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Why exporters can be financially constrained in a recently liberalised economy? A puzzle based on Argentinean firms during the 1990s

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Abstract

Trade-related characteristics have only been recently started to be included in empirical studies analysing the determinants of the financial constraints faced by firms. A result broadly shared by these studies is that exporting firms tend to be those less financially constrained. In this paper we test this result using panel data built up from quarterly balance sheet information for 74 Argentinean big firms covering the years of the currency board regime (1992-2001). We estimate an investment equation splitting up the sample between exporters and non-exporters. Using three alternative econometric models (random effects, fixed effects and instrumental variables) we find that, contrary to what is commonly stressed in the literature, exporting firms are the ones facing larger financial constraints on investment. We propose an explanation for this original result based on the currency appreciation that follows financial liberalisation processes in emerging countries, particularly in Argentina, which triggers a profit squeeze phenomenon for exportable firms, reducing their investment capacity.

Keywords: financial constraint, investment, foreign trade, Argentine.
JEL Classification Numbers: E22, O16, O54

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1 Introduction

A large empirical literature has been developed in the past years concerning financial constraints on firms' investment behaviour. Some studies consider export capacity as a factor that helps overcoming financial constraints, as this leads, among other things, to greater creditworthiness, whereas non-exporting firms are the ones unable to completely finance their projected investment (Ganesh-Kumar, Sen & Vaidya 2001, Gelos & Werner 2002, Tornell & Westermann 2002, Tornell & Westermann 2003). The economic rationale underlying these results is that: (1) foreign exchange revenues constitute a better collateral to borrow in international markets (Tornell & Westermann 2003); (2) selling in international markets is considered as a sign of efficiency and competitiveness (Ganesh-Kumar et al. 2001), and (3) external markets allow exporting firms to achieve economies of scale and increase sales and profits.

In this paper we aim to test the hypothesis that firms' characteristics related to trade are a determinant of financial constraints in Argentina. Thus, we estimate an investment equation using a panel database built up on quarterly balance sheet information for 74 Argentinean big firms listed in Buenos Aires Stock Market, covering the 1992-2001 period. Using three alternative econometric techniques: fixed effects, random effects and instrumental variables, we obtain an original result: in Argentina, exporting firms are the ones facing larger financial constraints.

Having in mind the Argentinean economy, we can think about some clues to understand this puzzling result, where exchange rates appreciation is at the very heart of the explanation. As a matter of fact, the new macroeconomic context of the 1990s drew large capital inflows, what combined with a price stabilization programme based on fixed exchange rate, provoked currency appreciation as occurred in other economies (Taylor 1998). This change in relative prices initiated a profit squeeze process for exportable firms and weakened their balance sheet (diminishing both sales and assets accounts). As a consequence, not only it reduced internal sources of finance but also increased the probability of bankruptcy, prompting banks to be extremely

cautious when granting loans to these firms.

Our study is inscribed within a large empirical literature testing the existence of financial constraints to investment at the firm level[1], whose common outcome is that investment tends to be largely financed with internal resources, i.e. cash flow is a significant variable to explain firms' investment levels. As the literature has been extended to developing countries[2], researchers have been adding several variables -both at macro and micro levels-to better account for developing countries' specificities. These new variables refer to whether the firm has been recently privatised, its debt currency denomination, liberalisation dummy variables, etc. Nonetheless, all these works remain quite close to the original empirical approach: testing the existence of financial constraint for firms belonging to one particular group.

The paper is organised as follows. In section 2 we present the econometric model and estimation techniques to be used. In section 3, we describe the database and some descriptive statistics, and in section 4 we discuss our results. In section 5 we propose some explanations of why exporting firms tend to be the ones facing lager financial constraints, and propose future directions for our research. In section 6 we conclude.

2 Econometric model and method of estimation

2.1 Investment equation

Theoretically, if markets were complete and there was no radical uncertainty about the future, the amount of external finance a firm could find would be related to the actualised value of its future profits and it would not be any link between financial markets and the investment behaviour of firms (i.e.

