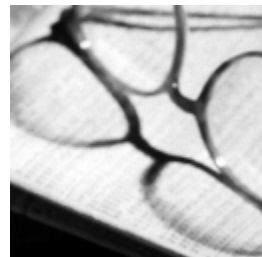# Financial Dollarization and Debt Deflation under a Currency Board

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Abstract

In the late currency board years, Argentina faced a real exchange rate adjustment through price deflation amidst growing devaluation expectations. Using a firm-level panel database to analyze the incidence of these factors on the currency composition of private debt and on firms' performance, we find that widespread debt dollarization showed no relationship with the firms' production mix or the ever-changing probability of a nominal devaluation. While relative price changes favored export-oriented firms with the expected impact on sales, earnings and investment, increases in devaluation expectations elicited only a marginal differential response in investment from more financially dollarized firms. Our findings provide support to two criticisms faced by the Argentine currency board in recent years, namely, that by fueling beliefs in an implicit guarantee it stimulated across-the-board debt dollarization, and that it could not fully isolate the economy from real shocks, as the feared balance sheet effect was replaced by a gradual but equally deleterious debt deflation effect.

I.   Introduction

Firm-level effects of exchange rate volatility have been increasingly at the center of the exchange rate regime debate for developing economies. In a nutshell, the so-called "balance sheet" approach emphasizes that, by funding domestic credit in a foreign currency (either through dollarized domestic savings or through foreign borrowing), systemic exposure to exchange rate risk increases either at the bank level (if financial regulations allow institutions to run unbalanced foreign currency positions) or, more typically, at the firm level (more precisely, through the exchange rate risk exposure of dollar indebted non-dollar earners). This approach has been used to argue against attempts to deepen financial intermediation in emerging economies through increased reliance on a foreign currency, and to criticize exchange rate-based stabilizations that induce financial dollarization through the perception of a public exchange rate guarantee. On the other hand, it has also been used to explain the propensity of developing economies to reduce exchange rate volatility under any de jure exchange rate regime, and to argue in favor of the adoption of superfixed exchange rate arrangements (including unilateral dollarization).[1]

Exchange rate-related balance sheet effects, however, are a more general phenomenon ultimately derived from the lack of a strong national currency. Emerging economies tend to have *weak currencies*, namely, currencies that are not accepted as store of value either domestically or internationally. In the domestic case, the immediate symptom is that the public prefers to save mainly in a foreign currency (inducing financial dollarization) or, if this is restricted by the monetary authorities, in short-term local currency assets or directly offshore. As a result, when financial dollarization is allowed, debtors from the non-tradable sector end up with debts denominated in tradables, increasing their exchange rate exposure. On the contrary, when not dollarized, "a country with a weak currency displays pronounced short-termism in financial contracts, with investors lured towards the peso by instruments that re-price very frequently (e.g., deposits with interest rates that adjust daily in line with the overnight rate)."[2]

Although, in general, partially dollarized weak currency economies are likely to suffer from *both* currency and maturity mismatches, intuitively, countries where the first one is prevalent will tend to carefully manage their exchange rates while those where the second problem dominates will adapt their monetary policy in order to minimize the real effects of an interest rate defense of the exchange rate. Thus, irrespective of the de jure regime reported by the country, the de facto exchange rate policy will be to a large degree determined by the relative importance of currency and maturity mismatches, and their perceived consequences.[3]

While the literature has tended to focus on the adverse effects of an unexpected nominal devaluation in the presence of (bank- or firm-level) currency mismatches, it is essential to note that a superfixed regime that successfully prevents a sharp nominal devaluation does not protect a country from the balance sheet effects of a real exchange rate (RER) adjustment. On the contrary, under a peg, RER overvaluation is corrected through a process of deflation that reduces the relative price of non-tradables eroding the capacity to pay of debtors from the non-tradable

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[1] Examples include De la Torre et al. (2002), Ize and Levy Yeyati (2003) and Burnside et al. (2001), in the first case, and Calvo (2002), Calvo and Reinhart (2002) and Haussman, Panizza and Stein (2001), in the second. By financial dollarization we refer to the holding by residents of foreign currency-denominated assets and liabilities.

[2] De la Torre, Levy Yeyati and Schmukler (2002). Argentina is a good example of the first type: in the currency board period, financial dollarization was not only tolerated but also fostered by the authorities. A good example of the second type is Brazil, where not only dollar intermediation is severely restricted but also interest rate indexation has been widely used in the past as a "policy crutch" to bolster financial intermediation in the local currency.

[3] See Levy Yeyati and Sturzenegger (2002), and references therein.

sector *regardless of the currency of denomination of their loans*, in line with Fisher's (1933) classical "debt deflation" argument. By contrast, in a country *without* financial dollarization, the adjustment to a more depreciated equilibrium RER that comes through nominal depreciation of a flexible exchange rate *improves* (via debt dilution) the capacity to pay of debtors in the non-tradable sector, partially offsetting the negative impact of the devaluation from the rise in the price of tradable inputs.[4] Balance sheet and debt deflation effects can be regarded to a large extent as two sides of the same real exchange rate exposure problem in dollarized economies.

In spite of their growing importance in both policy and theoretical debates, the empirical relevance of balance sheet and debt deflation effects remains largely an open question. The analytical literature contrasts with the scarcity of empirical studies assessing the real magnitude of these effects. Among the few available articles, Bleakley and Cowan (2002) analyze the effect on investment of holding foreign-currency denominated debt during devaluations using a sample of 500 non-financial publicly traded companies from five Latin American countries. They find that the expansionary competitiveness effect associated to exchange-rate realignments offsets the potential contractive balance sheet effect on investment. They also find that, after depreciations, earnings are higher for firms holding more dollar debt, suggesting the presence of investment opportunities that arise from the change in relative prices. Thus, the authors conclude that there is no severe currency mismatch of output and liabilities. Firms match the currency composition of their debt with the exchange rate elasticity of their income.

Forbes (2002) analyzes firm effects on publicly traded companies from 42 countries to examine the impact of 12 major currency depreciations. She finds no significant debt effects on performance after depreciations (the currency composition of debt is not analyzed), although firms with higher debt ratios tend to show lower net income growth. As expected, firms with a higher share of foreign sales exposure perform better after depreciations. In the year after depreciations, firms show larger growth in market capitalization than in net income suggesting that the reallocation of resources forced by devaluations need time to materialize, although these effects are anticipated by market values.[5]

A series of articles look at the determinants of capital structure and balance sheet effects for Mexican companies around the Tequila crisis. Martinez and Werner (2002) find that, during the fixed exchange-rate period before the December 1994 crisis, companies show no relationship between the currency composition of their debt and output. Instead, under a floating regime after the crisis, companies are less likely to show currency mismatches between debt and output. These results are contradicted by Aguiar (2002) and Gelos (2003), who find a positive relationship between firms' foreign-currency denominated debt and exports before the Tequila crisis. In an related piece, Harvey and Roper (1999), in the context of the Asian crises, presents evidence that Asian corporations "bet" on the stability of the exchange rate by favoring less

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[4] See Obstfeld (2001). Moreover, if the debt bears fixed interest rates (as is usually the case in Argentina), peso debt behaves countercyclically, as non-tradable producers benefit from the partial pass-through of a nominal devaluation to domestic prices while the debt burden remains constant. Real exchange rate risk, in this case, is born by the lender.

[5] Campa and Goldberg (1999) and Nucci and Pozzolo (2001) consider the effect of exchange rate fluctuations on investment decisions at the industry and firm level, respectively. They find that positive effects of a depreciation of the local currency are associated to larger shares of exports as percentage of total firm production, and negative effects are associated to the share of imported inputs. While these studies do not consider balance sheet effects directly (and use no financial information), the reported effects of exchange rate suggest that firms are not perfectly hedged against exchange rate risk

costly dollar debt at a time of declining profitability, benefiting with higher short–term returns at the expense of a larger currency exposure that ultimately exacerbated the extent of the crisis.

Our paper intends to contribute to this growing literature by looking at balance sheet in the late years of the Argentine currency board. While most of the literature on balance sheet effects focuses on fluctuations in the nominal exchange rate, either under a flexible regime or as a result of the collapse of a peg, our study addresses the impact of debt deflation, namely, the effect of an adverse external shocks under a peg through changes in the real exchange rate and price deflation in the local currency. As price deflation induces increases in the real value of the debt regardless of the currency denomination, balance sheet effects through both dollar and peso denominated debt are considered in our study.

