed foreign investors that the value of their peso investments was fixed (or at least bounded below) in terms of U.S. dollars.

As has been noted, a U.S. financial panic usually got started because of bad news suggesting that loans made by some U.S. banks might not be repaid, making it difficult or impossible for the banks to cover their deposits. In Mexico, the "bad news" that triggered the financial crisis was somewhat less direct and took the form of political instability. Explaining the nature of these political problems will require a fairly extended digression.

Mexican Politics before and during 1994

Historically, Mexico's political system has been somewhat less stable than that of the United States. For the last sixty-five years, the Mexican government has been dominated by a single political party, the Institutional Revolutionary Party, or PRI (see above). Although the PRI candidate has invariably won Mexican presidential elections, allegations of vote fraud have plagued most of these victories, and the party is regarded by a great many Mexicans as corrupt and unresponsive to their needs.¹⁴ From the point of view of foreign investors, however, the PRI appears to be a source of stability: during the last decade, at least, the

party has committed itself to a policy of respect for private property rights. Mexican or foreign firms engaged in investment projects have been able to operate relatively unhindered by government interference, and the party has enforced these firms' promises to repay foreign lenders and investors. Many investors undoubtedly fear that if there were a successful revolt in Mexico, or even if the PRI candidate lost the presidential election, the new government might change the country's laws in ways that would interfere with many Mexican firms' repayment of their debts, or it might simply refuse to assist in enforcing these debts. Similarly, the outbreak of civil war or widespread political violence might make it impossible for many firms to operate profitably and might divert government attention and resources away from debt enforcement.

Under the Mexican constitution, a presidential election is scheduled every six years. The most recent election occurred in late August of 1994. In early January 1994, about nine months before the election, an armed rebellion broke out among the Mayan Indian inhabitants of the province of Chiapas in extreme southern Mexico. The participants in the rebellion called themselves Zapatistas after Emiliano Zapata, an early-twentieth-century Mexican revolutionary hero. The rebellion was surprisingly successful, catching the Mexican government off-guard and making headlines worldwide. It was halted only after the government agreed to open high-level negotiations with rebel leaders. Three months later, in late March, the PRI presidential candidate, Luis Donaldo Colosio, was assassinated. (See Chart 4 for a chronology of political events and monetary policy actions during 1994). Although the motives for the assassination were not entirely clear, there were indications that it might have been the outgrowth of dissension inside the PRI. None of Colosio's potential replacements enjoyed consensus support within or outside the party, and the eventual choice, Ernesto Zedillo, was an economist with little political experience. As a result, the assassination raised the possibility that the PRI candidate might lose the election or that he might win the election but be unable to govern effectively.

The Colosio assassination set off a minor financial crisis that preceded the major crisis by roughly nine months. This first crisis is instructive for understanding the second one. The assassination shook the confidence of foreign investors. As the foreign deposits of the Mexican banks were short-term and required semi-continuous refinancing, this loss of confidence created immediate difficulties for Mexican banks and put downward pressure on the dollar price of the peso.

The government responded by selling large quantities of foreign exchange reserves and allowing domestic interest rates to increase sharply. These moves seemed to be successful, in the sense that the government was able to defend its peso peg without exhausting its foreign exchange reserves (which were, however, greatly reduced; see Chart 4).¹⁵

The March crisis was also similar to events that sometimes occurred in the nineteenth-century United States. As was noted above, financial panics often got started when bad news about the assets of one or more banks in a major financial center disconcerted many depositors and led to large withdrawals. The banks in the affected center would respond to this situation by raising their deposit and loan interest rates sharply in an attempt to defend their cash reserves. Sometimes this strategy would succeed, and the crisis would end before the reserves had been drawn down to a point at which the banks felt compelled to suspend convertibility. Often, however, a near-crisis of this sort would be the harbinger of a full-fledged crisis that would come weeks or months later—a crisis that might result in both a payments suspension and a financial panic. In many of these cases the events that ignited the second crisis seemed somewhat less serious than those that touched off the first one. Apparently, investor confidence, once shaken, became fragile and more sensitive to subsequent shocks.¹⁶

In the case of the recent crisis in Mexico, the possibility of renewed unrest in Chiapas cast a pall over the Mexican election campaign. Nonetheless, the election took place in late August as scheduled and resulted in a victory for PRI candidate Zedillo. Both the Mexican public and the foreign investment community began watching the Zedillo administration nervously for signs that it was capable of pulling the PRI together and resolving the troubles in Chiapas. During the months immediately following the election, observers saw nothing to inspire confidence on either front. Just one month after the election, José Francisco Ruíz Massieu, the head of the PRI, was assassinated. In late November Mario Ruíz Massieu, the brother of José Francisco, publicly accused the party's leadership of organizing a cover-up designed to prevent the identities and motives of his brother's killers from being revealed. Suspicion fell on Raul Salinas de Gortari, the brother of ex-president Carlos Salinas de Gortari, and there were press reports of discord between the new president and his predecessor. Meanwhile, the new government had failed to make any progress in negotiations with the Zapatistas. (Its problems were complicated by the fact that Manuel Camacho Solis, a PRI leader and rival of

