In the first quarter of 1995, Mexico found itself in the grip of an intense financial panic. Foreign investors fled the country despite very high interest rates, an undervalued currency and financial indicators that pointed to long-term solvency. The fundamental conditions of the Mexican economy cannot account for the extent of the crisis. The crisis was not the result of irresponsible fiscal behaviour. The crisis was due to unexpected shocks that occurred in 1994, the inadequate policy response to those shocks, the increased vulnerability to panic, and finally panic itself. In the aftermath of the March assassination, the exchange rate experienced a nominal devaluation of around 10% and interest rates increased by 7 percentage points. However, capital outflows continued. The policy response was to maintain the exchange rate rule and to prevent further increases in interest rates. Interest rates were held down 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.

— Jeffrey Sachs, Aaron Tornell and Andrés Velasco
The collapse of the Mexican peso: what have we learned?

Jeffrey Sachs, Aaron Tornell and Andrés Velasco

Harvard University and NBER; Harvard University and NBER; New York University and NBER

1. INTRODUCTION

Starting in December 1994, and through 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 became self-fulfilling prophecies of doom.

Fundamentals cannot account fully for the December crisis. Rather, the crisis was a self-fulfilling panic made possible by the fact that the sizeable short-term liabilities of the government...
became greater than its liquid assets. It is certainly true that the real exchange rate had appreciated in 1994, 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% of GDP in 1993, and would reach almost 8% in 1994, much of it financing consumption spending. Therefore, a decline in the current account 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 percentage of GDP, and remained in a moderate deficit position, instead of disappearing abruptly as a result of a creditor panic.

The Mexican currency crisis, unlike many others in Latin America, was not the result of irresponsible fiscal behaviour. The Mexican operational budget balance had been in surplus during 1990–4. The increase in absorption and the bulk of the borrowing during the last few years had been done by the private sector. It is true that there were hidden deficits, but these were of moderate size. The public sector entered the picture mainly when it attempted to sterilize the monetary effects of the capital inflow by issuing short-term securities, first in pesos and then in dollars.

How did Mexico get into this predicament? The state of illiquidity at the end of 1994 was due to unexpected shocks that occurred throughout the year, and the inadequate policy response to those shocks. In the aftermath of the assassination of the presidential candidate Colosio in March, the exchange rate experienced a nominal devaluation of around 10% (reaching the edge of the band Mexico had long been operating), and interest rates increased by around 7 percentage points. However, the capital outflow continued. The policy response was to maintain the exchange rate rule, and to prevent further increases in interest rates. The authorities 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 international reserves and an increase in short-term dollar-denominated debt resulted. The government simply ended up illiquid, and therefore financially vulnerable. It is important to see that the negative shocks did not lead by themselves to illiquidity. It was the unwillingness of monetary authorities to tighten (by using fiscal policy or letting interest rates increase further) or to permit a timely exchange rate adjustment that brought that result. Of course, there are explanations for such a policy course. One explanation for not letting interest rates go up was the perceived fragility of the banking system. The main reasons for not devaluing were fear of losing credibility and fear of arousing public discontent in the run-up to the August presidential elections. Nonetheless, the net outcome was a situation of greatly increased vulnerability, whose risks became fully evident in December.

There are two possible explanations of why the December crisis took place. One explanation is that the devaluation was expected and that it was an intrinsic part of the financial panic on government debt. This explanation is related to the mainstream speculative attack literature, according to which reserves gradually run out because of excessive domestic credit, and eventually a stock adjustment depletes the remaining reserves in one attack. The second explanation is that the crisis was largely unexpected and that the devaluation and the financial panic were separate events, with the devaluation coming first, and then helping to provoke the panic. In this view, the Mexican government could still have borrowed, albeit at a high cost, in November and early December. Instead, it chose to devalue because it finally perceived the costs of defending the exchange rate (in terms of high interest rates and domestic recession) to be too high. The devaluation contributed to a shift in expectations and thereby generated a self-fulfilling panic in the market for government securities. 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. This panic was made possible by the government’s illiquidity at the end of the year.
We believe that the second explanation better captures the genesis of the Mexican crisis. It is true that the permanence of a large current account deficit, coupled with a slowdown in foreign lending, made an eventual exhaustion of reserves inevitable. However, the timing and, especially, the magnitude of the attack were not uniquely pinned down. In this paper we will present some empirical evidence to support this view.

The collapse of the peso, combined with the creditor panic, pushed Mexico to the brink of default. The US government and the IMF responded to the collapse with the announcement of a $52 billion international support package intended to forestall a default and bolster confidence in the Mexican economy. The emergency aid package for Mexico was highly unusual, both in its use of the US Treasury’s Exchange Stabilization Fund and in the magnitude of the IMF standby loan. Nonetheless, we believe that the bail-out route selected by the Mexican government, the US government and the International Monetary Fund was the correct one. Given that Mexico’s long-term fundamentals (e.g. debt ratios, fiscal position) are manageable – and provided sound policies continue to be followed, as they mostly have been in the course of 1995 – the country has a good chance of regaining market creditworthiness. This road to recovery would have been made much harder by an avoidable default on Tesobonos.

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/GDP 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 policy-makers' toughness, but also on their ability to defend the peg. Fourth, pegged exchange rates are often helpful in ending very high inflations (as in 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.

2. 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. Without a sharp policy turnaround, Mexico was inevitably heading for disaster. The opposing view holds that Mexico's path was an equilibrium one, and that no adjustment was needed. The approval of NAFTA and the reforms carried out in the 1980s had increased national wealth; the resulting (and perfectly natural) increase in absorption was reflected in a current account deficit. If the political shocks in January and March 1994 were regarded as transitory, it was neither necessary nor appropriate to deviate from the equilibrium path. Furthermore, Mexico's debt/GDP ratio was low, down from 78.4% of GDP in 1986 to 34.7% in 1993, with interest payments then at 21% of GDP. It would be possible to continue to borrow internationally in 1994 to the same extent as in 1993 (i.e. around 8% of GDP).

In our opinion, neither view is fully convincing. Mexico was indeed already in need of adjustment 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 was so extreme as to provoke the deep crisis that actually occurred in December 1994.

Let us look at the evidence. According to these data, by the end of 1993 the real exchange rate had appreciated relative to

Neither the overvaluation nor the deficit provoked the crisis
the long-term average, perhaps by 20–5% (see Figure 1). However, Mexican inflation had declined sufficiently by early 1994 (to about 5–8% per annum) that the extent of overvaluation had stabilized. Moreover, in March 1994 the nominal exchange rate experienced a depreciation of 10%, and the US dollar itself was depreciating in real terms against the European currencies and the Japanese yen, so that Mexico's multilateral real exchange rate had appreciated less than its bilateral real rate vis-à-vis the US dollar. The conclusion is that, while a relative price realignment was necessary, it did not have to be very large, traumatic or sudden. Of course, if Mexico had followed a course of expected gradual realignment, peso-denominated interest rates would have had to remain sufficiently high to preserve an adequate dollar-based return on peso assets.

