THE COLLAPSE OF THE MEXICAN PESO: WHAT HAVE WE LEARNED?

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ABSTRACT

In the first quarter of 1995 Mexico found itself in the grip of an intense financial panic. Foreign investors fled Mexico despite very high interest rates on Mexican securities, an undervalued currency, and financial indicators that pointed to long-term solvency. The fundamental conditions of the Mexican economy cannot account for the entire crisis. The crisis was due to unexpected shocks that occurred in 1994, and the inadequate policy response to those shocks. In the aftermath of the March assassination the exchange rate experienced a nominal devaluation of around 10 percent and interest rates increased by around 7 percentage points. However, the capital outflow continued. The policy response to this was to maintain the exchange rate rule, and to prevent further increases in interest rates by expanding domestic credit and by converting short-term peso-denominated government liabilities (Cetes) falling due into dollar-denominated bonds (Tesobonos). A fall in international reserves and an increase in short-term dollar-denominated debt resulted. The government simply ended up illiquid, and therefore financially vulnerable. Illiquidity exposed Mexico to a self-fulfilling panic.

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I. Introduction

In the first quarter of 1995 Mexico found itself in the grip of an intense financial panic. Foreign investors fled Mexico despite very high interest rates on Mexican securities, an undervalued currency, and financial indicators that pointed to long-term solvency. Investors feared default as well as the possibility of an explosive inflation in coming months, caused by the collapse of the peso. The odd fact is that these concerns were as much the result of the panic as they were its cause. Adverse expectations about Mexico's financial conditions have become self-fulfilling prophecies of doom.

The fundamental conditions of the Mexican economy cannot account for the entire crisis. Debt indicators do not suggest risk of insolvency: the stock of foreign debt as a percent of GDP and as a percent of exports has been falling, and is out of the "danger" range usually identified for developing countries, as we see in Table 1. With an exchange rate of about 6 new pesos to the dollar (roughly the rate in April 1995), the Mexican currency has depreciated beyond any needed correction based on considerations of competitiveness or purchasing power parity (PPP), as we see in Figure 1. In real terms the peso is back to the levels reached in the depths of the Mexican debt crisis in the 1980s. Given improvements in Mexico's international competitiveness and productivity since the mid-1980s, and its guaranteed access to U.S. markets via the NAFTA, it is hard to argue that any additional real depreciation of the peso is needed. On the contrary, Mexico is on a good footing to embark upon the route of export-led growth.

The Mexican currency crisis, unlike many others in Latin America, is not the result of irresponsible fiscal behavior. The Mexican operational budget balance, shown in Table 2, has been in surplus during 1990-94. The increase in absorption and the bulk of the borrowing during the last few years has been done by the private sector. The public sector only entered the picture when it attempted to sterilize the monetary effects of the capital inflow by issuing short-term securities, first in pesos and then in dollars.

The problem does not lie in the Mexican fundamentals, but in the perceived risk of financial collapse. Investors have feared three things in particular: (1) an imminent default on

short-term debt, especially dollar-denominated public debt; (2) a collapse of the banking system as a result of a rapid accumulation of bad commercial debts; and (3) a spiraling collapse of the exchange rate. While at the time of writing the worst of the panic seems to be over, with the peso and the stock market more-or-less stable, fears linger. The result of these fears has been enormously high interest rates, as shown in Figure 2, which signal market expectations both of a high risk of default and of further currency depreciation. We can measure the default risk by comparing Mexican dollar-denominated T-bill rates with U.S. T-bill rates. We can determine the expected rate of depreciation by comparing Mexican peso-denominated and Mexican dollar-denominated T-bill rates. These comparisons are shown in Table 3.

The panic was not inevitable. It is certainly true, as many argue now, that Mexico was relying too heavily on foreign borrowing in 1993 and in early 1994, and that the pace of foreign lending was bound to contract. The current account deficit, after all, had reached 6.8 percent of GDP in 1993, and would reach almost 8 percent in 1994. Therefore, a decline in the trade deficit and a real exchange rate depreciation were necessary as of mid-1994. These adjustments could have been accomplished without precipitating a financial panic had they been made early enough, while reserves were still plentiful and while there was little short-term dollar-denominated government debt. Such adjustments would have included a tightening of fiscal and monetary policy and a correction in the exchange rate. In such a scenario, the Mexican current account deficit could have declined gradually as a percent of GDP instead of disappearing abruptly as a result of a creditor panic.

How did Mexico get into this predicament? The crisis was due to unexpected shocks that occurred in 1994, and the inadequate policy response to those shocks. In the aftermath of the March assassination the exchange rate experienced a nominal devaluation of around 10 percent and interest rates increased by 7 percentage points, reaching the edge of the band. However, the capital outflow continued. The policy response to this was to maintain the exchange rate rule, and to prevent further increases in interest rates. The Government prevented interest rates from going up by expanding domestic credit and by converting short-term peso-denominated government liabilities (*Cetes*) falling due into dollar-denominated bonds (*Tesobonos*). A fall in

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international reserves and an increase in short-term dollar-denominated debt resulted. The government simply ended up illiquid, and therefore financially vulnerable. Illiquidity exposed Mexico to a self-fulfilling panic. Investors realized that if other investors stopped lending money to the Mexican Government, the Government would be unable to repay its debts --particularly the dollar-denominated Tesobonos-- as they fell due. Therefore, each individual investor could do no better than to withdraw its funds when other investors started to withdraw their funds.

A related point is that once the government found itself in a liquidity squeeze as a result of dwindling reserves and the public's reluctance to roll-over short-term debt, it contaminated the private sector's credit-worthiness. This is a fact often overlooked in economic analyses: if a government succumbs to a creditor panic, the private sector is generally cut off from international capital markets as well, even though the country as a whole is solvent. The practical implication of this for Mexico is that both the Mexican government and the private sector are now rationed out of international capital markets; therefore Mexico will have to shrink the current account deficit swiftly and with considerable pain.

Some lessons that can be drawn from the recent Mexican Peso crisis include the following. First, to avoid a financial crisis it is not sufficient for a country to be solvent in the sense of having low debt ratios. A government may be subject to a liquidity crisis if its own liquid reserves fall below levels needed to cover short-term liabilities. This kind of crisis is more likely to involve foreign-denominated liabilities than domestic-denominated liabilities, since the Central Bank can typically act as a lender of last resort with respect to domestic-denominated government liabilities. Second, short-term liabilities also include contingent liabilities such as short-term deposits in the commercial banking system, since markets rightly expect that governments will be forced to provide liquidity to cash-strapped banks. (Similarly, the Argentine Government faced a liquidity crisis in March 1995, despite strong fiscal accounts, as a result of a panic that hit the banking sector). Third, holding on to a preannounced peg of the exchange rate does not increase the credibility of the announced policy. Credibility of a peg depends not only on the signals of policymakers' toughness, but also on the ability to defend the peg. Fourth, pegged exchange rates are often helpful in ending very high inflations (as in

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Mexico in 1988), but they become dangerous if they are maintained long after stabilization has been achieved. After a high inflation has been ended, it is prudent to move from a pegged exchange rate regime to a more flexible exchange rate regime, such as a float, a crawling peg, or a crawling band.

II. The Conditions in Early 1994

It has become fashionable to argue that in early 1994 Mexico was on an unsustainable course, and the need for correction was urgent: the current account deficit would inevitably grow as a result of currency overvaluation, and the resulting gap could not possibly be financed from abroad. The opposite view holds that no adjustment was needed: the approval of NAFTA and the reforms carried in the 1980s had increased national wealth. As a result, absorption went up and this was reflected in a current account deficit. According to this alternative view, the political shocks in January and then in March 1994 were transitory, so that it was neither necessary nor appropriate to deviate from the previous equilibrium path. Furthermore, according to this view, Mexico's debt-to-GDP ratio was low, so that in 1994 it would be possible to continue to borrow internationally to the same extent as in 1993 (i.e. around 8 percent of GDP).

Neither view is fully convincing in our opinion. Mexico was indeed in need of adjustment already by late 1993. Two factors signalled disequilibrium: (1) peso overvaluation; and (2) a very large current account deficit, reflecting in part a decline in national savings rates. Not surprisingly, foreign investors became extremely skittish after the political shocks of early 1994, and began cutting off new loans **well before the devaluation**. Yet the problem was more subtle than it has been described *ex post*. Neither the overvaluation nor the deficit were so extreme as to provoke a deep crisis as actually occurred in December 1994.

Let us look at the evidence. Table 4 shows the quarterly inflation rates and exchange rate changes in Mexico during 1991-94, as well as an index of the real exchange rate vis-a-vis the

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U.S. (already shown in Figure 1). According to these data the real exchange rate was appreciated relative to the long-term average, perhaps by 20-25 percent.[1] However, Mexican inflation had declined sufficiently by early 1994 that the extent of overvaluation had stabilized: the gap was no longer widening. Moreover, the U.S. dollar itself was depreciating in real terms against the European currencies and the Japanese Yen, so that Mexico's multilateral real exchange rate was less appreciated than its bilateral real rate vis-a-via the U.S. dollar. The conclusion is that while a relative price realignment was necessary, it did not have to be very large, traumatic, or sudden.

The current account, which was balanced in the late 1980s, had started deteriorating in 1990, reaching 6.8% of GDP in 1993 and 7.9% in 1994. This deterioration did not only reflect higher investment, as some claim. Table 5 shows that the widening of the current account deficit between 1988 and 1994 was the result both of an increase in overall investment --from 20.4 percentage points of GDP to 23.6-- as well as a decline in the national savings rate, from 19.4 to 15.7 percent of GDP. Private consumption rose as a percent of GDP, from 69.4 percent of GDP to 71.0 percent.[2] The increase in private consumption was related to the massive capital inflows that took place and to the remonetization of the economy, as suggested by the increase in the ratio of M2 to GDP shown in table 8. The link was the banking system, which converted part of this increased liquidity into real estate and consumption loans.

Contrary to widespread belief, the external deficit did not reflect irresponsible fiscal behavior. From a national accounts point of view, government consumption remained almost constant since 1990, while public investment increased marginally. Moreover, the operational

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[1] Using other indices for domestic prices (such as the producer price index) leads to smaller assessments of the extent of overvaluation.

[2] Of course, there may be some mismeasurement here. Some apparent investment is really consumption spending. On the other hand, purchases of consumer durables, typically measured as consumption, should be viewed at least partly as investment.

fiscal deficit was in surplus starting in 1990, as can be seen in table 2.[3] This implies that the deterioration of the current account reflected an excess of private investment over private savings, as shown clearly in figure 3. Given this, the bulk of the external borrowing in the last few years was done by the private sector. The public sector's net indebtedness rose little: gross liabilities (Cetes and Tesobonos) issued to sterilize the monetary effects of the capital inflow were matched until late 1993 by accumulating foreign exchange reserves, so that net government indebtedness changed little.

Another important aspect is that the levels of Mexican public debt were low by world standards. The public debt was reduced from 67 percent of GDP in 1989 to 30 percent of GDP in 1993. Of this, 19 percent of GDP was foreign debt (most of which was long-term at the end of 1993 as a result of the 1989 debt restructuring) and 11 percent was domestic debt (with an average maturity of around 200 days).[4] Compared with OECD countries the government debt ratios are modest, as we can see in table 6.

Overall, while we might conclude that Mexico was borrowing a large amount relative to GDP, it was not on a consumption binge. Nor was Mexico reaching dangerous new levels of overall foreign indebtedness relative to GDP, as we already noted in connection to Table 1. Therefore, the view that Mexico was inevitably headed for disaster is unconvincing. What is clearly true, especially with the benefit of hindsight, is that the presence of such a large current

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[3] In the wake of the crisis, it has become fashionable to claim that these numbers hide a part of the deficit, for starting in 1993 they omit the financial intermediation activities of state development banks. But most or all of such activities do not belong in an economically meaningful definition of a budget deficit. Development banks raise money in the open market (often abroad) and relend it to domestic commercial banks. Beginning in 1993, development banks must by law have an 8% capitalization ratio, must hold reserves against bad loans and must lend to private banks on commercial terms. Clearly, total lending by these entities should not be considered a deficit item, only the contingent liabilities to the budget in the event of losses on the balance sheets of the state banks. Moreover, unpaid loans can be charged against reserves and capital, so that even balance sheet losses might not impose significant fiscal costs.