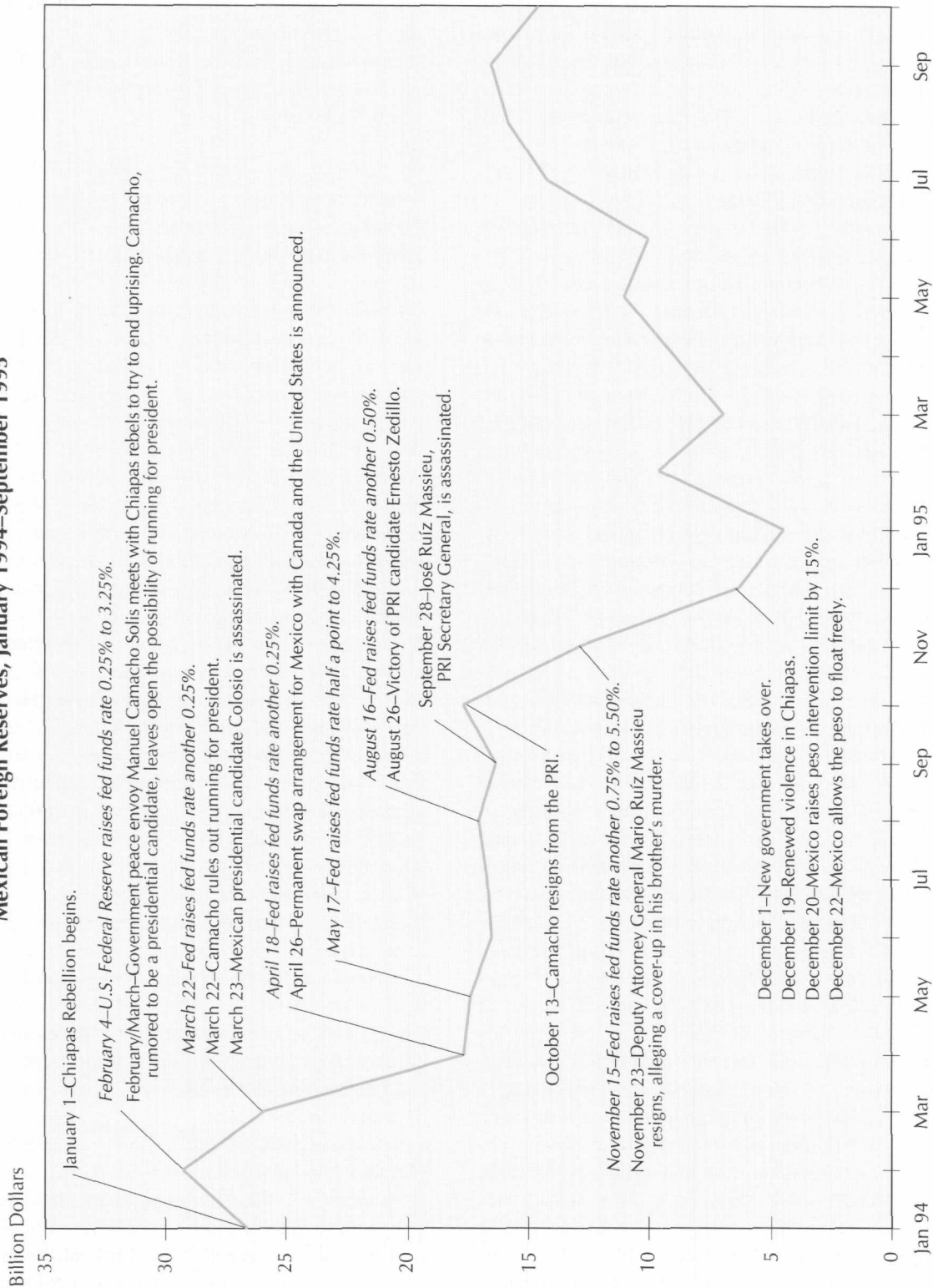
Zedillo's who was the government's chief negotiator with the rebels, had resigned shortly before the election.) In mid-December, the Zapatistas took up arms again, and the government responded by sending a large army detachment to Chiapas.

Genesis of Panic. In our view, the adverse political events that occurred in the months following the August election, and particularly in November and December, convinced many foreign investors that the Zedillo government was not making much progress bringing the PRI or the country together and that the potential for really serious political strife was high and rising. These investors responded by becoming increasingly reluctant to commit or recommit funds to Mexico. The supply of foreign funds seems to have begun to shift back in November, and the government was again forced to sell large amounts of reserves. By December 20 the reserves were nearly exhausted, and the government responded by devaluing the peso by 15 percent (see above).

The government's decision to devalue the peso had an effect on the Mexican financial system that was similar to the effect of a payments suspension on the nineteenth-century U.S. banking system. A suspension by the banks in one U.S. city created expectations of suspensions elsewhere that would deprive depositors in other cities of access to their funds; the peso devaluation created investor expectations of further devaluations that would greatly reduce the dollar value of their assets. Nineteenth-century depositors responded to the threat of suspension by rushing to their banks to withdraw their funds; modern foreign investors responded to the threat of devaluation by refusing to roll over their securities and deposits. As most of the deposits were short-term, millions of dollars were drawn off every day, producing a rapid deterioration in the government's reserve position and putting severe downward pressure on the dollar price of the peso. Within two days, the government was forced to give up its exchange rate pegging strategy completely and allow the peso to float. Its market value quickly fell by roughly 40 percent against the U.S. dollar.

Ironically, in the weeks and months following the crisis it became clear that the various threats to Mexican political stability were considerably less serious than they had appeared in November and December of 1994. Although the PRI continued to be troubled by political infighting and accusations of corruption, these troubles did not endanger the political dominance of the party or produce any challenge to the leadership of President Zedillo. The Zapatistas, moreover, proved unable to expand their political base to the extent

Chart 4
Mexican Foreign Reserves, January 1994–September 1995



Source: Reuters News Service, Haver Analytics, and International Monetary Fund.

necessary to foment unrest outside of Chiapas or exert significant leverage over the federal government. In addition, despite the economic hardship created by the severe recession that followed the crisis, the government succeeded in preserving labor peace—an accomplishment that allowed it to implement a number of austerity measures. These measures, combined with financial assistance from the IMF, the United States, and Canada, enabled the government to continue to service its debts and to provide some assistance to the country's distressed private sector.

Unfortunately for Mexico, the fact that the political problems that touched off the financial crisis were not as serious as they appeared at the time has done little to limit the adverse economic effects of the crisis. The vulnerability of the Mexican financial system to liquidity crises has been convincingly demonstrated, and foreign investors consequently remain hesitant to recommit their funds. While some of this reluctance may be caused by genuine doubts about the long-run political stability of Mexico, we suspect that most of it is due to fear that renewed political turmoil could spook enough investors to provoke another liquidity crisis.

Before proceeding further, it is important to clarify our views on the role of "fundamental" factors in precipitating the Mexican crisis. The basic cause of the crisis was the political turmoil in Mexico that led foreign lenders to become concerned about the fate of their investments. There was nothing irrational about this concern or about the decisions lenders made in response. It is the nature of political crises, however, that they often seem far more serious at the time they break out than they do a few weeks or months later. As a result, it is important for a country whose social or economic circumstances make it vulnerable to occasional political fireworks to structure its financial system in a way that allows the system to remain stable until the smoke created by the fireworks has cleared. The Mexican government's policy mistakes did not involve managing the economy in a way that caused it to be out of balance under normal conditions; instead, they involved permitting (and, to some extent, encouraging) the development of financial institutions and practices that made the economy vulnerable to political shocks.

Again, considering the situation of the nineteenth-century United States may be insightful. At the time, the U.S. economy was based on a fractional-specie-reserve banking system that worked reasonably well under normal circumstances but was vulnerable to liquidity crises touched off by adverse economic shocks such as large commercial failures or cyclical trade downturns. The challenge for the U.S. government was

to develop a strategy for reforming and regulating the banking system that reduced the system's susceptibility to these sorts of crises. Critics of Mexican economic policy might do well to reflect on the fact that it took the U.S. government roughly fifty years to develop such a strategy and that its first attempt—the creation of the Federal Reserve System—was not entirely successful (see below).