The current account, which was balanced in the late 1980s, started deteriorating in 1990, reaching 6.8% of GDP in 1993 and 7.9% of GDP in 1994. This deterioration reflected not only higher investment, as some have claimed, but also a decline in saving rates. Table 1 shows that the widening of the current account deficit between 1988 and 1994 was the result of both an

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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.
Table 1. Saving and investment (% of GDP)

<table>
<thead>
<tr>
<th></th>
<th>Saving</th>
<th>Investment</th>
<th>Saving less investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>Private</td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>1988</td>
<td>1.4</td>
<td>17.6</td>
<td>5.0</td>
</tr>
<tr>
<td>1989</td>
<td>3.1</td>
<td>15.6</td>
<td>4.8</td>
</tr>
<tr>
<td>1990</td>
<td>6.7</td>
<td>12.5</td>
<td>4.9</td>
</tr>
<tr>
<td>1991</td>
<td>7.5</td>
<td>10.3</td>
<td>4.6</td>
</tr>
<tr>
<td>1992</td>
<td>7.1</td>
<td>9.5</td>
<td>4.2</td>
</tr>
<tr>
<td>1993</td>
<td>6.3</td>
<td>8.9</td>
<td>4.2</td>
</tr>
<tr>
<td>1994</td>
<td>5.0</td>
<td>10.7</td>
<td>4.5</td>
</tr>
</tbody>
</table>

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.

The external deficit did not reflect irresponsible fiscal behaviour. From a national accounts point of view, government consumption had remained almost constant since 1990, while public investment had increased marginally. Moreover, the operational fiscal deficit had been in surplus since 1990, as can be seen in Table 2.\(^2\) This implies that the deterioration of the current account reflected an excess of private investment over private savings, as shown clearly in Figure 2. Given this, the bulk of the external borrowing in the last few years...
Table 2. Public sector balances (% of GDP)

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

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.

Figure 2. Saving–investment gap and current account

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 did not change much.
Another important point is that Mexican public debt levels were moderate by world standards. Public debt was reduced from 67% of GDP in 1989 to 30% of GDP in 1993. Of this, 19% 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% was domestic debt (with an average maturity of around 200 days). Compared with OECD countries the government debt ratios are modest, as can be seen in Table 3.

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. Therefore, the view that Mexico was inevitably heading for disaster is unconvincing. What is clearly true, especially with the benefit of hindsight, is that the presence of such a large current 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. Net capital inflows ceased for much of the remainder of the year.

This shock made evident another kind of vulnerability: financial vulnerability. By the end of 1994, Mexico was an economy where financial deepening had vastly enlarged the stock of liquid assets which could be turned into dollars in a moment of crisis. First of all, the ratio of M2 to GDP had increased from 25% in 1989 to over 33% by year-end 1993. The

Table 3. Gross public debt (% of GDP)

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Mexico</td>
<td>74.7</td>
<td>66.6</td>
<td>57.5</td>
<td>46.8</td>
<td>36.3</td>
<td>33.7</td>
<td>50.7</td>
</tr>
<tr>
<td>External debt</td>
<td>46.8</td>
<td>39.5</td>
<td>33.4</td>
<td>28.4</td>
<td>23.2</td>
<td>21.7</td>
<td>36.4</td>
</tr>
<tr>
<td>Internal debt</td>
<td>27.9</td>
<td>27.1</td>
<td>24.1</td>
<td>18.4</td>
<td>13.1</td>
<td>12.0</td>
<td>14.3</td>
</tr>
<tr>
<td>OECD countries</td>
<td>58.0</td>
<td>57.5</td>
<td>58.3</td>
<td>59.9</td>
<td>64.1</td>
<td>68.1</td>
<td>70.6</td>
</tr>
</tbody>
</table>


It was this 11% of GDP that was transformed from peso-denominated Cetes into dollar-denominated Tesobonos during 1994.
increase in broad monetization was induced by the low levels of inflation achieved by the stabilization programme, 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. Why worry about a high M2/GDP ratio? 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, and with a pegged exchange rate, a bank run could easily be translated into a currency run.

Liberalization of the capital account also contributed to the process of financial deepening and increasing financial vulnerability. 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. This policy, combined with

Table 4. Monetary indicators

<table>
<thead>
<tr>
<th>Year</th>
<th>Reserves/M1</th>
<th>Reserves/M2</th>
<th>Reserves/M3</th>
<th>% of reserves</th>
<th>% of M3</th>
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</thead>
<tbody>
<tr>
<td>1989</td>
<td>1.80</td>
<td>7.15</td>
<td>10.45</td>
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<tr>
<td>1990</td>
<td>1.68</td>
<td>6.10</td>
<td>8.62</td>
<td>63.0</td>
<td>7.3</td>
</tr>
<tr>
<td>1991</td>
<td>1.95</td>
<td>4.87</td>
<td>6.09</td>
<td>56.3</td>
<td>9.3</td>
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<tr>
<td>1992</td>
<td>2.19</td>
<td>5.61</td>
<td>6.50</td>
<td>52.5</td>
<td>8.1</td>
</tr>
<tr>
<td>1993</td>
<td>1.77</td>
<td>4.49</td>
<td>5.68</td>
<td>56.6</td>
<td>10.0</td>
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<tr>
<td>1994M1</td>
<td>1.55</td>
<td>3.92</td>
<td>5.08</td>
<td>51.6</td>
<td>10.2</td>
</tr>
<tr>
<td>1994M2</td>
<td>1.74</td>
<td>4.59</td>
<td>5.79</td>
<td>69.2</td>
<td>11.9</td>
</tr>
<tr>
<td>1994M3</td>
<td>2.42</td>
<td>6.91</td>
<td>8.34</td>
<td>134.2</td>
<td>16.1</td>
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<tr>
<td>1994M4</td>
<td>2.44</td>
<td>6.90</td>
<td>8.48</td>
<td>143.6</td>
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<tr>
<td>1994M5</td>
<td>2.57</td>
<td>7.36</td>
<td>9.08</td>
<td>159.7</td>
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<tr>
<td>1994M6</td>
<td>2.54</td>
<td>7.46</td>
<td>9.18</td>
<td>177.4</td>
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<tr>
<td>1994M7</td>
<td>2.60</td>
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<td>9.37</td>
<td>195.8</td>
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<tr>
<td>1994M8</td>
<td>2.53</td>
<td>7.58</td>
<td>9.41</td>
<td>192.9</td>
<td>20.5</td>
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<tr>
<td>1994M9</td>
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<td>7.23</td>
<td>8.92</td>
<td>178.1</td>
<td>20.0</td>
</tr>
<tr>
<td>1994M10</td>
<td>3.39</td>
<td>10.20</td>
<td>12.45</td>
<td>259.5</td>
<td>20.8</td>
</tr>
<tr>
<td>1994M11</td>
<td>4.72</td>
<td>13.89</td>
<td>18.06</td>
<td>547.7</td>
<td>30.3</td>
</tr>
</tbody>
</table>

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

Incidentally, this also had the effect of eliminating reserve requirements as an instrument of monetary control, leaving the interest rate as essentially the only instrument.
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 plus 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% of net international reserves, and total M3 was six times larger than reserves. In this situation it was easy for any rumour to generate a massive capital outflow.

