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Ignacio Lobato
Instituto Tecnológico Autónomo de México

Sangeeta Pratap
Instituto Tecnológico Autónomo de México

and

Alejandro Somuano
Sociedad Hipotecaria Federal

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Col. Héroes de Padierna
México, D.F. 10700
M E X I C O

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Ignacio Lobato
Department of Economics & Centro de Investigación Económica, ITAM
ilobato@itam.mx

Sangeeta Pratap
Department of Economics & Centro de Investigación Económica, ITAM
pratap@itam.mx

Alejandro Somuano
Sociedad Hipotecaria Federal
asomuano@shf.gob.mx

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Abstract

We use Mexican firm-level data to study the role of currency mismatches in exacerbating the negative effects of a devaluation in the corporate sector and to investigate what drives Mexican firms to borrow in foreign currency. Our results show that large firms and exporters tend to borrow more heavily in foreign currency. The presence of foreign currency denominated debt poses a significant risk to balance sheets at the time of devaluation. Our findings suggest that in Mexico, the balalce sheet effects of a devaluation far outweigh the competitiveness effects.

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1 Introduction

The Mexican tequila crisis of 1994 has posed a puzzle for the traditional explanations of financial crises based on macroeconomic imbalances. In 1994 Mexico had a relatively healthy economy with GDP growth of 4.4% and a fiscal deficit and the current account deficit of 0.1% and 7% of GDP respectively. Nevertheless, the crisis of 1994-95 involved a peso devaluation of 44% in nominal terms and an increase in nominal interest rates from 16% in the last quarter of 1994 to 49% in the first quarter of 1995. This led to a substantial decline in GDP in 1995 by 6.2% and a 16.4% fall in capital investment. Credit to the private sector as a percentage of GDP fell from over 45% of GDP in the last quarter of 1994 to less than 41% in the last quarter of 1995 and further to roughly 20% by 2000.

Four years later, the international price of oil dropped sharply and as an exporter of oil, the Mexican economy suffered a negative shock. Interest rates increased again and the nominal exchange rate jumped from 8 to 9 pesos per dollar. Although the consequences of the devaluation were milder than those observed in 1994 and 1995, economic activity slowed down significantly and GDP fell by 1.8% in 1998.

A new view has emerged in the literature, which emphasizes currency mismatches of assets and liabilities by agents within the economy as the engine for the propagation of financial crisis. According to this view, when a devaluation occurs in the presence of foreign currency debt, it leads to a dramatic drop in investment. This is what Krugman (1999) has labeled the "Bernanke-Gertler effect", referring to the amplification of negative shocks due to the combination of capital market imperfections and weak balance sheets (Bernanke and Gertler 1989). While devaluation improves the financial situation of exporting firms -the competitiveness effect-, this effect is offset by the mismatch between foreign-currency liabilities and assets denominated in local currency, increasing indebtedness of firms with dollar denominated debt -net-worth effect-.

Assessing which effect dominates, however, is ultimately an empirical question,

and it may vary across time and countries. A recent paper that explores the 1994-95 peso crisis by Bleakley and Cowan (2002) investigates the effect of holding foreign-currency-denominated debt on investment during an exchange rate realignment. Using a database for over 500 non-financial firms in 5 Latin American countries -including Mexico- they find that the effect of a devaluation on investment is "consistently" positive. Aguiar (2002), for example, looks at the immediate effect of the crisis on investment and currency composition of debt in 1995 in Mexico. He finds that the immediate effect of the devaluation was to reduce investment for firms, and that investment was negatively related to net worth. He also finds that exporting and large firms borrowed mostly in foreign currency. However, the time period on which this study focuses is limited to the 1994-95 and is not able to exploit any of the panel characteristics of the data. The author is unable to account for firm heterogeneity and longer-term effects of the devaluation. Furthermore, the relationship between net worth and foreign debt is not statistically significant. It is not clear, therefore, whether the net worth of firms declined due to the effects of devaluation on their debt or because of factors related to their fundamentals.

Forbes (2002) also addresses the Mexican experience, although for a different period. Using a sample of over 13,500 firms from 42 countries -including Mexico- she examines the impact of 12 "major depreciations" between 1997 and 2000. Results suggest that in the year after depreciations, firms have significantly higher growth in market capitalization (when measured in local currency or US dollars), but significantly lower growth in net income (when measured in local currency). Firms with greater foreign sales exposure have significantly better performance. Firms with higher debt ratios tend to have lower net income growth after devaluations, but there is no robust relationship between debt levels and other performance variables. Finally, the author claims that there is no consistent relationship between a firm's profitability or capital/asset ratio and the impact of devaluations on firm performance.[1]

[1]See Nucci and Pozzolo (2001) for a review of the Italian experience.

In this context, the first objective of this paper is to contribute to this debate studying specifically the Mexican experience during the 1994-95 peso crisis and onwards. Using firm-level data we examine the role of a currency mismatch in exacerbating the negative effects of the 1994 and 1998 devaluations in the corporate sector. The main differences between this exercise and existing studies are the following. First and most important, our data set is a panel just for Mexican firms, that allows us to study the evolution of firms over time and control for firm heterogeneity, as opposed to just country effects as in Bleakley & Cowan. Secondly, we do have data on net sales in foreign currency, so we can actually control for the positive effects of devaluations and estimate the direct effect of dollar debt on firms´performance.

In order to better comprehend the overall effects of a devaluation at the firm level it is important to understand in the first place why domestic firms borrow in foreign currency. Despite its prominent role in the aftermath of macroeconomic crises, it seems that little is known about the precise determinants and consequences of the currency composition of debt, particularly at the microeconomic level. Economic theory suggests that this can be explained through hedging exchange rate risk. However, as we shall see later, one puzzle in the Mexican data is why firms were so imperfectly hedged before the 1994 crisis. Caballero and Krishnamurthy (2001) set up a model where the general equilibrium effects of liquidity constraints drive a wedge between the marginal product of capital and interest rates, and induce firms to borrow disproportionately in foreign currency.

Aguiar (2002) claims that he found "only weak evidence" to support the standard hedging model in Mexican firms, and that it is not necessarily true that firms allocate cash flow to states with relatively profitable investment opportunities. Nonetheless, his results show that exporting and large firms borrow disproportionately in foreign currency. Alternatively, Martínez and Werner (2002) suggest that the decision of borrowing in pesos or dollars highly depends on the exchange rate regime, due the implicit guarantees given by the government under a fixed exchange regime.

Along these lines, the second objective of this paper is to investigate what drives Mexican firms to borrow in foreign currency. Taking advantage of our data set, we seek to answer what determined the currency composition and term structure of debt in Mexican firms during the 1989-2000 period.

