NAFTA AND MEXICO'S LESS-THAN-STELLAR PERFORMANCE

Aaron Tornell
Frank Westermann
Lorenza Martinez

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ABSTRACT

Mexico, a prominent liberalizer, failed to attain stellar gross domestic product (GDP) growth in the 1990s, and since 2001 its GDP and exports have stagnated. In this paper we argue that the lack of spectacular growth in Mexico cannot be blamed on either the North American Free Trade Agreement (NAFTA) or the other reforms that were implemented, but on the lack of further judicial and structural reform after 1995. In fact, the benefits of liberalization can be seen in the extraordinary growth of exports and foreign domestic investment (FDI). The key to the Mexican puzzle lies in Mexico's response to crisis: a deterioration in contract enforceability and an increase in nonperforming loans. As a result, the credit crunch in Mexico has been far deeper and far more protracted than in the typical developing country. The credit crunch has hit the nontradables sector especially hard and has generated bottlenecks, which have blocked growth in the tradables sector and have contributed to the recent fall in exports.

Aaron Tornell
Department of Economics
UCLA
405 Hilgard Ave, Bunche Hall #8283
Los Angeles, CA 90095-1477
and NBER
tornell@ucla.edu

Frank Westermann
CESifo (University of Munich and ifo Institut)
Shackstr. 4
80539 Munich, Germany
frank.westermann@ces.vwl.uni-muenchen.de

Lorenza Martinez
Banco de Mexico
lmartin@banxico.org.mx

1. Introduction

The experience of Mexico, a prominent liberalizer, challenges the argument that liberalization promotes growth. Mexico liberalized its trade and finance and entered the North American Free Trade Agreement (NAFTA), yet despite these reforms and the advantage of proximity to the United States, Mexico's growth performance has been unremarkable in comparison with that of its peers. Moreover, during the last two years exports and GDP have stopped growing. Why has Mexico's aggregate growth performance failed to meet expectations? Why has there been an export slowdown? Where can we see the effects of liberalization and entry into NAFTA?

Some have argued that countries like Mexico could have grown faster had they not liberalized trade and finance so fast, and had they received more FDI and less capital in the form of risky bank flows; in this way, Mexico could have avoided the lending boom and the Tequila crisis. We do not agree. That liberalization is bad for growth because it leads to crises is the wrong lesson to draw from the Mexican experience. We have shown in a recent paper that in countries with severe credit market imperfections, liberalization leads to more rapid growth, but also to financial fragility and occasional crises.[1] Mexico is thus no exception in experiencing a boom and a bust. Something else must be at work. To find out what that is, we compare Mexico's experience to an international empirical norm.

We argue that Mexico's less-than-stellar growth is not due to liberalization or to the lending boom and crisis it engendered, and that, in all likelihood, GDP growth would have been slower without liberalization and NAFTA. In fact, in the wake of the crisis, exports experienced extraordinary growth and GDP growth recovered quite quickly. Instead, we argue that a lack of structural reform and Mexico's credit crunch, which was deeper and more protracted than that of the typical MIC, are important factors behind Mexico's unremarkable growth performance and the recent slowdown in exports.

The data indicate that a key ingredient in any successful explanation of the Mexican experience should account for the sharp ups and downs of the nontradables (N) sector relative to the tradables (T) sector. Furthermore, to account for the effects of trade and financial liberalization, models are needed that focus on the sources of financing at the firm level.

As we noted previously, the fastest growing countries of the developing world tend to experience booms and busts. Although Mexico's growth, relative to its initial GDP, has been decent, when we control for bumpiness Mexico is an underperformer. Even in the period since

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[1] Tornell, Westerman, and Martinez (2004).

liberalization, the Mexican economy has grown 2 percentage points less per year than the average for other countries with comparably risky paths. When we compare Mexico's boom-bust cycle with that of the typical MIC, we find that Mexico's boom phase and subsequent crisis are typical; it is Mexico's response to the crisis that is the outlier. Relative to the typical MIC, Mexico's credit crunch was both more severe and more protracted. The credit-to-GDP ratio in Mexico fell from 49 percent in 1994 to 17 percent in 2002.

This severe credit crunch is in contrast to the fast recovery of GDP growth in the wake of the Tequila crisis of 1994-95. The fast recovery of GDP growth masks a sharp sectoral asymmetry between an impressive increase in exports and a lagging N-sector. The N-to-T output ratio fell about five times as much in Mexico as in the average country in the aftermath of crisis. Micro-level data reveal that the prolonged postcrisis credit crunch mainly affected the N-sector, whereas the T-sector received a large share of foreign direct investment (FDI) and was insulated from the credit crunch because it could access international financial markets and shift away from domestic bank credit. Over the past eight years, tight domestic credit has limited investment and growth in the financially constrained N-sector, with the result that it is the T-sector, in large part, that has enjoyed the beneficial effects of liberalization and NAFTA.

Mexico's persistent credit crunch is puzzling. It cannot be explained by a fall in loanable funds: deposits have grown in parallel with GDP, and a large share of the banking system (88 percent by 2001) has been sold to foreigners. What accounts, then, for the credit crunch? Evidence suggests that the fall in credit has been associated both with a sharp deterioration in contract enforceability and with the policy response to the problem of nonperforming bank loans.

Since 2001 Mexican exports and GDP have stopped growing. The empirical evidence indicates that the U.S. recession can account for part of this slowdown, but not all of it. We show that some internal factors--fire sales and the bottleneck effect--can help account for this residual. Access to international financial markets combined with a real depreciation allowed the T-sector to buy N-sector inputs at fire-sale prices and thus to grow rapidly in the wake of the crisis. However, this rosy scenario could not go on forever. Lack of credit and of structural reform depressed N-sector investment, and the resulting decline in N-sector output generated bottlenecks that eventually blocked T-sector growth. In fact, sectoral evidence shows that the subsectors where exports have declined the most are those that use N-sector inputs most intensively. Given the lackluster performance of the N-sector, this suggests that bottlenecks are contributing to the slowdown.

NAFTA led to a sharp increase in FDI. However, the lion's share of FDI went to the T-sector and to financial institutions. Moreover, the small share that went to the N-sector was allocated to very large firms. Thus, most of the capital inflows that ended up in the N-sector were intermediated by domestic banks. This shows that FDI has not been a substitute for risky bank flows.

A key element in our account of the Mexican experience has been the sharp asymmetric response of the N- and T-sectors. This phenomenon can be accounted for by the existence of sectoral asymmetries in financing opportunities: in Mexico, many T-sector firms are large and have access to international financial markets, while most N-sector firms are small and bank dependent. As a result, the T-sector was not as hard hit by the credit crunch as the N-sector. To establish these facts we analyze two Mexican micro-level data sets: the firms listed on the Mexican stock market (the Bolsa Mexicana de Valores, or BMV), and the economic census. The BMV set contains only those firms that issue either bonds or equity (310 firms) and thus is not representative of the economy as a whole; whereas the census includes all firms in the economy (2,788,222 firms). This is, to our knowledge, the first paper to analyze the micro-level data contained in the Mexican economic census.

2. Reforms

Mexico acceded to the General Agreement on Tariffs and Trade in 1985, and by 1987 it had eliminated most of its trade barriers (except in agriculture). Mexico went from being a very closed economy to one of the most open in the world, and it experienced a dramatic increase in exports. Between 1985 and 2000 non-oil exports jumped from $12 billion to $150 billion, and the share of trade in GDP rose from 26 percent to 64 percent (of figure 1).

Financial liberalization began in 1989. Although Mexico's capital account was not totally closed, financial markets and capital flows were heavily regulated. The rules that restricted the opening of bank accounts and the purchase of stocks by foreigners were relaxed, as were the rules that had strictly restricted FDI.[2] At about the same time, banks were privatized, and reserve requirements, interest rate ceilings, and directed lending were eliminated. Finally, the limits on the

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[2] In 1989 a new *reglamento* to the Ley para Promover la Inversión Mexicana y Regular la Inversión Extranjera (Law for the Promotion of Mexican Investment and the Regulation of Foreign Investment) was introduced. Then, in 1993, a new FDI law was passed by congress. This law was subsequently revised in 1998.
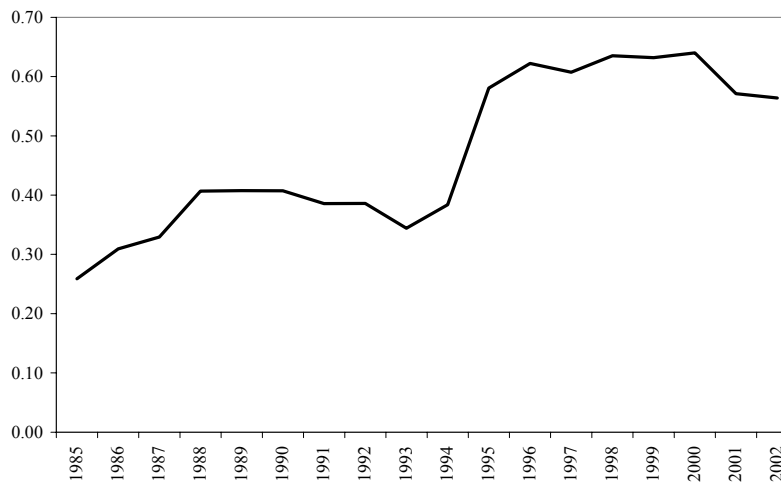
amount of commercial paper and corporate bonds that firms could issue, as well as the prohibition against issuing indexed securities, were lifted.[3]

Figure 1: International Trade

a) Exports of Goods
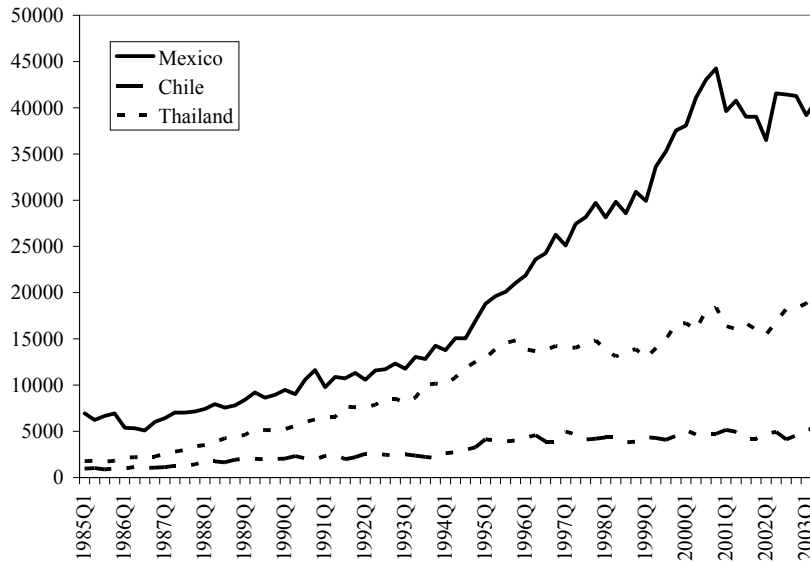
a) Exports+Imports/GDP

NAFTA was signed in 1993 and went into effect on January 1, 1994. The treaty did not significantly reduce trade barriers from their already low levels. Its significance resides in the fact that it codified the new rules of the game and greatly reduced the uncertainty faced by investors. On the one hand, it solidified the reforms that had been implemented and reduced the likelihood

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[3] For a detailed description see Babatz and Conesa (1997) and Martinez and Werner (2002a).

that the Mexican government would violate investors' property rights as it had in the past. On the other hand, it made it very unlikely that the United States or Canada would suddenly impose trade barriers on some products. NAFTA also established a supranational body to settle disputes arising under the treaty.[4]

A key shortcoming of the liberalization program is that it was not accompanied by badly needed judicial and structural reforms. First, Mexico had and still has severe contract enforceability problems, which make it very difficult for a creditor to take over the assets of defaulting debtors. The problems include long delays in the adjudication of commercial disputes (with a median time of over thirty months), very low salaries for judges (a median monthly salary of around $1,000), biased judgments (lawyers in fourteen out of thirty-two states rate judges as deserving the low score of 1 on an impartiality scale), and poor enforcement of judicial decisions. It was not until 2000 that new bankruptcy and guarantee laws were introduced.[5] Second, structural reforms in key sectors, such as energy, have not been implemented. This has implied higher costs for other sectors in the Mexican economy.