3. HOW DID THE MEXICAN GOVERNMENT BECOME FINANCIALLY VULNERABLE?

In this section we trace the evolution of the Mexican government's liquid assets and liabilities in the course of 1994. First, we focus on Mexican foreign exchange reserves and later we analyse the evolution of short-term liabilities.

3.1. The current account and foreign exchange reserves

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 in reserves was the inevitable result of the negative shocks that Mexico experienced. This is not correct. The fall in 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, which were considered dangerous given the vulnerable situation of the banks. One useful starting point is the balance of payments identity:

\[ CAD = \Delta K - \Delta R \] (1)

The current account deficit \( CAD \) must be financed by private capital inflows \( \Delta K \) or by a decline in foreign exchange reserves \( -\Delta R \). During 1992 and 1993, \( \Delta K \) averaged approximately $24 billion per year, or around 7% 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 1992–3, \( CAD = $48 \) billion, \( \Delta K = $57 \)

Table 6 shows the evolution of the components of the government's domestic debt.
billion and $\Delta R = $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 ($CAD = \Delta K$), Mexico began to finance it through declines in central bank reserves ($CAD = -\Delta R$). Eventually, Mexico ran out of reserves. As shown in Table 5, reserve declines accounted for a very important share of the financing of the current account deficit during the last three quarters of 1994.

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 Cetes purchased by the central bank from private investors) both expanded. Mexicans use the pesos generated by the credit 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, it sells the importers the dollars needed to cover the deficit. Reserves thereby fall in the amount of $CAD$.

Hence, 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.

**Table 5. Financing of current account deficit (%)**

<table>
<thead>
<tr>
<th></th>
<th>1993</th>
<th>1994</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Current account deficit</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Capital account</td>
<td>144.42</td>
<td>132.47</td>
</tr>
<tr>
<td>Errors and omissions</td>
<td>-4.39</td>
<td>-3.93</td>
</tr>
<tr>
<td>Change in reserves</td>
<td>-40.02</td>
<td>-28.54</td>
</tr>
</tbody>
</table>

*Source: Banco de Mexico.*
account deficit, with or without a devaluation. *It was the attempt of the central bank to resist a further rise in 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 in parts 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 between 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

$$\Delta MB = \Delta NDA + \Delta R$$

(2)

where $\Delta MB$ is the increase in the money supply, $\Delta NDA$ is the expansion of domestic credit, and $\Delta R$ is the increase in 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 $\Delta K$ falls, the Mexican private sector has two options: to reduce 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 $\Delta K$ 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 domestic credit expansion, which is the conclusion we reached in the preceding paragraph. In Figure 3, we see that $MB$ is nearly constant in 1994, while the decline in reserves $-\Delta R$ 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 of the combination of this withdrawal and a policy of sterilized intervention followed by the Banco de Mexico in order to limit the interest rate effects of the declining foreign capital inflows.

The Banco de Mexico has argued that its monetary policies were prudent since they led to a one-time fall in reserves, not to an ongoing haemorrhage of reserves. Indeed, if we look at Figure 3, we see that reserves fell in steps, not continuously: March–April 1994, November 1994 and then December 1994. Mexico was buffeted, unexpectedly, by three shocks: the Colosio assassination in March; the resignation in November of the Deputy Attorney-General, who alleged a cover-up of the assassination of his brother, PRI leader Mr Ruiz Massieu; and the rumours surrounding devaluation in early December. The

Source: Banco de Mexico.

Figure 3. Components of monetary base
defence, then, is that the policies were prudent but were undermined by the fact that the bad news kept coming.

Two comments are in order. First, the step-wise decline hides the presence of a smoother ‘underlying’ trend of reserve loss, equal to the current account deficit (since private flows, other than foreign direct investment, 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 of the order of $1.7 billion per month to be financed. 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 about 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 as an ‘errors and omissions’ item a $2 billion outflow in April–June, as the excessive credit expansion was 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 4.

The second comment is that during 1994 Mexico also faced positive shocks, such as the electoral victory of Mr Zedillo with a

Reserves had an underlying tendency to fall by that amount month after month.
higher than expected margin. It is interesting to note that these positive shocks did not induce capital inflows of similar magnitude to 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 desired rates of borrowing were too high, and Mexican interest rates too low, to attract the necessary foreign savings.

3.2. Public debt maturity

We now turn to the increase in government short-term liabilities (both actual and contingent) that occurred in the course of 1994. As we argued above, an important stock of domestic debt had accumulated by year-end 1993, mostly as a result of the Banco de Mexico’s attempts at sterilizing the effects of capital inflows during the previous three years. In the course of 1994 three things happened. First, total government domestic debt, regardless of currency denomination, grew moderately, both in absolute magnitude and as a multiple of reserves (see Table 6). Expressed in dollars, domestic debt amounted to 1.7 times December 1993 reserves and to 2.6 times September 1994 reserves.

Second, and more importantly, the average maturity of domestic debt shrank in the course of 1994. This was the result of a deliberate policy choice. With the increased turmoil in
1994, the yield curve turned steeper, and issuing long-term debt became increasingly expensive. If one could be confident that the shocks were transitory (and that the markets therefore had it wrong), the correct policy would be to borrow short in order to get over the hump (until the end of the year, say) without undermining the public finances. That is indeed what the Mexican government chose to do. Such a strategy had two big risks: (1) the shock could turn out not to be transitory, in which case a real fiscal adjustment would be needed to compensate for the higher interest payment burden, and (2) the shorter maturities rendered the government largely defenceless against any circumstance in which investors refused to roll over their government bonds.

Third, perceived devaluation risk increased after the assassination in March 1994. Facing growing reluctance to hold peso debt, and hoping to avoid a further increase in domestic interest rates, the Mexican government began rolling over its short-term peso-denominated debt (Cetes) into short-term dollar-indexed debt (Tesobonos). Starting at $1 billion at the beginning of the year, 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 as reserves. In December the stock of Tesobonos reached $18 billion.\(^6\) In March, the move towards dollar-denominated debt was greeted with enthusiasm by the financial markets: only a government that would never devalue could contemplate borrowing in a foreign currency. Barely nine months later, the very same

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\(^6\)It is important to notice, however, that the total stock of domestic debt – which included Cetes and Tesobonos as well as the so-called Ajustabonos and Bondes – grew only by a nominal 26% in the course of the year.
international financial community would be pointing to the *Tesobonos* as a major vulnerability in the Mexican situation.