Our focus lies on two potentially relevant effects stressed by the analytical literature: i) the incidence of exchange rate policy on the currency composition of private debt, and ii) the incidence of real shocks on firms with real exchange rate exposures. The first issue relates to the presence of implicit guarantees provided by fixed exchange rate regimes. The relevant question is whether a peg creates an implicit exchange rate guarantee that reduces the firms' willingness to pay the cost of hedging their positions (in the case of non-tradable producers, by paying the additional cost of peso funding).[6]

The second issue is directly related to the implications of a pegged exchange rate regime and to the dilemma between nominal deflation and devaluation (alternatively, debt deflation or balance sheet effects) as a response to a substantial RER misalignment. While in principle there is a symmetry between the two as both eventually converge to an equilibrium RER level, in practical terms there is a tradeoff between gradualism (at the cost of a long recession) and shock therapy (at the cost of abrupt financial disruptions). In the Argentine experience analyzed in this paper, the effects are entirely generated by the gradual deflation process. By contrast, no conclusion can be extracted concerning standard devaluation-related balance sheet effects based on the sample analyzed in this study, as the nominal exchange rate was kept constant over the period.[7]

The map of this paper is as follows. Section 2 describes the period of analysis and provides some basic macroeconomic background. Section 3 presents our data. Section 4 lists the hypotheses to be tested empirically. Section 5 describes the methodological approach. Section 6 discusses the empirical results, and section 7 concludes.

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[6] Note that prudential norms in the financial sector limited at the time the exposure to exchange rate risk at the bank level, but were completely silent regarding currency mismatches at the firm level. In particular, no discrimination was made in relation to the tradable component of debtors' production mix. From a normative perspective, the question intends to explore whether firms in the non-tradable sector internalized the risk associated with a currency mismatch between earnings and financial costs. For more general discussions on ways in which a peg may induce financial dollarization, see Ize and Levy Yeyati (2003), Burnside, Eichembaum and Rebelo (2001) and Broda and Levy Yeyati (2003). See also the discussion of the empirical evidence in Harvey and Roper (1999).

[7] Indeed, the pesification (that is, the compulsory conversion of dollar liabilities at the one-to-one exchange rate) of all domestic liabilities that followed the January 2002 devaluation all but eliminated any potential balance sheet effect, so that an assessment of the latter in Argentina will remain a speculative issue. A proxy analysis can still be conducted based on external corporate exposure, exploiting the fact that external debt could not be unilaterally converted. The impact, however, is also muted here, since most of this debt is in the process of being renegotiated under the umbrella of the sovereign default and extensive controls to capital transfers.

II. Macroeconomic Setting

Exploring the empirical answer to our questions requires the combination of widespread financial dollarization with an important variability in both real exchange rate and devaluation expectations. The late 1990s in Argentina satisfy these requirements. Dollarization was extensive at both sides of the banks' balance sheet. The real exchange rate went through important variations as the steady appreciation of the dollar that characterized the 1990s compounded with the stream of devaluations triggered by the Asian crises and the Russian default that led, finally, to the devaluation of the Brazilian real in 1999. As a result, the latest Convertibility years witnessed a contractionary adjustment through price deflation. Moreover, these external shocks fueled sizable and volatile devaluation expectations. We exploit these elements, plus a rich firm-level panel database, to investigate the response of debt composition and performance to real exchange rate changes. Table 1 presents a summary of the major economic and political events during the Convertibility period. The evolution of key macroeconomic variables is illustrated in Appendix 1.[8]

We analyze the period from 1993 to 2001. The study starts in 1993 as data quality and availability becomes poorer for earlier years. Our last observations correspond to 2001, right before the devaluation and pesification of loans and deposits that ended the Argentine currency board period. Thus, our sample comprises almost all the Convertibility era including the Tequila crisis and the final recession that started in 1998.

III. Data Description

Our Sample

As explained, we study the evolution of companies' balance sheets from 1993 to 2001. We consider annual observations using information from companies' statements.[9] We restrict our sample to non-financial companies. Given that currency mismatches are affected by banking regulation, the capital structure of banks is not comparable with the behavior of non-financial companies. As our estimation methodology requires the use of lagged variables as instruments, we exclude companies for which balances are not available for some intermediate year. To avoid having a panel of very short duration, we also exclude companies for which there are less than four years of information after 1995. Our sample of firms is composed of three types of companies: publicly traded companies, publicly held but not publicly traded companies, and privatized companies.

Information from publicly traded companies is available from the Buenos Aires Stock Exchange. We consider all the non-financial publicly traded companies for which there is a minimum of four observations from contiguous years since 1995. A total of 71 companies satisfy these conditions. The data for these publicly traded companies were obtained from the financial data company *Economatica*.

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[8] For a detailed account of the Argentine economy over the currency board period, see Levy Yeyati (2001) and references therein.
[9] A table with variable definitions and sources used in the paper is presented in Appendix 2

We also took advantage of the fact that a large number of formerly state-owned companies were privatized in Argentina. The privatization process took place during the period 1990-98. Although most of these companies are not publicly traded, they are obliged to report their financial information to the regulatory agencies. We followed the balance sheets presented by the privatized companies to the regulatory agencies of the Air Transport, Airports, Electricity, Gas, Telecommunications, Water and Sewerage, Railways, and Postal Services sectors. Financial data for a total of 56 non-financial privatized companies (with at least four observations for contiguous years since 1995) were obtained through this process.

We completed our database tracking data for non-publicly-traded non-privatized companies. Some companies, although not publicly traded, present regularly their financial information to the Buenos Aires Stock Exchange because they have issued publicly traded debt bonds, or because they intend to be publicly traded at some point. Data for 18 non-financial firms of this type were obtained directly from the Buenos Aires Stock Exchange. Finally, companies that are publicly held but not publicly traded and that incorporated in the city of Buenos Aires have to present their annual balances to the General Inspection of Justice (the enforcement of this rule is somewhat loose). We requested to this public office the financial information for the top 100 firms (according to the 2001 ranking of sales of the specialized business magazine *Mercado*) not covered by the other sources of information described above. Data for 57 non-financial non-publicly traded companies (with at least four observations from contiguous years since 1995) were obtained through this procedure.

Thus, our database comprises a total of 202 firms. Table 2 summarizes the number of companies and observations available for each year. The panel gets thinner for the first years because of data unavailability and because some companies were privatized after 1993. It is also thinner for 2001 because of companies' delays during the 2002 crisis in presenting their financial information. the complete list of firms included in the study and the years for which data are available for each company are reported in Galiani et al. (2003).

We classify the companies in our sample according to their main sector of economic activity (at CIIU-2 digit level). For each of these CIIU sectors we have available a price index that will allow us to measure relative price movements. The 202 companies participate in 33 sectors. We then classify these sectors as tradable or non-tradable according to their production composition. We perform this classification at the sector level using information from the Argentine national accounts, because company data do not disaggregate between domestic and external sales. In Table 3, a firm is classified as tradable if the expo share (the 1993-2001 average of the ratio of exports over total value added) of its sector of activity is larger than the median of the sector export shares across all the companies in our sample.[10] This procedure divides our sample in a tradable half and a non-tradable half.

Table 4 reports the summary statistics for all the observations of our sample for selected variables of interest splitting the sample between tradable and non-tradable companies. A main finding is noteworthy and anticipatory of our results. It appears to be no correlation between the tradable nature of firms' output and the currency composition of their debt. Tradable and non-tradable companies show very similar debt and dollar-debt ratios.[11] If anything, non-tradable

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[10] We obtain similar results by classifying our firms as tradable when they belong to the agriculture, mining or manufacturing sector, and as non-tradable for the other sectors.
[11] These numbers, in turn, are consistent with the level of financial dollarization observed for the whole economy (Figure A3).

firms display a slightly higher level of debt dollarization. This contrasts with what one would expect in the absence of exchange rate guarantees and given the deflationary period of the late 1990s. On the other hand, the table reveals that tradable producers were favored by the relative price changes over the period. Prices followed the GDP deflator very closely for the tradable sectors, while they displayed a decline of around 10% for the non-tradable sector.

There is also little difference concerning the other variables. Companies in both sectors seem to have, on average, similar size according to assets. The evolution of sales over assets was similar across sectors. During the period of analysis, non-tradable companies show larger investment and earnings. By construction, the export (and import) shares of the firms classified as tradable producers are obviously larger than for the non-tradables. Table 5 presents the same data in more detail, ordering sectors according to their export content. Again, no apparent pattern appears relating tradable content of the production mix and dollar debt ratios (the correlation coefficient between these two variables is a mere 8.8%).