[4] It was this 11 percent of GDP that was transformed from peso-denominated *Cetes* into dollar-denominated *Tesobonos* during 1994.

account gap would necessitate a **sharp** policy turnaround if, for some reason, foreign investors decided to stop financing it. That is precisely what happened in the course of 1994: the political shocks starting with the January Chiapas uprising and continuing with the assassination of presidential candidate Luis Donaldo Colosio in March, greatly increased the risk premium demanded by foreign investors. And the Mexican policy response, we know today, was less than adequate.

III. The Fall in Mexican Foreign Exchange Reserves

The key to understanding the roots of the Mexican panic is to trace the evolution in the Mexican government's liquid assets and liabilities in the course of 1994. Here we focus on Mexican foreign exchange reserves; the evolution of short-term liabilities is studied in the following section.

The Mexican Central Bank ran down reserves from a post-NAFTA high of $29 billion in February 1994 to around $6 billion in December 1994. It is often argued that the drop of reserves was the inevitable result of the negative shocks that Mexico experienced. This is not correct. The fall of reserves was caused by a combination of the reduction of capital inflows and the monetary policy response, which was designed to limit further increases in domestic interest rates. This section traces this link.

One useful starting point is the balance of payments identity:

$$(1) \quad CAD = \Delta K + \Delta R$$

The current account deficit CAD must be financed by private capital inflows ΔK or by a decline in foreign exchange reserves ΔR. During 1992 and 1993, ΔK averaged approximately $24 billion per year, or around 7 percent of Mexican GDP. Reserves actually increased as well, so that the private capital flows were more than enough to finance the current account deficit. Specifically, in the period 1992-1993, CAD = $48 billion, ΔK = $57 billion and ΔR = $7

billion, with the difference being in errors and omissions.

Starting in March 1994, in the wake of the Colosio assassination, private capital flows fell precipitously. Instead of financing the current account deficit through private capital inflows (CAD = ΔK), Mexico began to finance the current account deficit through declines in central bank reserves (CAD = ΔR). Eventually, Mexico ran out of reserves. As shown in Table 7, reserve declines ΔR accounted for 86.3 percent of the financing of the current account deficit during the last three quarters of 1994. Private capital inflows, in the form of FDI, plus errors and omissions accounted for the balance (13.7 %).

It is useful at this point to introduce Figure 4, which shows the negative relationship between Mexico's current account deficit CAD and the interest rate required by foreign investors on Mexican securities. The Mexican current account deficit is the excess of Mexican investment over Mexican domestic savings. When interest rates are low, Mexican investment is increased and savings are reduced. Therefore, declines in U.S. interest rates, for example, tend to raise the Mexican current account deficit. Alternatively, if foreign investors demand a higher risk premium on Mexican securities, then Mexican interest rates rise, and the current account deficit is reduced, as Mexican investment falls while savings rise.

In late 1993 and early 1994, the Mexican risk premium was low, especially after the passage of the NAFTA. Therefore, the pre-Colosio assassination position of Mexico may be represented on Figure 4 as point 1, in which there is a sizeable current account deficit, CAD_1, financed by capital inflows at a relatively low interest rate R_1. After the assassination, the risk premium on Mexican securities rose. Normally, this would tend to raise Mexican interest rates relative to U.S. rates, perhaps to the level R_2. We see that the current account deficit would decline, as Mexican investments are cut back and Mexican savings are increased. Such an adjustment would take place with or without a currency devaluation, simply as the result of the higher interest rates in the Mexican market. Thus, the current account deficit would decline to CAD_2, but the deficit would continue to be financed by private capital inflows, albeit at a reduced rate and at a higher interest rate. If the risk premium rose sufficiently, i.e. to R_3, then

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CAD would fall to zero, as would private capital flows. In either case, however, there would be no reason for a significant loss of central bank reserves. (As discussed below, there might be a slight fall of reserves, but certainly not enough to deplete the stock).

Monetary policy fits into this process in the following way. Suppose that foreign investors are requiring an interest rate of R_2 in order to put in new funds into Mexico, but the Central Bank resists the increase in domestic interest rates through expansionary monetary policies. If the Central Bank expands its own loans to the private economy (e.g. via credits to the banking sector, or the purchases of government securities owned by the private sector), it can fight the increase in Mexican market interest rates, but at the cost of stopping the inflow of funds from abroad. Suppose, to be concrete, that the Mexican Central Bank tries to peg the interest rate at R_1 after the assassination through expansionary domestic credit, even though foreign investors are demanding a return of R_2. The current account deficit would remain at CAD_1 since interest rates have not changed. ΔK would fall to zero.[5] From equation (1), the current account deficit would have to be covered by reserve losses, with $CAD_1 = \Delta R$.

The precise mechanics are as follows. Until March 1994, the Mexican private sector was selling securities at a rate of more than $20 billion per year to foreign investors. After March, those sales of securities stopped. Instead, the private sector sold securities to the Mexican Central Bank, at about the same pace, and at interest rates below those demanded by the foreign investors. These sales of securities show up in the Central Bank accounts as Domestic Credit Expansion to the private sector and to the government, since the Central Bank's claims on the private sector (mainly banks) and the government (mainly Tesobonos purchased by the Central Bank from private investors) both expand. Mexicans use the pesos generated by the credit

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[5]Importantly, we are implicitly assuming that new investments will stop coming at the interest rate R_1, but that existing investment will not be withdrawn (until they mature). It is this assumed asymmetry between inflows, which respond to interest rates, and outflows, which depend on the amortization of existing loans, which allows the Mexican central bank to fight the interest rate increase without provoking a massive withdrawal of funds from Mexico. In truth, we would expect the Central Bank not only to provide new net financing, but also to buy up some existing debts, in its efforts to maintain domestic interest rates below the "required" levels.

expansion to continue to fund the current account deficit. In the aggregate, they convert CAD worth of Mexican pesos into dollars to cover the excess of imports over exports. Since the Central Bank is pegging the exchange rate, the central bank sells the importers the needed dollars to cover the deficit. Reserves thereby fall in the amount of the CAD.

We see that reserve losses are the direct result of the Central Bank's domestic credit expansion, not the result of the loss of investor confidence *per se*. The loss of confidence, by itself, would have led to higher interest rates and a smaller current account deficit, with or without a devaluation. *It was the attempt of the Central Bank to resist a further rise of interest rates demanded by foreign investors, through various channels of domestic credit expansion, that led to the collapse of reserves.* Without the credit expansion, Mexico would have had to adjust to a smaller inflow of foreign private capital, but it would not have run out of Central Bank reserves. The other side of the coin is that higher interest rates would have increased the likelihood of bankruptcy of the banking system.

Another accounting identity is useful at this point. The Mexican monetary base (currency plus commercial bank reserves held at the Central Bank) can change only as the result of domestic credit expansion (which tends to raise the supply of money), and the loss of reserves (which tends to reduce the supply of money). The link of reserve loss and the monetary base is straightforward: each sale of dollar reserves by the Mexican central bank absorbs pesos used by the private sector to purchase the dollars. Thus, the basic identity for the money supply is:

(2) $\Delta Mb = \Delta NDA - \Delta R$

where ΔMb is the increase in the money supply, ΔNDA is the expansion of domestic credit, and ΔR, as before, is the decline of foreign exchange reserves held by the Central Bank.

Now, from the vantage point of money demand, consider what happens when foreign capital inflows decline. Assume, initially, that $\Delta NDA = 0$, so that the Central Bank does not expand domestic credit. As ΔK falls, the Mexican private sector has two options: to reduce

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spending, thereby narrowing the current account deficit, or to run down money holdings by selling pesos to the Central Bank to buy dollars to continue to finance imports. In fact, it would be most unusual for money holdings to fall by very much: Mb is used by Mexicans for transactions, not as a store of wealth. Therefore, the demand for money is a fairly stable function of the level of GDP, and would not tend to fall simply because foreign lending was reduced. Therefore, if $\Delta Mb = 0$, then $\Delta R = 0$. There would not be a loss of reserves simply because of a decline in foreign capital inflows. Instead, the current account deficit would shrink.

Now consider what happens when the Central Bank responds to the fall in ΔK by expanding domestic credit. If we continue to assume, realistically, that $\Delta Mb = 0$, then we have that $\Delta R = \Delta NDA$. Reserves fall as a direct result of the rise of domestic credit expansion, which is the conclusion that we reached in the preceding paragraph.

The stability of money demand can be verified in Figure 5. We see that Mb is nearly constant in 1994, while the decline in reserves R is the exact counterpart of the rise in domestic credit NDA. This figure strengthens our earlier conclusion: the decline in reserves was the result not of a withdrawal of foreign financing per se, but rather the combination of this with a policy of sterilized intervention followed by the Bank of Mexico designed to limit the interest rate effects of the declining foreign capital inflows.

The Bank of Mexico has argued that monetary policies were prudent since they led to a one-time fall in reserves, not to an ongoing hemorrhage of reserves. Indeed, if we look again at Figure 6, we see that reserves fell in steps, not continuously: March-April, 1994, November 1994, and then December 1994.[6] The Mexican Central Bank has suggested simply that Mexico was buffeted, unexpectedly, by three shocks: the Colosio assassination in March; the resignation in November of the Deputy Attorney General, who charged a coverup of the assassination of his brother, the PRI leader Mr. Ruiz Massieu; and the rumors surrounding devaluation in early December. The defense, then, is that the policies were prudent except for the fact that the bad

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[6]Note that reserve losses are shown by the *upward* movement of the reserve schedule.

news kept coming, three times in a row.

Two comments are in order. First, the stepwise decline hides the presence of a smoother "underlying" trend of reserve loss, equal to the current account deficit (since private flows, other than FDI, had dried up). The current account deficit was approximately $2.3 billion per month during March-December 1994, or $29 billion at an annual rate. Other forms of private capital, especially foreign direct investment, continued at a more or less unchanged rate throughout 1994, at an average of around $0.6 billion per month. This left a balance of payments gap to be financed of the order of $1.7 billion per month. Once private flows stopped, reserves tended to fall at around $1.7 billion per month, assuming that the central bank maintained domestic interest rates low enough to preserve the current account deficit at its pre-shock levels. Therefore, in an unchanged policy environment, reserves had an underlying tendency to fall by that amount month after month.

The following interpretation of the balance of payments data during 1994 is congruent with this view. The current account deficit could have been financed by $1.7 billion of credit per month from the Central Bank. Instead, the Central Bank extended $8 billion of domestic credit in March and April, or roughly enough in loans to last for roughly four-and-a-half months. The private sector took slightly over $6 billion of the $8 billion and temporarily purchased foreign assets, while using almost $2 billion in April to finance the current account deficit. Then in May-July, the private sector drew down the remaining $6 billion, which had been temporarily parked in foreign assets, to finance the current account deficit in those months. We even see in the Balance of Payments accounts an "errors and omissions" item of $2 billion outflow in April-June, as the excessive credit expansion is translated into a capital outflow by Mexican investors, followed by an "errors and omissions" inflow of roughly $4 billion in the third quarter, as the private sector drew down its foreign asset holdings to finance the current account deficit. The next big wave of reserve loss came in November, when reserves declined by roughly $4 billion. The overall consistency between reserve losses and the cumulative current account deficit after March 1994 is shown in Figure 6.