The remainder of the paper is organized as follows. Section 2 describes the data used in the empirical analysis. Section 3 presents the equations to be estimated, the empirical methods utilized and the obtained results. Finally, section 4 includes some concluding remarks and extensions for future research.

2 Data

The data used in this study comes from the Mexican stock market (Bolsa Mexicana de Valores or BMV). The data is on yearly basis from 1989 to 2000. While the sample is restricted to mostly publicly traded firms and some non-traded ones, this does not represent a serious limitation for the study. First, this is the only data set of its kind available in Mexico and provides detailed information on the maturity structure of debt as well as its currency composition. Second, while small firms, which are not listed on the stock market, could probably be exporters, they are not likely to have access to international capital markets. Our sample, therefore, contains the firms where it is most likely to observe currency mismatches.

Each firm in the sample has an identifier, which allows us to link it across time. The panel is not balanced and we do observe entry and exit. Exit can take place if a firm is de-listed from the stock exchange, or if it merges with another one. In either case, the BMV removes the firm from the panel. However, we retain firms, which are de-listed in the panel for the entire period for which data is available. For mergers or other ownership changes, we follow Bleakley & Cowan and aggregate data for all firms which participate in a merger into one artificial firm throughout the sample

period.[2]

Although our full sample includes 378 firms, only 202 firms were considered in the empirical analysis. This follows from the following adjustments. First, we removed firms with less than 4 years of data. Second, we did not include firms, which have zero capital for one or more years. Third, we eliminated firms where the investment-to-capital ratio is beyond the mean +/- 3 standard deviations for that year, for one of more years. For the GMM estimations we further had to reduce our sample to 196 firms who had data for at least four consecutive years. Investment for each firm was calculated subtracting gross capital at time t+1 from gross capital at time t.[3]

Table 1 defines all variables, and Tables 2 to 6 present some features of the adjusted sample. All data is in real terms, deflated by the annual average producer price index (base year=1994). Table 2 (Figure 1) shows the investment-to-capital ratio for the whole sample. As can be noticed, this ratio increased moderately from 1989 to 1993, rose sharply in 1992-93 -perhaps due to the positive expectations following the announcement of NAFTA- and fell dramatically before the crisis, from about 25% to zero in 1994. This fall in investment might be explained by the change in expectations due to the Chiapas uprisings at the beginning of 1994 and the assassinations of several political actors throughout the year. The crisis at the end of 1994 exacerbated this fall, and investment was only able to recover to its pre 1994 levels by 1997. The devaluation of 1998 also shows up in a significant fall in investment ratios.

Tables 3 and 4 present, respectively, the summary statistics of the proportion that short-term foreign debt represents of total short-term debt for all firms and for exporting firms. As can be observed (Figure 2) the ratio in both cases increased gradually in the years leading up to the crisis, increased sharply in 1994 and declined after both the 1994-95 and 1998 peso devaluations. Under the fixed exchange regime firms borrowed heavily in dollars as opposed to pesos, but they switched back to pesos

[2]We have experimented with other exercises, such as keeping the two merged entities as separate through the period with almost no change in results.

[3]Due to data limitations, i.e. many missing observations on investment expenditures, we could not build up a series of capital stock using the perpetual inventory method.

after the devaluation and adoption of the flexible exchange rate. Interestingly, this pattern is more pronounced in exporting firms, perhaps because these businesses are the ones with broader access to credit in international markets.

Table 5 (Figure 3) shows the evolution of the ratio of short-term foreign debt to exports which indicates the degree of currency matching undertaken by firms. While in the early 1990s the median of this ratio oscillated around 1.5, it reached a peak of 2.3 in 1994. Apparently, given the favorable expectations following NAFTA, exporters gained a lot of trust from creditors and borrowed heavily in dollar-denominated liabilities. This left them very vulnerable to exchange rate devaluations. It is interesting to note also that the introduction of the floating exchange rate lead firms to adjust their currency positions rapidly and from 1996, the median firm had a ratio of short term foreign debt to exports of less than 1.

Table 6 shows the difference in second moments of some ratios between exporters and non exporters. A weighted average of the variance across time of these ratios is constructed, with weights proportional to the average of the ratio for the firm through this period. This exercise shows that the investment of exporters fluctuated more than that of non exporters in this period. They also faced at least three times higher volatility in their earnings. This suggests that exporters operated in a far more risky environment than non exporters.

Finally Table 7 shows the relation between our sample and some macro aggregates. The total debt in foreign currency contracted by the firms in our sample is more than 80 % of the total borrowing abroad by the private sector until the last two years of the sample, where it falls to about 60%. These firms also accounted for about 20% of all exports in this period. These firms therefore seem like likely candidates to experience both the positive and negative effects of exchange rate movements.

3 Methodology and Empirical Results

3.1 Investment

Following Bleakley & Cowan the basic specification we estimate is the following

$$\frac{I_{it}}{K_{it-1}} = \gamma \left(\frac{D^*_{it-1}}{K_{it-1}} \Delta \log e_{it} \right) + \delta \frac{D^*_{it-1}}{K_{it-1}} + \varphi \frac{D_{it-1}}{K_{it-1}} + \alpha \frac{I_{it-1}}{K_{it-2}} + \eta_t + \mu_i + \epsilon_{it} \quad (1)$$

where firms are indexed by i and time by t. I and K denote the firms' investment and capital expenditure respectively. D^* is the amount of debt in foreign currency, $\Delta \log e_{it}$ is the change in the real exchange rate (defined as the nominal exchange rate divided by the consumer price index) between time t and $t-1$ and D represents total debt of the firm. The last three terms are time effects, firm specific effects and the error term respectively. The coefficient γ captures the investment response of holding dollar debt during a devaluation, whereas δ captures the direct effect of dollar debt on investment. In principle, these coefficients could be either positive or negative. If firms match the currencies of their inflows and outflows, a devaluation would be associated with a simultaneous increase in the value of debt and earnings. If the increase is expected to be persistant, γ is likely to be positive. On the other hand for firms that do not undertake this kind of currency matching, a devaluation is a negative shock to net worth and, in the presence of capital market frictions, would affect investment negatively.

The results of this estimation are shown in Tables 8 and 9. The first column of Table 8 replicates the Bleakley & Cowan results using OLS. The specification in the second column is the same as in the first with the lagged dependent variable as an additional independent variable. In both these columns we see that the coefficient γ is negative, although not significantly different from zero. This is in contrast to the Bleakley & Cowan results which find a positive and significant relation between devaluation and investment. The direct influence of dollar debt on investment is

also negative and significantly different from zero in both cases, while the effect of total debt does not seem to be significantly different from zero. As expected, the coefficient on lagged investment ratios is positive. The year dummies show a large and significant negative coefficient for 1994-95 and 1998, which were the years in which substantial devaluations took place. The third column presents the within estimator. γ is still negative though not statistically significant. The direct effect of dollar debt is still negative and the coefficient of total debt is not significant. The coefficient on lagged investment is negative, but downward biased if the independent variables are endogenous, i.e. correlated with the fixed effect.