Implications of the Financial Panic Explanation

A Floating Exchange Rate? The policy implications of the conventional account of the Mexican financial crisis (see above) seem fairly straightforward. According to the conventional view, the crisis occurred because the Mexican government's exchange rate pegging regime allowed the Mexican peso to become substantially overvalued. The overvaluation produced a persistent (though necessarily temporary) disequilibrium in which Mexicans were consuming more than could be justified by their incomes at international prices. This overconsumption was financed by foreign borrowing and was reflected in Mexico's large trade deficit. The disequilibrium ended in December 1994 when the government was no longer able to defend its exchange rate peg because it had exhausted its foreign exchange reserves. The peso was then allowed to fall to a value that produced substantially lower incomes and consumption for Mexicans. Presumably, the Mexican government could prevent future problems of this sort by permanently abandoning its policy of exchange rate pegging and allowing the peso to continue to float. The exchange rate would then adjust to keep Mexico's domestic consumption in line with its domestic income.

Because the financial panic explanation for the crisis also gives a role to the collapse of the pegged exchange rate regime, one might think that its policy implications would be similar in nature. As has been noted, however, the financial panic explanation suggests that Mexico's exchange rate policies have been overemphasized as a cause of the crisis and that a more important cause was the short-term nature of Mexican borrowers' liability portfolios. This difference in views is important because certain major implications of the conventional explanation are not implications of the financial panic explanation. In particular, the financial panic explanation does not necessarily imply that the Mexican peso was dramatically overvalued. In addition, the panic explanation

does not interpret the fact that Mexico was running large trade deficits as necessarily indicating that the country was borrowing or consuming at unsustainable rates. Nevertheless, the policy recommendations presented below probably imply that even after the current crisis has passed Mexico still will have to accept somewhat lower levels of borrowing and consumption.

Short-term liabilities were a problem for Mexican commercial and financial institutions for the same reason that demand deposits were a problem for nineteenth-century American banks. Because demand deposits could be withdrawn at any time, the banks were very vulnerable to bad news that shook depositors' confidence in the value of their asset portfolios. There was no way, short of concerted suspension, that they could force their depositors to wait weeks or months for an accurate and dispassionate determination of the extent of their problems—a determination that would have revealed, in most instances, no real grounds for serious concern. Similarly, the short-term nature of the deposits of Mexican banks allowed large numbers of depositors to withdraw their funds in response to bad news about Mexico's political stability. Before the true seriousness of the political situation could be dispassionately determined, the Mexican government had exhausted its foreign exchange reserves and was forced to devalue the peso. This decision further disconcerted investors and intensified the outflow of foreign funds.

A natural question that arises at this point is why Mexican financial institutions allowed themselves to acquire liability portfolios that made them so vulnerable to confidence shocks. The answer seems to lie in the nature of the Mexican development strategy. The relatively low rate of domestic savings discussed earlier forced the Mexican financial system to look to foreign countries for funds to finance domestic investment. Moreover, both direct Mexican borrowers and the country's financial intermediaries were content to rely on short-term foreign credit. Foreign short-term lenders had little reason to be concerned about the long-run prospects of the projects their funds were being used to finance as it seemed certain that the Mexican borrowers could continue to roll over their short-term deposits using short-term funds provided by further foreign lenders. As long as this was the case, the deposits were perceived to have little default and the lenders were willing to purchase them at relatively low interest rates.

Long-term lenders would have recognized that the ability of borrowers to repay their loans was dependent on the long-run success of the investment pro-

jects and consequently was attended by a substantial amount of risk. They would have demanded higher interest rates to compensate themselves for this risk. The combination of higher interest rates and greater lender risk-consciousness would have forced Mexican firms to scale back their investments, reducing both the firms' potential profits and the overall growth rate of the Mexican economy. However, neither these firms nor the Mexican government was willing to accept such a slowdown in the pace of development.

One potential source of risk whose existence was generally recognized was exchange rate risk. Although there was relatively little chance that the banks issuing the deposits would default over horizons of three or six months, under a floating exchange rate regime there would have been significant risk of substantial declines in the dollar value of the peso. After all, even for developed countries exchange rate fluctuations of 10 percent or even 20 percent over short time horizons are not uncommon. Lenders whose base currency was dollars would have had to charge substantially higher interest rates to compensate themselves for the exchange rate risk. Presumably, the desire to avoid these interest costs was the reason the Mexican government began pegging the exchange rate in the first place and was also the reason it continually assured investors that it had no plans to abandon or revise the policy. Of course, the exchange rate pegging scheme produced the same sorts of potential instabilities as the nineteenth-century guarantee of deposit convertibility: any threat that the policy might have to be abandoned, whether real or imagined, could produce a self-perpetuating outflow of funds and a financial/economic disaster.

In sum, the Mexican government's policy of pegging the exchange rate appears to have been part of a larger strategy of making sure that short-term funds were available to Mexico's firms and government agencies in large quantities and at moderate interest rates. It is important to emphasize, however, that while the exchange rate peg increased both the benefits and the risks of the Mexican development strategy, neither the benefits nor the risks would have disappeared without it. Clearly, even under a floating-rate regime Mexican firms and government agencies could have obtained funds more cheaply in the short-term rather than the long-term credit market. Under floating rates, however, changes in the market value of the Mexican peso would have replaced changes in the reserve position of the Mexican government as potential factors touching off a panic. Under a floating-rate regime, a sudden loss of investor confidence would be immediately reflected in a sharp decline in the value of the Mexican

peso. This decline would reduce the dollar value of Mexican assets and disconcert foreign investors; it might well become the cause of additional confidence losses or create expectations of further depreciation in the exchange rate. Either eventuality would lead to a rapid drawdown of short-term foreign deposits and would put further downward pressure on the peso. A situation of this sort could easily degenerate into a self-reinforcing financial panic similar to the one Mexico actually experienced. Thus, one could argue that under some conditions a flexible exchange rate regime could make the Mexican financial system more vulnerable to a financial panic.

On balance, we think that a major financial crisis would have been somewhat less likely under a floating exchange rate regime. Under floating rates, an event or sequence of events disturbing enough to shake the confidence of a large group of depositors might produce a fairly gradual decline in the value of the peso, at least when the decline is compared with the abrupt changes that typically occur when countries adjust their exchange rate pegs. Declines of this sort might not disconcert less timid or better-informed depositors to the extent necessary to touch off concerted runs. At the very least, there would no longer be any need for the large, abrupt official devaluations that almost guarantee runs and panic.¹⁷

On the other hand, unregulated foreign exchange markets are notoriously volatile: as noted above, swings of 10 or 20 percent over periods of three months or less are not uncommon, even for exchange rates between the currencies of developed countries. In the relatively thin market for the currency of a less-developed country like Mexico, the extent of the volatility is likely to be much greater. Indeed, we suspect that one of the considerations that led the Mexican government to adopt a pegged exchange rate regime may have been its belief that a floating exchange rate was more likely to be a source of instability than a cure for it.