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We also note that during 1994 Mexico faced also positive shocks from the point of view of foreign investors, such as the electoral victory of Mr. Zedillo with a higher-than- expected margin. It is interesting to note that these positive shocks did not induce capital inflows of the same magnitude as the outflows generated by the negative shocks (capital inflows recovered moderately in the third quarter, but were still far below the current account deficit). It seems clear that borrowing levels were too high, and Mexican interest rates too low, to attract the necessary foreign savings.

The classic "gold-standard" adjustment mechanism under fixed exchange rates, as outlined by Hume two centuries ago, would have required the domestic money supply to be governed by changes in reserves: in our notation above, that $\Delta NDA = 0$, so that $\Delta Mb = \Delta R$. The mechanism operates in practice by pushing up interest rates when foreign lending stops, thereby reducing domestic absorption and closing external deficit (or reducing it to the level willing financed at the higher interest rates). Interest rates did go up in Mexico in the wake of the March shock, but not enough to entice foreign lenders or to reduce the current account deficit.

The Hume mechanism was not allowed to run its course, a point recognized by the *Banco de Mexico* itself in its 1995 Monetary Program:

> ...(the fall in foreign reserves) made it necessary to carry out compensatory operations in the money market. Had liquidity not recovered through these operations, interest rates would have reached exorbitant levels, which would have affected debtors, including financial intermediaries, in a highly unfavorable way. That fact could have caused additional capital flight and could have required an eventual expansion of primary credit.[7]

We have some sympathy with this view. But then the right answer was to expand domestic

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[7] *Banco de Mexico* (1995), p.36. The translation is our own.

credit *moderately*, while allowing the exchange rate to depreciate. The chosen combination of credit expansion and a pegged exchange rate simply led to the depletion of reserves by the end of the year. We might note that several countries in Europe in 1992-93 also found the costs of tight credit and pegged exchange rates to be unbearable, leading to a serious weakening of domestic banking systems. These countries, including the U.K., Sweden, Finland, and Norway, ended up allowing their exchange rates to depreciate vis-a-vis the deutschemark, rather than depleting reserves or sticking with a costly credit squeeze at great risk to the banking sector.

IV. Financial Deepening, Government Debt and Financial Vulnerability

The source of the financial panic as of December 1994 does not lie in the high level of Mexican public debt *per se*. The panic was made possible by the fact that in the course of 1994 the short-term liabilities of the government and the banking system attained very high levels relative to the government's liquid reserves. This meant that the government became "financially vulnerable."

The increase in short-term liabilities was spurred by two factors: (i) financial deepening, and (ii) liberalization of the capital account. We consider each in turn. Financial deepening, as measured by the ratio M2/GDP increased from 25% in 1989 to over 33% by year-end 1993. Such deepening is usually considered a good thing. In Mexico's case, the increase in broad monetization was induced by the low levels of inflation achieved by the stabilization program, and by the financial liberalization implemented by the Central Bank, which instituted a zero legal reserve requirement for the banks and increased the money multiplier.[8]

But as Guillermo Calvo stressed in the April 1994 meeting of the Brookings Panel on Economic Activity, financial deepening can also be a problem. The ratio of M2 to reserves was already high at the end of 1993 even by Latin American standards: "for Argentina, Chile,

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[8] Incidentally, this also had the effect of eliminating reserve requirements as an instrument of monetary control, leaving only the interest rate.

Colombia and Uruguay, the ratio hovered around two or three." As reserves fell, the ratio attained a level of 7 in mid-1994 and of 10 in November of that year (see table 8). Why worry about such an indicator? Because in a world of fractional (in fact, zero) reserve banking and implicit or explicit deposit insurance, bank deposits are a contingent liability of the Central Bank. With such high levels of short-term liabilities to Central Bank liquid assets, a bank run could easily be translated into a currency run.

With respect to the capital account, Mexican law was changed in 1990 to allow foreigners to hold government bonds and to buy (non-voting) shares in almost all sectors of the economy. These policy changes, combined with the changing perception of Mexico as a successful reformer, generated a huge capital inflow, a significant part of which was short-term. The Central Bank sterilized these inflows by issuing short-term peso debt (Cetes). As a result, the ratio of M3 (M2 + non-bank short-term securities) to GDP grew from 36% in 1989 to 41% in 1993. At the end of 1993, Cetes alone represented close to 100 percent of net international reserves. Total M3 was six times larger than reserves. In this situation it was easy for any rumor to generate a massive capital outflow.[9]

After the assassination in March 1994, as perceived devaluation risk increased and so did peso interest rates, the Mexican government began rolling over its short-term peso-denominated debt into Tesobonos. As a result, M3 denominated in foreign currency became greater than the Central Bank's reserves by April 1994 (see table 8). The stock of Tesobonos outstanding continued to increase during the year, reaching $18 billion by December --up from $1 billion at the beginning of the year.[10] By the end of September, before the last great decline in Central Bank foreign assets, the stock of Tesobonos outstanding had reached the same amount of the reserves.

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[9] Table 9 shows the evolution of the government's domestic debt and its components.

[10] It is important to notice, however, that the total stock of domestic debt --which included Cetes and Tesobonos and well as the so-called Ajustabonos and Bondes-- grew less spectacularly: by a nominal 26 percent in the course of the year.

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Total government domestic debt, regardless of currency denomination, also grew in the course of 1994 --both in absolute magnitude and as a multiple of reserves (see Table 9). For descriptive purposes it suffices to point out that, expressed in dollars, it amounted to 1.7 times reserves December 1993 and to 2.6 times reserves in September 1994.

A self-fulfilling panic ensues when creditors believe that the government will default on its liabilities, and therefore stop new lending to the government. Unable to roll over short-term liabilities, the government is then indeed pushed into a self-fulfilling default. Pegged exchange rates exacerbate the risk of panic. Normally, the central bank can issue domestic credit to the government to help it meet its short-term liabilities, thereby keeping the government out of default. The credit expansion, however, undermines the exchange rate peg. Therefore, either the government is pushed into default or the exchange rate peg is fatally undermined. Something has to give, and the markets know it.

When M3 eventually "headed for Miami" in late 1994 and early 1995, the government was not able to cover the system's short-term liabilities with available reserves. At that point, both panic and currency devaluation occurred. Mexico had arrived at the worst of both worlds.

V. Should Mexico have Devalued in March 1994?

Since November 1991 Mexico operated a moving band system. Beginning in October 1992 the ceiling of the band has been adjusted at a rate of 0.0004 new pesos per day, while the floor has been kept constant at 3.0512 new pesos per dollar. This meant that in September 1994 the band was (plus or minus) 6% wide around a central parity of 3.2438 pesos per dollar.

Before the March 1994 shocks, the exchange rate was in the lower portion of the band. In the days that followed the assassination it went all the way to the top, in what constituted a nominal devaluation of around 10 percent.[11] The exchange rate spend the rest of the year at or

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[11] The fact that in the same period the Central Bank also lost around $ 9 billion in reserves only attests to the magnitude of the shock.

very near the ceiling. Both marginal and inframarginal intervention led to the reserves losses we have documented above. The upshot is that between and March and December Mexico operated an essentially pegged exchange rate, in that only the top of the band was relevant.[12] We know examine the pros and cons of exchange rate policy between March and December 1994.

The policy options facing Mexico after the shock of March of 1994 are summarized in Figure 7. One policy variable under the control of the authorities was domestic credit. The other was the exchange rate. The option that was actually followed is the one contained in the south-east cell: maintain the fixed exchange rate at the top of the band, expand domestic credit and resist a further rise in interest rates. This option was only temporary, in that it meant that the country eventually would run out of reserves. The other options were: (i) place the onus of adjustment on monetary policy, without a further devaluation (i.e., the one in the south-west cell); (ii)devaluation coupled with tight credit; and devaluation with loose credit (this option would have been highly inflationary). The counterfactual policy question, therefore, is whether Mexico should have lifted the ceiling of the band in March to achieve a greater nominal (and hopefully real) depreciation.

To answer that question properly, it is useful to refer to Figure 8, the familiar model of traded and non-traded goods. In the diagram, tradeable goods production and consumption is shown on the Y-axis, and non-tradeable production and consumption is shown on the X-axis. Just before the assassination, Mexico was consuming at the point C^1 and producing at the point Q^1. Since tradeable consumption C^T_1 was greater than tradeable production Q^T_1, we see in the figure that Mexico was running a trade deficit. Of course, non-tradeable production and consumption are necessarily equal, as shown by $C^N_1 = Q^N_1$.

In terms of this standard diagram, the cutback in foreign lending after the March assassination would involve an inward shift in consumption, to a point like C_2, involving a drop

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[12] Of course, the ceiling itself was gradually depreciating, for a total of nearly 5 percent in the period.

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in consumption of both tradeables and non-tradeables. Assuming that full employment is maintained, production would shift to a point like Q_2. Note that as the trade deficit is reduced, there is a decline in non-tradeable production (from Q^N_1 to Q^N_2) and a rise in tradeable production (from Q^T_1 to Q^T_2). The relative price of non-tradeable goods to tradeable goods, PN/PT, is equal to the slope of the production possibility frontier at the respective production points. Thus, at Q_2, the relative price of non-tradeables has declined compared with the relative price at Q_1. In other words, in order to spur the shift of production from non-tradeables to tradeables, the relative price of non-tradeables must fall. In standard terminology, the real exchange rate must depreciate (that is, PT/PN must rise).

We can therefore conclude that no matter whether Mexico devalued the nominal peso-dollar exchange rate or not in March 1994, the real exchange rate --measured as the price of tradeable goods relative to non-tradeable goods-- would have to rise in consequence of the fall in capital inflows, and the consequent decline in the trade and current account deficits. The real question for Mexico, therefore, was how best to achieve a depreciation of the real exchange rate.

There were two options. First, Mexico could devalue the nominal exchange rate so as to raise PT for a given value of PN. Alternatively, Mexico could try to reduce the nominal price of PN (or at least slow its rate of inflation) relative to PT. The first path is more inflationary; the second path is presumably more contractionary in real terms, since it gambles on a reduction in nominal prices and wages that might only be achieved as a result of a period of higher unemployment. In other words, if the Mexican Government attempted to achieve a rise of PT/PN through a fall in PN, the initial impact might have been unemployment, at a production point like Q3, rather than full employment at a production point like Q2.

The choice, then, between devaluing and not devaluing in March 1994, was not a choice between adjusting the current account or not. A smaller current account deficit was necessary as a result of the reduction of foreign capital inflows (itself a reflection of a higher risk premium on Mexico). The choice was between a more or less inflationary manner of adjustment. The main argument in favor of a greater nominal devaluation (above and beyond the correction that

had taken place within the band) is that it would entail lower unemployment along the transition to a reduced current account deficit. Here the implications are familiar. The rate of unemployment required to force wage and price deflation may be economically very costly and politically unacceptable.

Moreover, it can be argued the markets expected a devaluation in any event, since investors doubted that the Mexican Government would tolerate the unemployment necessary for an adjustment under a fixed exchange rate. As a result of this, nominal interest rates in pesos rose sharply above dollar-denominated interest rates in Mexico, signalling the rising expectations of devaluation after the March assassination, as we can see in Figure 2. Since the markets *expected* a devaluation, the cost of avoiding a devaluation was a prolonged period of high peso interest rates, which in turn debilitated the banking sector in the second half of 1994. In the end, the argument is somewhat circular, but no less true for that: devaluation was most likely the least-costly step, in large part because it was expected. It is a curious logic, admittedly, but one that is hard to dismiss or to overcome through simple declarations of the government. In the end, Mexico announced that they would not devalue, but peso interest rates remained much higher than dollar interest rates anyway.