Table 9 presents the GMM difference and system estimators which accounts for this endogeneity. The instruments in both cases are one and two period lags of the independent variables. In both cases the Sargan test does not reject the overidentifying restrictions, although less strongly for the system estimator. The interesting feature of the GMM difference estimator is the negative and significant γ which shows that devaluations seem to have a negative effect on investment. The coefficient on total debt is also negative, showing evidence of balance sheet effects. However, the direct effect of dollar debt is positive and significantly different from zero, unlike the other estimations. This may reflect an omitted variable bias, that is, the ability to contract dollar debt may be an indicator of firm quality. The coefficient on lagged investment is positive, and lies within the bounds of the OLS (upward biased) and the Within Groups (downward biased) estimator. The system estimator for γ is again not significantly different from zero. The other coefficients are also quite different from the difference estimator, the coefficient on dollar debt is negative whereas the coefficient on total debt is positive. The only robust conclusion from this table is that, contrary to the results of Bleakley & Cowan, devaluations are not accompanied by an increase in investment.

Table 10 adds additional controls such as sales and earnings, to equation (1). The results are still mixed and it is hard to derive any definite conclusions. γ is not

significant in either of the two estimations. The coefficient on cash flow is positive and significant. Dollar debt is either not significant or is negative and significant.

If firms are matching the currency compositions of their revenues and expenditures, the coefficients on dollar debt and dollar debt interacted with the change in exchange rates may include the effect of devaluations on exports as well, i.e. the competitiveness effect. Table 11 includes exports and the interaction of exports with the change in exchange rate as independent variables. The results of this table are very striking. In both specifications, as well as with both estimators, the coefficient on the interaction of dollar debt with the exchange rate is negative and significant. In contrast, the interaction of exports with the exchange rate is positive and significant. Dollar debt enters with a negative and strongly significant coefficient and the coefficients on non-interacted exports is also negative. The latter is probably due to the higher volatility in the economic environment faced by exporters, as documented in Table 6, which dampens investment.

Table 12 presents interactions of the dollar debt and exports with yearly dummies with a within groups, GMM difference and GMM system estimator. This confirms what we saw in Table 11 above. In 1994-95 and 1998, holding dollar debt negatively affected firms' investment. It is interesting to see that in years of exchange rate stability such as 1992 and 1993 the presence of dollar debt allowed firms to invest far more than they could have otherwise. In the same years exporters invested heavily as well. In 1994 and 1995, the coefficient on exports is positive but not significant, perhaps as a response to the general turbulence in that time.

Finally Tables 13 and 14 demonstrate the effects of devaluations on the earnings of firms, through its effect on dollar debt and exports. As we would expect, the coefficient on the interaction of the exchange rate with dollar debt is negative, while that of the interaction with exports is positive. What is interesting however, is that the former coefficient is of a much larger magnitude than the latter, suggesting that the net effect of devaluations on the earnings of a firm is negative.

The conclusions from these tables are very clear. Devaluations induce both balance sheet and competitiveness effects, which in turn affect investment. If we omit variables that are related to dollar debt and to investment, the coefficient on dollar debt tries to capture these opposing tendencies and is not robust. However, including exports and their interaction with exchange rates indicates the presence of a competitiveness effect and allows us to isolate the balance sheet effect of dollar debt. Interestingly enough, exporters invested heavily from 1991 through 1993, presumably in anticipation of NAFTA, but overall their investment was less than non exporting firms'. Devaluations affect firms' earnings negatively on the balance; increases in export earnings were more than offset by a decline through the foreign currency debt channel.

3.2 Currency Composition of Debt

The previous section suggests that the holding of foreign currency debt is a channel for the propogation of exchange rate shocks. A related question therefore is: Why do firms hold foreign currency debt? According to economic theory, firms borrow in different currencies to hedge against risk. Two questions then are: (i) why do firms in only some specific countries tend to follow this pattern, and (ii) why do only some firms have access to international markets. Regarding the first question, some scholars claim that emerging markets have a natural tendency for liability dollarization (see Eichengreen and Hausmann 2000, and Calvo and Reinhart 2000). Other people -like Mishkin (1996)- tend to believe that the exchange rate regime explains for the most part why firms borrow in foreign currency. According to this theory, firms borrow more heavily in dollars under a fixed exchange regime, given the implicit guarantee provided by the government.

A recent paper by Caballero and Krishnamurthy (2001) argues that firms that are liquidity constrained are likely to borrow heavily in dollars since in general equilibrium these constraints drive interest rates below the marginal product of capital. Hence excessive dollar debt, i.e. inadequate hedging, arises as a somewhat paradoxical result

of a lack of collateral.

The first column of Table 15 presents a probit using an indicator variable whether the firm holds any foreign currency debt or not and the second column presents a tobit with the actual proportion of total debt that is dollar debt. Both estimates are very similar. Exporters and large firms tend to hold more foreign debt. We also use two dummies, one for whether the firm operates in the tradeables sector and the other for whether it issues American Depository Reciepts (ADRs) in the U.S. The former is positive and highly significant and the latter is not. Since a large part of the observations in our data were non zero (1255 out of 1418), we also decided to remove the zero observations and use a transformation of the ratio of dollar debt to total debt as the dependent variable. The results are in Table 16. The first two columns show OLS and within groups estimators, the results of which are very similar to the previous ones. The coefficient on exports and firm size-proxied by fixed capital- are consistently positive and significant across different specifications. These results are consistent with previous evidence[4] and confirm the hypothesis that big firms and/or exporters, i.e. firms with collateral, are more likely to borrow in foreign currency. With the GMM difference estimator, the coefficient on exports is no longer significant, however the system estimates are very similar to the within groups and the OLS estimator.[5] Finally Table 17 presents the same estimators using lagged dependent variables as well. Somewhat surprisingly the coefficient on exports is negative and significant with the difference estimator but the system estimator is unchanged.

3.3 Economic Effects of a Devaluation

Given our estimations, a relevant question is: how large were the effects of the devaluation? In other words, although the coeffecients of interest have the right signs

[4]See for example Martínez and Werner (2002) and Aguiar (2002).