[1]See Athey & Fazzari (1987), Devereux & Schiantarelli (1989), Fazzari & Mott (1986-7), Fazzari, Hubbard, Petersen, S. & Poterba (1988), Fazzari & Peterson (1993), Gertler & Hubbard (1989), Gertler & Gilchrist (1994), Gilchrist & Himmelberg (1995), Ndikumana (1999), Mairesse, Mulkay & Hall (2001), among others.

[2]See Athey & Laumas (1994), Hermes & Lensink (1998), Gallego & Loayza (2000), Ganesh-Kumar et al. (2001), Fanelli, Bebczuk & Pradelli (2002), Gelos & Werner (2002).

there would not any difference in opportunity cost of using internal or external finance). Therefore, internal source of finance would not play any role when firms bring their investment projects, à la Modigliani-Miller. However, markets are not perfect, uncertainty about the future is predominant and thus some firms cannot reach the desired level of external finance and find themselves limited to invest - i.e. firms' investment is financially constrained when a windfall increase in the supply of internal funds "results in a higher level of investment spending" (Bond & Van Reenen 2003, page 58). Actually, market failures have been incorporated in an orthodox framework, by introducing asymmetric information in the borrower-lender relationship (Stiglitz & Weiss 1981).

From an empirical point of view, as just noted in the introduction, an abundant literature has been developed in order to test the existence of financial constraints limiting firms' investment behaviour. Following this empirical work, we propose an investment equation, using cash flow variable as a measure of internal sources of finance. It is worth noting that cash flow is representing firms' financial constraints in a double sense, directly and indirectly. On the one hand, it is a genuine source of liquidity to invest after dividends have been distributed. On the other hand, we consider this variable as a proxy of firm's net worth [3] (i.e. firm collateral), which limits the amount of external finance a firm can have access to (Bernanke & Gertler 1989). A significant and positive coefficient for this variable should be interpreted as a signal of financial constraints.

A common criticism to the extended use of cash flow as the key variable to test the presence of financial constraint is that cash flow can also represent the future investment opportunities.[4] To overcome this difficulty, most empirical

[3]Even if cash flow is not the ideal proxy for variation in net worth, as Hubbard (1998) : page 203) points out, it is the better proxy available for a large number of firms.

[4]Kaplan & Zingales (1997) criticize Fazzari et al. (1988) seminal work. They argue that conclusions about cash flow-investment sensitivities might be spureous. This is because, on the one hand, Tobin's Q may be a weak proxy of investment opportunities and, on the other hand, because influencial outliers might biais the result, particularly regarding most indebted firms. To overcome these problems we use sales to control for investment opportunities and we exclude outliers from the database. To follow this debate Fazzari et al. (1988), Kaplan & Zingales (1997), Fazzari, Hubbard & Peterson (2000), Kaplan & Zingales (2000).

studies divide the sample of firms' in two sub-samples, and consider one of them to be, at least theoretically, more constrained. Given that there is no reason *a priori* to think that the cash flow considered as a sign of future profitability would have any differential impact in the sub-samples, a higher coefficient should then confirm a situation of financial constraint.

The most common (but not the only) feature to partition the sample is size. It is often argued that smaller firms are in theory more financially constrained as they face greater problems of asymmetric information and agency costs or, in a more Keynesian vein, they are exposed to greater radical uncertainty. In both cases, firms' net worth determines external finance, in particular for negotiating the level and the repayment conditions of the borrowed amount. Since our database contains only large firms, we aim to test other feature than size that would limit investment decisions in Argentina. Therefore, having all firms similar size and following (Ganesh-Kumar et al. 2001, Gelos & Werner 2002, Tornell & Westermann 2002, Tornell & Westermann 2003), we argue that trade-related characteristics of firms are key elements to identify which firms are facing financial constraints.[5]

In our investment equation, cash flow coefficients should be significant and, according to those authors, if N firms are likely to face larger financial constraints than firms from sector T, we should expect α_{cfn} to be higher than α_{cft} (cash flow variable interacted with N and T dummies respectively).