Opponents of moving the band ceiling and attaining a greater devaluation deployed three arguments: 1) Credibility: it was of utmost importance to signal the toughness and seriousness of policymakers, in order to reduce devaluation expectations and interest rates once and for all. Moreover, a capital levy on investors (particularly those holding billions of dollars worth of Cetes) would throw into question the whole design of the program, causing turmoil in the financial markets; 2) Ineffectiveness: a nominal devaluation would have just spurred inflation and left the real exchange rate unchanged; 3) U.S. Politics: a devaluation just after signing NAFTA would be considered treacherous and an easy way to gain competitiveness at the expense of US jobs.

Of these, the credibility argument is the most compelling one. It was argued that the credibility of the whole reform effort depended on adhering to the pre-announced exchange rate

rule, even in the face of a large exogenous shock. According to this view, the credibility of a fixed (or crawling) exchange rate policy is a function of how long the policy has been in place. By sticking to his announcements, the policymaker gradually persuades the public that he "means business," thereby lowering nominal peso interest rates. By contrast, a surprise devaluation, however small, simply destroys this hard-won credibility capital and convinces the public of the policymaker's taste for discretionary policy. A devaluation might also lead investors to revise their assessments about the seriousness and commitment to property rights of the reformers in power.

This arguments carried a lot of weight among economists. For instance Calvo wrote in April 1994: "In my opinion, this is not the time to implement the Dornbusch-Werner devaluation.[13] The forces that have held together the "good" equilibrium...may dissipate overnight. A 20 percent devaluation (outside the present band) may get U.S. investors up in arms about the fall in the real value of their Cetes....The Dornbusch-Werner solution --taken without prior consultation and support from its NAFTA partners-- may thus prove to be a poison pill for the ruling political party or its successor."

We disagree. The public's confidence that the fixed exchange rate will be maintained depends not only on the government's **perceived desire** not to devalue, but also (and crucially) on the government's **ability** not to devalue. By letting reserves dwindle, the government of Mexico may have convinced the public of its desire not to devalue, but also made it increasingly likely that the desire could not be sustained. By not devaluing in March, the government may have increased rather than decreased the expected rate of devaluation.[14] Moreover, the circumstances under which a government abandons an announced policy matter very much. Had the devaluation been carried out in March, after the assassination, it is plausible that the investor community would have understood that the devaluation was prompted by a political disaster

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[13] Rudi Dornbusch and Alejandro Werner (1994) had advocated a 20 percent devaluation at the same meeting of the Brookings panel.

[14] A similar argument has recently been formalized by Drazen and Masson (1993).

which was painfully observable to all.

In any case, Mexican government decisions should be understood in the context of that country's political calendar. Presidential elections were coming up in August. The nominal exchange rate had already depreciated by around 10 percent and domestic interest rates had gone up by around 700 basis points in the aftermath of the shock. Greater depreciation, it was feared, might have caused generalized discontent among the population, as it had in 1976 and 1982. Letting interest rates increase even further, might have caused many bankruptcies and the collapse of the banking system. With elections coming up in August, the calculation was that the risks were greater than the expected benefits. It is understandable --if not necessarily defensible-- that the government resisted the rise in interest rates or the needed devaluation during the run-up to elections. Given these constraints the only way out was to roll-over the short-term debt in the form of dollar denominated debt, and to run down reserves.

The more puzzling issue is why the inaction continued after the elections. The situation in August was more precarious than in March, since reserves had already declined by around $12 billion, from $28 billion to $16 billion. However, after the elections were over, two facts suggested to Mexican policymakers that the fears that had caused the capital outflows in early 1994 had ended. First, reserves had stopped falling in June and had remained roughly constant at $16 billion until October. This constancy, we have argued, was mostly illusory, but it surely loomed large in Mexican policymaking circles. Second, interest rate differentials between U.S. and Mexican assets (regardless of currency denomination) were shrinking. Direct foreign investment continued unabated. And a devaluation in the immediate aftermath of the elections, rather than in the aftermath of the assassination, would surely have looked like a breach of faith. Once again, it is understandable --though not defensible in our view -- that the authorities chose to stick to their credit and exchange rate policies. In fact, foreign investors returned in a dribble, not in a wave; reserve losses continued in October and November. The stage was set for panic at the end of the year.

VI. Panic after December

Investors in Mexican assets panicked in December 1994, and since that date have been willing to roll over Mexican securities only at extremely high interest rates reflecting a significant expectation of default. In Table 3 we show, on a weekly basis since November 1994, the interest rates on 90-day Tesobonos and on U.S. Treasury bills. The huge spread reflects the perceived risk of default.

The essence of the Mexican panic, like any panic, is that the fear of default substantially raised the probability of default: in early 1995 the Mexican Government was at risk of default not because it was insolvent, nor because it was unwilling to pay, but because it was illiquid. It lacked the reserves to cover its short-term debts as they fell due, and it could only cover the debts if it received new loans. Therefore, the Mexican Government might have defaulted if creditors stopped buying government paper; in turn, the creditors stopped buying government paper since they feared default.

There are three elements that contributed to the onset of panic. First, and as discussed at length above, the Central bank nearly ran out of foreign exchange reserves in December, and this quickly became public knowledge. Second, as a result of the accumulation of Tesobonos the level of dollar amortizations due in the early months of 1995 was very high. Third, the bond-rating agencies (Moody's and Standard and Poors) quickly downgraded Mexican debt, thereby making it much more difficult to win back the confidence of investors.

The panic has been widely blamed on the announcement of devaluation on December 19. There is some truth to this linkage. It is almost surely the case that pre-devaluation whispering by the Government about its contemplation of a devaluation led to the final collapse of Central Bank reserves, in the week leading up to the devaluation. Others have argued that the devaluation was not just the proximate cause of the panic, but was the **only** cause, since the government reneged on its informal commitments with the international capital markets. We very much doubt that a devaluation by itself could lead to a panic, since devaluation is not all that uncommon, even in countries where the finance minister has ritually pledged that a

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devaluation would not occur (compare, for example, with the aftermath of the devaluation crisis of the EMS in 1992). The devaluing countries experienced a fall in interest rates and an acceleration of growth. The key difference in the Mexican case is that the devaluation was taken after reserves had been depleted, and in the face of large short-term debts coming due. This combination was an invitation to financial panic.

The panic on Government securities quickly led to a generalized panic on the Mexican economy. Even private sector borrowers were suddenly unable to attract loans, despite dollar-denominated interest rates significantly above U.S. levels. We see at work the phenomenon known in bond ratings as the "sovereign ceiling": the credit risk of the Government places an upper limit on the borrowing capacity of the whole economy. If the Government borrows at BBB, no private-sector borrower can borrow on terms better than BBB. If the Government is below investment grade, the entire economy is below investment grade.

There are several reasons for this kind of market behavior. Most importantly, the government is the lender of last resort to the banking sector, and in many LDCs is the implicit guarantor of private corporate debts as well. If the Government is illiquid, it cannot act as a lender of last resort or a guarantor. Suddenly, the banking system itself is subject to a panic. This panic spreads to corporate borrowers with short-term debts. With banks suddenly illiquid, the risk of default by corporate borrowers also increases. Thus, corporations become subject to panics. This scenario is especially true in a case like Mexico's, in which the banking sector issues liabilities (bank deposits, Cds) that are dollar denominated. Mexican commercial banks had $39 billion of dollar-denominated bank deposits as of October 1994, 23.5 percent of total deposits. Development banks had 64 percent of their liabilities ($40 billion) denominated in dollars. At the time of the crisis the Bank of Mexico lacked the reserves to guarantee these deposits in the event of a bank run.

The spread of panic also works through the dramatic changes in asset values that have accompanied the surge in interest rates and the real exchange rate devaluation in Mexico. If Mexico had avoided a panic, interest rates would have risen much more moderately and the real

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exchange rate would have depreciated by less. The sharp rise in interest rates has quickly produced acute financial distress throughout the industrial and commercial sectors, as well as among households that took on consumer credit on a variable rate. Moreover, for enterprises in the non-traded goods sector, the fall in the relative price of non-tradeables will lead to the spread of bankruptcy. Recent evidence on the rise of bad debts in the banking sector, though necessarily incomplete at this early date, are shown in table 10a.

VII. Mexico's policies and the international aid package

The collapse of the peso, combined with the creditor panic, pushed Mexico to the brink of default. The U.S. Government and the IMF responded with the announcement of a package of $52 billion of international support to forestall a default and to bolster confidence in the Mexican economy. The package was accompanied by commitments of the Mexican Government to a set of policy guidelines. One set of guidelines was announced upon signing the IMF agreement in early February. These targets quickly went out of date as a result of the continuing sharp depreciation of the currency and the much larger rise in inflation than was incorporated in the IMF program. Another set of guidelines was issued at the time of the signing of the U.S-Mexican $20 billion aid agreement, on February 21. A third set of targets, together with new fiscal adjustment measures, was unveiled on March 9, after continuing downward pressure on the peso.

The Mexican bailout was extraordinary from several points of view. The large-scale, long-term use of the U.S. Exchange Stabilization Fund (ESF) of the Treasury was unprecedented. The IMF standby of $17 billion, equal to around seven times the Mexican quota at the IMF, was far and away the largest single IMF program in history, both in absolute amount and as a percent of quota. The program has generated an enormous degree of controversy and skepticism. Leading members of the Congress, such as Senate Finance Committee Chairman Alfonse D'Amato, called for the suspension of the aid program as recently as March 8. Market reactions up to March 10 were similarly unenthusiastic, with Mexican T-bill

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interest rates on peso-denominated securities continuing to rise (up to 70 percent per annum as of March 10 on 30-day notes), and the peso continuing to depreciate sharply in nominal and real terms. This outcome poses three questions:

Was the bailout a good idea? Is it effective in meeting its goals? How could the overall adjustment program, both aid and Mexican policy measures, be improved?

The bailout program can best be justified according to the logic of the Lender of Last Resort, LLR (see Sachs, 1995 for an elaboration of this point). According to Bagehot's classic advice, the LLR should lend freely but at penalty rates to an illiquid yet solvent debtor facing a creditor panic. To the extent possible, lending should be against good collateral. While Bagehot's advice was meant for a commercial bank panic, an analogy can be made to a sovereign borrower facing an analogous panic. The notion of the LLR is threefold: (1) since the debtor (the Mexican Government) is solvent, and loans are made against good collateral, the emergency lending by the LLR is prudent; (2) since the lending is at penalty rates, the LLR reduces the risks of moral hazard (that debtors will behave flagrantly, letting themselves become vulnerable to a panic); and (3) since the panic is a case of multiple equilibria, the mere public knowledge of the international line of credit can suffice to stop the panic, and allow market-based lending to resume on a normal basis.

The arguments for an international LLR are at least open to question. Even with respect to commercial banks, there are alternatives to an LLR in the face of a panic. The main alternative is the *force majeure* of suspending debt repayments, in one way or another, until the Government is able to re-establish creditworthiness (through a combination of debt service payments and renewed market access to loans). Throughout American history before World War II, banks recurrently turned to the suspension of convertibility of deposits into currency in the face of depositor runs. Depositors were told that they would temporarily be unable to convert their deposits into high powered money. The evidence suggests that such suspensions of deposit convertibility were understood by bank depositors as an acceptable if rare expedient. Depositors tended to accept (unhappily) the delay in convertibility rather than to resort to legal remedies that

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might have been available, such as suing the bank for relief. In analogy, Mexico might simply have announced a suspension of repayments on Tesobonos, perhaps linked to an exchange offer, in which short-term Tesobonos would be converted into medium-term claims on the Mexican Government. This was recommended by some financiers in analogy with private-sector debt workouts.[15]

In general, we believe that the bailout route selected by the Mexican Government, the U.S. Government, and the International Monetary Fund was the correct one. There are two main reasons for this: (1) Mexico still has a chance to reestablish its market creditworthiness, which a default on Tesobonos would quickly destroy; and (2) Mexico's long-term fundamentals (e.g. debt ratios, fiscal position) are manageable, and strongly argue against an avoidable default.