[5]Notice that we cannot use the tradeables dummies or the ADR dummy in any regression which accounts for firm heterogeneity because these variables do not change over time.

and are statistically significant, were the quantitative effects of the devaluation large enough to merit our attention? The answer to this question is given in Figure 4. Using the estimates from the first two columns of Table 11 we compute the effect of a 1% devaluation on investment. In this specification, the effect of the change in exchange rate on investment is mediated through two opposing forces: a balance sheet effect through the holding of foreign currency denominated debt, and a competitiveness effect through exports. Although the coefficients on the two terms are not very different, the imperfect hedging in the years up to the 1994 crisis would lead us to expect that the balance sheet effect would predominate. Figure 4 shows the yearly net effect of a change in real exchange rate i.e. $\left(\beta_2 \left(D^*_{t-1}/K_{t-1}\right) + \beta_5 \left(X_{t-1}/K_{t-1}\right)\right) \Delta \log e_t$, evaluated at the total D^*_{t-1}/K_{t-1} and X_{t-1}/K_{t-1} for all firms and $\Delta \log e_t$ in that year. The solid line represents the net effect based on the GMM difference estimator and the dashed line is the estimate from the GMM system estimator, i.e. the first two columns of Table 11. The effects of devaluation vary over time. In the period before 1994, even though firms were imperfectly hedged (i.e. the term inside the brackets was negative), the real exchange rate appreciated which implied positive real effects on investment between 5 and 8% in 1992, and between 8% and 13% in 1993. In other words, the real appreciation of the exchange rate benefitted holders of foreign currency debt and outweighed the negative effects on exports. The devaluation of 1994 triggered a significant fall in investment of about 5 to 7% in 1994 and, more dramatically, more than 50% in 1995. It is interesting to note that the recovery in 1996 and 1997 was quite pronounced, partly as a result of better hedging (see for example, Table 5) where firms matched exports and foreign currency debt to a greater degree, and partly due to a relatively steady exchange rate. The 1998 devaluation produced only a small fall in investment of about 0.6% given that firms were much better hedged than they were in 1994.

We can therefore conclude that the balance sheet effects of the 1994 devaluation were extremely large and completely dominated the competitiveness effects due to

imperfect hedging brought about by fixed exchange rates. In 1998, while the balance sheet effect of the devaluation dominated the competitiveness effect, the net effect was small, due to (i) the relatively smaller depreciation of the real exchange rate and (ii) the debt portfolio adjustment firms were forced to make in a floating exchange rate regime.

4 Conclusions

In the context of a highly globalized world with almost no barriers in international financial markets it is not surprising to observe countries borrowing in different currencies to hedge against risk. What is interesting is that this process is no longer exclusive to governments and today is also common among private firms.

Recent economic literature has addressed the topic of multiple currency borrowing from various perspectives. At the microeconomic level, scholars have concentrated their attention on explaining two questions: i) why firms tend to borrow in currencies other than the domestic, and ii) what is the impact of a devaluation on private investment in the presence of foreign currency denominated debt. This paper provides some empirical evidence for the Mexican experience in the last decade.

Our main findings are as follows. Large firms and export-oriented firms in the tradeable sector tend to borrow more heavily in foreign currency. The presence of foreign currency debt poses a significant risk to balance sheets at the time of devaluation. Our findings suggest that in Mexico, the balance sheet effects of a devaluation outweigh the competitiveness effects. In standard investment equations we find that foreign debt as well as the interaction of foreign debt with changes in exchange rates are negatively correlated with investment. The other interesting finding is that depreciations induce exporters to invest, i.e. we have some evidence of a competitiveness effect. However, in general, exports are negatively correlated with investment. There is some evidence that the investment and earnings of exporters are far more volatile

than those of non exporters which may be the reason behind this negative sign. Another interesting result is that apparently in the years leading to the crises, firms positioned themselves in a way which rendered them particularly vulnerable to the adverse effects of a devaluation. Firms with high amounts of dollar denominated liabilities and exports invested substantially before the crisis. These were also the firms most affected by the exchange rate shock, as is reflected in their investment performance.

We also quantify the effects of devaluations on firm investment. The 1994 devaluation was associated with a significant negative effect on investment which was a combination of inadequate hedging and a sharp depreciation of the exchange rate. In contrast, the 1998 devaluation, which was substantially smaller, had a more modest effect on investment due to better hedging

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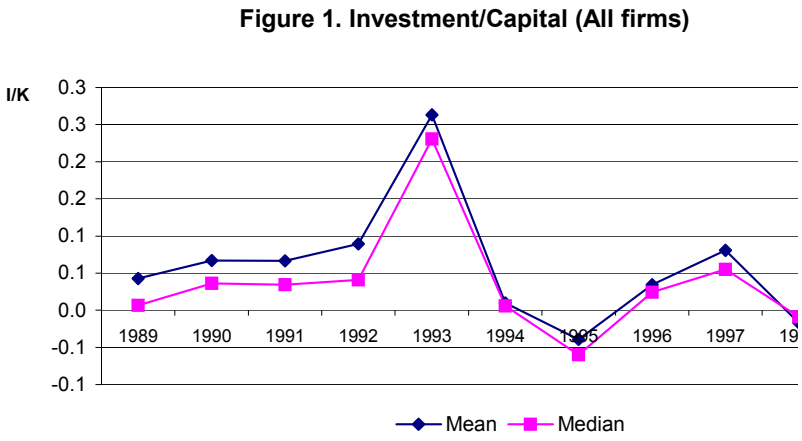


Figure 1:

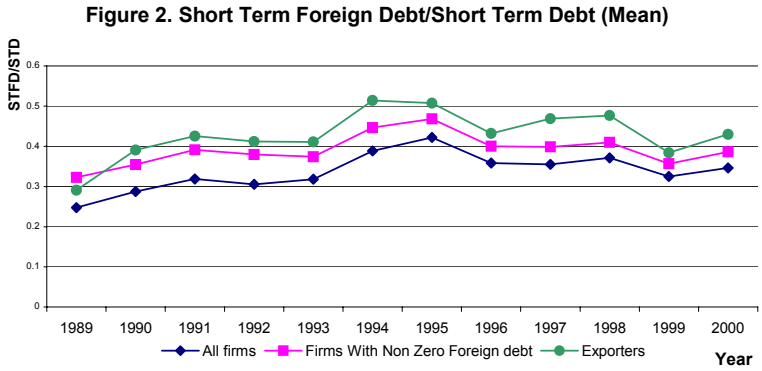
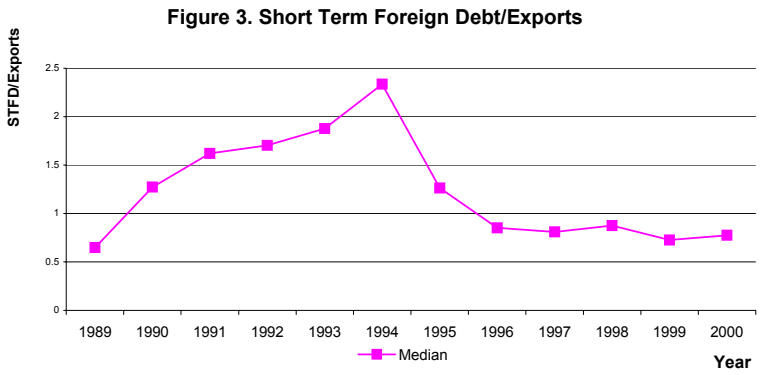