Other variables have been proposed to control the effect of future profitability on cash flows. Tobin's Q is one of the most commonly used, since it associates firm's stock-market value with its capital stock value, and thus summarises market anticipations of profitable investment opportunities of firms. Thus, α_q is expected to be significant and positive.

However, Q models have been largely criticised, particularly in emerging countries where stock indexes are often highly volatile and rarely represent firms' future revenues. Indeed, a central problem of Tobin's Q lies on the non equality between Average Q and Marginal Q, especially when financial

[5]It is worth noting that Gelos & Werner (2002) and Ganesh-Kumar et al. (2001), only consider firms from the tradable manufacturing sector, whereas our database considers both, tradable and non-tradable firms.

market imperfections are present (Chirinko 1993, Hubbard 1998) and, as Schiantarelli (1996) points out, when "*stock markets are not efficient and stock prices are driven by fads and fashions*".

Another proxy for future profitability can be given by the level of firms' sales (Chirinko 1993, Fanelli et al. 2002). Sales variables -in level or variation- are thus added to the investment equation and are considered to explain the past and potential future performance of a firm, as sales accelerator type models suggest: higher levels of sales encourage firms to increase capital goods demand to boost their production capacity in order to meet an enlarged demand (Fazzari & Mott 1986-7, Athey & Fazzari 1987, Fazzari et al. 1988, Ganesh-Kumar et al. 2001, Arza 2003).

Fazzari & Peterson (1993) also underline the role of working capital in financial constraint empirical analysis. According to the authors, investment projects are generally rather expensive and they require some continuity across time. As a consequence, when facing a negative shock that diminishes internal financial resources, a financially constrained firm would adjust its working capital in order to keep on going its designed investment with minimal stability. Putting it differently, working capital needs to fulfil a "buffer" function to cope with cash flow fluctuations (Fazzari & Peterson 1993). We thus expect α_{wk} to be significant and negative.

The last control variable is related to firms' indebtedness profile. This leverage effect is actually twofold. On the one hand, a higher indebtedness ratio can be considered as a signal of an improved capacity to finance investment, and in this case it will be a positive relation between debt and investment. On the other hand, once firms reach certain threshold, an increase of the indebtedness ratio will have negative consequences, provided that it triggers higher external finance costs due to balance-sheet deterioration (Bernanke & Gertler 1989). Therefore, the possibility of an inverted U-shaped debt curve is captured by two variables: the debt to capital stock ratio and its square. So α_d and α_{d2} should be significant, with positive and negative signs respectively.

For the econometric estimation we use a twofold error term model: [6]

[6]In order to avoid scale problems, all variables are normalised by stock capital of

$$\frac{I_t}{K_{t-1}} = \alpha_{cft}\frac{CF_{i,t}}{K_{i,t-1}} \times T + \alpha_{cfn}\frac{CF_{i,t}}{K_{i,t-1}} \times N + \alpha_q Q_{i,t} + \alpha_s \frac{S_{i,t-1}}{K_{i,t-1}} + \alpha_{si} Size_{i,t} + \alpha_{cwk}\frac{\Delta WK_{i,t}}{K_{i,t-1}} + \alpha_d \frac{D_{i,t}}{K_{i,t-1}} + \alpha_{d2}\left(\frac{D_{i,t}}{K_{i,t-1}}\right)^2 + \alpha_y YearD_t + u_{i,t} \tag{1}$$

$$u_{i,t} = n_i + \varepsilon_{e,t}$$

where n_i is the firm specific part of error term and $\varepsilon_{e,t}$ is the unsystematic error.
K = Physical Stock (Machinery and Intangible Assets)
I = Gross Investment: K_{t-1} - K_t + Depreciation
CF = Cash Flow = Operating Earnings + Depreciation
Q = Tobin's Q = Lag of Firm Value/ K_{t-1}
S = Total Sales
WK = Working Capital (Current Assets - Current Liabilities)
D = Total Debt (Current and non Current Liabilities)
$Size$ = Log Total Assets
$YearD$ = Year Dummies to control for macroeconomic shocks
T = Exportable sectors
N = Non-Exportable sectors