### 3.3. Bank weakness

Financial vulnerability was not limited to the public sector. Other indicators of fragility were that the ratio of M2 to reserves attained a level of 7 in mid-1994 and of 10 in November of that year (see Table 4). For Argentina, Chile, Colombia and Uruguay, the ratio hovered around 2 or 3 (Calvo, 1994). Meanwhile, M3 denominated in foreign currency became greater than the central bank's reserves in April 1994 (see Table 4). Domestic banks were also in an increasingly weak position. As can be seen in Table 7, the share of non-performing loans increased from around 3% in 1991 to almost 7% by the end of 1994.

The combination of high monetization and bank weakness was to prove lethal at the end of the year. Much of M2 was held as deposits in the banking system. Bank assets were illiquid (and increasingly non-performing), while deposits could be withdrawn at the drop of a hat. The resulting crunch on banks would inevitably become a source of pressure for the central bank. When M3 (both deposits and short-term government debt) '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.

### 4. THE POLICY DILEMMA

In retrospect, it seems clear that March 1994 represented a turning point for Mexico's macroeconomic performance. After
political shocks led to the cut-off in foreign lending, the time was ripe for a policy change. In this section we review the roles that monetary and exchange rate policy could have played, and analyse the arguments for and against different options.

4.1. Monetary policy

Consider first the role of monetary policy. It is useful at this point to introduce Figure 5, 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 US 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 NAFTA. Therefore, the position of Mexico before the Colosio assassination may be represented on Figure 5 as point 1, at which there is a sizeable current account deficit, $CAD_1$, financed by capital inflows at a

![Figure 5.](image-url)
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 US rates, perhaps to the level $R_2$. We see that the current account deficit declines 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 $CAD$ 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 in reserves, but certainly not enough to deplete the stock.)

Monetary policy fits into this process in the following way. Suppose that foreign investors require an interest rate of $R_2$ in order to put 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 purchase 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. $K$ would fall to zero. From equation (1), the current account deficit would have to be covered by reserve losses, with $CAD_1 = -\Delta R$.

The classic 'gold standard' adjustment mechanism under fixed exchange rates, as outlined by Hume two centuries ago,

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7 Importantly, we are implicitly assuming that new investments will stop coming at the interest rate $R_1$, but that existing investments 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.
would have required the domestic money supply to be governed by changes in reserves: in our notation above, it would have required 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 an external deficit (or reducing it to the level willingly 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 Programme:

[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 unfavourable way. That fact could have caused additional capital flight and could have required an eventual expansion of primary credit. (Banco de Mexico, 1995a, p. 36; our translation)

4.2. Exchange rate policy

If monetary policy was not used actively to effect the required adjustment, what about the exchange rate? Since November 1991 Mexico had operated a moving band system. Beginning in October 1992, the ceiling of the band had been adjusted at a rate of 0.0004 new pesos per day, while the floor had 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 had been 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%. The exchange rate spent the rest of the year at or very near the ceiling. Both marginal and inframarginal intervention led to the reserves losses we have documented above. The upshot was that between March and December Mexico operated an essentially pegged exchange rate, in that

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*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.*
only the top of the band was relevant. (Of course, the ceiling itself was gradually depreciating, by a total of nearly 5% in the period.)

The question most observers have asked 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 6, the familiar model of traded and non-traded goods. In the diagram, tradable goods production and consumption are shown on the y-axis, and non-tradable production and consumption are 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 tradable consumption \( C^T_1 \) was greater than tradable production \( Q^T_1 \), Mexico was running a trade deficit. Of course, non-tradable 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 in consumption of both tradables and non-tradables. 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-tradable production (from \( Q^N_1 \) to \( Q^N_2 \) ) and a

![Figure 6.](image)
rise in tradable production (from $Q^T_1$ to $Q^T_2$). The relative price of non-tradable goods to tradable 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-tradables has declined compared with the relative price at $Q_1$. In other words, in order to spur the shift of production from non-tradables to tradables, the relative price of non-tradables must fall. In standard terminology, the real exchange rate must depreciate (that is, $PT/PN$ must rise).

We can therefore conclude that, regardless of whether or not Mexico devalued the nominal peso-dollar exchange rate in March 1994, the real exchange rate – measured as the price of tradable goods relative to non-tradable goods – had to rise in consequence of the fall in capital inflows, and the resulting 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. On the one hand, Mexico could devalue the nominal exchange rate so as to raise the price of traded goods for a given value of non-traded goods. On the other hand, Mexico could try to reduce the nominal price of non-traded goods (or at least slow its rate of inflation) relative to the price of traded goods. 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 be achieved only as a result of a period of higher unemployment. In other words, if the Mexican government attempted to achieve a rise in $PT/PN$ through a fall in the price of non-traded goods, the initial impact might have been unemployment, at a production point like $Q_3$, rather than full employment, at a production point like $Q_2$.

The choice, then, between devaluing and not devaluing in March 1994 was not a choice between adjusting or not adjusting the current account. A smaller current account deficit was necessary as a result of the reduction in 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 favour of a greater nominal devaluation (above and beyond the correction that had taken place within the band) is that it would entail lower unemployment during 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.

4.3. Policy options

The policy options facing Mexico after the shock of March 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 available only temporarily, in that exercising it meant that the country would eventually run out of reserves. The other options were: (1) place the onus of adjustment on monetary policy, without a further devaluation (i.e. the option in the south-west cell); (2) devalue and tighten credit; and (3) devalue and loosen credit (this option would have been highly inflationary).

We have some sympathy for the view expressed by the Banco de Mexico concerning the limits to adjustment via monetary policy: it is indeed possible that interest rates would have had to reach exorbitant levels, perhaps devastating an already weak financial system. But then the right answer would have been to expand domestic credit \textit{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 1992–3 also found the costs of tight credit and pegged exchange rates to be unbearable, leading to a serious weakening of domestic banking systems.

The right answer would have been to expand domestic credit \textit{moderately} and to depreciate

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{EXCHANGE RATE} & \textbf{DOMESTIC CREDIT} \\
\hline
\textbf{Devalue} & \textbf{Tight} & \textbf{Loose} \\
\hline
\text{Adjustment with devaluation} & \text{High inflation} \\
\hline
\text{Adjustment with contraction} & \text{Actual policies} \\
\hline
\end{tabular}
\end{center}

Figure 7.
These countries, including the UK, Sweden, Finland and Norway, ended up allowing their exchange rates to depreciate \textit{vis-a-vis} the Deutschmark, rather than depleting reserves or sticking with a costly credit squeeze at great risk to the banking sector.