Measurement of Real Exchange Rate Exposure and Debt Deflation

Key to our analysis is the definition and measurement of firms' RER exposure. This variable should tell us how firms' value changes in the event of a devaluation. However, this definition combines stock and flow effects that are crucial in the estimation of value. Regarding stocks, the RER exposure depends heavily on the liability side of the balance sheet, given that domestic firms typically hold non-tradable physical assets. However, it is in the flow dimension (related with the company's income statement) where the debt deflation effect is more deleterious, as dollarized firms with income only marginally correlated with the nominal exchange rate or, more generally, with income sensitive to fluctuations in the real exchange rate, are more likely to face a financial constraint that may limit its operations and eventually precipitate bankruptcy.[12] On the flow dimension, the real exchange rate exposure has to take into account not only the currency composition of debt (which determines the peso value of their financing expenses) but also the composition of its production mix. In light of this, we understand the real exchange rate exposure of a firm under a peg as the sensitivity of net income to changes in the real exchange rate.

Given the available data, we measure this exposure operationally combining debt composition and export orientation (under the realistic assumption that the dollar price of tradables is less sensitive to changes in the real exchange rate). The former is computed at firm level as the dollar-to-total debt (*Dollar Ratio*). For the latter, we compute the export content (measured as the export-to-value added ratio, or *Expo*) for the 33 sectors comprised in our database (at CIIU-2 digit level), and assign firms to these sectors according to their production mix. Thus, a firm will have a larger RER exposure the larger the dollar share of its debt, and the smaller the export component of its predominant sector. We also compute and use import content (*Impo*) in the same way. However, this variable should be treated with caution. First, a sector may use imported inputs that are purchased from retailers in the domestic market. Second, firms with high import-content inputs may compete with imported final products in the domestic market. Although they will be hit by the relative price adjustment that follows a devaluation, these firms may, at the same time, benefit from weaker competition from more expensive rival imports.

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[12] As noted before, firms with tradable (but not traded) output may also suffer from imperfect dollar indexation, as domestic prices of tradables adjust to international ones only gradually.

Debt deflation, in turn, is measured in two indirect ways. First, we follow the evolution of the real effective exchange rate (*RER*) during the period, as a proxy for exchange rate misalignments that are corrected over time through relative price adjustments. A fall in the *RER* would then be associated with the presence of debt deflation. Second, we use *Deflator*, computed as the price index of the sector normalized by the GDP deflator, to measure relative price movements across sectors of different degrees of tradability. Thus, a fall in this variable (alternatively, a negative change in the ratio between the sector and the aggregate price deflators) would be associated with an adverse relative price adjustment. This allows us not only to follow actual relative price changes but also to observe the extent to which adverse real exchange rate shocks are accommodated through nominal deflation. More precisely, we are able to test whether, in the event of a negative real shock, less tradable sectors are hit by a decline in relative prices.

Finally, devaluation expectations are proxied by the peso-dollar interest rate spread (from interbank lending rates).[13] We also use *RER* (a signal of impending relative price adjustments) as an alternative. As noted, devaluation expectations are key to explain a differential response as a function of debt currency composition in a context in which expectations of an exchange rate devaluation may not materialize in practice.

IV. Hypotheses[14]

Capital Structure

Under Convertibility, dollar and peso debt in Argentina only differed in that the former has higher risk and lower financing costs than the latter. A key question regarding the impact of financial dollarization is, then, which of these countervailing aspects dominated. More precisely, we hypothesize that:

> *H1: In the absence of (explicit or implicit) exchange rate guarantees, debt currency composition should reflect the currency composition of the debtor's income. Firms in sectors with a larger tradable component should display a larger dollar debt share.*

Moreover, it was widely believed (as witness the presence of a persistent and highly volatile currency premium) that there was a positive probability of abandoning the currency board, which, in the absence of exchange rate guarantees, should have deterred non-tradable producers from dollarizing their funding sources. Thus, again in the absence of guarantees, an increase in devaluation expectations, as reflected in larger currency premiums, should have raised the risk associated with exchange rate exposure and moved (partially) unhedged (i.e., currency mismatched) debtors to reduce it. In this regard,

> *H1a: Absent (explicit or implicit) exchange rate guarantees, devaluation expectations should lead firms to reduce their real exchange rate exposure. The (positive) relationship between loan dollarization and the tradable component of the production mix of the debtor should strengthen as devaluation expectations increase.*

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[13] Our results are unaffected if alternatively we use the deposit rate (highly correlated, albeit less sensitive, than its interbank counterpart).
[14] Although we do not derive them from a formal model, these hypotheses, which encompass different ideas usually presented in policy and analytical discussions, are a useful guide to orient our empirical exploration.

Finally, in the particular case of Argentina, there is an additional aspect that may have played a role in the currency composition of debt, namely, the fact that most privatized companies in regulated sectors were legally endowed an explicit exchange rate guarantee through indexation of their rates to the United States' Consumer Price Index. While the preservation of dollar indexation in the event of a sizeable devaluation may have been an unrealistic assumption, it could be argued that companies with dollarized prices should have mirror more closely the behavior of tradable producers. To check this in the data, we test whether hypotheses H1 and H1a cease to hold for privatized companies with dollar-indexed prices.

Real Exchange Rate Adjustment and Debt Deflation

In the presence of (limited) nominal flexibility under a peg, an adverse external shock should have induced an accommodating relative price adjustment hitting non-tradable producers more than tradable producers. This is, in essence, the mechanism through which debt deflation materializes in practice. Accordingly, we expect that the real exchange rate misalignment that resulted from the successive adverse shocks that characterized the Argentine economy during the late 1990s should have reflected in a deterioration of the relative performance of non-tradable producers. In particular, we expect the RER adjustment to show in both relative price deflation and a fall in demand (sales), affecting the firm's returns and, through this channel, the investment performance. This prior leads to the following hypothesis:

> *H2: The impact of an RER adjustment through debt deflation on firm performance is positively correlated with the non-tradable component of the production mix of the debtor.*

On the other hand, one could argue that, due to the presence of a persistent "peso problem," dollar debtors indeed benefited in good times from (sometimes substantially) lower financing costs, which eventually showed in a better performance and, through this channel, additional internal funds to finance new investment.[15] Thus, once debt deflation is controlled for, a higher dollar debt ratio may be found to be positively (rather than negatively as conventional wisdom would indicate) correlated with firm's returns and investment. In line with this, we test the following:

> *H2a: In the absence of a nominal devaluation, debt dollarization is positively correlated with performance.*

Firms' Expectations and Anticipated Debt Deflation

As noted, many of the existing studies on balance sheet effects assume that investment reacts ex-post to changes in the exchange rate. While this is true under a flexible regime where the exchange rate supposedly reflect all the information currently available, devaluation expectations under a peg may precede actual changes in the nominal exchange rate, thus inducing an anticipatory reaction in investments plans. Indeed, even if the negative expectations do not materialize, lack of confidence could induce firms to react, cutting investment plans preemptively. In either case, the probability of a devaluation (rather than shocks in fundamentals or even relative price adjustments) should be the key control variable.

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[15] By good times we refer to the years in which devaluation expectations were not confirmed by real fundamentals and deflation was not already at play.

H3: Investment was negatively correlated with devaluation expectations, the more so the higher the firms' real exchange rate exposure.

V. Methodological Considerations

Estimation Methods

We first consider estimation methods for the simple AR(1) model:

$$y_{it} = \alpha y_{it-1} + (\mu_i + \varepsilon_{it}); \; |\alpha| < 1; \; i = 1, ..., N; \; t = 1, ..., T \qquad (1)$$

where μ_i is an unobserved firm-specific time-invariant effect, and ε_{it} is a disturbance term independent across firms. The asymptotic analysis assumes that T is fixed. As it is well known, both the Ordinary Least Squares (OLS) and Least Square Dummy Variables (LSDV) estimators of α are inconsistent. Standard results for omitted variable bias indicate that, at least in large samples, the OLS estimator is biased upward and the LSDV estimator is biased downwards. The fact that these two estimators are likely to be biased in opposite directions is useful since a consistent estimator must lie between the OLS and the LSDV estimates, or at least not be significantly higher than the former or significantly lower than the latter (see Bond, 2002). We exploit this result in the ensuing analysis to check for the validity of our estimates.