Figure 2:



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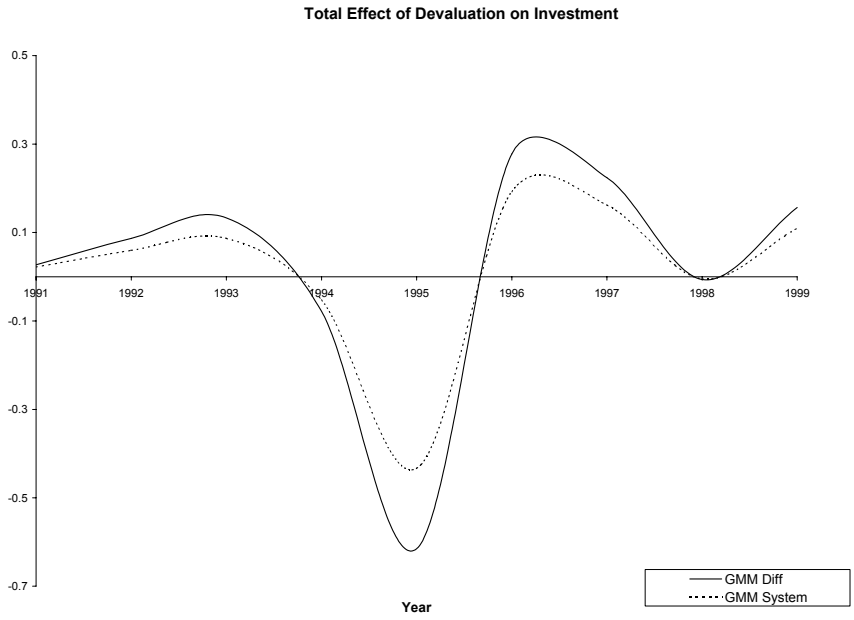

Figure 4: Total Effect of Devaluation on Investment

Table 1: Definitions of Variables

D	Total debt
D^*	Total dollar debt
X	Total exports
EBITDA	Earnings before accrued interest, taxes, depreciation and amortization
Sales	Total sales (domestic and exports)
$\Delta loge_t$	Change in the (log of) real exchange rate between time t and $t-1$

Table 2: Investment/Capital

Year	No of Firms	Mean	Median	Std Deviation
1989	60	0.0428	0.0064	0.1425
1990	127	0.0668	0.0361	0.1699
1991	150	0.0665	0.0344	0.1683
1992	162	0.0894	0.0410	0.1695
1993	167	0.2632	0.2306	0.2735
1994	147	0.0098	0.0060	0.1484
1995	137	-0.0392	-0.0599	0.1259
1996	134	0.0343	0.0242	0.1671
1997	128	0.0806	0.0550	0.1362
1998	113	-0.0167	-0.0090	0.1531
1999	94	0.0120	0.0036	0.0966

Table 3: Ratio of Short Term Foreign Debt to Total Short Term Debt for all firms

Year	No of Firms	Mean	Median	Std. Deviation
1989	60	0.2475	0.2143	0.2316
1990	127	0.2873	0.2208	0.2655
1991	150	0.3184	0.2807	0.2881
1992	164	0.3053	0.2451	0.2821
1993	175	0.3183	0.3017	0.2621
1994	169	0.3886	0.3930	0.2947
1995	158	0.4220	0.4268	0.3001
1996	152	0.3583	0.3466	0.2828
1997	137	0.3548	0.3524	0.2781
1998	127	0.3711	0.3839	0.2858
1999	113	0.3251	0.3146	0.2639
2000	95	0.3458	0.3331	0.2858

Table 4: Short Term Foreign Debt/Short Term Debt (Exporters)

Year	No of Firms	Mean	Median	Std Deviation
1989	45	0.2907	0.2774	0.2188
1990	80	0.3908	0.4054	0.2417
1991	94	0.4254	0.4263	0.2576
1992	103	0.4116	0.4174	0.2621
1993	107	0.4106	0.4026	0.2384
1994	105	0.5139	0.5569	0.2579
1995	109	0.5071	0.5580	0.2741
1996	108	0.4319	0.4304	0.2681
1997	92	0.4691	0.5274	0.2516
1998	86	0.4764	0.5338	0.2543
1999	82	0.3840	0.3660	0.2562
2000	68	0.4299	0.4351	0.2807

Table 5: Short Term Foreign Debt/Exports

Year	No of Firms	Mean	Median	Std Deviation
1989	45	1.6093	0.6473	3.9902
1990	80	3.3812	1.2727	7.1595
1991	94	5.8081	1.6193	18.1250
1992	104	5.8649	1.7026	12.6269
1993	107	5.9134	1.8778	11.7592
1994	105	50.9801	2.3347	366.5397
1995	109	13.8450	1.2637	67.5086
1996	108	4.8988	0.8511	16.4119
1997	92	7.6851	0.8093	32.1631
1998	86	6.9136	0.8750	18.2148
1999	85	11.0444	0.7279	50.2445
2000	77	18.2304	0.7747	132.2806

Table 6: Variance Analysis

	$\frac{I_t}{K_{t-1}}$	$\frac{EBITDA}{Assets}$	$\frac{D^*}{Assets}$	$\frac{Sales}{Assets}$
Exporters[1] (98 firms)				
Max	0.232	0.074	0.296	0.205
Min	0.000	0.000	0.000	0.000
Median	0.020	0.003	0.002	0.014
Average	0.031	0.006	0.009	0.027
Weighted average*	0.071	0.022	0.113	0.074
Non Exporters (98 firms)				
Max	0.203	0.028	0.093	0.932
Min	0.000	0.000	0.000	0.000
Median	0.024	0.002	0.000	0.019
Average	0.035	0.004	0.004	0.056
Weighted average*	0.065	0.007	0.029	0.310
Exporters[2] (69 firms)				
Max	0.232	0.074	0.296	0.181
Min	0.000	0.000	0.000	0.000
Median	0.022	0.003	0.002	0.012
Average	0.032	0.006	0.102	0.023
Weighted average*	0.080	0.022	0.134	0.000
Non Exporters (127 firms)				
Max	0.203	0.051	0.093	0.932
Min	0.000	0.000	0.000	0.000
Median	0.024	0.003	0.001	0.019
Average	0.035	0.005	0.004	0.053
Weighted average*	0.074	0.016	0.037	0.330

[1] At least one year with Exports/Sales greater than or equal to 0.10.