It is interesting, in this connection, to compare the Mexican economic crisis with events that took place in the United States shortly thereafter. Between January and April 1995, the U.S. dollar depreciated by roughly 20 percent against the Japanese yen and 13 percent against the German mark. Although there was much debate about the causes and consequences of the dollar's relatively rapid loss in value against these two major currencies, no one seems to have feared that the sky was about to fall on the U.S. economy. In retrospect this lack of concern seems to have been justified: the decline in the dollar's exchange value did not produce an economic recession, an episode of high infla-

tion, or a serious economic problem of any other sort. The dollar, moreover, has since regained all the ground it lost during this period.

In Mexico, the economic sky really did seem to fall after the December devaluations. The first victim of the devaluations was Mexican financial markets, where interest rates skyrocketed and asset prices declined sharply. In the aftermath of the devaluations, moreover, most economic analysts became quite pessimistic about the outlook for Mexico's economy. Before the crisis erupted, most private forecasts were roughly consistent with the Mexican government's real GDP growth target of 3.8 percent. Afterwards, however, nearly every forecaster predicted a serious, extended recession that would be accompanied by high inflation. These predictions turned out to be correct, at least qualitatively: during the year following the crisis, Mexico's real GDP fell by 7 percent, and its price level rose by roughly 50 percent.

Policy Prescriptions

By now it should be clear that in our view the principal cause of the Mexican financial crisis was excessive reliance on short-term liabilities issued to foreign investors. What, if anything, could the Mexican government have done to avoid this problem, and what can it do to prevent similar crises in the future? One might argue that the problem will eventually solve itself as borrowers become more aware of the potential risks of heavy reliance on short-term credit—risks that should now be evident to everyone because of the crisis. However, there are reasons to doubt that changes in private behavior stimulated by this crisis will be sufficient, in themselves, to prevent future crises. The key problem is that when a Mexican financial institution issues additional short-term debt, it increases not only its own refinancing risk but also the risk of a financial crisis that will affect many other financial and commercial institutions. In the jargon of economists, issuance of short-term credit by one firm imposes external costs on other firms. A well-known principle of economic theory states that unregulated markets cannot be expected to find the most efficient solutions to problems involving external costs and that there may therefore be a constructive role for government intervention.

The external-cost problems of contemporary Mexican financial markets are not drastically different from the problems that confronted the U.S. financial system of the nineteenth century. When a U.S. bank issued ad-

ditional demand deposits, it increased its own vulnerability to an idiosyncratic bank run, and it also increased the vulnerability of the U.S. financial system to a nationwide financial panic. Clearly, the experience gained from past financial panics was not sufficient to motivate U.S. banks to rearrange their balance sheets in ways that prevented future ones: panics continued to occur roughly once every dozen years.

The U.S. government tried two basic strategies for preventing financial panics. The first strategy, which was not entirely successful, was to create Federal Reserve Banks to provide a lender of last resort for the private banking system.¹⁸ The second strategy, which has been quite successful (at least in preventing panics) was to establish a system of federally administered deposit insurance. Unfortunately, neither of these strategies would seem to offer a viable solution to the problems of the Mexican financial system. The short-term deposits that are in the most danger of being run off are those supplied by foreigners who are very concerned about the *dollar* value of their peso-denominated deposits. As Mexican government last-resort loans would presumably be extended in pesos, large-scale emergency lending would cause the peso to depreciate further against the dollar and would therefore create at least as many problems as it solved. Similarly, in order for a deposit insurance system to be reassuring to foreigners, it would have to guarantee the dollar value of deposits. Neither the Mexican government nor its banking system appear to have the financial resources necessary to underwrite such a system.

In addition to last-resort lending and deposit insurance, the U.S. government tried several other strategies for reducing the vulnerability of the U.S. banking system to financial panics. Two of these strategies seem particularly relevant to a discussion of the Mexican financial situation. First, U.S. banks were prohibited from purchasing corporate bonds or common stock. This prohibition was motivated, at least in part, by a desire to prevent volatile demand deposits from being used to finance risky investment activities. Second, the payment of interest on demand deposits was prohibited. Part of the rationale for this prohibition was to discourage the issuance of demand deposits and reduce their importance in the U.S. financial system.

In the case of Mexico, prohibiting banks from financing investment activities is probably not a realistic option. It was possible in the United States only because the U.S. financial system was sufficiently well developed to allow investment-minded firms to seek funds from other sources. In Mexico such alternatives are just beginning to emerge; almost all private

credit is intermediated through the banking system. Prohibiting or limiting interest on short-term liabilities is also probably too drastic. The U.S. government felt free to prohibit banks from paying interest on demand deposits because it was certain that the American public would continue to hold substantial quantities of these deposits for direct use as money or for related liquidity-oriented reasons. It seems unlikely, however, that many foreigners rely on short-term deposits in Mexican banks as a source of liquidity. Consequently, an interest prohibition or limitation might cause this source of funds to dry up completely.

Reserve Requirements. The policy intervention proposed here is considerably less drastic. We suggest

The Mexican financial crisis can be seen as an expectations-driven liquidity crisis that shares many similarities with the financial panics that afflicted the U.S. economy during the late nineteenth century.

that the Mexican government impose reserve requirements on the short-term liabilities of banks and other financial intermediaries and also on any direct (that is, unintermediated) short-term liabilities of Mexican firms. The reservable assets would be medium-term bonds (bonds with terms of five to ten years) issued by the Mexican government.¹⁹ The new reserve requirements would be graduated in a manner similar, in spirit, to the interest rate ceilings the U.S. government formerly imposed under Regulation Q: longer-term liabilities would have lower reserve ratios than shorter-term liabilities, and liabilities with terms longer than five years or so would have reserve ratios at or near zero.²⁰

The purpose of these graduated reserve requirements would be to discourage Mexican banks from issuing short-term liabilities, without forbidding them to do so. Stated differently, the policy would provide Mexican banks with financial incentives to limit their exposure to institutional and systemic sources of refinancing risk. The lower reserve ratios on longer-term liabilities would give them a substantial interest-cost advantage relative to short-term liabilities—an advantage that

would allow Mexican financial institutions to issue longer-term liabilities at rates that would increase their relative attractiveness to domestic and foreign investors. The goal would be to increase the average term of Mexican domestic and foreign debts substantially, making the country's financial system less susceptible to liquidity crises. The policy would also help counteract the external-cost problem with short-term liabilities. Under the policy, when a Mexican bank issued additional short-term liabilities that marginally increased the susceptibility of the Mexican financial system to panics, the bank would also be allowing the Mexican government to sell additional medium-term debt. The average term of the government's liability portfolio would consequently increase, reducing its own vulnerability to liquidity crises and increasing its ability to provide emergency financial assistance to the country's private sector.