An alternative method to eliminate μ_i consist in first differencing equation (1). Note, nonetheless, that, after differencing, y_{it-1} is correlated with the differenced equation error, $\Delta\varepsilon_{it}$. Arellano and Bond (1991; AB) propose an efficient (among its class) linear estimator that is consistent even in panels with small and fixed T. They note that, as long as ε_{it} is serially uncorrelated, all lags of y beyond t-1 are valid instrument for the differenced equation in period t. Consequently, a consistent estimator of the parameters of interest is obtained by using appropriately lagged variables as instruments.[16]

Generically, in this paper we adopt a dynamic specification for our empirical models and postulate dynamic two-way fixed effects error component models of the following general form:

$$y_{it} = \varphi y_{it-1} - \beta(L) \, x_{it} + \lambda_t + \mu_i + \varepsilon_{it} \qquad (2)$$

where x_{it} is a vector of covariates that varies both across firms and time (possible including interaction terms between aggregate and firm level variables), and where $\beta(L)$ is a lag-polynomial at most of order 1.

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[16] The consistency of the GMM estimator proposed by Arellano and Bond (1991) depends crucially on the absence of serial correlation in ε_{it}. If the disturbance ε_{it} is not serially correlated, there should be evidence of significant negative first order serial correlation in the differenced residuals, but there should not be any evidence of second order serial correlation in the differenced residuals. Arellano and Bond (1991) develop tests for first and second order correlation in the differenced residuals. These tests are asymptotically standard normal distributed under the null hypothesis of no serial correlation. More generally, they propose to rely on Sargan tests of overidentifying restrictions to evaluate the specification of the estimated model. The Sargan test is asymptotically distributed Chi-squared under the null hypothesis of no correlation among the instruments and the residuals of the transformed model.

Different moment conditions will be available depending on what is assumed about the correlation between x_{it} and the components of the error term. We consider two cases here. First, let x_{it} to be strictly exogenous in the sense that is uncorrelated with all past, present and future realizations of ε_{it}. However, in this case, we do not exploit the extra moment conditions available to instrument the lagged dependent variable in the transformed model.[17] Second, let x_{it} to be endogenous in the sense that is correlated with present (and past) realizations of ε_{it} but is uncorrelated with all future realizations of the disturbance term. In this latter case, x_{it} is treated symmetrically with the dependent variable y_{it}. Again, in this case, we do not exploit all the moment conditions available to instrument the endogenous x's regressors in the transformed model.

In what follows we report OLS, LSDV and AB estimates. We also report Sargan, AR(1) and AR(2) tests. All GMM estimates are optimal two-step ones (see Hansen, 1982). We always report *corrected* 2-step standard errors using Windmeijer (2000) finite sample correction methodology.[18]

Econometric Specification

Based on our baseline specification (1), the test of our capital structure hypotheses H1 and H1a on the effect of the currency composition of income on the currency composition of debt takes as dependent variable the dollar-to-total-debt ratio (*Dollar Ratio*) and includes as controls: lagged real sales (to control for firm size), year effects (to control for common macroeconomic factors), and firm effects (to control for firm-specific characteristics). In addition, we use the sector export share measures (*Expo*) to control for export orientation.[19] Both dynamic and cross-section results will be reported. While the former would indicate how currency debt composition varies with changes in export content, these changes are likely to be small during the sample period. In particular, they display smaller variability over time than across firms. Thus, we expect any correlation between production mix and debt composition to be more visible using a cross section approach.

Both *CRISK* (currency risk) and *RER* (real effective exchange rate) are used to control for devaluation expectations. We expect non-export oriented firms to de-dollarize their liabilities as these expectations worsen. Hence, we interact the expectation variables with the export share to test whether the sensitivity of debt composition (if there is any) is correlated with the non-tradable content of the firms' output mix.

To test for the impact of debt deflation on firm behavior (H2) we use two performance measures: the sales-to-assets ratio (*Sales*) and the earning-to-asset ratio (*Earnings*). In the regressions we control for time and fixed effects, and for the firm's leverage ratio (lagged). In addition, we use the *Expo*, *RER*, and *CRISK*, and their interactions. Finally, we include the sector deflators (*Deflator*) to tests the incidence of expectations, which may be traced to the incremental effect of currency risk on investment once relative price measures are controlled for.

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[17] There is always a trade-off when applying an instrumental variable estimator. We want to obtain estimates that are as efficient as possible while avoiding small finite-sample bias.

[18] The standard two-step procedure would yield biased estimators of the standard errors in samples of our size.

[19] We also include the lagged export share for robustness. Import shares (*Impo*), also tested, did not yield significant results and were omitted for brevity. All ommited results are available from the authors upon request.

We expect a negative real shock to affect non-tradable producers both through quantities and prices. Thus, when *Sales* and, after controlling for the latter, *Earnings* are our dependent variables, we expect that the coefficient of the interaction of *RER* with *Expo* to be positive. In both cases, we also include *Deflator* to control for the incidence of relative price variations on earnings. Here, we expect the coefficient to be negative.

Note also that hypothesis H2a would imply that, once other measures of price deflation are included, the coefficient corresponding to the dollar debt ratio would be positive in the performance regressions. Indeed, if investment reacts *a posteriori* to performance (for example, due to the access to internal funds of financially constrained firms), investment may also respond positively to dollar ratios in good times, given that dollar debt was, ex-post, less costly for Argentine firms during the period of analysis. We include *Dollar Ratio* (lagged) in the earnings regression to test this in the data.

Finally, we run regressions of (net) purchases of physical capital (*Investment*) on the previous set of controls, including both sales and earnings in the preceding period to test our H3 hypothesis on the effect of devaluation expectations on investment. We expect these coefficients to have a positive sign reflecting the incidence of the availability of internal funds.

VI. Empirical Results

Tables 6 and 7 report the results on firms' debt composition and test our capital structure hypotheses. Tables 8 to 10 test the impact of real shocks on sales, earnings and investment in physical capital, as a function of the firms' export content and the evolution of relative prices, as well as the impact of devaluation expectations on investment.

Regarding the former, Tables 6 and 7 consistently show that the dollarization of corporate debt in convertible Argentina did not exhibit any relation with the tradable nature of the firms. There is no relationship either with the impending price adjustment as the RER fell during the last part of the decade. Table 6 presents a simple cross-section estimation of our baseline specification (including leverage ratio, firm size measured by assets, and export orientation as explanatory variables) using firm averages over the sample period. The results reveal a positive and significant association between the debt dollar ratio and both firm size and indebtedness. On the contrary, export orientation is negatively, albeit not significantly, related with debt dollarization, contradicting hypothesis H1 on the relationship between output and debt composition (column 2). As noted, many privatized companies were benefited by an explicit exchange rate guarantee in the form of dollar indexation of their tariffs. However, controlling for the presence of dollarized producers of services does not alter the results. Indeed, the coefficient for dollarized prices, while positive as expected, is not statistically significant (column 3).

Table 7 presents a fully specified dynamic model. We first present OLS and LSDV estimates of the parameters of interest as a check of the GMM estimates. As discussed in the previous section, consistent estimates of the coefficient of the dependent lagged variable must stretch out within the LSDV and OLS estimates. The GMM estimates we report exploit the

moment conditions proposed by Arellano and Bond (1991) as explained in the previous section.[20]

Coefficients differ as expected, with OLS closer to our cross-section estimates, and the coefficient of the lagged dependent variable estimated by AB lying between LSDV and OLS. We also report several specification tests. First, in all specifications, we test for the joint significance of the year effects. We also report the GMM estimates Sargan tests and the tests of first and second order autocorrelation of the transformed residuals as proposed in Arellano and Bond (1991). No sign of concern about the identification assumptions of the estimator used is reveled for any of these tests.

While the findings indicate that dollar ratios increase with leverage and size (possibly reflecting that firms need to reach a certain scale to gain access to the international capital markets), the evidence of a correlation between export orientation and debt dollarization is, at best, weak. The coefficient is positive in most of the specifications but barely significant only when estimated using fixed effects. In fact, once the model is consistently identified, by means of a GMM method (column 3), the sign of the *Expo* coefficient falls strongly suggesting the rejection of H1.[21] Note that we do not reject the hypothesis that the year effects are jointly equal to zero. In columns 4 and 5 we remove the year effects from the model and include the RER and CRISK measures. The estimated coefficients for these variables are not statistically significant. Since they do not span the same subspace that the year effects, we also test the exclusion restriction imposed. We do not reject it for any of the specifications reported.