[2] At least one year with Exports/Sales greater than or equal to 0.20.

* Weights are equal to the proportion that the average of each ratio represents of the total.

Table 7: Sample Statistics as a Percentage of Macro Aggregates

Year	Foreign Debt	Total Debt	Exports
1989	n.a.	n.a.	13
1990	n.a.	n.a.	18
1991	n.a.	n.a.	17
1992	n.a.	n.a.	16
1993	n.a.	n.a.	19
1994	86	37	20
1995	80	39	23
1996	88	44	20
1997	86	48	18
1998	67	48	15
1999	51	47	14

Source: Banco de Mexico. Exports do not include petroleum. Both columns of debt are private sector debt.

Table 8: Investment Equation :I

	Dependent Variable: $\frac{I_t}{K_{t-1}}$					
	OLS (1)		OLS (2)		Within Groups	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Constant	0.029*	0.013	0.030*	0.012		
$\frac{I_{t-1}}{K_{t-2}}$			0.184*	0.043	-0.067	0.036
$\frac{D^*_{t-1}}{K_{t-1}}\Delta loge_t$	-0.008	0.090	-0.049	0.090	-0.034	0.088
$\frac{D^*_{t-1}}{K_{t-1}}$	-0.061*	0.023	-0.047*	0.022	-0.196*	0.062
$\frac{D_{t-1}}{K_{t-1}}$	0.013	0.012	0.003	0.011	0.037	0.037
D91	0.026	0.025	0.020	0.024	0.095*	0.027
D92	0.046	0.019	0.037*	0.018	0.111*	0.021
D93	0.231*	0.027	0.216*	0.027	0.292*	0.026
D94	-0.030	0.018	-0.084*	0.019	0.036	0.022
D95	-0.064*	0.021	-0.063*	0.020	-0.020	0.020
D96	0.008	0.018	0.016	0.017	0.041*	0.017
D97	0.055*	0.016	0.049*	0.015	0.068*	0.014
D98	-0.025	0.018	-0.038*	0.017	-0.013	0.015
R^2	0.274		0.302		0.508	

Note: * denotes significance at the 5 percent level.

Table 9: Investment Equations: II

	Dependent Variable: $\frac{I_t}{K_{t-1}}$			
	GMM Difference		GMM Systems	
	Coeff.	Std. Error	Coeff.	Std. Error
Constant	-0.027	0.018	0.053*	0.013
$\frac{I_{t-1}}{K_{t-2}}$	0.119*	0.022	0.151*	0.014
$\frac{D^*_{t-1}}{K_{t-1}}\Delta loge_t$	-0.086*	0.041	0.011	0.018
$\frac{D^*_{t-1}}{K_{t-1}}$	0.327*	0.084	-0.069*	0.006
$\frac{D_{t-1}}{K_{t-1}}$	-0.095*	0.030	0.016*	0.003
D92			0.021	0.013
D93	0.206*	0.029	0.221*	0.019
D94	-0.293*	0.026	-0.108*	0.015
D95	0.003	0.022	-0.099*	0.014
D96	0.088*	0.023	-0.016	0.015
D97	0.063*	0.022	0.009	0.014
D98	-0.037	0.023	-0.068*	0.015
D99	0.040*	0.020	-0.037*	0.013
Sargan	44.387		79.387	
p-value	0.331		0.108	
AR1	0.000		0.000	
AR2	0.166		0.199	
Instruments	t-2 & t-3 lags		t-2 & t-3 lags	

Note: * denotes significance at the 5% level. AR1 and AR2 are the p values for the null hypothesis of no first order and second order serial correlation respectively.

Table 10: Investment Equations: III

	Dependent Variable: $\frac{I_t}{K_{t-1}}$			
	GMM Difference		GMM System	
	Coeff.	Std. Error	Coeff.	Std. Error
Constant	-0.002	0.014	0.060*	0.004
$\frac{I_{t-1}}{K_{t-2}}$	0.135*	0.015	0.144*	0.003
$\frac{D^*_{t-1}}{K_{t-1}}\Delta loge_t$	-0.021	0.018	0.024*	0.004
$\frac{D^*_{t-1}}{K_{t-1}}$	0.027	0.024	-0.050*	0.002
$\frac{D_{t-1}}{K_{t-1}}$	0.000	0.009	0.004*	0.001
$\frac{Sales_t}{K_{t-1}}$	-0.024	0.032	0.001*	0.000
$\frac{EBITDA_t}{K_{t-1}}$	0.037*	0.015	0.056*	0.001
D92			0.023*	0.004
D93	0.211*	0.023	0.221*	0.006
D94	-0.333*	0.018	-0.115*	0.004
D95	-0.014	0.017	-0.110*	0.004
D96	0.077*	0.016	-0.019*	0.004
D97	0.034*	0.016	0.001	0.004
D98	-0.080*	0.017	-0.088*	0.004
D99	0.030	0.016	-0.048*	0.005
Sargan	77.295		115.765	
p-value	0.141		0.311	
AR1	0.000		0.000	
AR2	0.128		0.181	
Instruments	t-2 and t-3 lags for $\frac{I_{t-1}}{K_{t-2}}$, $\frac{D^*_{t-1}}{K_{t-1}}$ and $\frac{D_{t-1}}{K_{t-1}}$ t-1 and t-2 lags for Sales and EBITDA)			

Note: * denotes significance at the 5% level. AR1 and AR2 are the p values for the null hypothesis of no first order and second order serial correlation respectively.