As has been indicated, if this policy of reducing the country's reliance on short-term debt were adopted, it would not be without costs to Mexico. Interest rates on debt would be higher than they would have been otherwise, and the amount of investment would be lower.²¹ As a result, in noncrisis periods the country would grow somewhat more slowly than in the absence of the policy. However, the recent financial crisis and the economic recession that followed it have imposed huge costs on the Mexican people. Consequently, if the reserve-requirement policy just outlined succeeds in materially reducing the probability of future crises, it may offer substantial net benefits to Mexico.

Other Policy Recommendations. As indicated above, allowing the peso to float might have made a financial crisis less likely. Thus, one of our policy recommendations is for Mexico to stick with its current flexible exchange rate regime (as it appears to have every intention of doing). However, exchange rate risk is certain to remain troubling to foreign investors and will consequently continue to provide a source of financial instability. One approach to reducing the severity of this problem would be for the Mexican government to encourage the country's banks and other borrowers to issue dollar-denominated debts. A first step in this direction would be to remove any legal impediments to the issuance of such debts that may currently be in place.²² A second step might be to nudge the process along by requiring that at least a minimum fraction of the foreign liabilities of Mexican financial intermediaries be dollar- or other-foreign-currency-denominated.²³

Clearly, one factor that contributed greatly to the financial crisis is Mexico's strategy of externally fi-

nanced development. Unfortunately, it is unrealistic to expect Mexican citizens to increase their savings to the extent necessary to allow Mexico to resume its precrisis development path without relying heavily on foreign funds, and it is equally unlikely that they will be willing to accept the much slower growth rate attainable through reliance on the current level of domestic savings. Nevertheless, the Mexican government can and should take steps to increase the domestic savings rate. The most important step in this direction would be continued progress toward deregulating the financial industry and exposing it to more vigorous domestic and foreign competition. The hope is that deregulation and competition will eventually create a situation in which attractive savings instruments are available to most Mexicans, even those with relatively low incomes.

Continued progress toward financial/economic deregulation would also promote financial stability by improving foreign lenders' confidence in the long-run prospects for the Mexican economy, which would increase their willingness to commit funds for longer periods. Finally, political and social reforms that succeed in significantly reducing the likelihood of future political unrest would obviously be an important factor in promoting economic stability.

Conclusion

The recent Mexican economic crisis has been the subject of numerous papers, articles, and commentaries. This article has not attempted to provide an exhaustive survey of this voluminous literature. Instead, the explanations that have been offered for the crisis have been grouped into two categories: (1) explanations that are based on the assumption that the crisis was caused by fundamental imbalances in the Mexican economy and (2) explanations that emphasize the vulnerability of the Mexican financial system to swings in expectations and investor confidence. The discussion has tried to clear up some misconceptions that are often associated with the first type of explanations and to explain why we favor the second type.

In our view, the Mexican financial crisis was an expectations-driven liquidity crisis that shares many similarities with the financial panics that afflicted the U.S. economy during the late nineteenth century. In Mexico's case, the immediate cause of the crisis was political turmoil that created concern among foreign lenders about the safety of their investments. Because

most of Mexico's foreign debts were short-term in nature, investors' natural tendency to withhold their funds in response to these fears created severe refinancing problems for private borrowers and made it difficult for the government to defend its pegged exchange rate. Investors interpreted the government's decision to devalue the peso as a sign of weakness; it reinforced their fears and produced a full-blown financial crisis. Ultimately, the gravity of the crisis itself far exceeded the seriousness of the political disruptions that touched it off.

While Mexico's pegged exchange rate system clearly played a role in producing the crisis, we think the single most important cause of the crisis was Mexican borrowers' overreliance on short-term liabilities. The need to refinance these liabilities frequently made both individual borrowers and the financial system as a whole extremely vulnerable to adverse political events that temporarily shook the confidence of foreign investors. Consequently, this article's principal policy recommendation is for the Mexican government to set up a system of term-graduated reserve requirements that would give financial institutions (and direct borrowers) strong incentives to lengthen the average term of their debts.

Further progress in the development of a financial panic theory of the Mexican-style economic crisis will require formal models of the causes and consequences of the crisis. These models will need to be able to describe the decisions of lenders and borrowers regarding the term structures of their assets and liabilities. In particular, they will have to be capable of generating situations in which both lenders and borrowers prefer short-term liabilities when they are confident about the future, but a financial system dominated by these

liabilities is vulnerable to a liquidity crisis if an adverse shock increases lenders' doubts about the financial prospects of borrowers. The liquidity crisis, moreover, can leave the economy mired in an undesirable low-output equilibrium in which lenders' expectations that borrowers' prospects are poor turn out to be self-fulfilling. If lenders and borrowers can be prevailed on to lengthen the maturities of their credit instruments, however, then the economy will have a more stable equilibrium in which output is somewhat lower than in the desirable short-term credit equilibrium but is considerably higher than in the undesirable version of this equilibrium. Stated differently, these models will have to have highly desirable short-term credit equilibria that are sustainable only at high levels of investor confidence, and fairly desirable long-term credit equilibria that are sustainable across a broader range of confidence levels.

The appendix to this article describes a paper by Harold Cole and Timothy Kehoe (1995) that presents a formal model of a country that is vulnerable to economic crises in which the government finds itself unable to refinance the national debt. These crises result from self-fulfilling shifts in lenders' expectations and impose large real costs on the country's economy. Cole and Kehoe offer their model as a possible explanation for certain aspects of the Mexican financial crisis. While the Cole-Kehoe approach differs from the approach advocated in this article in a number of important respects—in particular, in focusing on government rather than private debt—their analysis represents an important first step in the direction of plausible formal models of financial crises like the one Mexico suffered.

Appendix Self-Fulfilling Debt Crises

An alternative explanation for the Mexican financial crisis has recently been offered by Cole and Kehoe (1995). Like the Atkeson and Ríos-Rull (1995) explanation described earlier in the article, the Cole-Kehoe analysis is of particular interest because it is based on a formal economic model. In addition, while the diagnosis of the causes and cures of the crisis that is presented in this article differs from Cole and Kehoe's in a number of important respects, the two accounts share three basic similarities. First, the Cole-Kehoe story is not based on

the assumption that Mexican currency was overvalued or that the Mexican government had adopted unsustainable fiscal or monetary policies. Second, Cole and Kehoe argue that the crisis was the result of self-fulfilling swings in investors' expectations, in the sense that it might not have occurred if investors had reacted less strongly to events that were disconcerting but did not have lasting significance. Finally, Cole and Kehoe emphasize the role of the short average term of the Mexican government's foreign debts in allowing a potentially temporary loss of

investor confidence to produce a severe and persistent economic crisis. In their view, financial crises of the type that occurred in Mexico can be avoided if governments diversify the term structure of its debt sufficiently to ensure that only a small portion matures during any particular interval of time.