## 3. The Mexican Experience in Perspective

We have shown in Tornell et al. (2004) that across the set of developing countries with active financial markets, trade liberalization has typically been followed by financial liberalization, which has led to financial fragility and to occasional crises. On average, however, both trade and financial liberalization have led to more rapid long-run growth in GDP per capita. Thus, it cannot be the case that liberalization and crisis are the causes of Mexico's lack of stellar growth. Given the bumpiness it experienced, could Mexico have attained faster GDP growth? To address this issue we look at GDP growth rates in figure 2, which taken from Tornell et al. (2004). Even during the period of liberalization (1988-99), Mexico's GDP grew at an annual rate that was less than 1 percentage point above the value predicted by its initial income and population growth. This is around 2 percentage points less than that of countries with similar bumpiness, as measured by the negative skewness of real credit growth. For instance, Chile, Korea, and Thailand grew at rates of 2 or 3 percentage points above the predicted values. This indicates that, given its bumpiness, Mexico was an underperformer during the 1990s. Furthermore, from the first quarter of 2001

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[4] Aspe (1993); Esquivel and Tornell (1998); Lustig (2001); Perry et al. (2003).
[5] Calomiris, Fisman, and Love (2000).

through the second quarter of 2003, GDP growth has stagnated and non-oil exports have fallen 1 percent a year, on average.[6]

Figure 2: Growth and Skewness of Credit Growth
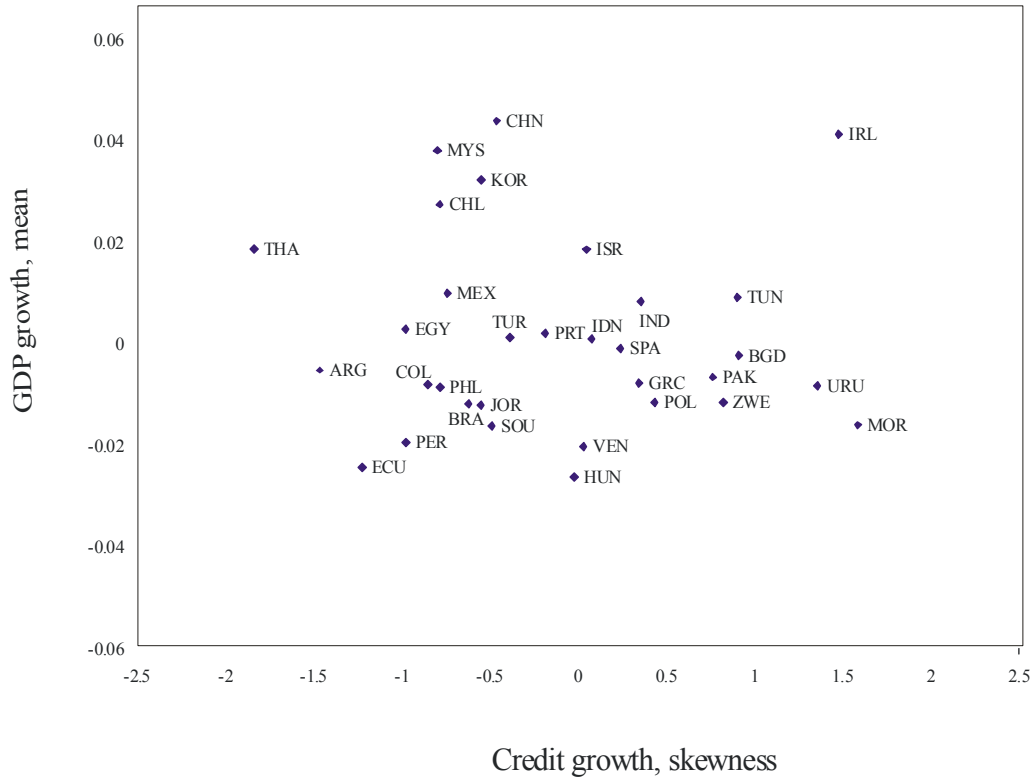
Note: The graphs plot the moments of real credit growth during the period 1988-1999 against the residuals of a growth regression that controls for initial per capita GDP and population growth.

The Typical Boom-Bust Cycle

To explain the negative growth differential and the recent slowdown in export growth, we compare Mexico's boom-bust cycle with the average cycle across the set of thirty-five MICs with functioning financial markets.[7] The deviations of Mexico from this international norm will shed light on the possible sources of the less-than-stellar growth performance of Mexico.

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[6] From 1980 to 1989 Mexican GDP grew at an average annual rate of 2 percent a year. Growth then averaged 4 percent a year during the five boom years preceding the crisis (1990-94); GDP then fell by 6 percent during the crisis year (1995), and GDP growth averaged 5 percent in the following five years (1996-2000). The last two years have witnessed stagnation, with an average growth rate of zero. Dornbusch and Werner (1994) analyze Mexico's performance prior to 1994.

[7] The sample consists of Argentina, Bangladesh, Belgium, Brazil, Chile, China, Colombia, Ecuador, Egypt, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, the Philippines, Poland, Portugal, South Africa, Spain, Sri Lanka, Thailand, Tunisia, Turkey, Uruguay, Venezuela, and Zimbabwe.

We represent the typical boom-bust cycle by means of an event study. Figure 3 shows the average behavior, across our set of countries, of several macroeconomic variables around twin currency and banking crises during the period 1980-99. Year 0 refers to the year during which twin currency and banking crises take place.[8] In each panel the heavy line represents the average deviation relative to tranquil times, the dotted lines represent the 95 percent confidence interval, and the thin lines correspond to Mexico.[9]

In the typical MIC, before a crisis there is a real appreciation and a lending boom, during which credit grows unusually fast. During the crisis there is a drastic real depreciation, which coincides with a meltdown of the banking system, widespread insolvencies, and fire sales. In the aftermath of the crisis there is typically a short-lived recession and a fall in credit that is both sharper and longer lasting than the fall in GDP. Thus the credit-to-GDP ratio declines. The milder fall in aggregate GDP than in credit masks the asymmetric sectoral response we emphasize in this paper: N-sector output falls more than T-sector output in the wake of a crisis and recuperates more sluggishly thereafter. This asymmetry is also present during the boom that precedes the crisis, as the N-sector grows faster than the T-sector and a real appreciation occurs.[10] Finally, the figure also shows that investment fluctuations are quite pronounced along the boom-bust cycle, whereas those of consumption are not.

These patterns can be accounted for by the model of Schneider and Tornell (2004). In that model, financial constraints and credit risk (in the form of currency mismatches) coexist in equilibrium, and their interaction generates real exchange rate variability. In a risky equilibrium, currency mismatch is optimal and borrowing constraints bind, so that there can be a steep, self-fulfilling real depreciation that generates widespread bankruptcies of N-sector firms and the banks that lend to them. Because N-sector net worth falls drastically and recuperates only gradually, there is a collapse in credit and N-sector investment, which take a long time to recuperate. Since T-sector firms do not face financial constraints, and the real depreciation allows them to buy inputs at

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[8] We say that there is a twin crisis at year 0 if both a currency and a banking crisis occur during that year, or if one occurs at year 0 and the other at year 1.

[9] The graphs are the visual representations of the point estimates and standard errors from regressions in which the variable depicted in the graph is the dependent variable, regressed on time dummies preceding and following a crisis. We estimate the following pooled regression:

$$y_{it} = a_i + \sum \beta_j \, \text{Dummy}_{\tau+j} + \varepsilon_{it},$$

where y is the variable of interest in the graph; $i = 1, \ldots, 35$ denotes the country; $t = 1980, \ldots, 1999$; and $\text{Dummy}_{\tau+j}$ equals 1 at time $\tau + j$ and zero otherwise, where τ is a crisis year. The panel data estimations account for differences in the mean by allowing for fixed effects, as well as for differences in the variance by using a generalized least squares estimator, using the estimated cross-sectional residual variances.

[10] This asymmetric sectoral response parallels the regressions using the N-to-T output ratio in the previous subsection.

fire-sale prices, this leads to rapid growth of T-sector output and GDP in the wake of the crisis. As a result, the N-to-T output ratio falls drastically and recuperates sluggishly.

However, rapid GDP growth cannot be sustained over a long period if it is driven only by T-sector growth, because T-sector production needs inputs from the N-sector. If the credit crunch continues for a long period, depressed N-sector investment eventually leads to bottlenecks: the T-sector no longer enjoys an abundant and cheap supply of N-sector inputs, and its growth starts falling. This is the *bottleneck effect*, which implies that sustainable growth cannot be supported only by export growth. This effect is key to understanding Mexico's recent performance, as we shall discuss below.

The Mexican Boom-Bust Cycle

As figure 3 shows, GDP growth in Mexico behaved quite typically both before and during the crisis. Mexico experienced a recession that was more severe but also shorter lived than in the typical MIC during a crisis. The decline in GDP of about 8 percent in comparison with the mean during tranquil times lies within the 95 percent confidence interval of the average MIC. During the immediate recovery phase, GDP growth in Mexico has been faster than in the typical MIC. In the second and third year after the crisis, Mexico grew 3 to 4 percent above its rate of growth in tranquil times, which is outside the 95 percent confidence bands.

The behavior of GDP growth masks the sharp sectoral asymmetry that we emphasize throughout this paper. As figure 3 also shows, in the three years preceding the crisis, the N-to-T output ratio increased by a cumulative 3 percent, despite a negative long-term trend toward T-sector production. This change lies within the 95 percent confidence interval of the average MIC. In contrast, in the three years after the crisis, the N-to-T output ratio declined cumulatively by about seven times as much as in the average MIC–a significantly larger drop than is typical. Furthermore, even by the third year after the crisis, this ratio showed no signs of reversion toward its mean in tranquil times. This persistent decline of the N-to-T output ratio can also be seen in figure 4, which depicts N-sector and T-sector production in Mexico from 1988 to 2001.

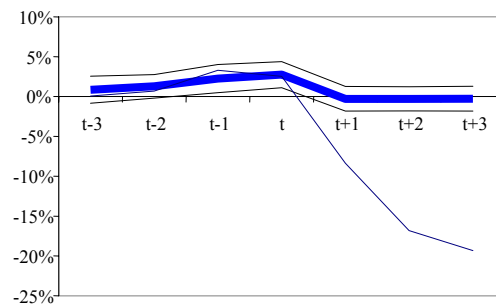**Figure 3: The Boom-Bust Cycle in Mexico and the Average Middle Income Country**
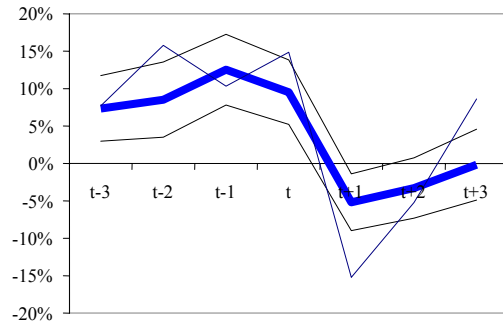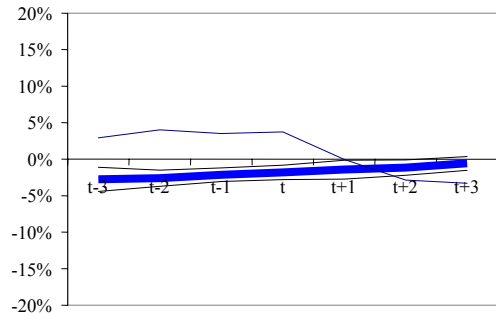
1/real exchange rate
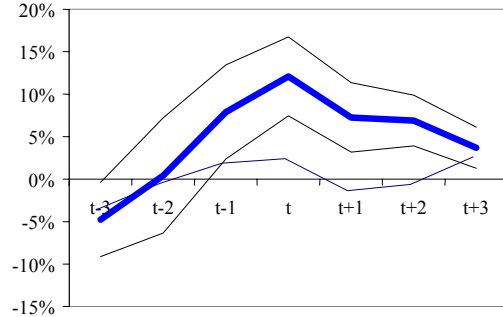
Credit-to-GDP ratio
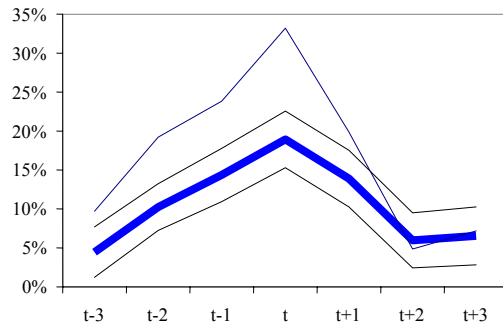
N-to-T output ratio

Investment-to-GDP ratio

Consumption-to-GDP ratio

GDP growth
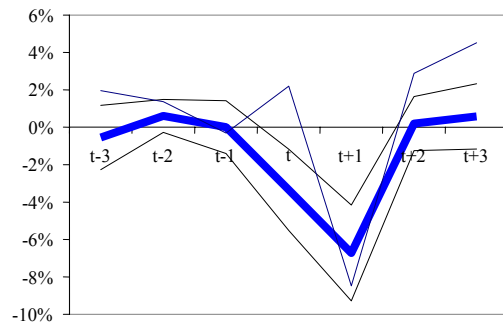
Export growth
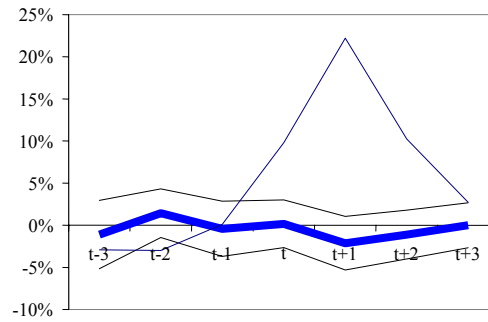
The abnormal behavior of the N-to-T output ratio in Mexico is closely linked to that of bank credit. Although the level of credit to GDP (relative to tranquil times) was already higher, three years before the crisis, than the international norm, the change in the credit-to-GDP ratio in Mexico was typical during the boom but was an outlier in the postcrisis period. As figure 3 reveals, Mexico experienced a change in the credit-to-GDP ratio of about 23 percentage points in the three years preceding the crisis. This change is above the MIC average, although it lies within the 95 percent confidence interval for the typical MIC. A distinctive fact about Mexico, however, is that in the wake of the Tequila crisis, Mexico's credit crunch was both more severe and more protracted than in the typical MIC. In the three years after the crisis, the credit-to-GDP ratio in Mexico fell by 30 percent, significantly more than in the average MIC.