It could be argued, however, that this specification biases our results towards lack of significance by bunching hedged exporters (for which currency risk should have been neutral) with unhedged non-tradable producers. To address this concern, in columns 6 to 9 we test whether the correlation between devaluation expectations and dollarization is stronger for the latter, interacting RER and CRISK with export orientation (similar results are obtained using the average export-content ratio over the period; see Galiani et al, 2003). Coefficients are positive as expected (with dollarization falling in relative terms with currency risk for firms with lower export orientation) but not significant. Again, none of the specification tests reported warns against our identification assumptions.

In sum, both hypotheses H1 and H1a are rejected by the data. Debt dollarization appears to have been a widespread phenomenon that did not respond to export orientation (or, for that matter, price indexation), nor was the result of positive devaluation expectation, as it is attested by the lack of sensitivity, both in general and for real exchange rate-exposed firms in particular, to currency risk (which varied dramatically over the period). At any rate, these findings only confirm the intuition provided by our first glance at the data, which revealed very high levels of debt dollarization regardless of the sector of activity.

Tables 8 to 10 address the link between debt deflation and firm performance. As noted, in Table 8 we run regressions of the sales-to-asset ratio on the relative price deflator and the firm's export orientation. Again, results conform to econometric theory. In column (3), the Sargan test

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[20] All available lags of the dependent variables are used as instruments. We also check the validity of these estimates by exploiting additional moment conditions as suggested in Blundell and Bond (1999). Results were always quite similar.

[21] The smaller coefficients obtained using using lagged values of *Expo* (ommited here for conciseness) further support this conclusion. See Galiani et al. (2003).

suggests that at least one of the moment conditions exploited by the estimator used is rejected by the data at the 5 percent level. Thus, in column 4 we treat both expo and deflator as endogenous variables. Results, however, are almost identical. The deflator displays, as expected, a positive coefficient (with favorable relative price changes increasing income), significant in most specifications. Thus, this finding, combined with the fact that the evolution of relative prices during the period of analysis negatively affected non-export oriented firms (Table 4), provides support to the view that a deflationary adjustment to a more depreciated real exchange rate tended to burden primarily non-tradable producers.

Deflation, in turn, affects firm earnings through a decline in income, as shown in the models reported in Table 9. The deflator coefficient is positive and significant when introduced alone (column 3), but loses explanatory power once sales are controlled for (column 4). No direct effect from real exchange rate changes is detected beyond their impact on relative prices as reflected in the sector deflator. The dollar debt ratio allows us to test H2b, namely, that a high dollar debt ratio in the preceding period, while ex-ante a one-sided bet for non-tradable producers exposed to RER changes, was profitable as long as a nominal devaluation did not materialize. Thus, debt dollarization may have enhanced, rather than hampered, firm performance through lower realized financing costs. The findings in Table 10 are consistent with this view. Larger dollar debt ratios are positively and significantly correlated with earnings in most specifications.22

Table 10 moves on to test the impact on investment. While the results indicate that deflation did have an effect on investment performance through its effect on earnings, other controls do not have additional significant incidence. Our baseline specification controls for profits, which as expected, display a positive and, in some regressions, significant coefficient. On the other hand, deflator and the dollar ratio either fail to be significant or display the wrong sign.

Finally, columns 4 to 7 address hypothesis H3 about the effect of devaluation expectations on investment behavior. Given the degree of debt dollarization, an increase in the perceived probability of a nominal devaluation should lead to changes in investment that are positively correlated with the export content of the firm, with larger content associated with larger investment expansions. Hence, the interaction between the expectation variable and export content should be positive. In turn, given export orientation, devaluation expectations should lead to changes in investment that are negatively correlated with the level of debt dollarization, with larger dollar ratios associated with smaller investment expansions. Hence, the interaction between the expectations variable and the debt dollar share should be negative.

As the table shows, the results are mixed. On the one hand, the real exchange rate (our proxy for devaluation expectations) does not exhibit any significant differential effect across sectors with varying export orientations (indeed, it displays the wrong sign), in line with findings in the previous tables and contradicting H3. On the other, increases in currency risk do appear to have exerted a significantly negative effect on investment decisions by more financially dollarized firms (column 7).

One possible explanation for these findings points at the anticipation of a low initial pass-through even for producers of tradables that are partially sold in domestic markets, as the market substitution process induced by the change in relative prices takes time. If so, the distinction

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22 This results are in line with the higher profitability of dollar-indebted Asian corporations reported in Harvey and Roper (1999).

tradable-nontradable would lead to an imperfect measure of the short-run real exchange rate exposure of the firm and, with a few exceptions (e.g. producers of traded commodities) devaluation expectations would impinge on the cash flows of all dollarized firms and, through this channel, on their investment plans. Note that this would reduce even further the scope for financial dollarization in a hedged environment. At any rate, this hypothesis deserves more careful empirical examination.

VII. Concluding Remarks

Using the specific case of Argentina, this paper helps illuminate the implications of a pegged exchange rate regime in two different dimensions, namely, the relation between a peg and the capital structure of the firm, and the distribution of the adjustment to real shocks while the peg is in place. On the former, we found that debt dollarization was the rule rather than the exception, and it born no relationship to the firm's production mix or the ever-changing probability of a sudden nominal devaluation. While the actual presence of an implicit guarantee cannot be directly tested in the data, the results reported here are broadly consistent to the conventional view that non-tradable producers disregarded real exchange rate exposures even during periods of sizable currency risk.

Two comments are in order concerning the previous point. First, we are ignoring the behavior of the supply side of the credit market. In particular, there is some anecdotal evidence that, in Argentina, access to peso funding was limited, the more so the higher the currency risk. However, while this could explain the resilience of dollarization ratios to changes in expectations, it does not detract from the fact that a simple cross section shows a *negative*, albeit not significant, correlation between these ratios and export orientation that is not driven by exchange rate-protected privatized companies.

The impact of debt deflation, while weaker, is still visible in the data. Relative price changes, which, due to the protracted deflation that characterized the period under analysis, favored export-oriented firms, had the expected impact on sales and earnings and, through the latter, on investment. Moreover, there is some evidence that dollarized firms benefited from lower financing costs during the convertibility period. This finding is not trivial, as financial costs (combined with a wrong incentive design) appear to have been an important factor contributing to the reluctance of financial officers to hedge their exposures.

Finally, and in line with the result on the currency choice, increases in devaluation expectations did not elicit any differential response on investment from those firms more exposed to real exchange rate risk, either through a large debt dollarization ratio or through a limited export orientation.

In sum, the core results of the paper seem in line with two criticisms that the Argentine currency board received in recent years. First, that by fueling beliefs in an implicit guarantee it stimulated dollarization across the board, even in a context of varying and recurrently high devaluation expectations. Second, that while it could postpone the real exchange adjustment over time, it could not completely isolate the economy from real shocks: the feared balance sheet effects were replaced by less dramatic but equally deleterious debt deflation effects.

Unfortunately, the discussion on balance sheet versus debt deflation effects is unlikely to be settled based on the Argentine case. On the one hand, the full impact of debt deflation cannot be assessed empirically because the devaluation interrupted what otherwise would have been a much longer contractionary process. On the other, after the devaluation, balance sheet effects materialized only to a very limited extent, as all domestic liabilities were compulsorily converted to the local currency at the exchange rate prevailing under the currency board. Nonetheless, the evidence presented here supports the concerns about the externalities associated with financial dollarization and the need to address the issue from a prudential perspective. Needless to say, the implication of any prudential norm requires an analysis of the supply side of the credit market, which would be the natural complement to the research presented in this paper.

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Table 1. Argentina: Chronology of Major Economic and Political Events

Date	Events
199103	Convertibility Law (fixed exchange rate to dollar and abolished all exchange and capital controls).
199108	Law protecting dollar denominated deposits enacted.
199110	Decree ordering reform of the state, including deregulation of financial market.
199304	Brady Plan agreement.
199307	Oil company (YPF) privatized as part of large privatization program. Second largest equity offering by a developing country and one of the largest in the world.
199407	New pension system began operating.
199412	Mexican Tequila crisis.
199500	Banking crises: suspension of 8 banks and collapse of 3 banks. A limited system of deposit insurance was introduced in response to the banking crisis.
199505	Re-election of President Menem after constitutional reform.
199607	Economy Minister Domingo Cavallo ousted.
199710	Heavy selling in Hong Kong caused a domino effect in other emerging market.
199805	Concern over the turmoil in Asian economies, financial problems in Russia.
199901	Devaluation of the Brazilian real.
199905	Macroeconomic figures were weak. GDP contracted 3.0% and unemployment rose to 14.5%. Export to Brazil declined significantly.
199910	President de la Rua elected, ending President Carlos Menem's 10-year Peronist party rule.
200010	Political crisis after allegations that a number of senators received bribes in exchange for backing a labor reform. Vice President Alvarez resigned. The country failed to meet its IMF-mandated fiscal targets due to slower third-quarter growth and high interest rates. Spreads on its FRB Bonds increased to more than 600 basis points.
200011	S&P lowered Argentina's local and foreign currency sovereign credit ratings. IMF-led coalition announced a US$39.7 billion aid package to prevent a debt crisis.
200012	IMF bailout.
200103	Deteriorated fiscal situation forced two economy ministers to resign and Domingo Cavallo took over as Economy Minister.
200106	A market-based solution was sought for the government's near inability to service debt by swapping US$29.5 billion of short-term obligations for long-term bonds. Beginning of huge withdraws from the banking system.
200109	US$8 billion IMF bailout package failed to prevent double-digit drops in tax revenues.
200111	S&P lowered Argentina's sovereign rating to default status. The government imposed restrictions on deposit outflows and capital flight.
200112	Citizens protested the newly restructured government bonds and lack of access to bank deposits. Mr. Cavallo and President de la Rua resigned. Three more interim leaders followed before Eduardo Duhalde became president. End of Convertibility: debt default and currency devaluation.