Table 11: Investment Equation: IV

	Dependent Variable: $\frac{I_t}{K_{t-1}}$							
	GMM Difference		GMM System		GMM Difference		GMM System	
	Coeff	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Constant	0.226*	0.017	0.064*	0.006	0.219*	0.024	0.059*	0.010
$\frac{I_{t-1}}{K_{t-2}}$	0.120*	0.019	0.210*	0.005	0.156*	0.023	0.214*	0.010
$\frac{D^*_{t-1}}{K_{t-1}}\Delta loge_t$	-0.121*	0.035	-0.071*	0.012	-0.146*	0.039	-0.032	0.019
$\frac{D^*_{t-1}}{K_{t-1}}$	-0.178*	0.030	-0.052*	0.004	-0.179*	0.042	-0.083*	0.005
$\frac{D_{t-1}}{K_{t-1}}$	0.050*	0.016	0.011*	0.002	0.067*	0.020	0.023*	0.002
$\frac{X_{t-1}}{K_{t-1}}\Delta loge_t$	0.150*	0.051	0.072*	0.014	0.114*	0.057	0.109*	0.024
$\frac{X_{t-1}}{K_{t-1}}$	-0.277*	0.036	-0.040*	0.004	-0.246*	0.049	-0.001	0.006
$\frac{EBITDA_t}{K_{t-1}}$	0.021	0.026	0.066*	0.002				
D93			0.211*	0.008			0.228*	0.014
D94	-0.551*	0.026	-0.130*	0.006	-0.548*	0.036	-0.131*	0.011
D95	-0.219*	0.022	-0.101*	0.007	-0.195*	0.029	-0.106*	0.010
D96	-0.157*	0.022	-0.028*	0.006	-0.156*	0.029	-0.022*	0.011
D97	-0.186*	0.019	-0.011	0.006	-0.184*	0.026	0.002	0.010
D98	-0.305*	0.021	-0.098*	0.006	-0.293*	0.028	-0.092*	0.010
D99	-0.199*	0.019	-0.060*	0.006	-0.193*	0.026	-0.055*	0.010
Sargan	72.237		111.037		57.689		90.978	
p-value	0.176		0.233		0.185		0.189	
AR1	0.000		0.000		0.000		0.488	
AR2	0.229		0.481		0.356			
Instruments	t-2 and t-3 lags for $\frac{I_{t-1}}{K_{t-2}}$, $\frac{D^*_{t-1}}{K_{t-1}}$, $\frac{D_{t-1}}{K_{t-1}}$ and $\frac{X_{t-1}}{K_{t-1}}$ t-1 and t-2 lags for EBITDA							

Note: * denotes significance at the 5% level. AR1 and AR2 are the p values for the null hypothesis of no first order and second order serial correlation respectively.

Table 12: Investment Equation: V

	Dependent Variable: $\frac{I_t}{K_{t-1}}$					
	Within Groups		GMM Difference		GMM System	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
$\frac{I_{t-1}}{K_{t-2}}$			0.122*	0.042	0.109*	0.005
$\frac{D^*_{t-1}}{K_{t-1}}$	-0.125*	0.033	0.078	0.101	-0.027*	0.003
$\frac{X_t}{K_{t-1}}$	-0.215*	0.090	-0.222	0.320	-0.008	0.012
$\frac{EBITDA_t}{K_{t-1}}$	-0.044	0.047	-0.013	0.060	0.036*	0.003
$\frac{Sales_t}{K_{t-1}}$	0.028*	0.010	-0.006	0.016	0.006*	0.000
$\frac{D^*_{t-1}}{K_{t-1}} * D91$	0.009	0.198	-0.375	0.260	-0.261*	0.049
$\frac{D^*_{t-1}}{K_{t-1}} * D92$	0.251	0.132	0.178	0.160	0.216*	0.020
$\frac{D^*_{t-1}}{K_{t-1}} * D93$	0.499*	0.164	0.582*	0.139	0.832*	0.042
$\frac{D^*_{t-1}}{K_{t-1}} * D94$	-0.114*	0.084	-0.154	0.106	-0.122*	0.016
$\frac{D^*_{t-1}}{K_{t-1}} * D95$	-0.102	0.066	-0.048	0.091	-0.037*	0.008
$\frac{D^*_{t-1}}{K_{t-1}} * D96$	-0.023	0.083	0.004	0.077	0.015*	0.007
$\frac{D^*_{t-1}}{K_{t-1}} * D97$	-0.010	0.050	0.027	0.078	0.059*	0.006
$\frac{D^*_{t-1}}{K_{t-1}} * D98$	-0.109*	0.039	-0.099	0.074	-0.086*	0.004
$\frac{X_{t-1}}{K_{t-1}} * D91$	0.387*	0.181	1.201*	0.427	0.909*	0.075
$\frac{X_{t-1}}{K_{t-1}} * D92$	0.007	0.141	0.387	0.291	0.050	0.040
$\frac{X_{t-1}}{K_{t-1}} * D93$	0.676*	0.255	1.083*	0.301	0.455*	0.078
$\frac{X_{t-1}}{K_{t-1}} * D94$	0.156	0.106	0.206	0.213	0.002	0.028
$\frac{X_{t-1}}{K_{t-1}} * D95$	0.113	0.125	0.018	0.203	-0.092*	0.015
$\frac{X_{t-1}}{K_{t-1}} * D96$	0.158	0.120	0.120	0.191	0.030*	0.014
$\frac{X_{t-1}}{K_{t-1}} * D97$	0.236*	0.080	0.166	0.183	0.068*	0.020
$\frac{X_{t-1}}{K_{t-1}} * D98$	1.000*	0.060	0.051	0.191	-0.054*	0.020
R^2	0.442					
Sargan			60.181		103.910	
p-value			0.262		0.206	
AR1			0.000		0.000	
AR2			0.005		0.005	
Instruments	t-2 t-3 lags for all variables					

Note: * denotes significance at the 5% level. AR1 and AR2 are the p values for the null hypothesis of no first order and second order serial correlation respectively.

Table 13: $\frac{EBITDA_t}{K_{t-1}}$: Within Groups Estimator

	Dependent Variable: $\frac{EBITDA_t}{K_{t-1}}$			
	Coeff.	Std. Error	Coeff.	Std. Error
$\frac{D^*_{t-1}}{K_{t-1}}\Delta loge_t$	-0.298*	0.093	-0.626*	0.110
$\frac{D^*_{t-1}}{K_{t-1}}$	-0.295	0.155	-0.320	0.156
$\frac{D_{t-1}}{K_{t-1}}$	0.119	0.127	0.099	0.118
$\frac{X_{t-1}}{K_{t-1}}\Delta loge_t$			0.664*	0.188
$\frac{X_{t-1}}{K_{t-1}}$			0.171	0.106
D91	0.015	0.023	0.015	0.022
D92	0.010	0.020	0.010	0.019
D93	0.008	0.020	0.009	0.019
D94	-0.062*	0.021	-0.061*	0.020
D95	0.012	0.026	0.014	0.026
D96	0.026	0.020	0.021	0.018
D97	0.009	0.022	0.004	0.021
D98	-0.033	0.028	-0.040	0.030
R^2	0.829		0.834	

* denotes significance at 5% level.