Figure 4: Non-tradables and Tradables Production

a)   Levels
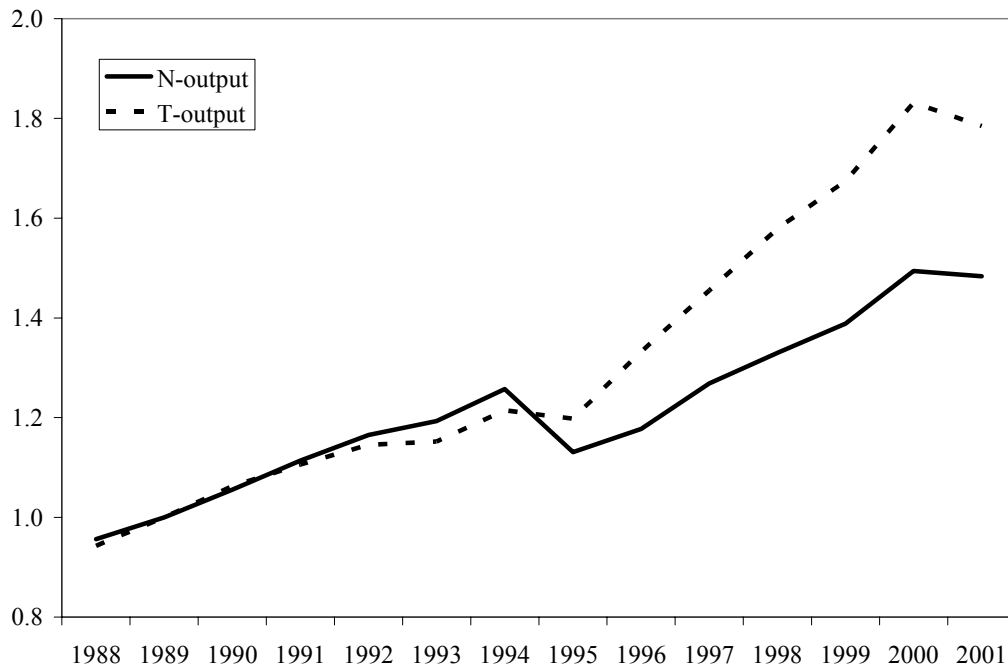
b)   Ratio
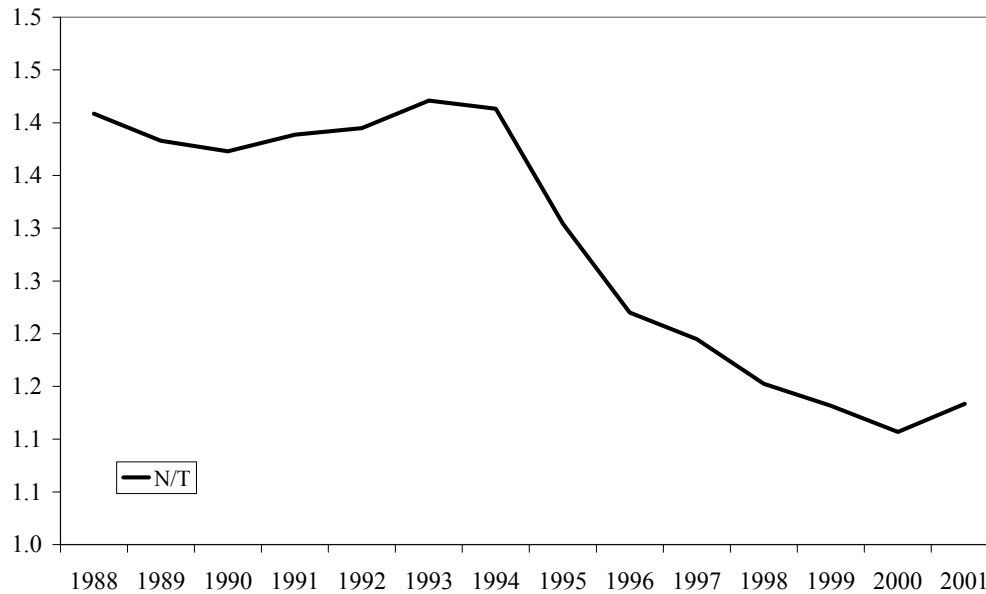
Note: The T-sector includes Manufacturing, Mining and Agriculture. The N-sector includes Construction, Commerce, Restaurants and Hotels, Transporting, Storage and Communications and Communal Services.
Source: INEGI

Figure 5 looks in more detail at the behavior of credit in Mexico. As we can see, real credit fell an astounding 58 percent between 1994 and 2002 and the credit-to-GDP ratio declined

from more than 50 to about 15%. Figure 6 shows that this credit crunch hit the N-sector particularly hard and generated bottlenecks that have blocked T-sector growth. Real credit to the N-sector fell 72 percent between 1994 and 2002. In contrast, the T-sector was not hard hit by the credit crunch. As we will show below, using micro-level data from the economic census and from the set of firms listed on the stock market, in the wake of the crisis T-sector firms in Mexico had significantly greater access to international financial markets than did N-sector firms.

Figure 5: Credit in Mexico

a) Credit/GDP
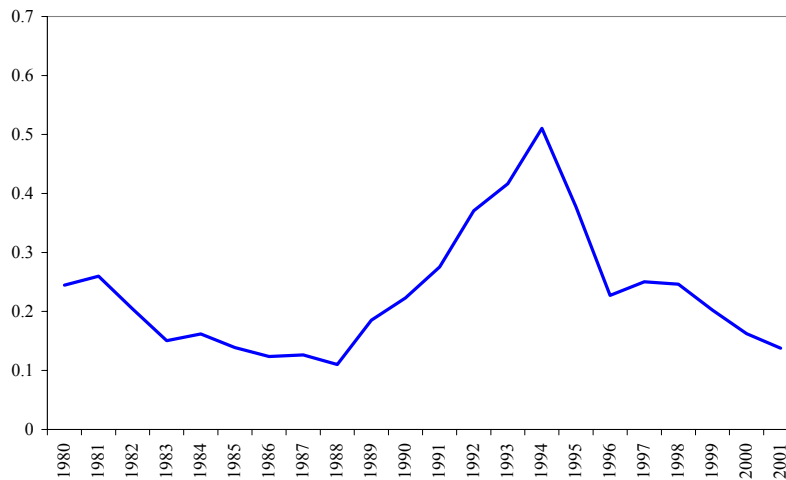
b) Real Credit
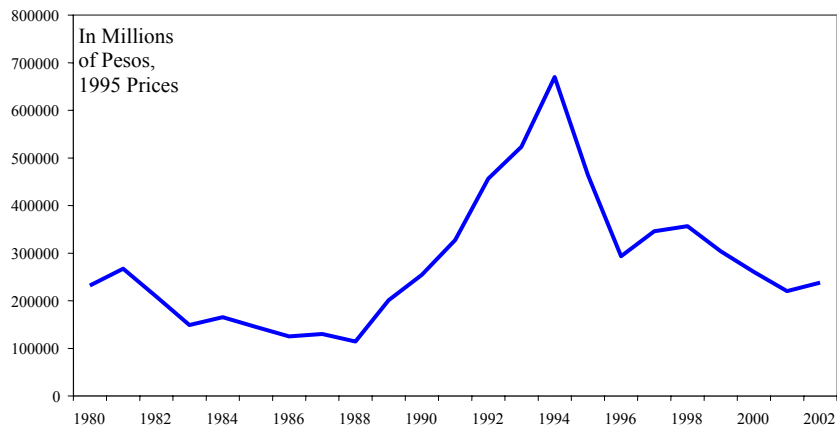
Source: Banco de Mexico.

Rapid T-sector growth thus explains why GDP, which is the sum of N-sector and T-sector output, did not fall as much as either N-sector output or credit, and why robust GDP growth resumed one year after the crisis. This remarkably fast T-sector growth is associated with the

extraordinary export growth that can be observed in figure 3. Whereas, remarkably, export growth in the typical MIC does not display any significant deviation from tranquil times in the wake of crisis, Mexico's exports increased more than 20 percent above its mean in tranquil times in 1995. This increase is certainly an outlier.

Figure 6: Credit to the N sector

In Millions of Pesos, 1995 Prices

Note: Starting 1995, the graph shows performing loans to the N-Sector
Source: Bank of Mexico and IMF, IFS.

The investment-to-GDP ratio behaved typically during the boom phase. During the crisis, however, it fell significantly more than in the typical MIC, with a -15 percent deviation from tranquil times recorded in the year after the crisis. Its recovery was also more pronounced, as the ratio climbed to 8 percent above its level in tranqu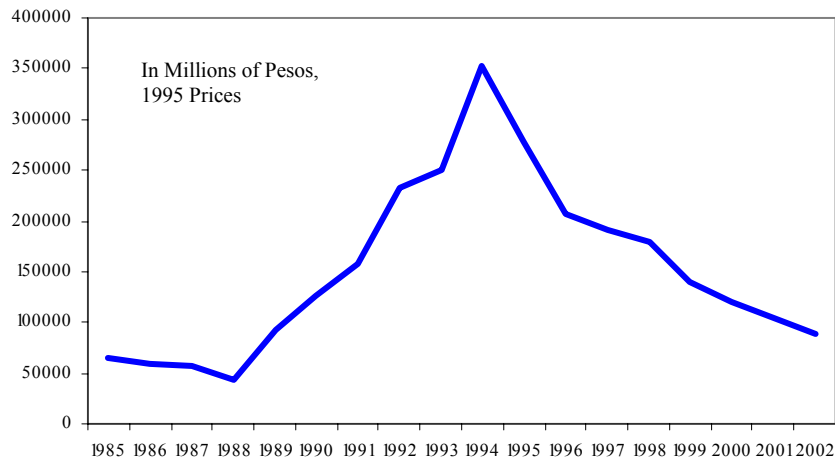il times in the third year after the crisis. Finally, consumption displays a similar cyclical pattern, although with a much smaller amplitude than that of investment.

In sum, our findings indicate that the lack of spectacular growth in Mexico during the 1990s cannot be blamed on liberalization, the boom, or the crisis.[11] In fact, the effects of liberalization and of NAFTA can be observed in the extraordinary growth of exports, which drove the fast and robust recovery of GDP growth in the years following the crisis. However, the dynamism of exports has faded: since the first quarter of 2001, exports have fallen in absolute

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[11] This view is consistent with Bergoening and others (2002), who find that most of the difference in growth between Mexico and Chile over the period 1980-2000 is due to differences in total factor productivity (TFP), not differences in capital and labor inputs. They conclude that the crucial factor that drives the difference in TFP is differences in banking systems and bankruptcy procedures.

terms and GDP has stagnated. What role have developments in the U.S. economy played in Mexico's export performance? And what role have internal factors played?

4. Can U.S. Fluctuations Explain Mexican Export Growth?

Because a large share of Mexican exports goes to the United States, a natural question is to what extent developments in the U.S. economy explain the behavior of exports. In particular, we investigate to what extent developments in U.S. imports or U.S. manufacturing can account for the extraordinary growth in Mexico's exports in 1995-2000 and the stagnation in 2001-03.[12] We will show that developments in the United States can explain part but not all of the fluctuations in export growth. We then discuss how the predictions of the model can help explain the residual export growth. We explain the boom in exports with reference to the fire sales that occurred during the crisis, and the recent stagnation with reference to the lack of structural reform, the protracted credit crunch and the N-sector bottlenecks they generated.

Before presenting the results, we wish to emphasize that the strict macroeconomic policies that Mexico put in place in the wake of the crisis were necessary for the extraordinary growth in exports. These policies kept the fiscal balance under control and ensured that the peso did not become overvalued in real terms.

First, we investigate the link between U.S. imports and Mexican exports at a quarterly frequency over the period 1988:1-2003:2.[13] We estimate a bivariate VAR that allows for two lags. Since both series have a unit root and their growth rates are stationary, we perform our analysis using growth rates.[14] The top left panel of figure 7, which traces the response of Mexican exports to a 1-standard-deviation shock to U.S. imports, shows that the response is equivalent to 3.5 percent of a standard deviation in the first quarter, and to 3, 2.6, and 2.2 percent in the following quarters. All of these responses are significant at the 5 percent level.

Although these impulse responses provide information on the effect of a standardized shock, they do not indicate the extent to which a given shock contributes to the total forecast error variance of Mexico's exports. To assess the relative importance of shocks to U.S. imports, we decompose the forecast error variance of Mexican exports into the part that is attributable to shocks emanating from the United States and the part attributable to shocks emanating from

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[12] We choose U.S. imports and manufacturing instead of a broader aggregate, such as U.S. GDP, because our objective is to determine an upper bound on the effect of trends in the U.S. economy on Mexican exports.
[13] An earlier starting date is not appropriate, because the two countries did not trade much before 1987.
[14] We cannot reject the null hypothesis of no cointegration according to finite-sample critical values of Cheung and Lai (1993).