Source: Extracts from Bekaert and Harvey, Chronology of Economic, Political and Financial Events in Emerging Markets, available at http://www.duke.edu/~charvey

Table 2. Panel Structure

Firms	Number of companies	Number of observations									
		1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL
Always Private											
Publicly Traded	54	45	50	53	54	54	54	54	54	49	467
Non-Publicly Traded	75	46	55	61	66	68	75	75	75	67	588
	129	91	105	114	120	122	129	129	129	116	1055
Privatized											
Publicly Traded	17	11	13	15	16	17	17	17	17	17	140
Non-Publicly Traded	56	20	28	35	40	54	56	56	55	53	397
	73	31	41	50	56	71	73	73	72	70	537
TOTAL	**202**	**122**	**146**	**164**	**176**	**193**	**202**	**202**	**201**	**186**	**1592**

Table 3. Tradable and Non-Tradable Companies

Firms	Number of companies	Number of observations									
		1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL
Tradable	104	78	89	93	98	98	104	104	104	96	864
Non-tradable	98	44	57	71	78	95	98	98	97	90	728
TOTAL	**202**	**122**	**146**	**164**	**176**	**193**	**202**	**202**	**201**	**186**	**1592**

Note: A firm is classified as tradable if the export share (average of the ratio of exports over total added value over the period 1993-2001) of its sector of activity is larger than the median of the sector export shares across all the companies in our sample.

Table 4. Summary Statistics

Variable	Tradables		Non-Tradables	
	Mean	**Median**	**Mean**	**Median**
Total Debt*	50.5%	48.7%	50.7%	50.6%
Dollar Debt**	55.1%	62.0%	57.9%	64.4%
Log Assets	18.84	18.89	18.99	19.06
Investment in Physical Capital*	4.0%	2.6%	8.0%	4.1%
Purchases of Physical Capital*	5.3%	3.4%	8.8%	4.7%
Sales*	88.9%	73.8%	85.9%	55.7%
Earnings*	9.3%	7.1%	15.7%	11.4%
Expo Share	42.7%	32.6%	0.5%	0.02%
Impo Share	115.0%	35.0%	1.6%	0.03%
Deflator (interperiod variation)	-0.9%	-0.4%	-10.8%	-21.6%

Notes: A firm is classified as tradable if the expo share (1993-2001 average of the ratio of exports over total added value) of its sector of activity is larger than the median of the sector export shares across all the companies in our sample. * Ratios over total assets. ** Ratios over total debt

Table 5. Summary Statistics by Sector of Economic Activity

Firms	CIIU	Sector Description	Total Debt*	Dollar Debt**	Log Assets	Investment in Physical Capital*	Purchases of physical capital*	Sales*	Earnings*	Expo Share[1]	Impo Share[2]	Deflator (interperiod variation)[3]
		Tradable Sectors										
2	30	Computer Equipments	82.7%	89.4%	18.7	11.4%	2649.0%	102.7%	9.4%	129.9%	16.6%	-48.6%
8	34	Automobile	68.6%	59.9%	19.7	5.6%	135.9%	113.5%	6.3%	83.1%	6.0%	-7.8%
2	19	Leather	62.0%	60.3%	18.8	-2.4%	19.6%	56.6%	6.0%	76.2%	2.4%	0.7%
21	15	Food and Beverage	50.3%	50.2%	19.1	5.0%	8.9%	104.9%	12.7%	68.4%	6.2%	-0.4%
3	27	Metals	40.3%	63.1%	20.3	4.2%	55.7%	66.4%	9.1%	64.7%	4.5%	-7.8%
2	16	Tobacco	44.1%	12.7%	19.5	4.4%	6.4%	104.8%	22.5%	49.0%	5.9%	6.5%
9	11	Oil and Gas	54.5%	71.4%	20.6	7.8%	3.6%	40.4%	15.1%	38.6%	9.8%	31.0%
8	1	Agriculture and Livestock	66.3%	73.5%	18.6	2.7%	3.6%	158.0%	7.8%	30.5%	3.7%	-22.4%
17	24	Chemicals	51.9%	49.8%	18.4	3.1%	76.7%	110.1%	10.6%	28.5%	4.2%	12.2%
1	31	Electrical Equipments	21.5%	27.2%	15.1	0.4%	177.9%	75.0%	4.6%	28.0%	0.4%	-19.9%
2	17	Textile	31.6%	64.5%	17.1	4.7%	34.5%	61.1%	7.0%	24.9%	6.1%	-11.7%
6	29	Other Machinery	31.7%	30.0%	16.7	-0.1%	157.5%	50.4%	0.0%	24.3%	1.5%	-5.1%
8	21	Paper	35.9%	38.3%	18.9	2.1%	59.0%	41.9%	5.7%	18.1%	2.7%	2.4%
1	2	Wood Extraction	22.2%	55.5%	17.3	-3.8%	2.3%	18.1%	-1.1%	15.7%	1.3%	-16.9%
3	32	Radio and Television Equipments	81.5%	79.1%	17.4	6.1%	428.4%	112.6%	2.8%	15.6%	7.7%	-48.6%
3	25	Rubber, Plastics	47.0%	69.3%	18.1	6.1%	36.3%	88.0%	10.5%	10.7%	7.3%	14.0%
2	28	Metal Products	30.1%	63.9%	21.1	3.5%	39.4%	53.6%	9.8%	8.3%	4.0%	-0.9%
6	26	Mineral non metallic	34.7%	56.7%	18.8	4.5%	22.5%	48.5%	8.4%	8.3%	5.0%	-8.1%
		Non-Tradable Sectors										
1	20	Wood products	37.4%	58.0%	17.9	3.7%	11.2%	48.2%	8.7%	4.9%	6.9%	-9.1%
47	40	Gas, Electricity, Steam and Water supply	37.6%	66.2%	19.2	6.8%	2.7%	41.3%	10.6%	0.8%	7.3%	-21.6%
2	92	Sporting and Cultural Activities	60.3%	64.3%	18.3	6.9%	0.1%	64.1%	14.7%	0.2%	7.0%	-20.3%
1	41	Water Distribution	70.1%	75.8%	20.6	23.8%	0%	49.2%	18.5%	0%	23.9%	24.2%
5	45	Construction	49.8%	43.6%	18.0	2.7%	0%	65.9%	8.7%	0%	3.7%	-9.8%
2	50	Car sale, manteinance and reparation	45.9%	72.5%	20.9	6.6%	0%	91.2%	9.9%	0%	8.5%	-8.6%
3	51	Wholesale	61.9%	43.0%	17.9	3.4%	0%	307.2%	9.2%	0%	4.1%	-2.9%
7	52	Retailing	62.0%	42.9%	19.1	16.0%	0%	179.7%	7.3%	0%	17.8%	-3.5%
11	60	Road Transport	71.4%	36.3%	17.6	10.5%	0%	117.1%	55.6%	0%	11.3%	20.3%
2	62	Air Transport	87.4%	70.2%	19.2	16.0%	0%	113.0%	2.3%	0%	21.9%	34.0%
2	63	Travel Agency	70.1%	61.6%	20.1	8.2%	0%	27.8%	6.4%	0%	8.2%	38.1%
10	64	Post Offices and Telecommunications	59.0%	66.1%	20.5	8.1%	0%	60.2%	14.9%	0%	8.8%	-28.4%
1	65	Real Estate and Financial Services	25.7%	91.2%	19.7	0.5%	0%	12.3%	3.3%	0%	0.7%	-15.1%
1	70	Real Estate	45.1%	80.5%	19.1	13.5%	0%	7.1%	3.9%	0%	13.6%	7.5%
3	85	Health and Social Services	75.9%	17.2%	17.4	2.1%	0%	429.8%	3.6%	0%	2.6%	2.1%

Notes: * Ratios over total assets / ** Ratios over total debt. 1 Ratio exports/value added for each sector / 2 Ratio imports/value added for each sector / 3 Variation over 1993-2001.