Cole and Kehoe focus their attention entirely on the financing problems of a national government. In their model, the government inherits a certain amount of foreign debt that it must either retire, refinance, or repudiate.¹ In the most interesting cases, the initial debt is so large that it is either entirely infeasible to retire in one period or can be immediately retired only at a very large welfare cost. Repudiating the debt is also costly because it permanently reduces the productivity of the national economy. Under some circumstances, however, repudiation may be preferable to retiring or refinancing the debt. The government, moreover, cannot credibly commit itself to refusing to repudiate the debt at a future date if repudiation turns out to be the preferred strategy at that date.

Cole and Kehoe show that if the initial debt is large enough it is possible for there to be more than one equilibrium outcome, depending on the nature of foreign lenders' expectations. If foreign lenders expect the government to be able to service its debts, then government bonds will sell at a moderate price and it will be optimal for the government to refinance them rather than repudiate them. If, on the other hand, the lenders believe, for whatever reason, that the government will not be able to service its debts, then they will be unwilling to lend to the government. When foreigners are unwilling to lend, however, the government cannot possibly refinance the debt, and it may be optimal for the government to repudiate the debt rather than make the large (and possibly infeasible) consumption sacrifices that would be necessary to retire it out of the country's current income. Thus, foreign lenders' expectations that the government will not be able to service the debt are self-fulfilling; when lenders hold this expectation, the government becomes unwilling or unable to service the debt. This situation can arise stochastically; that is, there can be equilibria in which lenders usually expect the government to be able to repay its debts, in which case the government refinances them and no crisis occurs, but occasionally lenders expect the government to be unable to pay, in which case the government cannot refinance the debt and elects to repudiate it, producing a crisis.² There can be only one crisis, however, because after the government has repudiated its debt it no longer has any reason to borrow.

In the model, a financial crisis can occur at a particular date only if the amount of debt that needs to be rolled over at that date is fairly large. As a result, changing the maturity structure of the debt can prevent crises from oc-

curing. If the government refinances the initial debt by issuing bonds with a range of maturities, then only a fraction of the debt would need to be refinanced at any particular future date. Once this step has been taken, even if lenders believe, for whatever reason, that the government is going to be unable to refinance its debt, the government can retire maturing debt out of its current income without incurring welfare costs large enough to induce it to repudiate the debt. As a result, under these conditions there is no equilibrium in which lenders' belief that the government will fail to repay becomes self-fulfilling, and a crisis cannot occur.

While many features of the Cole-Kehoe analysis are quite appealing, certain aspects of their explanation for the Mexican financial crisis do not seem consistent with the evidence. First, the authors concentrate on the role of the government's financial problems in precipitating the crisis. It seems natural to interpret this choice of focus as reflecting a belief, on their part, that the problems of private borrowers were caused by the government's problems.³ In contrast, it seems to us that the government's financial problems were largely the result of the refinancing problems being experienced by the private sector. (See the chart, which displays the large size of Mexico's private debt relative to its overall level of foreign indebtedness.) The trigger for the crisis appears to have been the Mexican government's decision to devalue its currency—a decision that represented a rather desperate attempt to staunch the rapid bleeding of its foreign exchange reserves. The reserve drain was caused by the government's attempt to maintain a pegged exchange rate in the face of weak foreign demand for the liabilities of private Mexican borrowers. Foreign demand was weak because many foreign lenders had become concerned about the apparent deterioration of the country's political situation.

Thus, the underlying cause of the financial crisis was weak demand for Mexican private liabilities resulting from a fear, on the part of many lenders, that adverse political shocks might create a situation in which the issuers of these liabilities would be unable to cover their debts. The drain on Mexico's foreign exchange reserves forced the Mexican government to devalue the peso, producing a full-blown liquidity crisis. The refinancing problems experienced by the government were simply a side-effect of this crisis. It is worth noting, in this connection, that the Mexican government does not seem to have experienced any problems refinancing its tesobonos until several days after the devaluations took place (IMF 1995, 60-61).

A second problem with the Cole-Kehoe analysis is that the mechanism that drives the crisis is the fear that government will decide to repudiate its debts. In the Cole-Kehoe model, this fear is potentially rational for

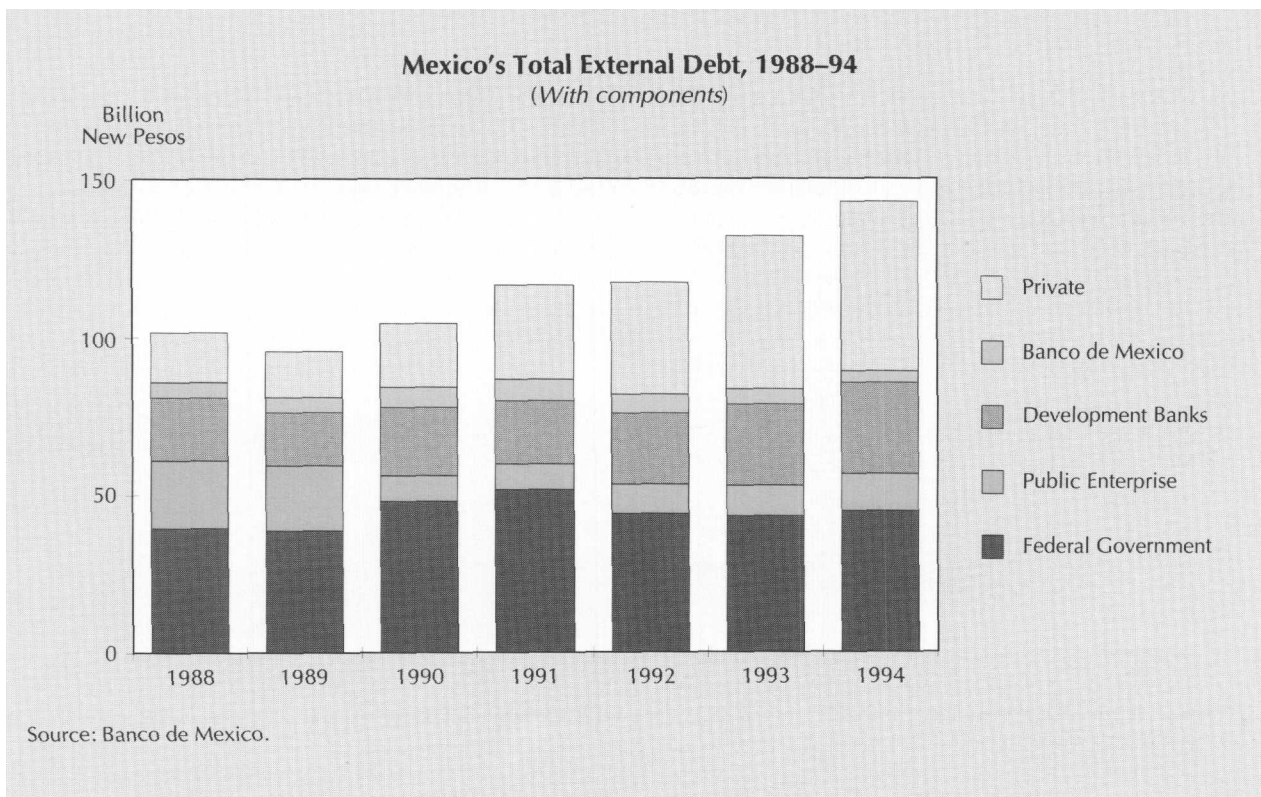
two reasons. First, if private lenders are unwilling to purchase government debt, then the government does not have any alternative refinancing options. Second, once the government has repudiated its debt it has no incentive to do any future borrowing and thus no reason to be concerned about its future ability to borrow. In Mexico's case, there does not seem to have been widespread fear that the government intended to repudiate its debts, despite its difficulties in refunding them. The principal reason for this confidence was investors' belief that the government recognized the fact that the ability of the country to grow at a politically acceptable rate depended critically on its ability to attract foreign investment.