Mexico. The top right panel of figure 11 shows that U.S. shocks account for approximately 40 percent of the forecast error variance, and shocks from Mexico the remaining 60 percent. In other words, unexpected changes in Mexico's export growth are mainly generated by shocks to its own economy. Although statistically significant, U.S. shocks play only a secondary role.

Figure 7: The Effects of the US Economy on Mexican Exports (VARs)
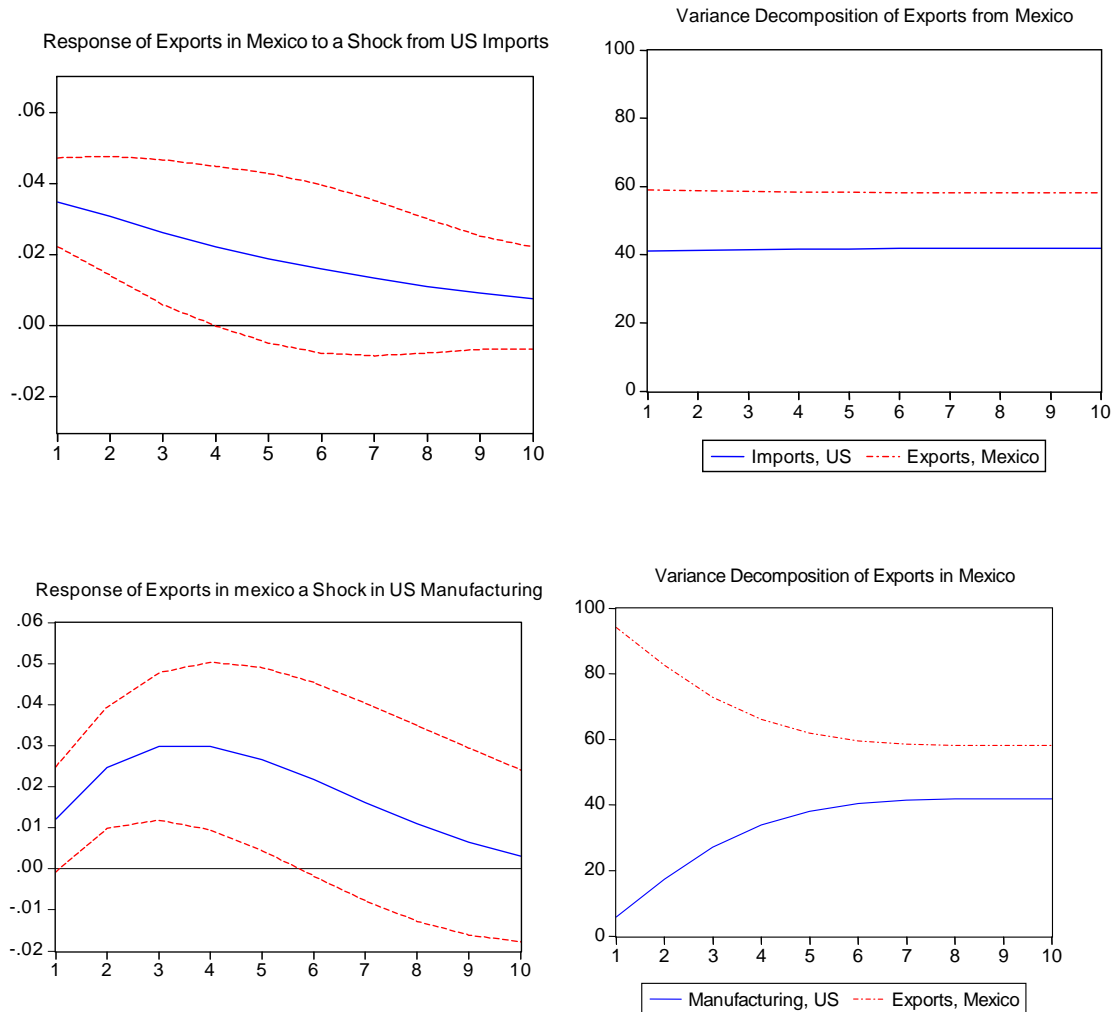
Note: In the two figures on the left, the heavy lines trace the response of Mexican exports to a one-standard deviation shock in US imports and US manufacturing, respectively. Calculations are based on two-variable VARs, including Mexican exports and either US imports or US manufacturing. Each VAR is estimated from quarterly data in growth rates over the sample period from 1987:1 to 1999:4, allowing for 2 lags in the estimation. The two figures on the left, trace the share of the forecast error variance that is attributable to the respective variables.

A similar pattern emerges when we estimate the VAR using U.S. manufacturing instead of imports. The long-run effects are of similar magnitude, with shocks to U.S. manufacturing accounting for around 40 percent of the unexpected forecast error variance. However, compared

with a shock to U.S. imports, it takes longer for a shock to U.S. manufacturing to fully translate into a reaction by Mexican exports.

Figure 8: Unexplained Export Growth (I)

(Average Residuals from the VARs)
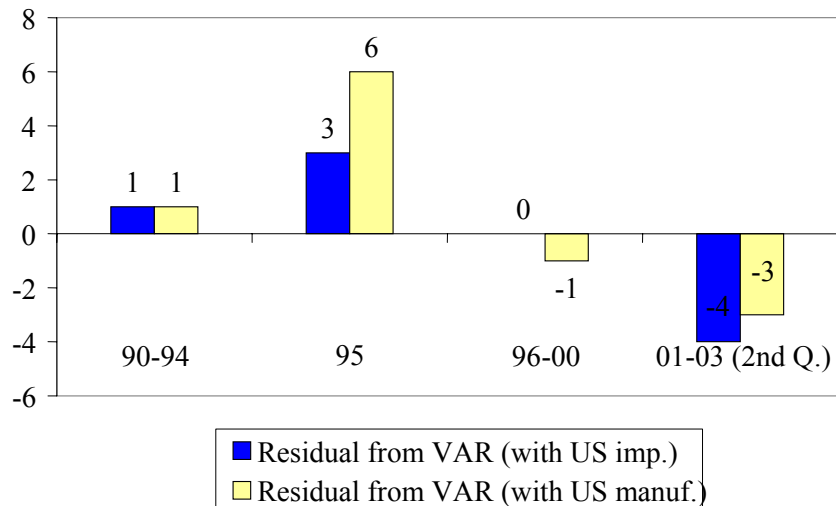
To illustrate what periods account for the low relative importance of U.S. shocks, we plot in figure 8 the average residuals from the VARs. The unusually high residual growth of exports in the crisis episode and the negative outliers of recent years indicate that the performance of the U.S. economy does not fully account for the skyrocketing 32 percent increase in Mexican exports during 1995, or for the 1 percent fall in exports in the last two years.

A simpler way to make the same point is to compare the growth rate of Mexican exports with those of U.S. imports and U.S. manufacturing. Table 1 shows the average annual growth rates and figure 9 the de-meaned growth differentials. For the comparison with U.S. imports, the largest deviations occurred during the crisis (1995), with an abnormally large growth residual of 14 percent (bottom panel), and from 2001:1 to 2003:2, with a residual of -11 percent. In fact, during some quarters the residuals are more than 2 standard deviations away from the expected value of zero. In contrast, the average residuals were relatively small in 1990-94 and 1996-2000 (1 percent and zero, respectively). A similar pattern is observed in the export growth residuals obtained in the comparison with U.S. manufacturing.[15]

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[15] These de-meaned growth differentials have the same interpretation as the residuals of an ordinary least squares regression of Mexican export growth on U.S. import growth. The slope coefficient in that regression is 0.83 and is significant at the 5 percent

16

Next we explain how the fire sales and bottlenecks generated by the credit crunch and lack of structural reform help account for these large deviations. We then provide empirical evidence in support of these effects.

Table 1. Growth in Mexican Exports and in U.S. Manufacturing and Imports, 1990-2003[a]

Percent a year

Indicator	1990-94	1995	1996-2000	2001-03[b]
Export growth in Mexico	15	32	17	-1
Manufacturing growth in the United States	2	5	5	-2
Import growth in the United States	7	11	10	2

Source: Authors' calculations using data from INEGI and International Monetary Fund, International Financial Statistics.
a. Averages of quarter-to-quarter growth rates.
b. Through 2003:2.

Figure 9: Unexplained Export Growth (II)

(Demeaned Growth Differentials)

(a) Mexican Exports vs. US Imports

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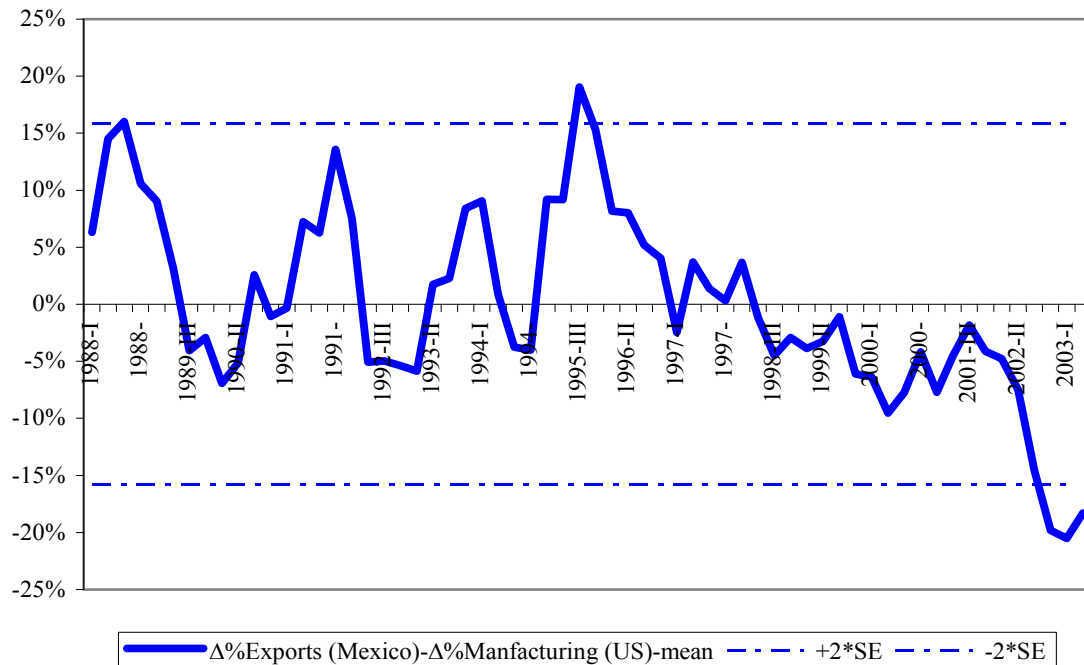
level, and the R^2 is 0.3. This shows that 30 percent of the total variance in Mexican exports is explained by U.S. imports. Recall that the VAR showed that 40 percent of the unexpected forecast error variance is explained by developments in the United States.

17

(b) Mexican Exports vs. US Manufacturing

Legend: —— Δ%Exports (Mexico)-Δ%Manfacturing (US)-mean   — · — · +2*SE   — · — · -2*SE
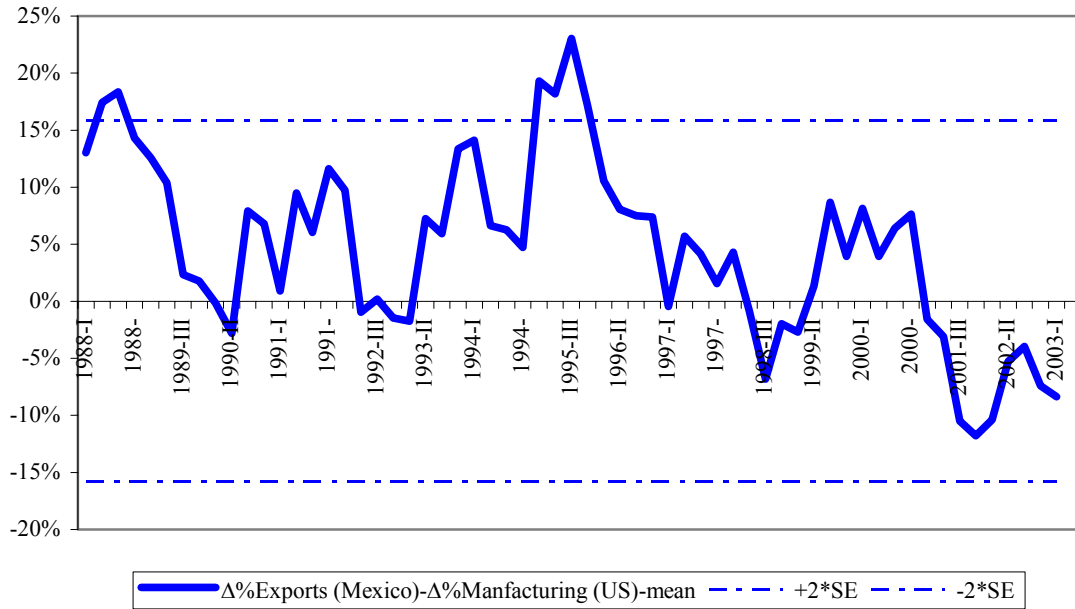
(c) Average Demeaned Differences

| 90-94 | 95 | 96-00 | 01-03 (2nd Q.) |

Legend:
■ Demeaned growth diff. (with US imports)
□ Demeaned growth diff. (with US manuf.)
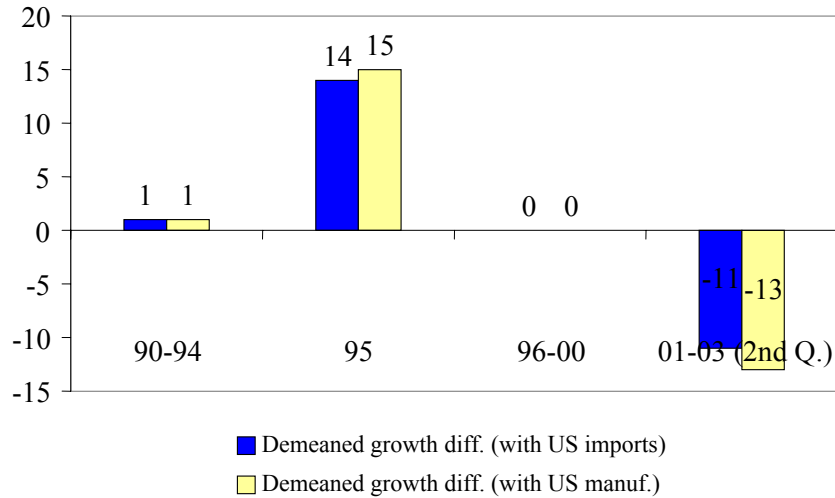
5. Fire Sales and the Bottleneck Effect

In our model economy the real depreciation that accompanies a crisis severely affects the cash flow of N-sector firms with currency mismatches in their borrowing and lending. As a result, N-sector credit and investment fall. In contrast, access to international financial markets combined with the real depreciation allows T-sector firms to buy inputs at fire-sale prices. This leads to rapid growth of exports, T-sector output, and GDP in the wake of the crisis.