There are two extreme suggestions that became fashionable in the wake of the Mexican crisis. The first was to return the nominal exchange rate to the status quo ante of 3.5 pesos per dollar. The notion behind this proposal was that the devaluation itself was the cause of panic, so that reversing the mistake would be sufficient to end the panic. We have already argued at length why this view is mistaken because: (1) Mexico needed a real adjustment, made considerably easier by a nominal exchange rate change; (2) even if such a pledge made sense in March 1994, it is now simply not credible in view of the loss of reserves between March and December 1994. We should also add the obvious point that the nominal price and wage increases since the devaluation have rendered any return to the 3.5 parity even less tenable.

The second suggestion has been to introduce a currency board. Under a currency board, the Mexican Central Bank would commit to a fixed exchange rate and to zero domestic credit expansion (in our earlier notation, $\Delta NDA = 0$), along the lines of the system adopted by Argentina after April 1991. This suggestion has little merit for Mexico at this time. While a currency board has the strong advantage of providing discipline on domestic credit policy, it has two powerful negative side-effects. First, and most importantly, a currency-board arrangement

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15 See Ackerman and Dorn, "Dose of Financial Morphine for Mexico," Financial Times, February 15, 1995.

deprives the Central Bank of its ability to act as a lender of last resort to its domestic banks. In countries without a currency board, the Central Bank is able to provide liquidity (NDA) to domestic banks in the event of a depositor panic. If depositors start to run from a healthy bank (for fear that other depositors are similarly withdrawing funds, thereby leaving the bank illiquid), the Central Bank has the power to provide the bank with liquidity, and thereby to stop the panic.

With a currency board system, however, the Central Bank is barred from issuing domestic credit. If it does, it jeopardizes the reputation of the currency board, and thereby may actually exacerbate a bank run. This precise phenomenon occurred in Argentina in March-April 1994, and the eventual ramifications are not yet known. Despite a balanced budget and zero inflation, Argentina suffered from a bank panic, which could not easily be addressed in conformity with the currency board arrangements. Therefore, Argentina was forced to mobilize international emergency help in the same way as Mexico, in the amount of some $11 billion, despite the fact that Argentina has plenty of international reserves. Under Argentina's currency board arrangement, the reserves are present, but they cannot be used to back up domestic credit to the banking sector.

The second deficiency of a currency board arrangement is that it eliminates the flexibility to change the nominal exchange rate in the face of external shocks --whether political shocks (Mexico in March of last year) or economic shocks (e.g. a dramatic shift in the terms of trade). Yet we have seen that in 1994 Mexico, nominal exchange rate changes might have been the least cost way to adjust the real exchange rate (PT/PN) in response to such disturbances. A straightjacket on exchange rates might be merited in two circumstances. For very small countries, such as Hong Kong, Estonia, and Lithuania (all of which now use a currency board), the economy is so open to trade that nominal exchange rate changes do not usefully produce real exchange rate changes. Therefore, little is lost by removing the option to devalue the nominal exchange rate. Alternatively, some countries have such deficient or unstable institutions that they are habitually unable to exercise monetary discipline. When all less drastic means have failed and are likely to fail in the future, giving up the freedom to issue domestic credit and to devalue is then a drastic way to impose self-control. Argentina presented such a case in 1991, following

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decades of extreme inflation. Mexico is different: while Mexican macroeconomic management has at times been flawed and undisciplined, the country has not demonstrated the chronic inflationary undiscipline of Argentina. We therefore believe in, and would opt for, solutions less drastic than a currency board.

Finally, as a practical matter, Mexico simply lacks the reserves to pledge to a currency board. The Central Bank cannot simultaneously pledge to a healthy banking system (in which all short-term deposits in peso and dollars can be quickly and assuredly turned into peso currency), and to a currency board, in which peso cash could quickly and assuredly be turned into dollars. At the moment Central Bank's reserves are not remotely sufficient to cover short-term deposits in the banking system plus the currency in circulation. Borrowed reserves from the U.S. and IMF might add another $20-30 billion, but these are temporary reserves that must be reconstituted in a few years.

In the longer run, the exchange rate arrangements that have been adopted should gradually evolve into a crawling band system of the kind that is successfully in operation in Chile and Israel (see Helpman, Leiderman and Bufman (1994)). The key feature of this system is that it provides a clear nominal anchor, while at the same time leaving room for a doses of monetary flexibility needed to offset shocks. The Chilean system has one feature which we do not recommend: a fairly hard rule linking the nominal devaluation of the central parity of the band to the rate of lagged inflation. We prefer the Israeli style crawling band, in which the rate of devaluation is based on expectations of future inflation, not the outcome of past inflation.

VIII. What Have We Learned?

In early 1994 Mexicans could look at their country's recent economic performance with pride. Since the adoption of the structural reforms in the mid-1980s and the *Pacto* in 1987, the economy had been opened to international trade and successfully restructured. Inflation, a pesky problem since the mid-1970s, and a very acute problem in the mid-1980s, was quickly converging to U.S. levels. True, the *peso* was somewhat overvalued and current account deficit too large for comfort. But that these two indicators were alone no reason for a crisis was made

clear by the sound state of public finances, the relatively low debt/GDP ratios and the ongoing inflow of foreign capital (both DFI and portfolio investment).

In the course of 1994 Mexico was hit by an external shock (the rise in U.S. interest rates) and a series of domestic ones (political assassinations and other kinds of turmoil). The sharp reduction in capital inflows in early 1994 meant that Mexico had to reduce its external gap quickly. The challenge was to accomplish a soft landing, reducing the current account deficit from nearly eight to perhaps two-four percent of GDP without precipitating serious macroeconomic instability. The government failed this test, so that by the beginning of 1995 Mexicans could look forward to ongoing financial panic and a large looming recession.

What are the lessons for other countries implementing stabilization-cum-adjustment policies? To what extent was the vulnerability related to the underlying policy framework, characterized by fixed exchange rates under conditions of financial liberalization and free capital mobility? To what extent were weaknesses accentuated by the short term monetary and fiscal policy response?

a) Difficulties of Automatic Adjustment under Fixed Exchange Rates

At least since Hume, economists have understood that fixed exchange rates require that the money supply be mainly determined by the balance of payments. Domestic credit expansion must be limited if the pegged rate is to remain intact. The Humean adjustment mechanism was never allowed to operate in Mexico. In the upswing, the Central Bank sterilized the monetary effects of capital inflows --as did all other countries in the region except for Argentina-- fearing that large increases in nominal money would be inflationary. In the downswing, when foreign lending fell sharply, the Central Bank once again sterilized --this time to keep interest rates from going through the roof. That the automatic correction mechanism was systematically aborted says something not only about policymaking in Mexico, but about the difficulties inherent in adjustment under fixed rates. It is hard to find cases where governments have let the process run its course. In Chile in the early 1980s, not even all-powerful General Pinochet could push nominal wages far enough to avoid a devaluation. In Europe in the early 1990s, country after

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country abandoned the ERM once the employment or domestic financial consequences of a high-interest rate policy undermined the ability to sustain a pegged exchange rate.

In the case of Mexico matters were made particularly tricky by three factors. The first was the political cycle, with elections in mid-1994. The second was the vulnerability of the financial sector, whose assets were quickly deteriorating. The third was uncertainty about the future course of capital flows: after the elections and witnessing a modest recovery of capital inflows, Mexican policymakers could conjecture (rather riskily) that the worst was over, and that new inflows would make more drastic adjustments unnecessary. All three factors helped to justify the loose credit stance adopted through much of 1994, a policy stance which in the end depleted reserves and caused the currency to crash. But clearly, elections, weak banks and uncertainty are not uniquely Mexican phenomena. Analogous complications bedevil almost everyone attempting adjustment through fixed rates.

Unrealistic "toughness" on the exchange rate does not increase credibility. Holding on to the peso exchange rate until the bitter end did not serve to build Mexico's long-term credibility. Moreover, devaluing in the face of a clear exogenous shock (i.e. political assassination) reduces the loss of credibility attendant upon a move of the exchange rate. In any event, the idea that a pegged exchange rate is the only linchpin to credibility is misguided. Central bank independence, publicly announced inflation targets, flexible labor markets, solid fiscal policies, are all forms of nominal anchors that can keep inflation low even with a floating exchange rate. The effectiveness of exchange rate pegging is probably highest in the early stages of an anti-inflation program, or for a country introducing a new currency (e.g. Estonia), or in cases such as Argentina where the past history of chronic hyperinflation has undermined all other roots to confidence in the currency. These conditions did not apply to Mexico in 1994.

A related and important lesson is that the consequences of a devaluation on confidence, expectations and market stability depend crucially on the liquidity position of the devaluing Central Bank. In 1992-93 several European central banks allowed their currencies to drop by 20 and even 30 percent (the same order of magnitude of the required Mexican devaluation) and financial panic did not follow. Because Mexico waited until it was on the verge of default on

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short-term dollar obligations, matters were otherwise.

b) Financial Vulnerability and Currency Pegs

Stabilization and reform in Mexico after 1987 led to a sharp re-monetization and financial deepening. The money base and the other broader monetary aggregate rose quickly as a proportion of GDP. The process was accelerated by financial liberalization and the associated reductions in reserve requirements, which pushed up the relevant money multipliers. Such trends are welcome as indications of financial maturity. Nonetheless, as foreign reserves fall, so that the ratio of domestic liquid assets to foreign assets rises precipitously, financial deepening increases "financial vulnerability," i.e. the susceptibility to a panic, as Guillermo Calvo (1985) stresses. That the stock of inside (bank) money should be a source of potential pressure on the currency needs underscoring. Many analysts assume that foreign reserves need only back outside (high-powered) money, not inside money, in order to preserve a pegged exchange rate. The reality is that, with bank deposits covered by implicit or explicit government guarantees, all M2 is potentially a liability of the government, to be redeemed with dollars at the time of a speculative attack against a pegged exchange rate.

The same is true of short-term government debt. We have stressed above that Mexican government debt was not large relative to GDP, and that in early 1994 its maturity was not unusually short. But as gross reserves fell, once again, the ratio of government short-term obligations to its liquid assets reached worrisome proportions. When expectations shifted at the end of 1994, this was to prove a lethal weakness.

In both cases, bank deposits and government debt, the risks of panic are enlarged when the liabilities are denominated in dollars rather than local currency. The Central Bank can be a lender of last resort for locally denominated liabilities (albeit at the possible cost of exchange rate devaluation), while it may literally be unable to fulfill this function in the case of dollar-denominated debts. In a panic, it may simply be unable to purchase or borrow the dollars needed

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to re-lend to the financially strapped borrower. Or more realistically, it might be able to procure the dollars only upon a startling collapse of the exchange rate.

It seems clear that the potential for self-fulfilling runs increases as the government's liquidity position weakens, but identification of the exact threshold remains elusive. There are not many countries that have gross foreign assets at the Central Bank to cover all of M2 --much less M2 plus outstanding short-term Treasury debt. Moreover, many countries have high levels of short-term foreign-denominated liabilities, in excess of foreign exchange reserves. Thus, most countries are vulnerable, at least in principle, to a self-fulfilling run on a pegged exchange rate. Yet the fact remains that such runs repeatedly occur in some countries and not others. Much inevitably depends on history, perceptions and even prejudices. That in spite of its recent reforms and fiscal prudence Mexico is not yet Switzerland has become painfully obvious in recent months.

We conclude with two comments, one at the country level and one at the global level. Domestically, there is enough experience now to suggest that pegged exchange rates can render countries extremely vulnerable, even with seemingly virtuous monetary and fiscal policies. Pegging seems to be extremely important in the early stages of a stabilization program, when anchoring expectations and permitting remonetization are priorities. But just as important is to get out of the fixed exchange rate system in time. In the aftermath of stabilization, a flexible crawling peg complemented by a wide band --such as those used successfully by Israel and Chile-- seems safer. At a global level, the potential for country crises caused by self-fulfilling runs sharply strengthens the case for an international lender of last resort mechanism (see Sachs, 1995 for a longer discussion). The magnitude of international capital movements clearly swamps what the IMF can do under existing arrangements. The U.S. Treasury-led bailout could have been quicker and more effective if it were part of an established procedure, not an ad-hoc operation that in fact violates many established rules. The obvious fact that moral hazard problems must be dealt with should not paralyze efforts to design a suitable international mechanism, which could help to address future crises such as Mexico's.