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 policy-makers, 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 \textit{Cetes}) would throw into question the whole design of the programme, causing turmoil in the financial markets. (2) Ineffectiveness: a nominal devaluation would have just spurred inflation and left the real exchange rate unchanged. (3) US politics: a devaluation just after signing NAFTA would have been 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 policy-maker 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 and convinces the public of the policy-maker'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 argument carried a lot of weight among economists. For instance, Guillermo Calvo wrote in April 1994:

In my opinion, this is not the time to implement the Dornbusch–Werner devaluation. The forces that have held together the 'good' equilibrium may dissipate overnight. A 20% devaluation [outside the present band] may get US investors up in arms about the fall in the real value of their \textit{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. (Calvo, 1994)
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 it also made it increasingly likely that this desire could not be sustained. By not devaluing in March, the government may have increased rather than decreased the expected rate of devaluation.\footnote{A similar argument has recently been formalized by Drazen and Masson (1993).} Moreover, the circumstances under which a government abandons an announced policy matter very much. Had the devaluation been carried out in March or April, in the immediate aftermath of the assassination, it is plausible that the investor community would have understood that the devaluation was prompted by a political disaster which was painfully observable to all.

It can also be argued that 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 pegged 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 8. Since the markets *expected* a devaluation, the cost of avoiding a devaluation was a prolonged period of high peso interest rates and therefore high real interest rates as long as the devaluation did not in fact occur. These high rates 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 probably 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 by the government. In the end, the Mexican authorities announced that they would not devalue, but peso interest rates remained much higher than dollar interest rates anyway.

Mexican government decisions in 1994 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%, and domestic interest rates had gone up by around 700 basis points in the aftermath
of the shock. Greater depreciation, it was feared, might cause generalized discontent among the population, as it had in 1976 and 1982 (also, not coincidentally, election years). Letting interest rates increase even further might cause many bankruptcies and some banking failures. 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 and 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 gross reserves.

The more puzzling issue is why the inaction continued after the elections. The situation in August was much 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 must have loomed large in Mexican policy-making circles. Second, interest rate differentials between US and Mexican assets (regardless of currency denomination) were shrinking.

The puzzling issue is why inaction continued after the elections.
Foreign direct 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.

5. THE DECEMBER PANIC

We want to emphasize that the December crisis was composed of two distinct events: the devaluation of 20 December itself, and the financial panic on government debt that followed. There are two possible explanations of why the December crisis took place, depending on one’s view of which event caused the other.

5.1. From devaluation to panic: two possible interpretations

One explanation is that the devaluation was expected and that it was an intrinsic part of the financial panic on government debt: in effect, that there was one shock. In this view, the political shocks coupled with the monetary policy response led to a devaluation and a financial panic on government debt as well. The government’s inability to borrow, and the need to devalue, were parts of the same phenomenon. This kind of explanation for the devaluation is related to the mainstream speculative attack literature: reserves gradually run out because of excessive domestic credit, and eventually a stock adjustment depletes the remaining reserves in one attack, which wipes out remaining reserves and leads to a float.

The second explanation is that the crisis was unexpected and that the two events, devaluation and financial panic, were separate – logically and temporally – with the devaluation coming first, and then helping to provoke the financial panic. In this view, the Mexican government could still have borrowed, albeit at a high cost, in November and early December. Instead, it chose to devalue because it finally perceived the costs of defending the exchange rate (in terms of high interest rates and domestic recession) to be too high. The devaluation,
however, led unexpectedly—and in some real sense unpredictably—to an extreme financial panic in the market for government securities.

We believe that this second explanation, which makes a strong distinction between a standard exchange rate crisis and a government liquidity crisis, much better explains the Mexican experience. It is true that the permanence of a large current account deficit, coupled with a slowdown in foreign lending, made an eventual exhaustion of reserves inevitable. However, the timing and, especially, the magnitude of the attack were not uniquely pinned down. Below we present some evidence to support this view.

The second explanation entails the following logical steps. First, although the Mexican government was solvent in December 1994, it was illiquid, as we have discussed at length. Second, although the government’s short-run dollar liabilities (approximately $28 billion) were small relative to Mexico’s GDP, they were very large relative to the lending capacity of any individual creditor, actual or potential, or even any small group of creditors. Hence, even if it was common knowledge that Mexico had the capacity to repay its liabilities over the medium run, no individual lender had pockets deep enough to make a long-term loan given that no one else was willing to lend to Mexico. 10 Third, the devaluation generated rumours that the government was not going to repay its short-run debt. Fourth, the Mexican government went to the brink of default, thereby fulfilling these expectations.

One possibly strong link between the devaluation and the financial panic is that investors interpreted the devaluation as a signal that the Mexican government might renege on its dollar-denominated liabilities, as it effectively had done in 1982 when it froze dollar-denominated bank accounts and paid them back at a controlled exchange rate significantly below the market

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10 The existence of a limited lending ability by an individual creditor, or any small group of creditors, plays a key role in most explanations of how a liquidity crisis can afflict an otherwise solvent borrower. If there is no lending constraint on individual creditors, one creditor could presumably refinance the whole debt, and then repackage it in another form to the capital markets at large. (Of course, even in this case, there would be great risks of being Mexico’s single substantial creditor, since Mexico might have more power ex post to renegotiate the terms of the loan.) In any event, almost all models of financial panics, such as the baseline Diamond and Dybvig (1991) model, assume away the ability of a single private market creditor to arbitrage the market by bailing out an illiquid but solvent lender. Of course, that role is exactly the one that the USA has chosen to play, though as an official rather than private market participant.
rate. The details of how the devaluation was enacted, and the seemingly improvisational nature of the announcements made by the Mexican authorities in the immediate aftermath of the devaluation, became focal points in determining market expectations, and thereby contributed to the snowballing of the panic. This problem was exacerbated by the fact that there were many bondholders, operating on information obtained third-hand or fourth-hand or from the general press, rather than a small number of banks that could have co-ordinated among themselves to help keep Mexico liquid.

5.2. Contagion to the private sector

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 US levels. At work was the phenomenon known in bond markets 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 behaviour. Most importantly, the government is the lender of last resort to the banking sector, and in many LDCs it 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 as 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, accounting for 23.5% of total deposits. Development banks had 64% of their liabilities ($40 billion) denominated in dollars. At the time of the crisis, the Banco de Mexico lacked the reserves to guarantee these deposits in the event of a bank run.
5.3. A self-fulfilling crisis

We present four pieces of evidence to suggest that the second explanation better rationalizes the genesis of the Mexican crisis. First, we look at the evolution of gross reserves. After the presidential elections in August, the central bank did not release any reserves in defending the peso until the second week of November (see Figure 9). In November two negative shocks hit Mexico: the Federal Reserve Board increased US interest rates and Mexican Attorney-General Mario Ruiz Massieu made public his allegation that the government had blocked the investigation of his brother’s murder in September. Ruiz Massieu resigned on 23 November. His allegations were interpreted as a crack in the political structure of the PRI, and led to another round of capital outflows, which were sterilized, reducing gross reserves from $16.3 billion at the beginning of November to $12.5 billion when President Zedillo took office on 1 December.11 Afterwards, gross reserves remained stable until 15 December.