Table 6. Dependent Variable: Dollar Ratio (cross section)

Explanatory Variables	Coefficients (Std. Errors) (1)	Coefficients (Std. Errors) (2)	Coefficients (Std. Errors) (3)
Leverage Ratio	0.273 *** (0.076)	0.288 *** (0.077)	0.293 *** (0.078)
Log Assets	0.081 *** (0.011)	0.082 *** (0.011)	0.081 *** (0.011)
Expo		-0.072 (0.055)	-0.065 (0.059)
Dollar Indexation			0.018 (0.049)
Number of Observations	202	202	202

Notes: Standard errors are reported in parentheses. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance. * Statistically different from zero at the 0.1 level of significance.

Table 7. Dependent Variable: Dollar Ratio

Explanatory Variables	OLS Coefficients (Std. Errors) (1)	LSDV Coefficients (Std. Errors) (2)	AB Coefficients (Std. Errors) (3)	AB Coefficients (Std. Errors) (5)	AB Coefficients (Std. Errors) (6)	AB Coefficients (Std. Errors) (1)	AB Coefficients (Std. Errors) (3)	AB Coefficients (Std. Errors) (5)	AB Coefficients (Std. Errors) (6)
Dollar Ratio (t–1)	0.8501 *** (0.0135)	0.3350 *** (0.0262)	0.5611 *** (0.0663)	0.6105 *** (0.0779)	0.5666 *** (0.0801)	0.5634 *** (0.0673)	0.5352 *** (0.0694)	0.5609 *** (0.0673)	0.5283 *** (0.0700)
Real Sales (t–1)	0.0018 ** (0.0008)	0.0054 * (0.0032)	0.0074 *** (0.0029)	0.0074 *** (0.0027)	0.0067 ** (0.0027)	0.0074 *** (0.0029)	0.0067 ** (0.0027)	0.0074 *** (0.0029)	0.0065 ** (0.0026)
Expo (t)	0.0075 (0.0126)	0.0576 (0.0393)	0.0157 (0.0442)	0.0253 (0.0424)	0.0006 (0.0320)	-0.2140 (0.2800)	-0.0177 (0.0370)	0.0130 (0.0441)	-0.0071 (0.0312)
RER (t)				0.0004 (0.0011)					
CRISK (t)					0.0008 (0.0027)				
Expo *RER (t)						0.0023 (0.0029)			
Expo *CRISK (t)							0.0056 (0.0085)		
Tradable *RER (t)								0.0007 (0.0020)	
Tradable *CRISK (t)									0.0057 (0.0055)
Year Effects	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Exclusion Restrictions: Year Effects	0.7410	0.3895	0.7993			0.8844	0.6267	0.8830	0.5455
Exclusion Restrictions Test				0.8246	0.5245				
Sargan Test			0.527	0.609	0.397	0.518	0.519	0.507	0.513
AR (1)			0.001	0.001	0.001	0.001	0.001	0.001	0.001
AR (2)			0.373	0.420	0.205	0.372	0.202	0.375	0.193
Number of Observations	1390	1390	1188	1188	1066	1188	1066	1188	1066
Number of Firms	202	202	202	202	202	202	202	202	202

Notes: Asymptotic standard errors robust to general cross-section and time series heteroskedasticity are reported in parentheses. The GMM estimates are all two-step estimates. The values of the coefficient and standard errors for Real Sales are multiplied by 100,000,000. Standard errors are corrected for finite sample bias following Windmeijer (2002). For the Sargan, AR(1) and AR(2) tests, the statistic reported is the p-value. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance. * Statistically different from zero at the 0.1 level of significance.

Table 8. Dependent Variable: Sales Ratio

Explanatory Variables	OLS Coefficients (Std. Errors) (1)	LSDV Coefficients (Std. Errors) (2)	AB Coefficients (Std. Errors) (3)	AB Coefficients (Std. Errors) (4)
Sales Ratio (t −1)	0.8440 *** (0.0086)	0.4613 *** (0.0222)	0.5939 *** (0.1637)	0.5863 *** (0.1738)
Expo (t)	-0.0048 (0.0259)	-0.0308 (0.0829)	-0.0367 (0.1011)	-0.1654 (0.4610)
Deflator (t)	0.0831 (0.0629)	0.0238 (0.1254)	0.2875 ** (0.1337)	0.3290* (0.2024)
Year Effects	Yes	Yes	Yes	Yes
Exclusion Restrictions: Year Effects	0.0001	0.0000	0.0001	0.0114
Sargan Test			0.038	0.165
AR (1)			0.007	0.009
AR (2)			0.869	0.873
Number of Observations	1390	1390	1188	1188
Number of Firms	202	202	202	202

Notes: Asymptotic standard errors robust to general cross-section and time series heteroskedasticity are reported in parentheses. The GMM estimates are all two-step estimates. Standard errors are corrected for finite sample bias following Windmeijer (2002). For the Sargan, AR(1) and AR(2) tests, the statistic reported is the p-value. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance. * Statistically different from zero at the 0.1 level of significance.