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Table 1

Debt Indicators

(percentages)

	1980	1986	1987	1988	1989	1990	1991	1992	1993
Total Debt Stock/GDP	29.6	78.4	78.3	58.0	45.7	43.6	40.2	34.7	34.7
Total Debt Stock/ Exports of Goods and Services	258.1	356.1	308.7	248.9	198.9	196.7	203.2	188.0	184.6
Interest / GDP	3.1	6.5	5.9	5.1	4.5	3.0	2.9	2.3	2.1
Interest / Exports	27.3	29.6	23.5	21.9	19.7	13.8	14.7	12.7	10.9

Source: World Debt Tables, 1994.

Table 2

Public Sector Balances
(% of GDP)

	Financial Balance	Primary Balance	Operational Balance
1980	-7.5	-3.0	-3.6
1981	-14.1	-8.0	-10.0
1982	-17.0	-3.5	-5.5
1983	-8.6	4.6	0.4
1984	-8.5	4.1	-0.3
1985	-9.6	3.9	-0.8
1986	-16.1	3.7	-2.4
1987	-16.0	5.8	1.8
1988	-12.4	8.0	-3.6
1989	-5.6	8.4	-1.7
1990	-3.3	7.6	1.8
1991	-1.5	5.3	2.9
1992	0.5	5.6	2.9
1993	-2.1	3.6	2.1
1994	-3.9	2.3	0.5

Source: DGPH, Ministry of Finance, Mexico

Note:

Financial Balance: Includes all the public sector borrowing requirements.

Primary Balance: Financial Balance less interest paid on public debt.

Operational Balance: Primary Balance plus the real portion of the interest paid on public debt.

Table 3

Interest Rates

(3 Months)

		Cetes	Tesobonos	U.S.	Interest Rates Differentials	
		(1)	(2)	(3)	(1)-(2)	(2)-(3)
1989	December	40.19	15.07	8.01	25.12	7.06
1990	December	25.84	12.00	7.91	13.84	4.09
1991	December	17.33	9.06	4.54	8.27	4.52
1992	December	17.53	3.48	3.53	14.05	-0.05
1993	December	11.71	5.09	3.08	6.62	2.01
1994	January	10.89	4.67	3.02	6.22	1.65
	February	9.13	4.34	3.21	4.79	1.13
	March	11.97	7.27	3.52	4.70	3.75
	April	16.45	7.75	3.74	8.70	4.01
	May	16.54	7.05	4.19	9.49	2.86
	June	16.49	6.95	4.18	9.54	2.77
	July	17.19	7.25	4.39	9.94	2.86
	August	13.82	7.24	4.50	6.58	2.74
	September	13.10	6.79	4.64	6.31	2.15
	October	14.35	6.85	4.96	7.50	1.89
	Nov. (1st. week)	14.50	6.81	5.10	7.69	1.71
	Nov. (2nd. week)	14.18	6.82	5.24	7.36	1.58
	Nov. (3rd. week)	14.50	6.77	5.38	7.73	1.39
	Nov. (4th. week)	14.76	7.50	5.52	7.26	1.98
	Dec. (1st. week)	14.58	7.58	5.65	7.00	1.93
	Dec. (2nd. week)	14.89	7.40	5.70	7.49	1.70
	Dec. (3rd. week)	17.00	8.26	5.50	8.74	2.76
	Dec. (4th. week)	31.99	10.49	5.50	21.50	4.99
1995	Jan. (1st. week)	34.99	12.49	5.55	22.50	6.94
	Jan. (2nd. week)	44.94	19.50	5.70	25.44	13.80
	Jan. (3rd. week)	39.00	19.75	5.65	19.25	14.10
	Jan. (4th. week)	38.00	24.98	5.75	13.02	19.23

Note: 1989-1992 Tesobono rates are for 28 days.

Source: Banco de Mexico and Survey of Current Business

Table 4

Inflation and Exchange Rate Changes

		Inflation	Nominal Exchange Rate Change (%)	Real Exchange Rate Index (1980=100)
1991	I	7.32	0.67	127.09
	II	3.61	1.22	124.88
	III	2.74	1.30	124.08
	IV	4.60	0.90	120.61
1992	I	5.40	-0.03	115.15
	II	2.71	0.92	114.11
	III	2.00	0.10	112.82
	IV	2.52	0.73	111.68
1993	I	3.27	-0.42	108.58
	II	1.85	0.19	107.69
	III	1.62	0.10	106.46
	IV	1.66	0.30	105.80
1994	I	1.94	1.34	105.84
	II	1.54	5.51	110.66
	III	1.45	1.56	111.75
	IV	1.85	5.95	116.76
1995	I	8.00	58.09	172.41

Note: Real Exchange Rate is defined as RER = eP*/P, where e is the nominal exchange rate (in new pesos per dollar), P* is the consumer price level in the United States, and P is the corresponding price level in Mexico.

Source: International Financial Statistics, IMF, various issues.

Table 5

Saving and Investment
(as percentage of GDP)

	Saving		Investment		(S-I)		Current Account
	Public *	Private ***	Public	Private	Public	Private **	
1988	1.4	17.6	5.0	15.4	-3.6	2.2	-1.4
1989	3.1	15.6	4.8	16.5	-1.7	-0.9	-2.6
1990	6.7	12.5	4.9	17.0	1.8	-4.5	-2.7
1991	7.5	10.3	4.6	17.8	2.9	-7.5	-4.6
1992	7.1	9.5	4.2	19.1	2.9	-9.6	-6.7
1993	6.3	8.9	4.2	17.8	2.1	-8.9	-6.8
1994	5.0	10.7	4.5	19.1	0.5	-8.4	-7.9

Source: Banco de Mexico.

Notes:
* Defined as the Operational Deficit plus Public Investment.
** Defined as Current Account Deficit less (S-I) public.
*** Defined as (S-I) Private plus Private Investment.

Table 5a

Mexico: Components of Gross Domestic Product
(As a percentage of GDP, current prices)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Gross Domestic Product	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Private Consumption	65.1	64.4	61.6	60.9	63.1	64.5	68.5	65.8	69.4	70.3	70.9	71.8	72.2	71.5	71.0
Government Consumption	10.0	10.8	10.5	8.8	9.2	9.2	9.1	8.8	8.6	8.5	8.4	9.0	10.1	10.8	11.3
Total Investment	27.2	27.4	22.9	20.8	19.8	21.2	18.5	19.2	20.4	21.3	21.9	22.4	23.3	22.0	23.6
Private Investment	14.1	14.3	12.8	11.0	11.3	12.5	12.9	13.2	14.2	13.3	13.7	14.9	16.6	16.2	16.6
Public Investment	10.7	12.1	10.2	6.6	6.6	6.6	6.5	5.2	5.0	4.8	4.9	4.6	4.2	4.2	4.5
Change in Inventories	2.4	1.0	-0.0	3.2	1.9	2.1	-0.9	0.8	1.2	3.2	3.3	2.9	2.5	1.6	2.5
Exports	10.7	10.4	15.3	19.0	17.4	15.4	17.3	19.5	16.8	16.0	15.8	13.8	12.6	12.4	13.1
Imports	13.0	12.9	10.3	9.4	9.6	10.3	13.4	13.4	15.3	16.2	16.9	17.0	18.1	16.7	18.9

Source: Banco de Mexico

Table 6

Gross Public Debt
(as a percentage of GDP)

	1988	1989	1990	1991	1992	1993	1994
MEXICO	74.7	66.6	57.5	46.8	36.3	33.7	50.7
External Debt	46.8	39.5	33.4	28.4	23.2	21.7	36.4
Internal Debt	27.9	27.1	24.1	18.4	13.1	12.0	14.3
OECD Countries	58	57.5	58.3	59.9	64.1	68.1	70.6

Sources: Informe Sobre la Situacion Economica, las Finanzas Publicas y la Deuda Publica. SHCP. 1995
and OECD, Economic Outlook, December 1994.

Table 7   Financing of Current Account Deficit
                                          (percentages)

| | 1993 | | | | 1994 | | | |
	I	II	III	IV	I	II	III	IV
Current Account Deficit	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Capital Account	144.42	132.47	104.48	152.18	157.17	1.00	44.28	-50.62
Errors and Omissions	-4.39	-3.93	-3.21	-14.23	-45.60	-29.28	54.10	17.64
Change In Reserves	-40.02	-28.54	-1.27	-37.95	-11.56	128.27	1.62	132.98

Source: Banco de Mexico

Table 7a

Balance of Payments
(millions of dollars)

	1991	1992	1993	1994	1993				1994			
					I	II	III	IV	I	II	III	IV
Current Account	-14892.6	-24804.3	-23392.7	-29654.5	-5706.5	-5761.8	-6578.8	-5345.6	-6851.9	-7366.5	-7839.3	-7596.8
Merchandise exp.	42687.5	46195.6	51886.0	60833.4	11769.3	12949.5	12915.3	14251.9	13775.6	15038.3	15055.3	16964.2
Mechandise Imp.	49966.6	62129.3	65366.5	79374.9	15384.6	16319.5	16326.2	17336.2	18073.1	19618.0	19886.7	21797.1
Others	-7613.5	-8870.6	-9912.2	-11113.0	-2091.2	-2391.8	-3167.9	-2261.3	-2554.4	-2786.8	-3007.9	-2763.9
Capital Account	24940.0	26542.3	30882.3	10468.3	8241.1	7632.8	6673.7	8134.7	10768.9	73.8	3471.1	-3845.5
Borrowing	11450.4	3697.9	12859.4	7423.2	3480.2	4199.1	2004.3	3175.8	5991.7	-225.6	-335.1	1992.2
Public Sector	1534.3	-2436.3	1488.6	2415.6	1009.3	463.0	-34.5	50.8	1283.8	320.6	505.1	306.1
Commercial Banks	6052.1	1089.7	3980.4	997.8	501.8	1952.6	1060.6	465.4	2125.9	-379.2	-1414.2	665.1
Other Private	3864.0	5066.5	7390.4	4010.0	1969.1	1783.5	978.2	2659.6	2582.0	-167.0	574.0	1021.0
Foreign Direct Investment	4761.5	4392.8	4900.6	7979.6	1307.1	1244.2	898.9	1450.4	1846.9	1620.5	2379.4	2132.8
Stock Market	6332.0	4783.1	10718.6	4123.1	1268.5	1312.1	1878.6	6257.4	3465.6	247.7	743.5	-333.7
Money Market	3395.7	8118.6	6485.0	-1942.8	3518.3	1244.0	1540.0	182.7	1486.7	34.6	1163.2	-4627.3
Gross Outflows	-999.6	5551.9	-4079.3	-7114.8	-1333.0	-366.6	551.9	-2931.8	-2022.0	-1603.4	-479.9	-3009.5
Errors and Omissions	-1910.2	-564.6	-1449.0	299.8	-250.8	-226.6	-211.0	-760.5	-3124.7	-2156.6	4241.1	1340.0
Change in Reserves	8137.2	1173.3	6040.6	-18886.4	2283.8	1644.4	63.8	2028.6	792.3	-9449.3	-127.1	-10102.3

Source: Indicadores Economicos, Banco de Mexico, December, IV-2.