In our view, the Mexican government experienced a liquidity crisis rather than a solvency crisis. This diagnosis raises the question of what convinced so many lenders that the government might have difficulty refinancing its debts. The answer may be that expectations of liquidity problems can also be self-fulfilling. Foreign lenders may have become reluctant to buy tesobonos because they anticipated that the crisis would make it difficult for the government to refinance this debt on schedule—a situation that they may have feared would force the government to delay tesobono repayment unilaterally, attempt to negotiate extensions of their maturities, or take other steps to avoid prompt repayment.

In the actual crisis, unlike a crisis in the Cole-Kehoe model, the Mexican government did not repudiate its

debt; in fact, it never missed a payment. It was able to accomplish the latter feat partly because it received financial assistance from a number of foreign governments and international organizations—assistance that allowed it to refinance the debt on terms that greatly increased its average maturity. The relative speed with which the aid package was put together suggests that many of the contributors had contemplated the possibility that Mexico might someday require emergency financial assistance and had done some planning for this contingency—a fact that was undoubtedly known to some foreign investors. However, it seems unlikely that the government would have repudiated its debt even if external assistance had not been forthcoming; instead it would have rescheduled the debt unilaterally, paying off some fraction of the tesobonos that matured each month and announcing that the rest would be repaid at later dates.

Of course, it is far from clear that the government could have accomplished this rescheduling without losing its access to the international credit market. It is interesting to note, though, that in the Cole-Kehoe model, giving the government the option of unilateral rescheduling would be just as effective at preventing crises as maturity diversification of the initial government debt. If the government could respond to a zero market price of new debt by unilaterally rescheduling the old debt, it would no longer be optimal for it to repudiate the debt; if lenders realize this fact, they will not expect a repudiation, zero



will not be an equilibrium new-debt price, and there will be no crisis. The only reason that unilateral rescheduling is not an equilibrium in the model is that Cole and Kehoe rule it out by assuming (implicitly) that any unilateral changes in the repayment terms of the national debt will be penalized by a large, permanent decline in national productivity. While this assumption may be reasonable for outright repudiation of the debt, at least as a first approximation, it is clearly not reasonable for unilateral rescheduling that does not involve any threat of repudiation.⁴

Unilateral rescheduling is not a solution to liquidity crises. The principal force driving these crises is lenders' fear that they will lose short-run access to their funds, and this problem cannot be solved by rescheduling. Thus the hypothesis that the Mexican government was the victim of a liquidity rather than a solvency crisis would explain why it found itself unable to sell tesobonos at auctions that occurred shortly after the devaluations, even though it managed to avoid defaulting on any of its tesobono debts, and there are good reasons to believe that no one ever expected it to repudiate them.

Notes

1. For the purposes of this discussion, it is important to distinguish between repudiating a debt, which is a decision not to

repay any of it at any future date, and defaulting on a debt, a broader term that could include not only repudiation but also such actions as repaying only part of the principal or interest on the debt or unilaterally extending the term of the debt. When Cole and Kehoe use the term *default*, they are talking about repudiation (see below).

2. Formally, these adverse occasions are tied to adverse realization of a spurious indicator variable—a “sunspot.”
3. In fairness to Cole and Kehoe, they are careful to note in their concluding section that their model is not intended to explain either the sharp decline in the Mexican government's foreign exchange reserves that took place during November-December 1994 or the subsequent peso devaluations.
4. After the 1982 financial crisis the Mexican government rescheduled much of its debt, unilaterally or after negotiations with creditors and their governments. Nonetheless, it was several years before Mexico regained ready access to international credit markets. A probable reason for markets' reluctance to allow Mexico access was that a substantial fraction of the Mexican debt was ultimately rescheduled on terms that amounted to partial repudiation, and the likelihood of such a repudiation, in this form or a more direct one, was well understood by potential lenders. For details of the 1989 rescheduling agreement and an estimate of the amount of debt relief it provided, see Lustig (1992, 141-44).

Notes

1. Almost a decade ago, in 1987, the Mexican economy experienced a somewhat less serious crisis that involved an episode of high inflation, a run on the peso, and a crash in the domestic stock market. The government responded to this crisis by designing a long-run plan to combat what it viewed as Mexico's principal economic enemy—high inflation. A cornerstone of the plan was the exchange rate pegging policy described below. According to the Banco de Mexico, “The main objectives of exchange rate policy have been to contribute to the fight against inflation” (1992, 77). Stable exchange rates were viewed as essential for restraining price and wage increases and also for building domestic and foreign confidence in the country's other economic policies. Each year, the economic plan was revised after consultations with labor leaders; the current version of the plan came to be known as the pacto. The specification of an exchange rate band became an important element of every pacto.
2. For an analysis of exchange rate pegging policies and other devices for nominal stabilization (such as currency boards) see Zarazaga (1995) and Humpage and McIntire (1995).
3. These numbers are the official unemployment figures and do not reflect the millions of underemployed individuals.

The fact that the official unemployment rate almost doubled suggests that there was probably also a large increase in the amount of underemployment. For a discussion of the problem of underemployment in Mexico, see Lustig (1992).