Table 9. Dependent Variable: Earnings Ratio

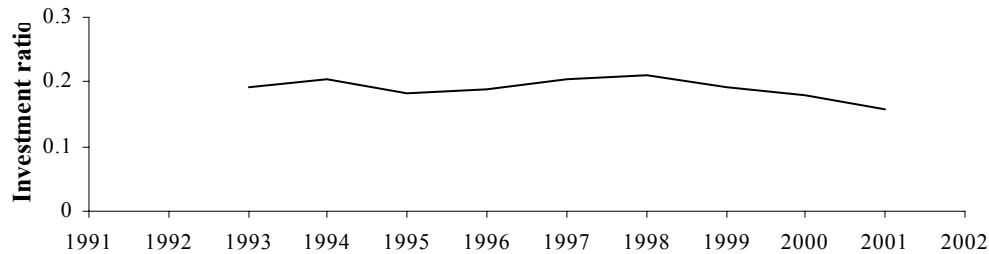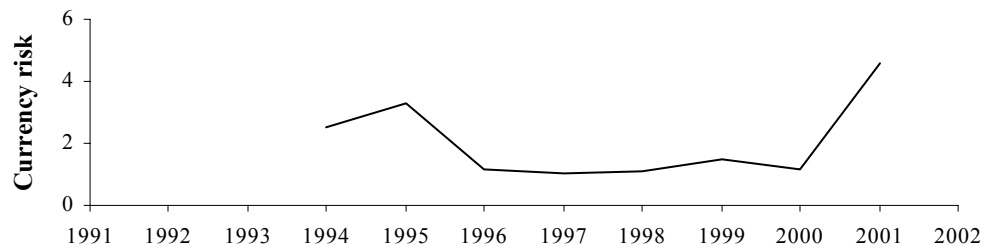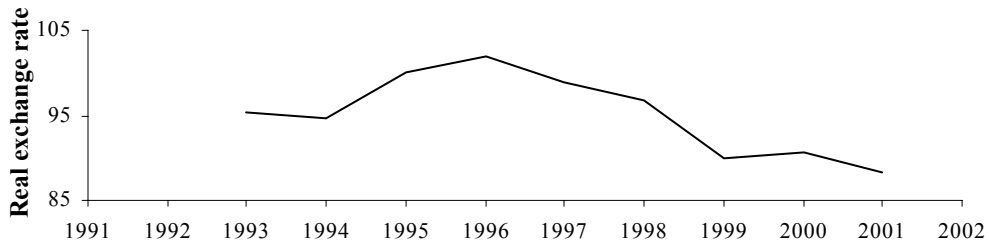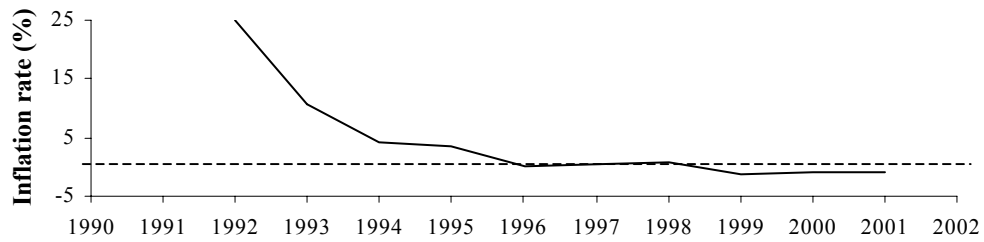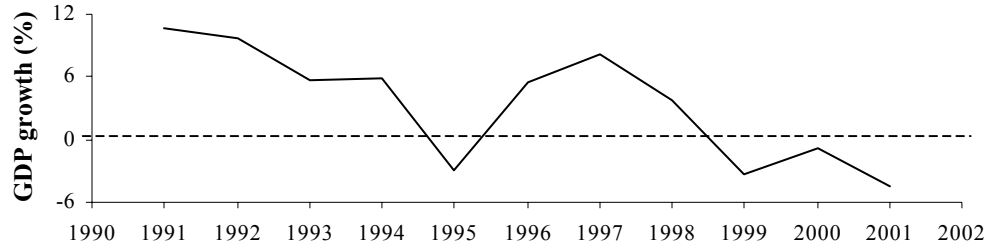| Explanatory Variables	OLS Coefficients (Std. Errors) (1)	LSDV Coefficients (Std. Errors) (2)	AB Coefficients (Std. Errors) (3)	AB Coefficients (Std. Errors) (4)	AB Coefficients (Std. Errors) (5)
Earnings Ratio (t −1)	0.8000 *** (0.0141)	0.4341 *** (0.0264)	0.6822 *** (0.0950)	0.5099 *** (0.1011)	0.5077 *** (0.1032)
Leverage Ratio (t-1)	0.0071 (0.0114)	-0.0233 (0.0213)	0.0345 (0.0390)	0.0060 (0.0350)	0.0061 (0.0351)
Dollar Ratio (t-1)	0.0038 (0.0094)	0.0273 (0.0186)	0.0575 *** (0.0205)	0.0366 ** (0.0183)	0.0365 ** (0.0183)
Expo (t)	-0.0145 * (0.0083)	0.0224 (0.0271)	-0.0484 (0.0393)	-0.0234 (0.0289)	0.0142 (0.1837)
Deflator (t)	0.0230 (0.0205)	-0.0289 (0.0412)	0.0989 ** (0.0475)	0.0609 (0.0407)	0.0612 (0.0403)
Sales Ratio (t)				0.1330 *** (0.0434)	0.1333 *** (0.0426)
Expo*RER (t)					-0.0004 (0.0020)
Year Effects	Yes	Yes	Yes	Yes	Yes
Exclusion Restrictions: Year Effects	0.0002	0.0001	0.0001	0.0009	0.0015
Sargan Test			0.209	0.220	0.203
AR (1)			0.001	0.003	0.003
AR (2)			0.621	0.142	0.140
Number of Observations	1390	1390	1188	1188	1188
Number of Firms	202	202	202	202	202

Notes: Asymptotic standard errors robust to general cross-section and time series heteroskedasticity are reported in parentheses. The GMM estimates are all two-step estimates. Standard errors are corrected for finite sample bias following Windmeijer (2002). For the Sargan, AR(1) and AR(2) tests, the statistic reported is the p-value. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance. * Statistically different from zero at the 0.1 level of significance.

Table 10. Dependent Variable: Investment Ratio

Explanatory Variables	OLS Coefficients (Std. Errors) (1)	LSDV Coefficients (Std. Errors) (2)	AB Coefficients (Std. Errors) (3)	AB Coefficients (Std. Errors) (4)	AB Coefficients (Std. Errors) (3)	AB Coefficients (Std. Errors) (5)	AB Coefficients (Std. Errors) (6)
Investment Ratio (t −1)	0.3389 *** (0.0201)	0.0488 ** (0.0230)	0.2353 *** (0.0558)	0.2362 *** (0.0556)	0.2213 *** (0.0631)	0.2221 *** (0.0597)	0.2317 *** (0.0563)
Leverage Ratio (t-1)	0.0258 *** (0.0092)	0.0681 *** (0.0160)	0.0709 (0.0511)	0.0698 (0.0507)	0.0795 (0.0594)	0.0996 (0.0719)	0.0839 (0.0833)
Dollar Ratio (t-1)	-0.0029 (0.0076)	-0.0395 *** (0.0140)	-0.0704 ** (0.0338)	-0.0701 ** (0.0334)	-0.0715 * (0.0371)	1.2236 (1.074)	-0.0050 (0.0409)
Earnings Ratio (t-1)	0.0528 *** (0.0114)	0.0506 ** (0.0198)	0.0450 * (0.0258)	0.0429 (0.0262)	0.0572 ** (0.0271)	0.0467 * (0.0260)	0.0659 *** (0.0238)
Expo (t)	-0.0140 ** (0.0067)	0.0187 (0.0203)	-0.0088 (0.0164)	0.0443 (0.1791)	-0.0086 (0.0206)	0.0028 (0.0180)	-0.0077 (0.0164)
Deflator (t)	0.0112 (0.0164)	-0.0283 (0.0308)	-0.0559 (0.0648)	-0.0554 (0.0643)	-0.0846 (0.0742)	-0.0410 (0.0620)	-0.1540 ** (0.0740)
Expo*RER (t)				-0.0005 (0.0018)			
Expo*CRISK (t)					-0.0012 (0.0031)		
Dollar Ratio (t −1) *RER (t)						-0.0136 (0.0114)	
Dollar Ratio (t −1) *CRISK (t)							-0.0454 ** (0.0188)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exclusion Restrictions: Year Effects	0.0003	0.0001	0.2125	0.2586	0.2534	0.2290	0.0360
Sargan Test	…..	…..	0.126	0.115	0.147	0.150	0.518
AR (1)	….	…..	0.001	0.001	0.001	0.001	0.001
AR (2)	….	…..	0.514	0.517	0.204	0.277	0.390
Number of Observations	1390	1390	1188	1188	1066	1188	1066
Number of Firms	202	202	202	202	202	202	202

Notes: Asymptotic standard errors robust to general cross-section and time series heteroskedasticity are reported in parentheses. The GMM estimates are all two-step estimates. Standard errors are corrected for finite sample bias following Windmeijer (2002). For the Sargan, AR(1) and AR(2) tests, the statistic reported is the p-value. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance. * Statistically different from zero at the 0.1 level of significance.

APPENDIX 1: Argentina's Macroeconomic Variables

APPENDIX 2: Data Definition and Sources

Variable	Definition	Source
Dollar Ratio	Ratio of debt denominated in foreign currency (converted into local currency using the end-of-period exchange rate) over total debt.	Balance sheet data obtained from Economatica, Buenos Aires Stock Exchange, regulatory agencies, and Inspeccion General de Justicia.
Leverage Ratio	Ratio of total debt over assets.	See Dollar Ratio.
Investment Ratio	Ratio of purchases of fixed assets net of disposal of fixed assets over assets.	Cash-flow Statements obtained from Economatica, Buenos Aires Stock Exchange, regulatory agencies, and Inspeccion General de Justicia.
Sales Ratio	Ratio of revenue from main operating activities over assets.	Income Statements obtained from Economatica, Buenos Aires Stock Exchange, regulatory agencies, and Inspeccion General de Justicia.
Real Sales	Revenue from main operating activities over assets in constant pesos.	See Sales Ratio.
Earnings Ratio	Ratio of earnings before accrued interest, taxes, depreciation and amortization over assets.	See Investment Ratio.
Assets	Sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property, plant and equipment, and other assets.	See Dollar Ratio.
Expo	Sector export content measured as the export-to-value added ratio. Firms are assigned to sectors according to their production mix.	Ministry of Finance.
Impo	Sector import content measured as the import-to-value added ratio. Firms are assigned to sectors according to their production mix.	Ministry of Finance.
Deflator	Sectoral value added at current prices over sectoral value added at constant prices, normalized by the GDP deflator.	Ministry of Finance.
RER	Real effective exchange rate, measured as the average bilateral RER vis a vis the country main trade partners, weighted by the average export share for 1995-1999.	ECLAC, based on IMF.
CRISK	Currency risk measured as the differential between peso and dollar interbank deposit rates, using daily one-month interest rate premiums.	Central Bank of Argentina.
Dollar Indexation	Dummy that equals one for privatized firms in regulated sectors if rates are indexed by the United States' Consumer Price Index.	Regulatory Agencies.

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