Table 8

Monetary Indicators
(millions of dollars)

	1989	1990	1991	1992	1993	I	II	III	IV	V	1994 VI	VII	VIII	IX	X	XI	XII
Base	8,415	10,226	12,563	14,114	15,196	13,686	13,120	13,351	12,823	12,848	12,790	13,236	13,090	12,868	13,049	14,251	10,692
Reserves	6,820	10,168	17,547	18,554	24,537	26,273	29,216	24,849	17,297	17,142	15,999	16,162	16,420	16,140	17,242	12,471	6,148
M1	11,886	17,089	35,785	40,595	47,945	46,828	45,244	42,869	41,887	41,751	41,192	41,058	40,958	40,780	40,762	42,313	29,018
M2	47,342	62,056	87,633	104,031	119,409	117,928	114,391	113,220	119,501	118,325	117,747	120,524	123,981	122,299	124,561	127,183	85,429
M3	69,166	87,604	103,622	120,563	149,358	149,279	148,358	142,824	144,242	145,439	145,225	148,417	153,904	151,947	153,831	155,219	111,033
Foreign currency	4,075	8,410	9,794	9,745	13,821	14,871	15,071	17,081	23,219	24,621	25,557	28,671	32,145	31,137	30,715	32,363	33,673
Domestic currency	65,111	81,194	93,828	110,818	135,537	134,408	133,287	125,782	121,023	120,818	119,668	119,746	121,759	120,810	123,117	122,856	77,360
M1/Reserves	1.80	1.68	2.04	2.19	1.95	1.77	1.55	1.74	2.42	2.44	2.57	2.54	2.49	2.53	2.36	3.39	4.72
M2/Reserves	7.15	6.10	4.99	5.61	4.87	4.49	3.92	4.59	6.91	6.90	7.36	7.46	7.55	7.58	7.23	10.20	13.89
M3/Reserves	10.45	8.62	5.91	6.50	6.09	5.68	5.08	5.79	8.34	8.48	9.08	9.18	9.37	9.41	8.92	12.45	18.06
M3 Foreign/Reserves	0.62	0.83	0.56	0.53	0.56	0.57	0.52	0.69	1.34	1.44	1.60	1.77	1.96	1.93	1.78	2.60	5.48
M3 Foreign/M3	0.06	0.07	0.09	0.08	0.09	0.10	0.10	0.12	0.16	0.17	0.18	0.19	0.21	0.20	0.20	0.21	0.30
M1/GDP	0.06	0.07	0.13	0.12	0.13												0.12
M2/GDP	0.25	0.27	0.31	0.32	0.33												0.36
M3/GDP	0.36	0.36	0.37	0.37	0.41												0.46

Note: 1989-1993 figures are for the month of December.

Definitions:

M1: Currency + Checking Accounts
M2: M1 + short-term banking securities
M3: M2 + short-term non-banking securities
M3 denominated in foreign currency enicudes M2 denominated in foreign currency + Tesobonos

Source: Banco de Mexico, Indicadores Economicos, February 1995.

Monetary Base and Its Components

(billions of dollars)

		Monetary Base	Foreign Assets	Net Domestic Credit
1992	January	11.03	18.05	-7.02
	February	10.69	19.15	-8.46
	March	10.70	18.39	-7.70
	April	11.24	19.34	-8.11
	May	11.07	18.63	-7.56
	June	11.22	17.88	-6.66
	July	11.44	18.18	-6.75
	August	11.01	17.86	-6.85
	September	10.24	17.90	-7.66
	October	11.08	18.26	-7.18
	November	11.40	16.79	-5.39
	December	14.11	18.55	-4.44
1993	January	12.18	20.81	-8.63
	February	11.70	21.43	-9.73
	March	11.21	20.92	-9.71
	April	11.36	23.93	-12.57
	May	11.56	23.26	-11.70
	June	11.55	22.27	-10.72
	July	11.81	22.52	-10.71
	August	11.30	22.60	-11.30
	September	11.27	22.86	-11.60
	October	11.91	23.02	-11.10
	November	12.29	18.69	-6.40
	December	15.20	24.54	-9.34
1994	January	13.69	26.27	-12.59
	February	13.09	29.16	-16.06
	March	13.35	24.65	-11.30
	April	12.82	17.30	-4.47
	May	12.85	17.14	-4.29
	June	12.79	16.00	-3.21
	July	13.24	16.16	-2.93
	August	13.09	16.42	-3.33
	September	12.87	16.14	-3.27
	October	13.05	17.24	-4.19
	November	14.25	12.47	1.78
	December	10.69	6.15	4.54

Source: Banco de Mexico, Indicadores Economicos, February, 1995.

Table 9

Components of Domestic Debt
(millions of dollars)

	1989	1990	1991	1992	1993	1994
Cetes	20437	24445	23567	19047	26084	7456
Bondes	21082	21903	18871	11827	5485	1562
Ajustabonos	1221	4859	12696	11642	10849	5371
Tesobonos	75	408	302	296	1237	17780
Others	3661	3193	24	8	7	2
TOTAL	46476	54808	55459	42820	43662	32170

Source: Banco de Mexico, Indicadores Economicos, February, 1995

Note: Figures are for the end of the year.

Table 10a

Portfolio Overdue
(millions of dollars)

	1989	1990	1991	1992	1993	1994
Development Banks	1705	1480	643	815	1335	1905
Commercial Banks	667	1298	2491	4726	7638	11622
Porfolio Overdue Comm Banks/ Comm. Banks Credit	0.031	0.045	0.031	0.042	0.056	0.072

NOTE: 1989-1993 figures are for the month of December. 1994 is for the month of October

Table 10b

Liability of the Banking System
(billions of dollars)

	1989	1990	1991	1992	1993	1994
Domestic Currency	58.42	75.19	101.18	122.47	145.08	166.30
%	55.98	62.97	66.64	69.67	69.89	68.72
Foreign Currency	45.93	44.21	50.66	53.31	62.50	75.70
%	44.02	37.03	33.36	30.33	30.11	31.28

NOTE: 1989-1993 figures are for the month of December. 1994 is for the month of October

Figure 1

Real Exchange Rate Index
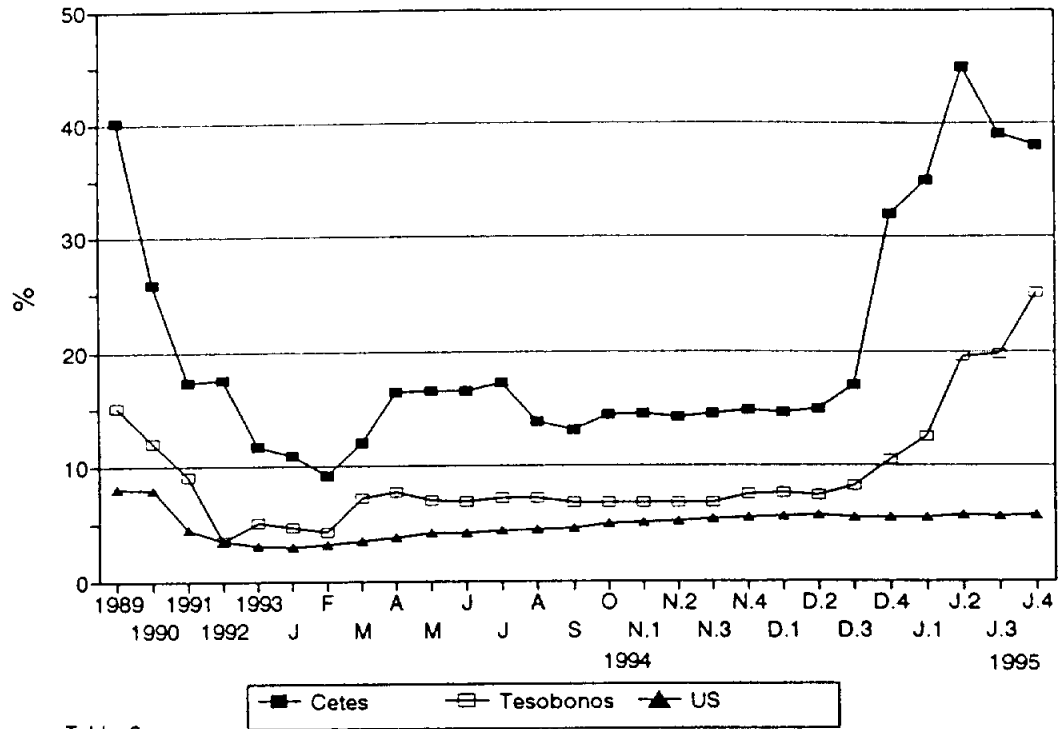### (1980 = 100)
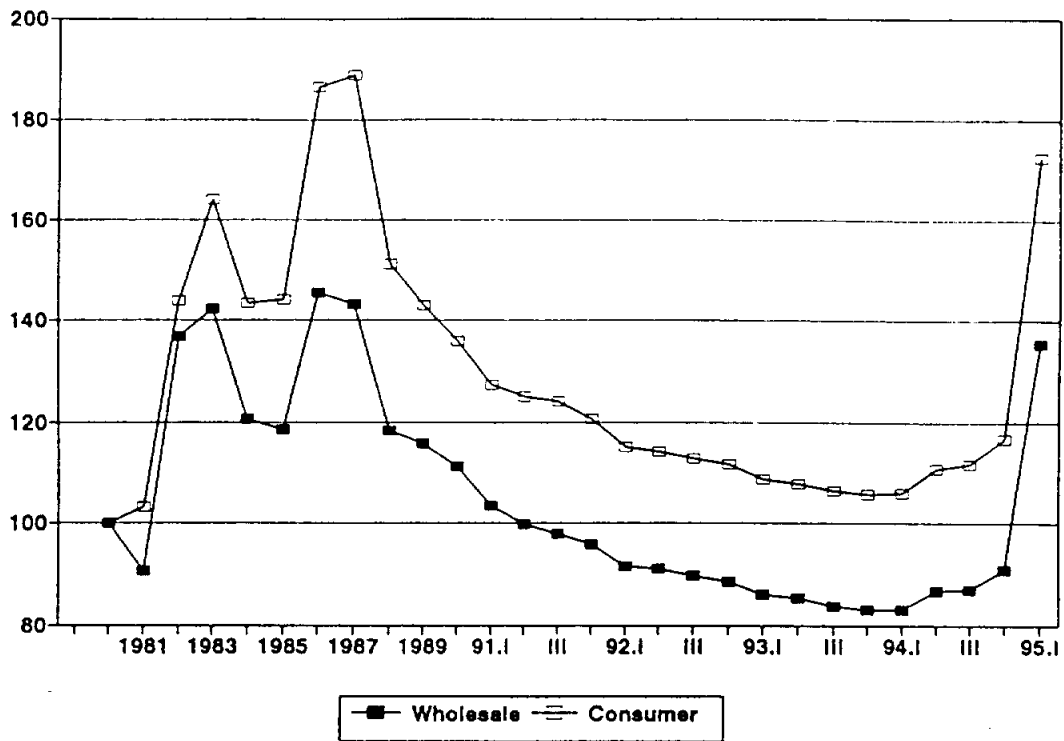
Legend: —■— Wholesale —▱— Consumer

Note: Real Exchange Rate is defined as RER = eP*/P, where e is the nominal exchange
rate (in new pesos per dollar), P* is either the consumer or the producer price
level in the United States, and P is the corresponding price level in Mexico.
All the values are period averages.

Source: International Financial Statistics, IMF, various issues, and Banco de Mexico.