18

However, as we discuss in the section on the model, rapid GDP growth cannot be sustained over a long period if it is driven only by T-sector growth, because T-sector production needs inputs from the N-sector. The real depreciation and the credit crunch depress N-sector investment, which eventually leads to bottlenecks: exporters then no longer have an abundant and cheap supply of N-sector inputs. Thus, ceteris paribus, at some point export growth starts falling as competitiveness erodes.

To test whether these predictions of the model apply to Mexico, we look at the annual manufacturing survey of Mexico's National Institute of Statistics, Geography, and Informatics (INEGI), which includes medium-size and large firms in the manufacturing sector, covers more than 80 percent of manufacturing value added, and includes 206 five-digit subsectors. First we assess the importance of N-sector inputs in T-sector production, and then we contrast the behavior over time of exports that are highly dependent on N-sector inputs and of exports that are less dependent on the N-sector.

Table 2. Use of Nontradable Inputs in Selected Mexican Tradable Goods Industries, 1994-99[a]

Percent of total expenses

Tradable industry	Input industry						
	Total	Outsourcing	Repairs and maintenance	Freight and transport	Electricity	Rentals and leases	Other
Textiles and apparel	23.0	16.5	2.4	1.7	0.8	1.2	0.5
Paper and printing	24.8	11.5	3.5	1.1	3.1	3.3	2.3
Basic inorganic chemical products, perfumes and cosmetics, and plastic and rubber	27.7	1.1	6.8	1.0	8.2	8.2	2.4
Nonmetallic mineral products	23.4	0.3	9.5	2.0	5.6	4.9	1.0
Discs and magnetophonic tapes	22.6	4.8	8.8	1.0	1.2	4.0	2.7
Total manufacturing	12.4	2.1	3.4	2.2	1.7	1.3	1.7

Source: Annual Industrial Survey, National Institute of Statistics, Geography, and Informatics.
a. Data are for expenditures on those N-sector inputs that are part of total variable cost; they are averages over the period; investment and expenditure on fixed assets are excluded.

According to this survey, N-sector inputs represented on average 12.4 percent of total variable costs in the manufacturing sector over the period 1994-99. This share ranges from 5 percent in some food manufacturing subsectors to 28 percent in some chemical subsectors. Table 2 shows the shares of the main N-sector inputs used in several manufacturing subsectors that use N-

sector inputs intensively. For example, the nonmetallic minerals products subsector devotes 9.5 percent of its expenditure to repairs and maintenance, 4.9 percent to rents and leases, 2 percent to freight and transport, 5.6 percent to electricity, and so on.

Not only are N-sector inputs a significant fraction of T-sector production, but those subsectors that are intensive in N-sector inputs display precisely the pattern that the model predicts. Figure 10 shows the ratio of manufacturing exports of the subsectors that use N-sector inputs most intensively to those that use these inputs least intensively (we call this the X-ratio). The figure shows three things. First, during the lending boom period, when the N-sector was booming and investing heavily, N-sector goods were expensive and the X-ratio fell. Second, after the crisis the situation reversed: in 1996-98 N-sector inputs could be bought at fire-sale prices, and the X-ratio increased. Third, the recent lack of N-sector investment has generated a dramatic fall in the X-ratio.

In sum, the asymmetric behavior of different export subsectors supports the view that fire sales contributed to the extraordinary export growth in the wake of the crisis, and that the bottleneck effect has contributed to the export slowdown over the last two years. We do not rule out the possibility that other external factors, such as competing exports from China, have also contributed to the export slowdown. However, it is unlikely that such external factors could generate the asymmetric export response we have documented.

Figure 10: The Bottleneck effect

(Ratio of highly N-intensive to low N-intensive exporters)
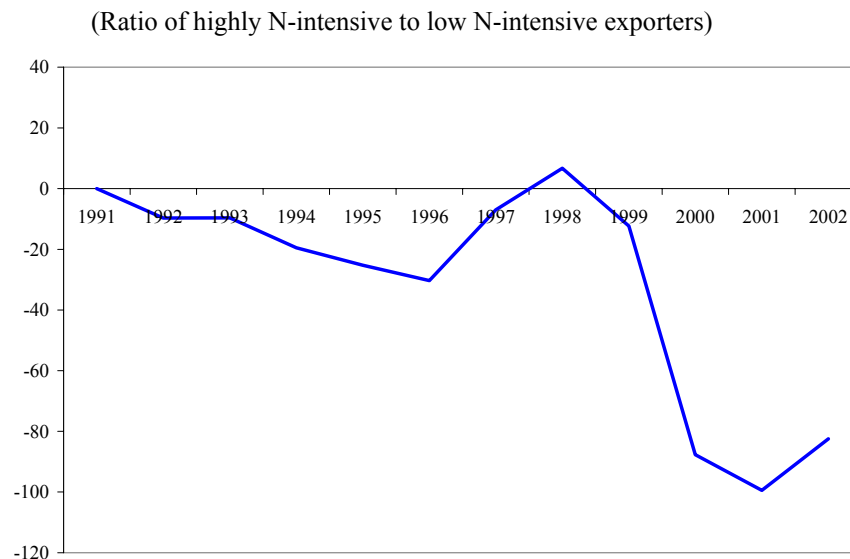
Note: The figure plots the ratio of exports of subsectors with the highest 20% and the lowest 20% of N-costs in total costs.
Source: INEGI

20

6. The Lending Boom and the Credit Crunch

The early 1990s saw a dramatic increase in the resources available to domestic banks. In addition to the increase in capital inflows, the consolidated public sector balance swung from a deficit of 8 percent of GDP in 1987 to a surplus of 1 percent in 1993. Thus credit from the banking system to the public sector fell from 14 percent of GDP to 2 percent.

Although bank liabilities were often denominated in foreign currency, the income streams that serviced those liabilities were ultimately denominated in domestic currency. Sometimes the banks lent in pesos, and when they lent in dollars, a large share of bank credit went to households and N-sector firms, whose products were valued in pesos. In both cases the banks were incurring the risk of insolvency through currency mismatch.[16] As is well known, currency mismatch was also present on the government's books through the famous dollar-denominated *tesobonos*.

Agents both in the government and in the private sector understood that they were taking on credit risk. However, as the model explains, taking on such risk was individually optimal because of the presence of systemic bailout guarantees and the rosy expectations generated by the prospect of NAFTA. These expectations may have been well founded, but unfortunately in 1994 several negative shocks to expectations befell the country. The first day of the year brought the news of the revolt in the southern state of Chiapas. Then March witnessed the assassination of the leading presidential candidate, Luis Donaldo Colosio. Although presidential elections took place in July without civil unrest, and Ernesto Zedillo won with an ample majority, a full-blown crisis erupted at the end of 1994, a few weeks after he took office.

March 1994 marks the date of the crisis because it is the "tipping point" that marks a reversal of capital inflows. Instead of letting the peso depreciate, the monetary authorities responded by letting reserves fall.[17] Central bank reserves net of *tesobonos* fell from $27 billion in February to $8 billion in April. They stood at negative $14 billion at the end of 1994.

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[16] The share of bank credit allocated to the N-sector reached 63 percent in 1994. Martínez and Werner (2002b) and Tornell and Westermann (2003) document the existence of currency mismatch.

[17] See, for instance, Lustig (2001) and Sachs, Tornell, and Velasco (1996b).

What Accounts for Mexico's Credit Crunch?

As mentioned earlier, Mexico's credit crunch is an outlier relative to that experienced by the typical postcrisis MIC. Not only did credit suffer a sharp fall during the crisis, but after a small rebound it continued falling until 2001. Credit growth resumed in 2002, but it again turned negative in the first quarter of 2003. This path of credit is all the more puzzling when one considers that the share of bank assets owned by foreigners increased from 6.4 percent in 1994 to 88 percent in 2001 (figure 11), and the foreign banks are arguably well capitalized.

Figure 11: Foreign Participation in the Mexican Banking System

(Share in Total Assets)
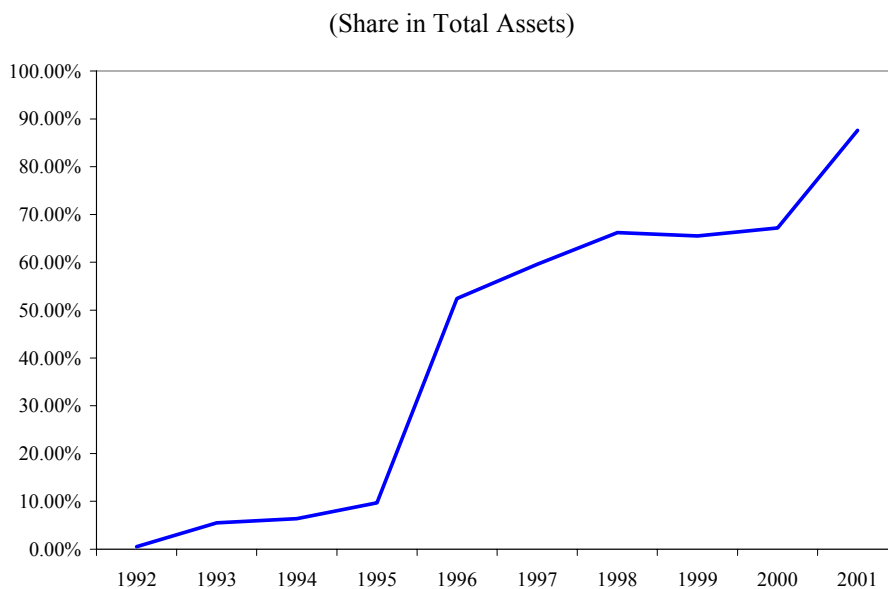
Source: Bank Failure Management, prepared by SHCP for the APEC, 2001.

Two important factors have contributed to the deepening credit crunch: the deterioration in contract enforceability and the policy response to the nonperforming loans (NPLs) problem. We consider each in turn.

In the wake of the crisis, many borrowers stopped servicing their debts, and this noncompliance went unpunished by the authorities. As a result, a *cultura de no pago* (culture of nonpayment) developed: borrowers that could have paid chose not to pay. This deterioration in law enforcement has manifested itself in other ways, such as an increase in tax evasion and in crime generally. Figure 12 shows that whereas tax collection improved and crime fell up to 1994, both have deteriorated since 1995. In terms of our model, this pattern implies a decline in the coefficient

of enforceability, which induces a fall in the credit multiplier and in the investment of credit-constrained firms.