![Graph showing daily reserves and intervention](source: Banco de Mexico)

Figure 9. Daily reserves and intervention

11 The stock of Tesobonos increased from around $13.5 billion in August to around $15.5 billion at the end of November.
However, between 15 and 19 December rumours that the government was going to devalue and increased instability in Chiapas led to a $1.7 billion fall in reserves. On 20 December a widening of 15% in the exchange rate band was announced. This led to a massive capital outflow on 22 December (reserves fell by $4.5 billion in one day), which forced the authorities to let the exchange rate float. On 27 December the Tesobonos auction failed. Bids were received for only $28 million out of the $600 million that were offered. This signalled the start of the panic.

Second, consider the behaviour of the interest rate differential between three-month peso-denominated bonds (Cetes) and dollar-indexed bonds (Tesobonos). This differential fell in August (due to the electoral success of Zedillo) and remained basically constant until the beginning of December. By contrast, in a speculative attack model, if the attack is expected, the interest rate differential should increase over time, as the likelihood of depreciation increases (Flood and Garber, 1984). Furthermore, after the devaluation took place, the interest rate differential shot up (in both nominal and real terms). In a speculative attack model, the nominal differential may increase after the attack, since the exchange rate is floating, but the real differential should fall.

Third, consider the interest rate differential between Tesobonos and US Treasury bills. This differential is an indicator of the likelihood of default by the Mexican government. After the March assassination, this differential fell gradually from 4% in April to 1.4% at the beginning of November. Then it increased slightly during the second week of December. After the devaluation, it jumped to 5% at the end of December, to 7% in January of 1995 and to 19% in February.

Last, and perhaps most surprisingly, international press coverage does not suggest that agents were expecting a peso collapse in December, or that they were concerned about the possibility that Mexico might default. Before December 1994, there was only one article in the Financial Times, New York Times and Wall Street Journal where Tesobonos was an issue (in the New York Times in July). This number jumped to 6 in December and 46 in January, and then fell back to 29 in February and 8 in March. Moreover, during 1994 the articles on Mexico were very optimistic about Mexico’s future and its investment opportunities.
Summing up, two elements contributed to the onset of panic. As discussed at length above, the central bank nearly ran out of foreign exchange reserves in December, and this quickly became public knowledge. Moreover, as a result of the accumulation of Tesobonos, the level of dollar amortizations due in the early months of 1995 was very high. When a government becomes illiquid and multiple equilibria become possible, the particular actions of policy-makers become important, and actions or statements that might otherwise be inconsequential end up as turning points. It is in this sense that the panic has been widely blamed on the announcement of devaluation on 20 December.

We believe this view is plausible. Yet we do not think that a devaluation in March or April 1994 would have caused a panic as it did in December. Since reserves were sufficient to cover the current account deficit for one year and the short-term foreign debt was nil, a devaluation might have annoyed investors and the labour and business members of the anti-inflation pact, but real interest rates need not have increased so much. Compare, for example, the aftermath of the devaluation crisis of the EMS in 1992. In that crisis, the devaluing countries experienced a fall in interest rates and an acceleration of growth. By contrast, the Mexican panic caused a sharp rise in interest rates, which 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-tradables will lead to the spread of bankruptcy. The following quote from Friedman and Schwartz (1963) captures well the dynamics of the December panic:

Yet it is also true that small events at times have large consequences, that there are such things as chain reactions and cumulative forces. It happens that a liquidity crisis in a unit fractional reserve banking system is precisely the kind of event that can trigger — and often has triggered — a chain reaction. And economic collapse often has the character of a cumulative process. Let it go beyond a certain point, and it will tend for a time to gain strength from its own development as its effects spread and return to intensify the process of collapse. Because no great strength would be required to hold back the rock that starts a landslide, it does not follow that the landslide will not be of major proportions.
6. 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 US 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 on the part 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 a rise in inflation much larger than was incorporated in the IMF programme. Another set of guidelines was issued at the time of the signing of the US–Mexican $20 billion aid agreement, on 21 February. A third set of targets, together with new fiscal adjustment measures, was unveiled on 9 March, in response to continuing downward pressure on the peso.

The Mexican bail-out was extraordinary from several points of view. The large-scale, long-term use of the US 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 programme in history, both in absolute amount and as a percentage of quota. The programme generated an enormous degree of controversy and scepticism. Leading members of the US Congress called for the suspension of the aid programme. Market reactions up until 10 March were similarly unenthusiastic, with Mexican Treasury bill interest rates on peso-denominated securities continuing to rise (up to 70% per annum as of 10 March on 30-day notes), and the peso continuing to depreciate sharply in nominal and real terms. This outcome poses three questions: Was the bail-out a good idea? Is it effective in meeting its goals? How could the overall adjustment programme, in terms of both aid and Mexican policy measures, be improved?

The bail-out programme 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, a parallel can be drawn with 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 the Second World War, 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 might have been available, such as suing the bank for relief. By analogy, Mexico might simply have announced a suspension of repayments on Tesobonos, perhaps linked to an exchange offer, in which short-term Tesobonos would have been converted into medium-term claims on the Mexican government. This was recommended by some financiers by analogy with private sector debt work-outs (see Ackerman and Dorn, 1995).

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

6.1. Alternative solutions

Two extreme suggestions 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: (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, by then it was 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 was 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, $\Delta\text{NDA} = 0$), along the lines of the system adopted by Argentina after April 1991. This suggestion had little merit for Mexico at that 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 deprives the central bank of its ability to act as lender of last resort to its domestic banks. In countries without a currency board, the central bank is able to provide liquidity ($\text{NDA}$) 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 exacerbate a bank run. This precise phenomenon occurred in Argentina in March–April 1995. Argentina suffered from a bank panic, which could not easily be addressed in conformity
with the currency board arrangements. Therefore, Argentina, like Mexico, was forced to mobilize international emergency help, despite the fact that Argentina had (and still 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 (Mexico in March of last year) or economic (e.g. a dramatic shift in the terms of trade). Yet we have seen that, in Mexico in 1994, 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 straitjacket 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 a drastic way to impose self-control. Argentina presented such a case in 1991, following 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. For Mexico we therefore believe that less drastic solutions were preferable.

Finally, as a practical matter, Mexico simply lacked the reserves to pledge to a currency board. The central bank could not simultaneously pledge itself to a healthy banking system (in which all short-term deposits in pesos 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. The reserves were not remotely sufficient to cover short-term deposits in the banking system plus the currency in circulation. Borrowed reserves from the USA and IMF might have added another $20–30 billion, but these were only temporary reserves.
In the longer run, the exchange rate arrangements that have been adopted should gradually evolve into a crawling band system like those successfully in operation in Chile and Israel (see Helpman et al., 1994). The key feature of this kind of system is that it provides a nominal anchor, while at the same time leaving room for doses of monetary and exchange rate 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.

7. 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 troublesome problem since the mid-1970s, and a very acute problem in the mid-1980s, was quickly converging to US levels. True, the peso was somewhat overvalued and the 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 foreign direct investment and portfolio investment).

In the course of 1994, Mexico was hit by an external shock (the rise in US 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 8% of GDP to a range of, perhaps, 2–4% of GDP, without precipitating serious macroeconomic instability. The government did not achieve this, so that by the beginning of 1995 Mexicans could look forward to ongoing financial panic and a large looming recession.