Figure 2   **Interest Rates**

Source: Table 3

Figure 3   **Saving-Investment Gap & Current Account**
(% of GDP)

| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |

Legend: ■ (S-I) Public   □ (S-I) Private   ☐ Current Account
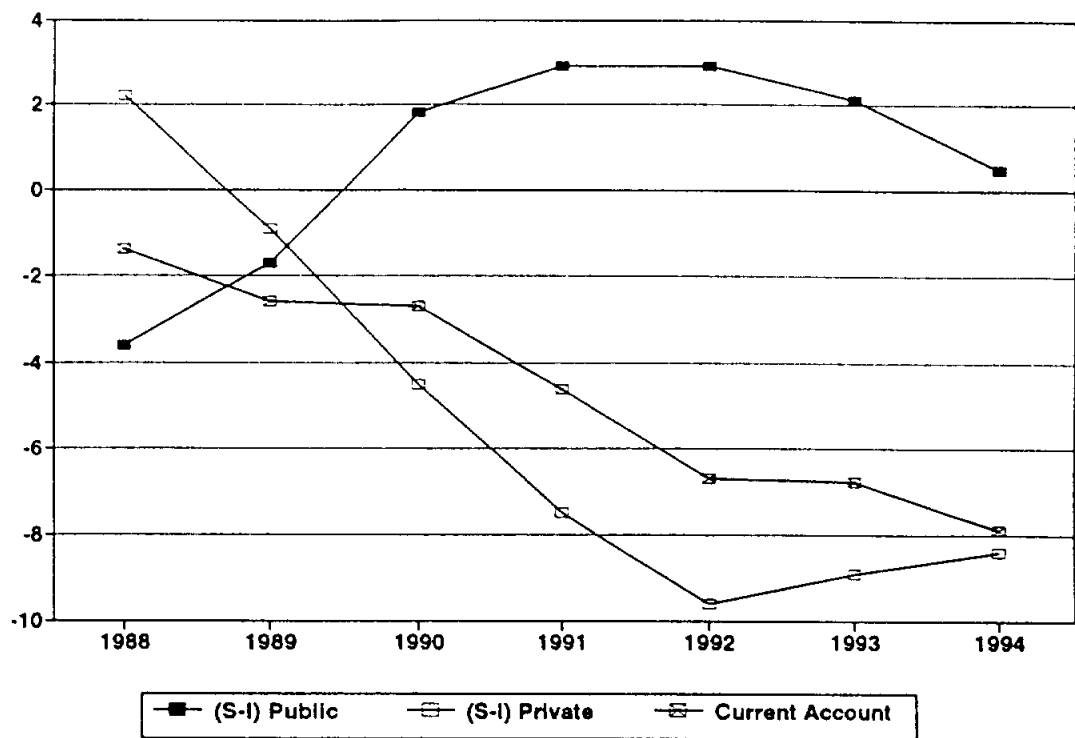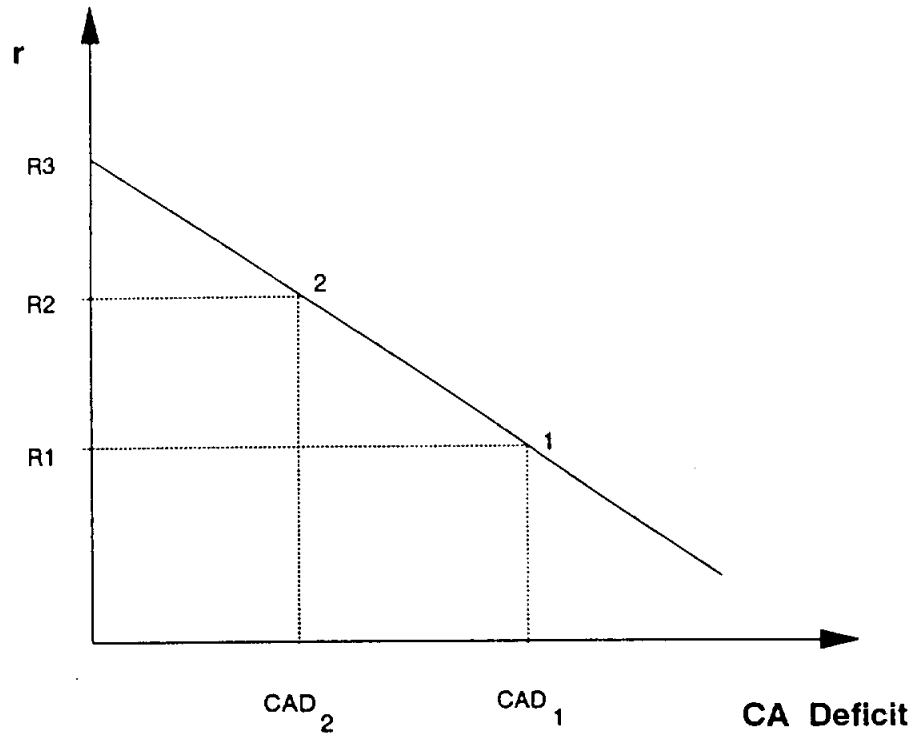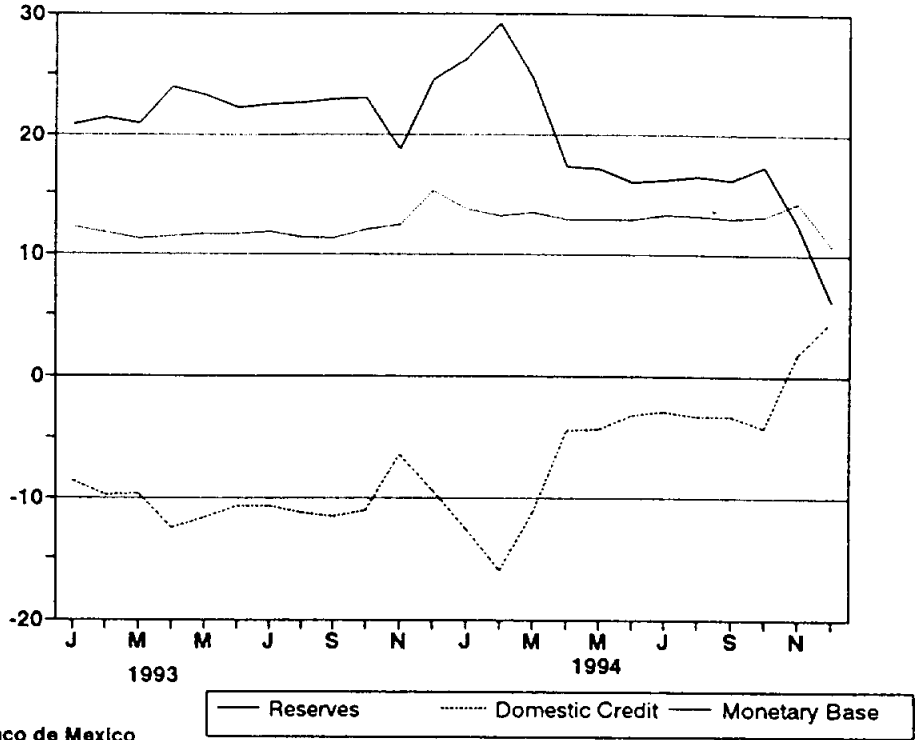
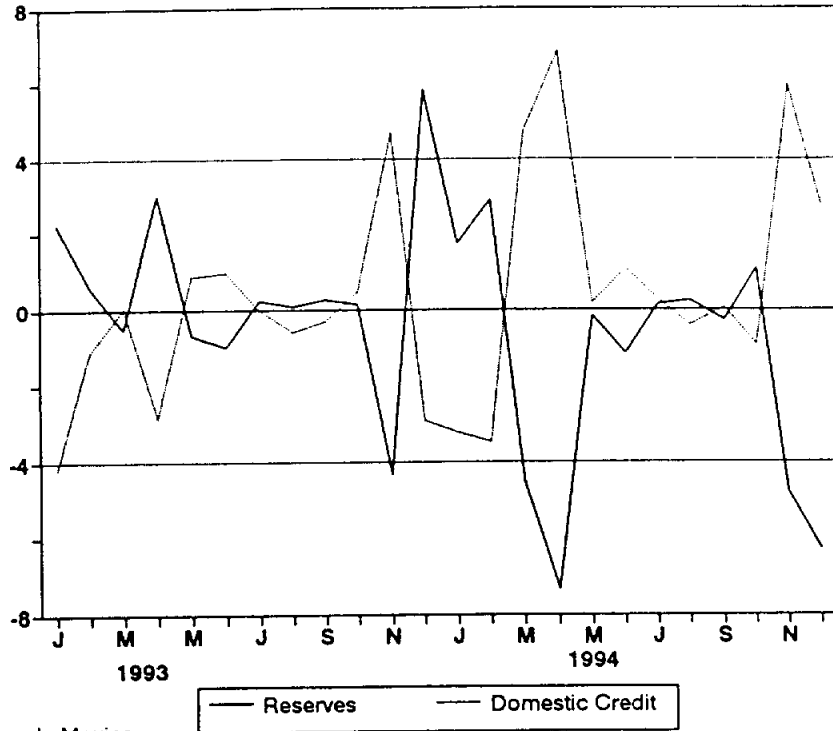**Figure 4**

Figure 5

Components of Monetary Base
(Billions of Dollars)

Source: Banco de Mexico

Figure 5a

Components of Monetary Base
(Monthly changes, billions of Dollars)

| | Reserves | | Domestic Credit |

Source: Banco de Mexico

Figure 6

Current Acc Deficit & Reserve Losses
(Cummulative, billions of dollars)

Legend: Reserve Losses — CAD (Less FDI)
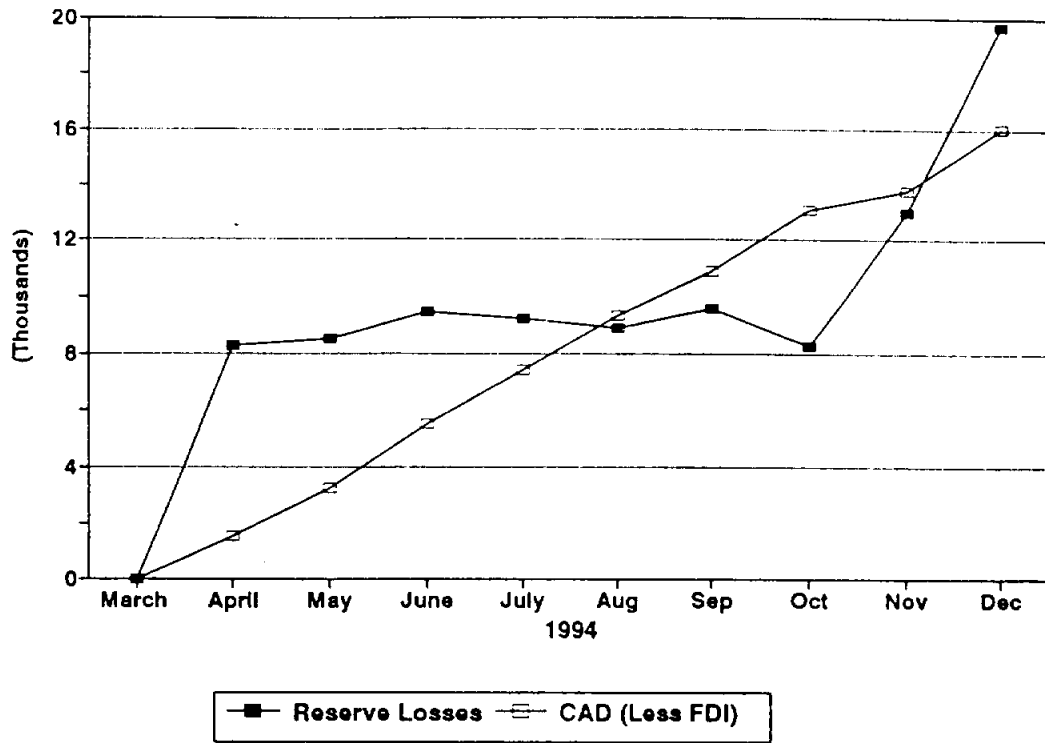
Figure 7

Domestic Credit

		Tight	Loose
Exchange Rate	**Devalue**	Adjustment with Devaluation	High Inflation
	Not Devalue	Adjustment with Contraction	Actual Policies

Figure 8