Figure 12: Law Enforcement
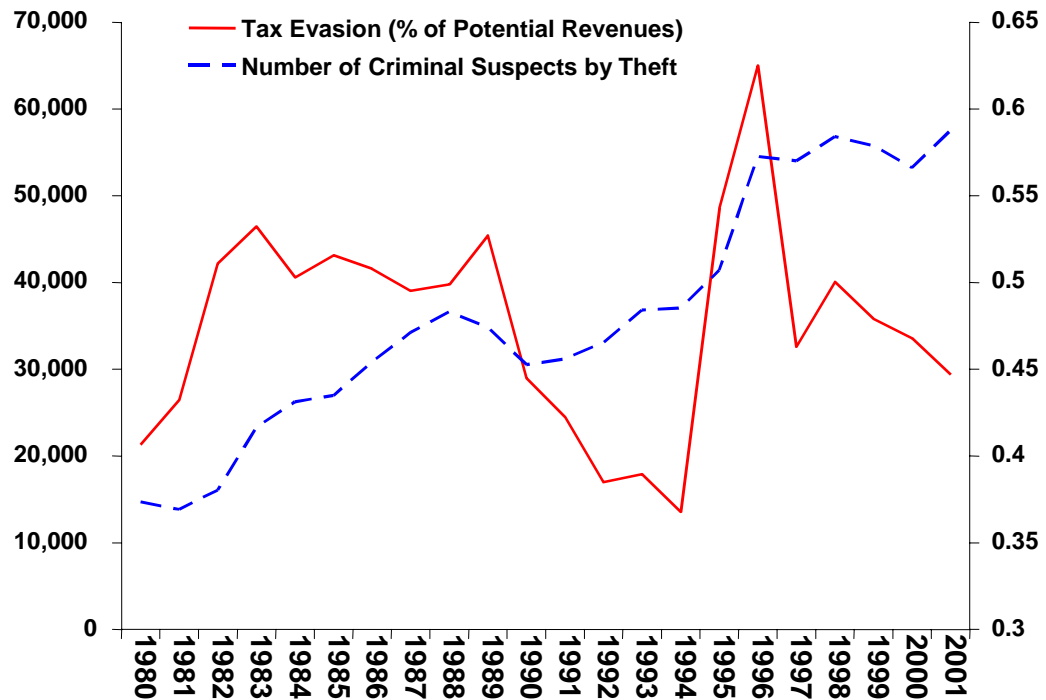
Notes: Number of criminal suspects by theft comes from SIMBAD, INEGI.

Tax evasion is constructed using value added revenues. Potential revenue is equal to the sectoral GDP times the share going to domestic consumption and its respective tax rate. We also applied different tax rates at border cities.

Because of the currency mismatch, all banks were de facto bankrupt in the wake of the crisis. However, regulatory discipline was not immediately established: only a small share of NPLs were officially recognized. The banks' bailout took the form of exchanging the officially recognized NPLs for ten-year government bonds that paid interest but could not be traded.[18] This piecemeal rescue program, which was meant to be temporary, soon became an open-ended bailout mechanism.[19] Despite rapid GDP growth, the share of NPLs in total loans kept rising, from 15 percent in 1995 to 21 percent in 1998, before gradually declining. During this period banks were

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[18] For an analysis of the banking problem see Krueger and Tornell (1999).

not making new loans but were making profits because they were receiving interest income on the government bonds they had received in exchange for their NPLs.

The increased cost of the rescue package is associated with the fact that banks were saddled with nonrecognized de facto NPLs (that is, evergreen accounts) and failed to increase their capital in order to make new loans (figure 13).[20] The quality of the portfolio deteriorated over time as moral hazard problems developed and the accrued interest of the evergreen accounts had to be capitalized.

Figure 13: Share of NPLs in Total Loans
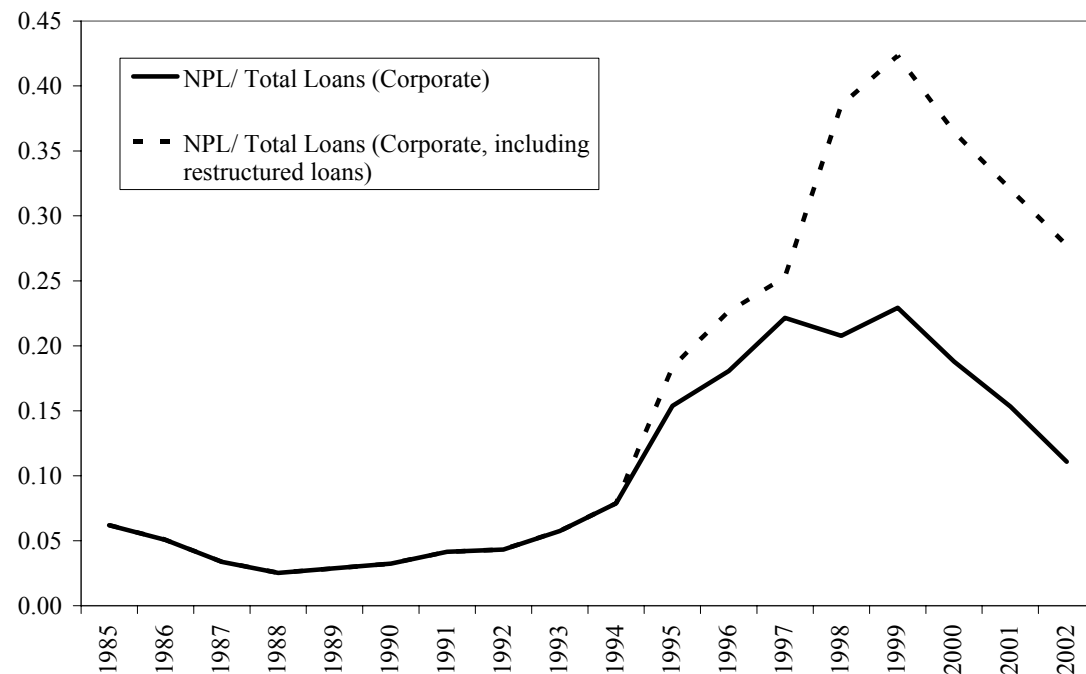
Note: * Restructured loans include the programs of UDIS, IPAB-FOBAPROA, restructured portfolio affecting the flow participation scheme and Special CETES The IPAB-FOBAPROA non-performing loans were obtained by applying the ratio of non-performing loans to the total IPAB-FOBAPROA portfolio to IPAB-FOBAPROA's Titles

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[19] Notice that this program is different from the systemic guarantees we consider in the model below. Under the latter, bailouts are not granted on an idiosyncratic basis, but only if a systemic meltdown takes place.

[20] *Evergreen accounts* are those in which the bank lends the debtor the principal plus interest that the debtor was supposed to have repaid, and these transfers are counted as "loans."

Over time several measures have been taken to solve the banking problem. First, in 2000 the bankruptcy and guarantee laws were reformed so as to limit ex post judicial discretion in the disposition of loan collateral and in the resolution of insolvent firms. However, given certain implementation problems and the limited power under the Mexican constitution of creditors to exercise their collateral rights, it is not yet clear whether the reforms will lead in practice to better contract enforceability. Second, key loopholes in bank accounting have been eliminated. Third, part of the debt overhang problem has been resolved (mainly the smaller debts) through the Punto Final program. However, unresolved problems remain in the areas of judicial reform and the resolution of large debts.

7. Sectoral Asymmetries: What Do Micro-Level Data Say?

The existence of sectoral asymmetries in financing opportunities is a key element in our theoretical argument, as well as in our account of the Mexican experience. Here we will show that, in Mexico, T-sector firms are on average larger than N-sector firms and have better access to international financial markets. We will also show that T-sector firms were not as hard hit by the credit crunch as N-sector firms.

To establish these facts we analyze two Mexican microeconomic data sets: the first consists of data on firms listed on the Mexican stock market (the Bolsa Mexicana de Valores, or BMV), and the second is the economic census. The BMV set contains only those firms that issue either bonds or equity (310 firms), whereas the census includes all firms in the economy (2,788,222 firms).

Table 3. Mexican Firms in Tradable and Nontradable Sectors by Firm Size, 1999[a]

| | Economic Census | | | | BMV-listed firms (number) | |
| | Number of firms | | Share of sector sales (percent) | | | |
Firm size	Nontradable	Tradable	Nontradable	Tradable	Nontradable	Tradable
Small[b]	2,371,468	329,242	56	10	0	0
Medium[c]	65,630	12,054	32	26	0	0
Large[d]	4,239	5,589	12	64	110	200

Sources: Economic Census of Mexico and Bolsa Mexicana de Valores.
a. Tradable sectors include primary goods and manufacturing. Nontradable sectors include construction, trade, telecommunications, transportation, hotels and restaurants, real estate, and other services. Financial services, electricity, gas, and water and not included in nontradables. For those firms entering between 2000 and 2002 or exiting between 1991 and 1999, data are for the year closest to 1999 for which data on total assets were available. The Bolsa Mexicana de Valores is the principal Mexican stock exchange.
b. Fixed assets less than $148,000 in 1994 dollars.
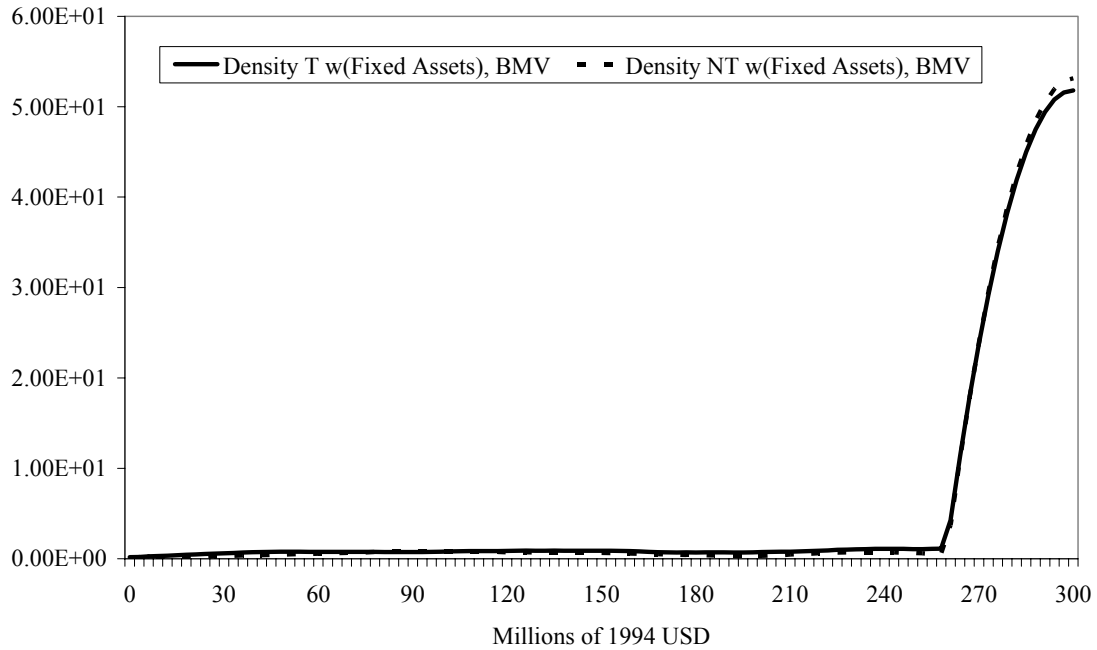c. Fixed assets less than $2,370,000 in 1994 dollars.
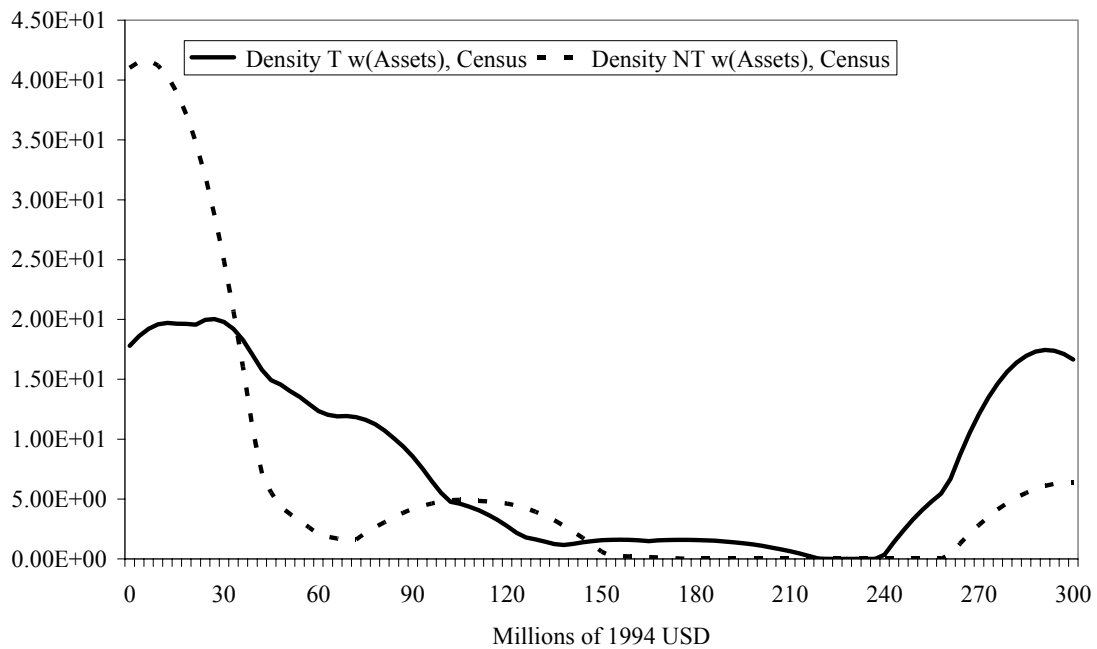d. Fixed assets greater than $2,370,000 in 1994 dollars.

Figure 14: The stock market is not representative of the economy

(Kernel Densities, Epanechnikov, h=90,000)

a) BMV

b) Census

As table 3 shows, the BMV set contains only large firms, whereas the vast majority of firms in the economy are small and medium-size. Moreover, although the BMV set contains both N- and T-sector firms, it is more representative of the T-sector than of the N-sector. The bias is greater for the N-sector than for the T-sector both in terms of the distribution of fixed assets and in terms of sales. For instance, as table 3 also shows, the sales of large N-sector firms constitute only 12 percent of economy-wide N-sector sales, according to the census of 1999, whereas the corresponding share for large T-sector firms is 64 percent (excluding financial firms in both cases). Figure 14 further shows that, in terms of the distribution of fixed assets, the bias is greater for the N-sector than for the T-sector.