What are the lessons from the Mexican experience 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 short-term
monetary and fiscal policy responses?

7.1. Difficulties of automatic adjustment under fixed exchange
rates
At least since Hume, it has been understood that fixed exchange
rates require that the money supply be determined mainly 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 policy making 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 down far enough
to avoid a devaluation. In Europe in the early 1990s, country
after 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 policy-makers 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
Unrealistic toughness on the exchange rate does not increase credibility

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 (e.g. 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 labour markets and 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 programme, 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 1992–3 several European central banks allowed their currencies to drop by 20 and even 30% (the same order of magnitude as the required Mexican devaluation) and financial panic did not follow. Because Mexico waited until it was on the verge of default on short-term dollar obligations, it had a different outcome.

7.2. Financial vulnerability and currency pegs

Stabilization and reform in Mexico after 1987 led to a sharp remonetization and financial deepening. The money base and the other broader monetary aggregates 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 has repeatedly stressed.
That the stock of inside (bank) money should be a source of potential pressure on the currency needs underscoring. The conventional wisdom is 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, or at least all short-term deposits, are 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 the cases of both 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 lender of last resort for locally denominated liabilities (albeit at the possible cost of exchange rate devaluation), while it may literally be unable to fulfil this function in the case of dollar-denominated debts. In a panic, it may simply be unable to purchase or borrow the dollars needed to relend 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, and foreign-currency-denominated short-term liabilities, 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 programme, when anchoring expectations and permitting remonetization are priorities. But it is just as important 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 US Treasury-led bail-out could have been quicker and more effective if it had been part of an established procedure, not an ad hoc operation that in fact violated many established rules. The obvious fact that moral hazard problems must be dealt with should not paralyse efforts to design a suitable international mechanism which could help to address future crises such as Mexico’s.

Discussion

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The Mexican experience which led to the crisis of December 1994 is similar to that of other countries that have undertaken exchange-rate-based stabilization programmes. During the initial honeymoon, domestic interest rates fall, reflecting the credibility of the exchange rate peg. The fall in interest rates is accompanied by a boom in spending. Spending goes up not only through the direct effect of lower interest rates on private demand, but also because the relatively low cost of financing the public sector deficit reduces the urgency of fiscal consolidation. Inflation initially falls, as private sector expectations adjust to the announcement of the peg. However, as time goes by, the boom in spending prevents further convergence of inflation.
Competitiveness starts deteriorating and the current account worsens. The honeymoon effect can last for a long time. When European exchange rates were fixed *vis-a-vis* the Deutschmark, the European 'convergence game' lasted more than five years: from early 1987 to the beginning of 1992. During that time, capital flows into the high-inflation countries were plentiful, and often in excess of what was needed to finance the current account deficit – to the point that two countries, Spain and Italy, introduced regulations designed to slow down the capital inflow.\(^\text{12}\) This is a time when it becomes fashionable to talk of 'structural change': the capital inflow is taken as the signal of a 'new' long-term attitude of investors towards the country. The loss in competitiveness is considered temporary because, thanks to the 'ongoing structural change of the domestic economy', a change in relative prices will become unnecessary. It was common, throughout 1994, for Mexican policy-makers to argue that NAFTA would have changed Mexico's equilibrium real exchange rate.

Then, quite unexpectedly, the capital inflow reverses: the funds that had supposedly come in to finance long-term investment, and which instead had been mostly invested in government bonds and bills, disappear almost overnight. The central bank reacts by raising short-term interest rates – to 500% in Sweden in the autumn of 1992. But at that point there is no rate of interest high enough to reverse the capital outflow. The reason is that reversing the imbalances without a devaluation is too expensive, and thus not credible. At an unchanged level of the nominal exchange rate, inflation should fall below foreign inflation and remain lower long enough to offset the initial loss in competitiveness. I therefore do not share the paper's implicit argument that the Banco de Mexico is to blame for the devaluation: the authors hint that the devaluation could have been avoided had the central bank allowed peso interest rates to rise to a high enough level. The European experience of 1992 clearly indicates that this would not have worked.

But there is an important difference between the devaluation of the peso and the European devaluations of September 1992. In Europe there seemed to be only winners – except perhaps

\(^{12}\) For a discussion of the European experience see, for example, Giavazzi and Spaventa (1990).
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for the central banks. Let us consider the case of Italy. The devaluation was followed by a remarkable turnaround in the current account: by mid-1993 the deficit had disappeared and the economy was booming, also thanks to an old-fashioned but effective incomes policy that prevented a rise in wages. Nothing like the deep recession that followed the Mexican devaluation. I believe that the reason is the denomination of the debt. In Italy the entire public debt is denominated in lire: the devaluation had no direct effect on the government budget constraint. In Mexico, on the contrary, in an attempt to raise the credibility of the exchange rate commitment, the Treasury had transformed a large fraction of the floating debt into dollars. When the devaluation came, the government’s budget constraint worsened overnight, and the markets realized that the Treasury was facing a liquidity crisis. The important lesson – and one that runs contrary to some of the credibility literature – is that raising the cost of deviating from your policies does not necessarily help your credibility.

István Székely

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The paper consists of three parts. It discusses the causes of the collapse of the Mexican peso in December 1994 and the alternative policy mixes that Mexican policy-makers could have used at certain points in time during the period under investigation to avoid the collapse, and finally, it draws the lessons. I shall discuss each of these in turn.

Let us take first the description of the causes of the crisis, and the process that led to the financial collapse. There is a fairly wide agreement on the fact that the Mexican peso was overvalued and that the peg (after a while, of the widening band type) imposed excessive limits on the room for manoeuvre of economic policy-makers. The paper is not so much about this, but more about the policy reaction to this situation: that is, to a gathering crisis.

The story presented in the paper is indeed convincingly simple. I think the authors are right in emphasizing that the major factor was the wrong policy reaction to a series of exogenous shocks, both external and internal (the latter being mainly political). I think that it is also correct to say that the prevailing exchange rate regime, which was one of the most
important commitments made both to social partners within Mexico (Fisher, 1994) and to financial investors inside and outside the country, made it very difficult for Mexican policymakers to come up with a less disastrous policy mix. Finally, the authors should be given credit for emphasizing the concept of financial vulnerability. This is indeed an area that deserves much more attention. The questions that the authors ask about the threshold and the factors explaining why thresholds differ for different countries are highly relevant.

Naturally, there are several details of the story on which one may have different opinions. Let me mention two. First, I think the authors underestimate the importance of speculative behaviour. Dornbusch and Werner (1994) point to speculative attacks around the first major fall in international reserves after the assassination in March 1994. As emphasized by Gould (1995), the fact that no hedging instruments against devaluation risk were available to investors in Mexico made a crash even more likely. Put differently, incomplete financial liberalization ironically made things much worse. Second, the authors underestimate the importance of domestic players. As the degree of convertibility was high, it was relatively easy and cheap for domestic agents to change the currency mix of their financial assets.