4. A fallacy closely related to this one is that it is possible to determine the sustainability of a current account deficit by examining the composition of the country's imports: if the imports are mostly investment goods, the deficit may be sustainable, while if they are mostly consumption goods, it will not be sustainable. This notion has been used to argue that Mexico's deficit was unsustainable. It is entirely possible, however, for a country to be importing consumption goods in order to replace domestic consumption goods that it is no longer producing because it has reallocated domestic resources toward production of investment goods.
5. The fact that many goods are effectively nontradable helps explain why travelers often comment that dollars seems to “go a lot further” in Mexico or other developing countries than in most parts of the United States. A high proportion of the items travelers purchase are effectively nontradable—local lodging and restaurant meals, for example—and these items tend to have lower prices in developing

- countries because average incomes, wages, and so forth are lower in these countries.
6. In 1981, Mexico suffered a major financial crisis that produced a huge decline in the peso exchange rate. As a result, it was possible for the peso to appreciate for a number of recent years without exceeding its 1978-79 valuation level.
 7. As has been noted, from 1990 to 1993 Mexico received a large inflow of foreign investment. Its average real GDP growth rate during this period was 2.4 percent, which is significantly if not dramatically higher than the average U.S. real growth rate of 1.4 percent (calculated using chain-weight methodology).
 8. The Mexican government has a substantial quantity of long-term foreign indebtedness (mostly "Brady bonds") left over from the debt crisis of the early 1980s. The volume of this debt has been declining in recent years, and it did not play a significant role in the financial crisis of 1994-95.
 9. Cole and Kehoe (1995) provide a formal model of the crisis that emphasizes the role of the government's financial problems. The Cole-Kehoe analysis is discussed in detail in the appendix to this article.
 10. The interbank loan rate, for example, rose from an average of 11 percent in March to an average above 20 percent in April (see Banco de Mexico 1995, 220); market rates on private loans to nonbank borrowers were considerably higher.
 11. After the Civil War, there were financial panics in 1873, 1884, 1893, and 1907. The Panic of 1884 was less severe than the others and did not result in a payments suspension. During the Great Depression of 1929-33 there were a number of regional panics that did not produce nationwide suspensions. These panics culminated in the "Bank Holiday" of March 1933, when the U.S. government forced all of the nation's banks to close their doors for a week in order to calm the ongoing crisis. For the details of the pre-Depression panics see Sprague (1968 [1910]); Roberds (1995) provides a good synopsis of these panics. For an account of the situation during the Depression, see Friedman and Schwartz (1963, chap. 7).
 12. The Panic of 1893, for example, was followed by a very depressed period that lasted until mid-1897; see Friedman and Schwartz (1963, 111). This panic will be discussed in more detail below.
 13. Of course, at the time they began the development process the average level of income in the Asian success-story countries was also very low. Why these countries were able to achieve persistently high rates of domestic savings, and why other developing countries have been largely unable to do so, is an unresolved problem in the economics of national growth and development.
 14. In the 1988 presidential election, the PRI candidate, Carlos Salinas de Gortari, won a relatively narrow victory that was marred by unusually widespread allegations of vote fraud.
 15. Foreign exchange reserves fell by \$11.6 billion during March and April, an amount roughly equal to 40 percent of the total available at the beginning of March (see IMF 1995, 56).
 16. For example, the chain of events that led up to the Panic of 1893 began as early as February, when a major commercial failure was followed by a sharp decline in the stock market and a period of bank loan contraction and high interest rates. In early May there was another big commercial failure followed by an even more dramatic stock market crash. In June there was a wave of bank failures in the West and South; these failures resulted from the cumulative effect of the large number of lesser business failures that occurred during the first half of the year. This crisis did not terminate in a suspension of specie payments, however. Payments suspension did not occur until early August, after yet another wave of bank failures. See Sprague (1968 [1910], 163-200). Sprague offers the following comment about the August suspension: "In some respects, affairs were in a more critical state than in June; in other respects the situation was distinctly more satisfactory" (178).
 17. A fundamental problem with pegged exchange rate regimes is that the government, recognizing that a devaluation sends an adverse signal to investors, is reluctant to change the pegged rate until it is convinced that an adjustment is absolutely necessary. By the time the situation has reached this stage, the required change in the rate is usually quite large. It should be noted, however, that an economic crisis does not necessarily force a country to devalue its currency—and it follows, conversely, that the adverse consequences of the Mexican crisis were not necessarily caused by the government's decision to devalue the peso. Shortly after the Mexican crisis broke out, Argentina experienced an economic crisis that included a nationwide banking panic and was followed by a severe recession. Argentina, however, has not devalued its currency.
 18. While the Federal Reserve System was not created exclusively to prevent financial panics—it was also intended, among other things, to ensure nationwide par clearing of checks and to provide various financial services for the government—panic prevention was clearly the single most immediate motive for its establishment. It seems fair to describe the System as less than fully successful in fulfilling this purpose as it did not prevent the financial panics that occurred during the Great Depression.
 19. The Mexican government already has experience with "multiple reserve requirements" under which bank reserves consist of a mix of currency and government debt. Espinosa (1995) and Espinosa and Russell (1995) have provided formal analyses of some of the properties of multiple-reserve-requirements regimes.
 20. This term-graduated reserve-requirements scheme can be viewed as a modified and strengthened version of a system that is already in place. Currently, Mexico gives a modest income tax break on interest earned from assets with terms in excess of one year.
 21. The generally higher market interest rates on long-term liabilities reflect the fact that the financial flexibility provided by liquidity has substantial benefits to lenders. For a discussion of these benefits, see Wallace (1995).

22. For example, the government currently imposes a special 15 percent reserve requirement on bank deposits denominated in dollars.
23. Of course, the Mexican government got in trouble when it rolled over its peso-denominated cetes into dollar-denominated (actually, dollar-indexed) tesobonos a few months before the crisis and then found itself unable to refinance the tesobonos during the crisis. As noted above, however, the motivation for this rollover was to reassure foreign lenders by eliminating their exchange rate risk. While this seems to have been a basically good idea, it worked out badly because shocks to investor confidence and severe portfolio imbalances had allowed Mexico's overall financial position

to become too precarious to be rescued by any financial actions of the government.

According to the IMF (1995, 63), before the crisis erupted many Mexican banks had issued dollar-denominated liabilities that were collateralized by holdings of tesobonos. After the crisis broke out, concern about the ability of the Mexican government to refinance the tesobonos reduced their acceptability as collateral and made it difficult for the banks to refinance their dollar-denominated debts when they matured. Again, however, the underlying source of these problems seems to have been the short maturities of both the tesobonos and the liabilities they collateralized, rather than the fact that these liabilities were dollar-denominated.

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