Because the BMV set is biased toward the T-sector, and firms in this set are the only ones that issue bonds and equity internationally, it follows that the T-sector has better access to international financial markets than the N-sector. To the extent that Mexico is typical of other MECs, this fact provides an important warning. In contrast to HICs, in MICs stock market-based data sets (such as Datastream or Worldscope) do not reflect economy-wide behavior but rather are biased toward the T-sector.[21]

To get an idea of the extent to which the crisis affected the access of BMV firms to external financing, consider the ratio of issuance of long-term bonds and equity to the stock of bonds and equity. Table 4 shows that this ratio jumped from an average of 1.6 percent in 1991-94 to 4.7 percent in 1996-97.[22] This jump indicates that BMV firms were not hard hit by the credit crunch.

Another fact that points in the same direction is that there was no significant increase in bankruptcies among BMV firms. As table 5 shows, 6 percent of firms exited the BMV in 1995, and 3 percent in 1996. The average rate of exit over the entire sample period was 3.6 percent, with a standard deviation of 3.5 percent. The increase in bankruptcies in 1995 was therefore not statistically significant.

The availability of external finance for the BMV firms contrasts with the protracted fall in the nationwide credit-to-GDP ratio over 1995-2001. The reason is that the BMV firms shifted away from domestic bank credit in the wake of the crisis. This shift is reflected in the increase in the share of foreign-denominated debt from an average of 35 percent of the total in 1990-94 to 45 percent during the credit crunch period (1996-2000; table 6). Since the BMV set is biased toward

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[21] Tornell and Westermann (2003), using survey data from the World Bank, find a similar sectoral asymmetry across MECs.
[22] New equity issues are typically placed in New York through American depository rights (ADRs).

the T-sector, this contrast in financing opportunities explains why T-sector production did not fall so sharply in the wake of the crisis, and why GDP recovered so fast.

Table 4. Issuance of Long-Term Bonds and Equity by Firms Listed on the Mexican Stock Market, 1991-2001[a]

Percent of outstanding stock of bonds plus equities

Year	Long-term bonds[b]	Equity	Total
1991	0.5	0.4	0.9
1992	1.7	0.2	2.0
1993	2.0	0.2	2.2
1994	1.1	0.1	1.3
1995	0.5	0.0	0.5
1996	3.8	0.0	3.8
1997	5.0	0.7	5.8
1998	3.0	0.0	3.0
1999	1.1	0.3	1.4
2000	3.1	0.0	3.2
2001	2.0	0.0	2.0

Source: Bolsa Mexicana de Valores.
a. Data are averages for all nonfinancial firms listed on the Bolsa Mexicana de Valores for which balance sheet data were available. Numbers may not sum to totals because of rounding.
b. Bonds with maturity of one year or longer.

Table 5. Entry and Exit from the Mexican Stock Market, 1990-2002

Percent of listed firms[a]

Year	Firms entering	Firms exiting[b]
1990	3.6	0.0
1991	16.4	1.7
1992	7.5	12.0
1993	10.2	3.9
1994	11.1	6.7
1995	2.1	6.4
1996	8.1	3.0
1997	11.2	3.5
1998	1.9	5.8
1999	0.7	1.4
2000	2.7	2.1
2001	0.7	3.4
2002	2.2	0.0

Source: Bolsa Mexicana de Valores.
a. Listed firms include some privately held firms that have issued corporate bonds.
b. Firms that left the stock market or that were suspended and remained suspended as of 2003.

Table 6. Foreign Liabilities of Firms Listed on the Mexican Stock Market, 1990-2002

Percent of total liabilities

Year	All firms	Firms in tradable sectors	Firms in nontradable sectors
1990	31.6	34.0	23.8
1991	32.9	36.5	23.7
1992	32.7	36.0	25.0
1993	36.0	39.3	29.3
1994	43.9	50.5	30.6
1995	46.4	53.5	34.2
1996	44.8	52.7	32.6
1997	47.4	54.8	37.2
1998	48.4	56.6	37.8
1999	44.9	52.1	36.4
2000	45.4	51.8	37.0
2001	44.4	52.1	35.6
2002	40.6	46.7	33.1

Source: Bolsa Mexicana de Valores.

Because the economic census does not provide data on the financing of firms, we look instead at the behavior of investment. We group the observations into quintiles and compute the change in the investment rate between 1994 and 1999.[23] Figure 15 shows that, within each size class, the investment rate fell more in the N-sector than in the T-sector firms. Furthermore, the quintile that contains the largest T-sector firms is the only group that experienced an increase in the investment rate. Table 7, which reports the average investment rate across all size classes, shows that in 1994, before the crisis, both sectors had essentially the same investment rate (about 7 percent). In contrast, in 1999 the investment rate of the N-sector was almost 1 percentage point lower than that in the T-sector (3.7 percent versus 4.6 percent).

To see whether the sectoral asymmetry we observe across the quintile of largest firms in figure 18 is associated with an asymmetry in financing opportunities, we run a standard cash-flow regression similar to that by S. Fazzari, R. Hubbard, and B. Petersen.[24] We regress the investment rate on the change in sales, on cash flow, and on cash flow interacted with a dummy that equals 1 for nonexporting firms during the years 1995-97 or 1995-98. Following Fazzari, Hubbard, and Petersen, we interpret a positive effect of cash flow on investment as an indication of

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[23] Because of confidentiality requirements, each observation represents not a single firm but a group of firms. Each group contains firms that are similar in size, are in the same subsector, and are located in the same geographical area. See the appendix for details.
[24] Fazzari, Hubbard, and Petersen (1988).

financing constraints (the change in sales controls for investment opportunities). We estimate the regression including fixed effects and using a generalized least squares estimator. The positive coefficient on the interaction dummy in table 8 implies that, in the wake of the crisis, cash flow was a more important determinant of investment for nonexporters than for exporters. This means that nonexporters were more credit constrained in the wake of the crisis. This effect is significant at the 5 level in the period 1995-97 and at the 10 percent level in 1995-98.

Figure 15: Change in the Investment Rate Between 1994 and 1999
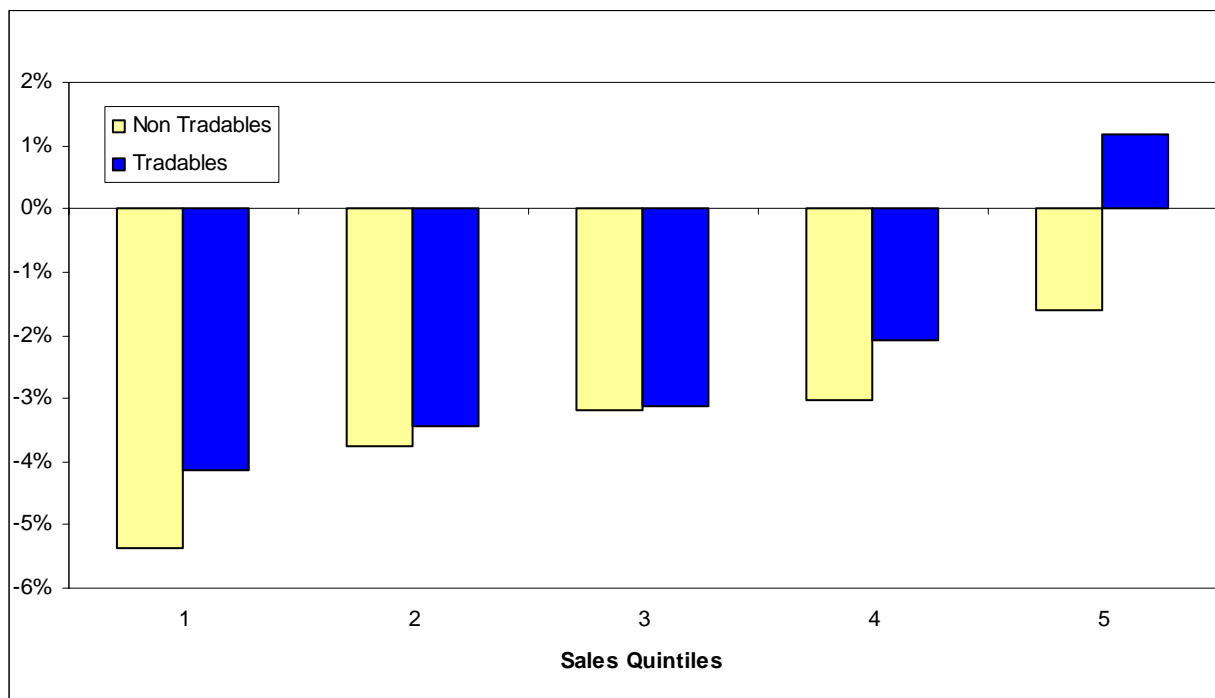
Notes: The investment rate is measured as net investment in fixed asset over the total level of fixed assets. Sales are the total revenues derived from own activity. The value displayed is the average investment rate in 1999 minus its value in 1994.

Table 7. Investment Rates of Firms in Tradables and Nontradables Sectors, 1994 and 1999

Percent of capital stock in preceding year, and ratio

Sector	1994	1999
Nontradables	7.1	3.7
Tradables	6.9	4.6
Ratio of nontradables to tradables investment rate	1.03	0.81

Source: Authors' calculations using data from the Mexican Economic Census.

30

Table 8. Regressions Explaining Investment Rates with Cash Flow and Sales[a]

Independent variable[b]	12-1	12-2
Cash flow	0.04***	0.02**
	(0.01)	(0.01)
Change in sales	0.05***	0.05***
	(0.00)	(0.00)
Cash flow interacted with crisis	0.15***	0.05*
and nonexporter dummies[c]	(0.05)	(0.03)
Summary statistics:		
No. of observations	1,430	1,592
No. of firms	328	338
Adjusted R^2	0.195	0.194

Source: Authors' regressions.
a. The regressions are estimated with fixed effects by generalized least squares and include year dummies (not reported). Standard errors are reported in parentheses. * denotes significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.
b. Cash flow and change in sales are expressed as a ratio to the capital stock in the previous period.
c. The crisis dummy variable equals 1 for the years 1995-97 in column 12-1 and for the years 1995-98 in column 12-2. The nonexporter dummy variable equals 1 if the firm does not export.
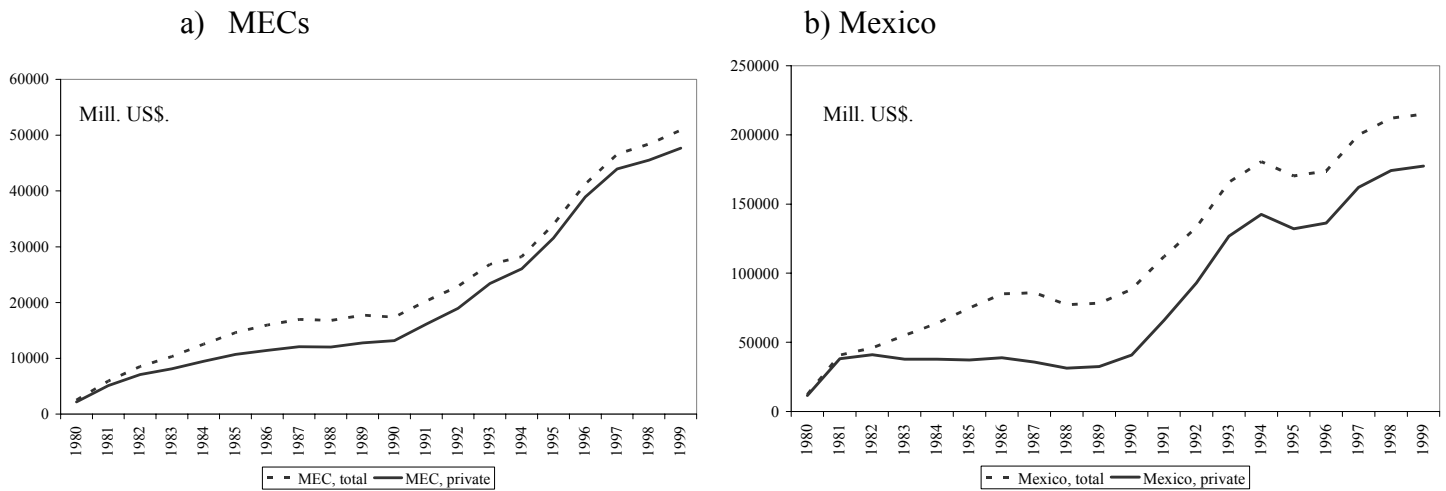
8. Capital Flows

A tangible effect of NAFTA has been the impressive increase in private capital inflows and in foreign direct investment (FDI) in particular (see figures 16 and 17). Between 1980 and 1999 net capital inflows to Mexico were, on average, equivalent to 3.3 percent of GDP (rising to 4.3 percent after liberalization). This is a remarkably high number, given that Mexico liberalized only in 1989 and experienced a crisis in 1994. During the same period the comparable ratio for Korea was 2 percent (3 percent after liberalization), and that for Thailand was 3.9 percent (5.3 percent after liberalization). The ratio for Chile was 7.2 percent.