As to the alternative policy mixes, the authors basically reiterate the Dornbusch–Werner proposal (Dornbusch and Werner, 1994). They are not specific about the form and extent of the devaluation that policy-makers should have undertaken, but perhaps ex post these details are not that important any more. On the other hand, they also suggest that a moderate expansion of domestic credit could have been used to smooth the process of adjustment. Given the structural and other characteristics of the Mexican economy, it is difficult to argue against this proposal, especially because the only promising alternative, suggested by Calvo (1994), did not materialize. What these two proposals share is that they were both unworkable for political reasons, a point to which I return below.

Most of the lessons drawn by the authors are not new. It was very well understood before the peso crisis that under a pegged nominal exchange rate, whatever the actual form of the peg is, there are severe limitations on monetary policy (see, for example, Guitian, 1994). The fact that, under certain circumstances, a peg may be a powerful tool in the early phase of
stabilization but a straitjacket later on is again nothing new (see, for example, Corden, 1993; Fischer, 1994). On the other hand, I think there remain some very important questions, precisely because most of the lessons were already known to Mexican policy-makers.

Why could the highly skilled Mexican economic policy-makers not foresee the (likely) outcome of their policy? What is even more difficult to believe is that they would not have known the consequences of pre-devaluation whispering by the government. It is more likely that they were not in a position to exert sufficient influence on policy making. Put differently, one suspects that politics overtook economics. This then raises the question of institution design. Could anything in the Mexican institutional and legal framework have been changed to prevent policy-makers, or rather politicians, from pursuing a misguided policy?

In my view, the essence of the Mexican peso crisis story, like that of many other recent currency crises, is that both policymakers and private agents/investors are learning the rules of a new game: how to manage a small national currency in a fully liberalized environment. In such an environment, the punishments for inconsistencies in economic policy come upfront and are spectacular, even if many of the economic fundamentals are sound.

General discussion

David Begg wanted to link two conclusions: that the deterioration in the current account was caused by a collapse of private savings, and that the crisis was due to the insolvency of the public sector. The abundance of credit had facilitated very high levels of private consumption. In such a situation the optimal fiscal stance, especially in a fixed exchange rate regime, was not a balanced budget but a surplus, to compensate for the private sector binge. The crisis was more about the political insolvency of the government than about financial insolvency: the government was not ready to undergo the political pain of the recession needed to correct the imbalance in the current account. When the government realized this, it engaged in an increasingly desperate series of stunts that ultimately precipitated the financial crisis.
Charles Wyplosz differed slightly on the issue of a compensating fiscal surplus. If liberalization of the economy generates an anticipation of increased future income, credit-financed consumption is a rational response. Besides, a compensating surplus smacked too much of fine tuning, and was not very likely to succeed. In response, Aaron Tornell stated that, given the volume of capital inflows in relation to the size of the economy, fiscal policy could not have been very effective as a counteracting device. A fiscal surplus, by enhancing credibility, could have led to even higher capital inflows. This, in turn, might have compounded the problem by financing even higher levels of private consumption.

Mathias Dewatripont thought that the collapse of the Mexican peso should caution policy-makers against the premature privatization of the banking system. The attempt to privatize banks in Mexico in the early 1990s had underestimated the intrinsic weakness of some of the smaller banks. Lax banking regulation, especially regarding capital requirements, made matters worse. The lesson to be drawn was that privatization of the banking system should not be a priority, especially if it interferes with macro stabilization.

Was the run on the peso an instance of a self-fulfilling attack? This issue was debated at length. Alan Kirman spoke of the inconsistency of an approach that claimed, on the one hand, that the run on the peso was of the self-fulfilling variety, while on the other hand, looking for its causes. Charles Wyplosz was not persuaded by the authors' claim that the absence of prior short-term interest rate movements provided a useful guide to the nature of the attack. For example, a devaluation anticipated to occur some time in the future (say, well after the elections) is not reflected in short maturities.

Richard Portes made a case for the Mexican authorities in the run-up to the crisis, arguing that they had little reason to believe that their fundamental position was weak. Indeed, the real trade-weighted exchange rate of the peso had already depreciated by 17% between mid-1993 and mid-1994 (so that further devaluation seemed unnecessary), and both total and non-oil exports had been growing at about 20% per annum in the preceding 3–4 years. While capital inflows stopped rather suddenly in early 1994, they had resumed by the third quarter of that year, presumably due to the post-election 'honeymoon effect'. The level of foreign reserves had been precarious, but it
had bottomed out in the summer and had been improving, at least till the end of October. In the presence of all these encouraging developments, it is unreasonable to expect the authorities to have acted earlier. Their calculation was, quite legitimately, that any relaxation of the exchange rate policy would weaken confidence, cause capital flight and worsen the problem. To the extent that one cannot blame the crisis on mismanagement, there was a case for arguing that the crisis was of the self-fulfilling variety. He went on to discuss the appropriate international response in the event of a run. The authors had endorsed a bail-out on the plea that Mexico's long-run fundamentals were sound. He thought that the latter judgement was premature: the crisis had proved very costly in terms of fall in output, and Mexico's external debt/GDP ratio was still excessive. Mexico had a long way to go before complete recovery. He also suggested a 'work-out' as an alternative to the 'bail-out'. Admittedly, this would have hit the holders of Tesobonos and external claims on Mexican banks, and entailed the risk of contagion to other countries, but these risks could have been minimized with some care. Aaron Tornell suspected that any adverse outcome for holders of Tesobonos would have seriously affected the credit lines in the future.

Riccardo Faini pointed out that, in judging Mexico's risk of insolvency from its debt indicators, it was important to recognize that these indicators were affected by the real appreciation of the peso: the dramatic fall in the debt indicators from 1987 to 1989 was partly a consequence of the real appreciation of the peso. What was worrisome and should have caused alarm was that, despite the continuing appreciation of the peso after 1989, there was no further improvement in the debt indicators.

Could the impending crisis have been averted? Charles Wyplosz thought a devaluation might have been effective if it had been implemented by the outgoing government (which had greater credibility), or if it had been accompanied by a package of other reforms. Aaron Tornell agreed, but felt that a devaluation had been politically infeasible: the official perception in Mexico was that any devaluation, even a modest one, would spark off a much greater fall in the peso. Francesco Giavazzi was uneasy with the talk of central bank credibility in this context. In his opinion, changing interest rates could not have staved off the crisis. Andres Velasco argued that the efficacy of monetary policy depended on the nature of the task at hand: it is true
that interest rate changes are helpless against a drastic turn in capital flows, but they could help in the face of a modest change. Axel Weber too was puzzled by the talk of credibility. To him, credibility was not a substitute for a good policy but rather a consequence of it. Charles Wyplosz wondered if restrictions on capital movements would have helped, as they did in the Chilean case, but had been ruled out for dogmatic reasons.

REFERENCES