Table 14: $\frac{EBITDA_t}{K_{t-1}}$: GMM Difference and System Estimator

	GMM Difference Estimator				GMM System Estimator			
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Constant	0.012*	0.009	0.014*	0.007	0.084*	0.008	0.065*	0.009
$\frac{D^*_{t-1}}{K_{t-1}}\Delta loge_t$	-0.400*	0.032	-0.523*	0.034	-0.141*	0.024	-0.540*	0.031
$\frac{D^*_{t-1}}{K_{t-1}}$	-0.773*	0.048	-0.611*	0.023	-0.501*	0.016	-0.691*	0.018
$\frac{D_{t-1}}{K_{t-1}}$	0.332*	0.021	0.251*	0.010	0.216*	0.007	0.251*	0.008
$\frac{X_{t-1}}{K_{t-1}}\Delta loge_t$			0.136*	0.038			0.094*	0.032
$\frac{X_{t-1}}{K_{t-1}}$			0.418*	0.014			0.520*	0.016
D92					-0.019*	0.006	0.001	0.006
D93	-0.022	0.013	-0.022*	0.008	-0.021*	0.007	-0.004	0.008
D94	-0.066*	0.012	-0.072*	0.009	-0.091*	0.008	-0.072*	0.008
D95	0.073*	0.015	0.061*	0.009	-0.015*	0.007	0.022*	0.009
D96	-0.001	0.011	-0.019*	0.007	0.044*	0.008	0.019*	0.009
D97	-0.023*	0.010	-0.030*	0.008	0.021*	0.008	-0.010	0.010
D98	-0.047*	0.012	-0.059*	0.008	-0.033*	0.008	-0.065*	0.011
D99	0.007	0.010	0.026*	0.007	-0.001	0.009	-0.018*	0.009
Sargan	63.904		86.499		85.227		81.374	
p-value	0.145		0.264		0.066		0.070	
AR1	0.096		0.095		0.070		0.099	
AR2	0.595		0.781		0.807		0.759	
Instruments	t-2 and t-3 lags lags for $\frac{D^*_{t-1}}{K_{t-1}}$, $\frac{D_{t-1}}{K_{t-1}}$ and $\frac{X_{t-1}}{K_{t-1}}$							

Note: * denotes significance at the 5% level. AR1 and AR2 are the p values for the null hypothesis of no first order and second order serial correlation respectively.

Table 15: Currency Composition of Debt: I

	Dependent Variable: $\frac{D*_t}{D_t}$			
	Probit		Tobit	
	Coeff.	Std. Error	Coeff.	Std. Error
$\frac{X_{t-1}}{Sales_{t-1}}$	2.430*	0.549	0.727*	0.044
$logK_{t-1}$	0.137*	0.020	0.034*	0.002
ADR Dummy	0.250	0.147	0.041*	0.019
Tradeable Dummy	0.609*	0.104	0.063*	0.015
D90	-1.150*	0.323	-0.240*	0.045
D91	-1.133*	0.269	-0.212*	0.036
D92	-1.154*	0.262	-0.188*	0.035
D93	-0.865*	0.265	-0.155*	0.034
D94	-0.845*	0.262	-0.091*	0.033
D95	-0.615*	0.283	-0.127*	0.034
D96	-0.809*	0.275	-0.141*	0.035
D97	-0.839*	0.271	-0.119*	0.035
D98	-0.711*	0.279	-0.107*	0.035
D99	-0.755*	0.284	-0.138*	0.036
σ			0.276*	0.006
Log L	-392.255		-327.599	
No. of Obs.	1418		1418	

The ADR dummy and the tradeable dummy take the value 1 for firms that issue ADRs and are in the tradeables sector respectively. σ refers to the standard deviation of the error term.

Table 16: Currency Composition of Debt: II

	Dependent Variable: $\log\left(\frac{D_t^*/D_t}{1-D_t^*/D_t}\right)$							
	OLS		Within Groups		GMM Difference		GMM System	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Constant	-5.505*	0.384			0.187	0.129	-4.344*	0.477
$\frac{X_{t-1}}{Sales_{t-1}}$	3.733*	0.279	1.348*	0.367	-1.792	1.108	3.814*	0.352
$logK_{t-1}$	0.346*	0.028	0.581*	0.243	1.311*	0.546	0.288	0.039
ADR Dummy	0.060	0.113						
Tradeables	0.449*	0.102						
D1990	-0.318	0.235	-0.163	0.208				
D1991	-0.222	0.240	-0.034	0.207				
D1992	0.009	0.232	0.231	0.213			0.063	0.102
D1993	0.062	0.221	0.357	0.183	-0.078	0.177	0.245*	0.099
D1994	0.460*	0.226	0.765*	0.180	0.157	0.154	0.550*	0.108
D1995	0.131	0.222	0.585*	0.165	-0.399	0.199	0.473*	0.108
D1996	-0.010	0.239	0.349	0.177	-0.208	0.208	-0.049	0.132
D1997	0.118	0.251	0.288	0.179	-0.137	0.153	0.092	0.144
D1998	0.265	0.243	0.374*	0.156	-0.122	0.158	0.224	0.130
D1999	0.063	0.251	0.102	0.130	-0.578*	0.148	-0.027	0.141
D2000					-0.240	0.159	-0.068	0.141
R^2	0.339		0.750					
No. of obs	1255		1255		873		1047	
Sargan					30.212		53.493	
p value					0.607		0.417	
AR(1)					0.000		0.000	
AR(2)					0.081		0.070	
Instruments					t-2 and t-3 lags of exports and capital stock			

Note: The ADR dummy and the tradeables dummy take the value 1 for firms that issue ADRs and are in the tradeables sector respectively. * denotes significance at the 5% level. AR1 and AR2 are the p values for the null hypothesis of no first order and second order serial correlation respectively.

Table 17: Currency Composition of Debt: III

	Dependent Variable: $\log\left(\frac{D_t^*/D_t}{1-D_t^*/D_t}\right)$			
	GMM Difference		GMM System	
	Coeff.	Std. Error	Coeff.	Std. Error
Constant	-0.037	0.113	-0.622*	0.185
$\log\left(\frac{D_{t-1}^*/D_{t-1}}{1-D_{t-1}^*/D_{t-1}}\right)$	0.334*	0.047	0.761*	0.015
$\frac{X_{t-1}}{Sales_{t-1}}$	-2.188*	0.805	0.992*	0.120
$logK_{t-1}$	0.985*	0.448	0.051*	0.014
D1992			-0.037	0.098
D1993	0.158	0.158	-0.038	0.102
D1994	0.279	0.136	0.108	0.088
D1995	-0.222	0.160	-0.059	0.087
D1996	0.062	0.162	-0.404*	0.099
D1997	0.166	0.142	-0.097	0.101
D1998	0.099	0.141	-0.083	0.089
D1999	-0.341*	0.121	-0.394*	0.098
D2000	0.083	0.149	-0.207	0.104
N	873		1047	
Sargan	38.889		83.66	
p-value	0.849		0.283	
AR(1)	0.000		0.000	
AR(2)	0.301		0.957	
Instruments	t-2 and t-3 lags of exports and capital stock			

Note: * denotes significance at the 5% level. AR1 and AR2 are the p values for the null hypothesis of no first order and second order serial correlation respectively.