Foreign direct investment is considered a "good" form of capital inflow, whereas bank flows are considered "bad" because they are foreign loans to domestic banks. Such loans are risky because of the currency mismatch. In Mexico the share of bank flows peaked in 1994 at about 25 percent of cumulative capital inflows since 1980.[25] This share has been declining ever since (figure 17). In contrast, the share of FDI in cumulative capital inflows has increased gradually, from 35 percent in 1980 to 57 percent in 2002, but at a faster pace after the Tequila crisis.

Several observers have noted that one reason financial liberalization has led to financial fragility is that an important share of capital inflows takes the form of bank flows. Many have

31

argued that the greater the share of inflows in the form of FDI and the lower the share of bank credit, the lower is financial fragility. To evaluate this argument we must keep in mind a key fact overlooked by the literature: the lion's share of FDI is directed mostly to the T-sector or to financial institutions.

Figure 16: Capital Inflows

a) MECs   b) Mexico

Note: The figures show the total accumulated financial inflows in Mill. US$.
Source: International Financial Statistics, IMF.

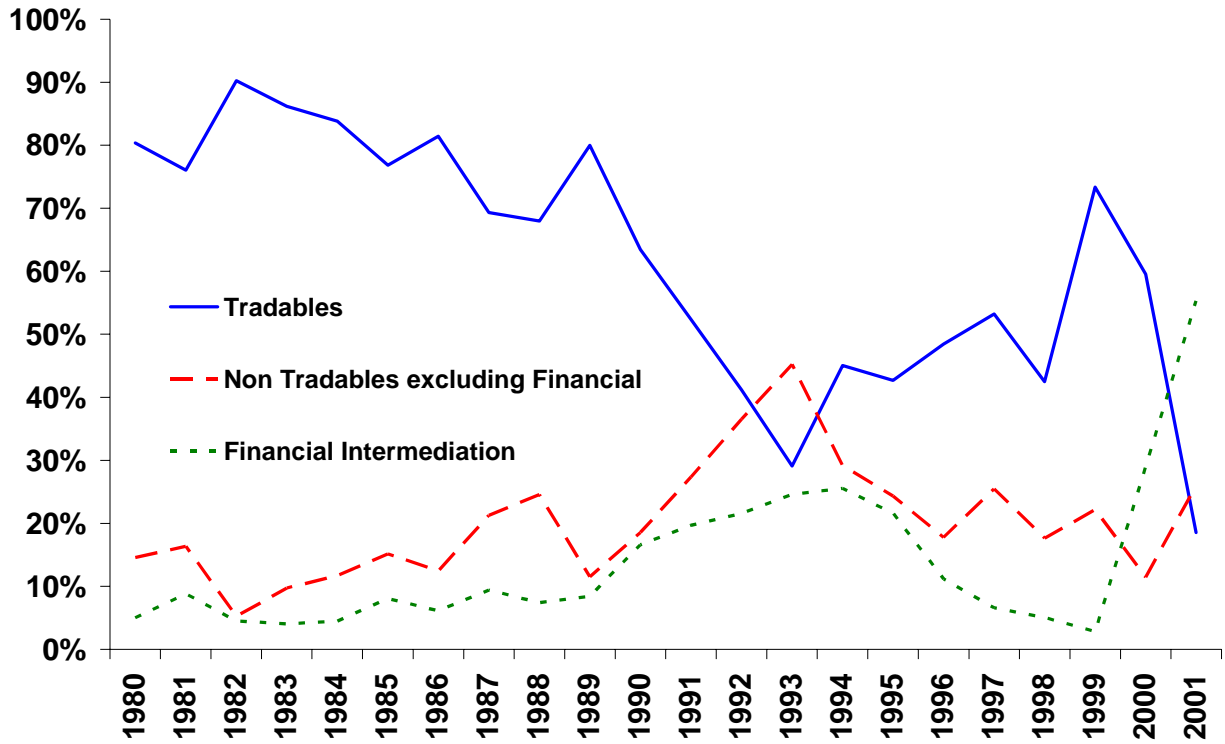**Figure 17: Components of Private Capital Inflows**

a) MECs   b) Mexico
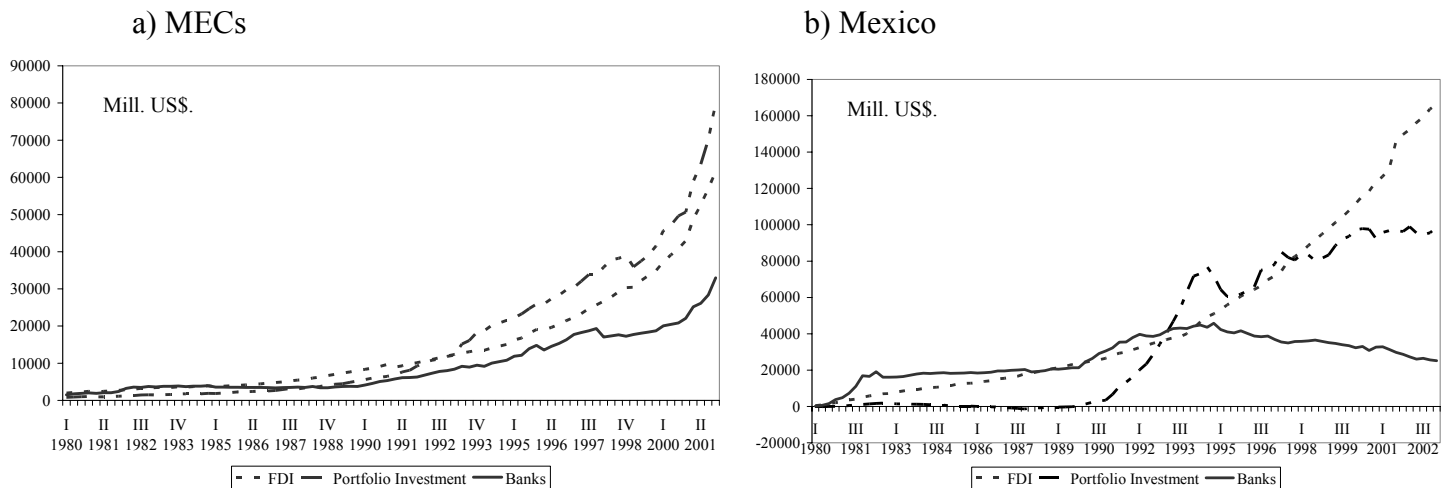
Note: Banks include commercial and development banks
Source: IFS, IMF and Bank of Mexico

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[25] This share can be viewed as a lower bound on inflows to the banking sector, because some banks also received FDI and portfolio flows.

Figure 18: FDI by Sector

Note: 1993 there was a major FDI inflow due to the investment in telecoms. Note that FDI into small and medium firms in 1993 was also only 6.5%.

This is illustrated in figure 18 for the case of Mexico. Because the nonfinancial N-sector receives a small share of FDI, bank flows remain the main source of external finance for most N-sector firms. Since this group of firms is financially constrained, a reduction in risky bank flows and credit may mean that N-sector investment and growth will fall. As there are productive linkages throughout the economy, the unconstrained T-sector will also be negatively affected. Hence it is possible that the net effect of banning risky bank flows is to reduce long-run GDP growth. Here again we see that, in the presence of credit market imperfections, a policy that reduces financial fragility can, as a by-product, lead to a fall in growth.[26]

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[26] We do not analyze here how the new theories of FDI account for the stylized fact that the largest share of nonfinancial FDI is allocated to the T-sector. Vertical motives for FDI involve fragmentation of production across countries (Markusen, 2002). Horizontal motives for FDI imply that firms invest abroad when the gains from avoiding trade costs outweigh the costs of maintaining capacity in a foreign country. Helpman, Melitz, and Yeaple (2003) test this theory using U.S. data and find that the least productive firms serve only the domestic market, that relatively more productive firms export, and that the most productive firms engage in FDI. A third theory, based on the role of information in driving FDI, might also help account for this fact (Mody, Razin, and Sadka, 2003).

9. Conclusions

Mexico is a prime example of a country that has shifted from a highly interventionist to a liberalized economic regime. Given Mexico's far-reaching reforms, the signing of NAFTA, and the large capital inflows into Mexico, many observers expected stellar growth performance. In terms of GDP per capita, Mexico's performance has, in fact, been reasonable but unremarkable. A particularly worrisome development is that, since 2001, Mexico's exports have stopped growing.

At first glance, the experience of Mexico challenges the argument that free trade and open capital markets are the best policies for developing countries. We have argued that Mexico's less-than-stellar growth performance does not imply that liberalization and NAFTA have been bad for growth. In fact, the benefits of liberalization can be seen in the extraordinary growth of exports and FDI during the 1990s. Boom-bust cycles are part of the growth process in financially liberalized countries with contract- enforcement problems. Mexico is thus no exception in having experienced a crisis. When we compare Mexico against an international norm, we find that the growth in Mexico's exports during the 1990s was outstanding. We also find that its pattern of boom and crisis is similar to that of the average liberalizing country. However, a distinctive fact about Mexic is that the credit crunch in the wake of its crisis has been atypically severe and long lasting.

The key to the Mexican puzzle lies in the lack of structural reform after 1995 and in its response to the crisis: a deterioration in contract enforceability and an increase in non-performing loans. As a result, the credit crunch in Mexico has been far deeper and far more protracted than in the typical country. This credit crunch, together with a lack of structural reform, has resulted in stagnation of the nontradables (N) sector, generating bottlenecks that have contributed to Mexico's anemic growth performance and to the more recent fall in exports.

The Mexican experience suggests that long-run growth cannot be based solely on export growth. Because the T-sector depends on N-sector inputs, it is necessary that the N-sector also grow in order to attain a balanced and sustainable growth path. This requires adequate financing for domestically oriented firms and structural reform in key sectors, such as energy. In the wake of a crisis, the economy can attain spectacular export growth for a few years through a real depreciation and the T-sector's use of inexpensive N-sector inputs. However, low N-sector investment eventually generates bottlenecks, which block further growth. This asymmetric response is intimately linked to a severe credit crunch that hits the N-sector particularly hard and

that goes hand in hand with a steady increase in the share of nonperforming loans (NPLs). The Mexican experience shows that NPLs are unlikely to disappear on their own, even if GDP growth resumes quickly. This raises the question of whether a policy under which all NPLs are recognized at once and the fiscal costs are all paid up front is preferable to a piecemeal policy.

Finally, our empirical analysis shows that stock market micro-level data sets are not representative of the economy as a whole and overemphasize the T-sector. This is demonstrated by comparing the Mexican stock market database with the Mexican economic census, which includes all firms in the economy.

Data APPENDIX

Mexican Manufacturing Sector Data Set

The data used to test for the presence of bottlenecks comes from the Annual Industrial Survey (Encuesta Industrial Annual) of the National Institute of Statistics, Geography, and Informatics (INEGI). In 1999 the sample contained 5,934 firms and covered more than 80 percent of manufacturing value added, 35 percent of employment, and 84 percent of sales in the manufacturing sector. The unit of observation is the manufacturing establishment. However, for confidentiality reasons we received the information at a five-digit aggregation level. To compute the share of N-sector inputs we consider the following as N-sector expenses: maintenance and repair services, outsourcing services, rents and leasing, transport, publicity, and electricity. The other expenses used to calculate total variable costs include labor costs, materials, technology transfers, commissions for sales, combustibles, and other expenses.

Mexican Economic Census

The economic census covers the whole Mexican economy and is available at five-year intervals from INEGI. The information at the establishment level is confidential. Thus each observation corresponds to a group of establishments with a similar number of employees, in the same economic activity (six-digit classification) and in the same geographical region (municipality).[75] The number of establishments is omitted for some observations. In such cases an average of the number of establishments by group is used in order to weight each. There are 286,866 observations in 1994 and 400,120 in 1999.

Mexican Stock Market (BMV) Data Set

The stock market data set is derived from the information contained in the financial statements of firms listed on the Bolsa Mexicana de Valores. It is an unbalanced panel of 310 firms, excluding financial firms, of which only 64 are present for the whole sample period. We have yearly observations from 1990 to 2000. All the variables are measured at the end of the year and are deflated by the December consumer price index. The variables used in the text are constructed as in the accompanying table.

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[75] Within each six-digit class and each municipality, establishments were grouped according to the following stratification: 0-2 employees, 3-5, 6-10, 11-15, 16-20, 21-30, 31-50, 51-100, 101-250, 251-500, 501-1,000, and 1,001 or more.

Variable	Definition
Issuance	Total value of equity plus long-term bonds issued domestically and internationally. Long-term bonds are those with maturities of one year or longer. Issuances are normalized with the sum of long-term liabilities plus the stock outstanding.
Entries/listed firms	Number of new firms or firms issuing initial public offerings divided by the total number of listed firms
Exits/listed firms	Number of firms de-listing divided by the total number of listed firms
Foreign liabilities/total liabilities	Liabilities denominated in foreign currency, divided by total liabilities
Capital stock	Fixed assets, including real estate, machinery, and equipment
Investment	Change in fixed assets from year $t-1$ to year t
Cash flow	Total sales minus operating expenses
Change in sales	Change in total sales from year $t-1$ to year t

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