2.1.1 Robustness

Note that the non-exportable sector is less represented in our sample for the first years (cf. section 3.1). Therefore, in order to gain in robustness, we propose two alternative investment equations to be estimated for exportable sector firms, which are largely represented along the period of study.

Equation 2 is the same as equation 1 but without the sample partition, whereas in equation 3, following Devereux & Schiantarelli (1989), we add

previous period.

liquid assets[7] in a investment equation from a Q model framework. According to these authors, liquid assets are likely to represent an easily collateralisable asset and thus a positive and significant coefficient will be an additional proof of financial constraints, given that liquid assets (taken as a collateral) would limit external finance capacity to invest (Devereux & Schiantarelli 1989, Ganesh-Kumar et al. 2001, Arza 2003). By contrast, in a perfect market world, there would not be any relation between investment and liquid assets, and thus α_{la} will not be significant.

$$\begin{aligned}\frac{I_t}{K_{t-1}} = \alpha_{cf}\frac{CF_{i,t}}{K_{i,t-1}} + \alpha_q Q + \alpha_s\frac{S_{i,t-1}}{K_{i,t-1}} + \alpha_{cwk}\frac{\Delta WK_{i,t}}{K_{i,t-1}} + \alpha_{si}Size_{i,t} \\ + \alpha_d\frac{D_{i,t}}{K_{i,t-1}} + \alpha_{d2}\left(\frac{D_{i,t}}{K_{i,t-1}}\right)^2 + \alpha_y YearD_t + u_{i,t}\end{aligned} \tag{2}$$

$$\begin{aligned}\frac{I_t}{K_{t-1}} = \alpha_{cf}\frac{CF_{i,t}}{K_{i,t-1}} + +\alpha_q Q + \alpha_{la}\frac{LA_{i,t-1}}{K_{i,t-1}} + \alpha_{cwk}\frac{\Delta WK_{i,t}}{K_{i,t-1}} + \alpha_{si}Size_{i,t} \\ + \alpha_d\frac{D_{i,t}}{K_{i,t-1}} + \alpha_{d2}\left(\frac{D_{i,t}}{K_{i,t-1}}\right)^2 + \alpha_y YearD_t + u_{i,t}\end{aligned} \tag{3}$$

$$u_{i,t} = n_i + \varepsilon_{e,t}$$

where, n_i is the firm specific part of error term and $\varepsilon_{e,t}$ is the unsystematic error.

Summarising, our econometric study estimates alternative investment equations suggested by the empirical literature to test the presence of financial constraints affecting exportable firms, which in all cases will be mainly represented by *cash flow* coefficients being significant and positive.

2.2 Estimation method

We estimate the investment equation using three alternative econometric models: the random effects model (RE-GLS), within fixed effects model

[7]Liquid Assets variable (LA) represents cash plus short-term commercial papers.

(FEW) and instrumental variables (IV). Obtaining good estimators[8] requires testing several hypotheses about the regressors and the error term. For instance, if we assume that the firm specific term in error term n_i is randomly distributed -i.e. it is not correlated with explicative variables in the investment equation-, then the random effect model will give estimators that are both consistent and efficient.

By contrast, if the firm-specific error term is correlated with any of the independent variables, one needs to use fixed effect models to estimate the investment equation. The Hausman test helps us to chose between RE and FEW estimations. Rejecting the Hausman test imply that the FE model provides regressors with the right properties.[9]

In addition, endogeneity problems[10] might be present. This would be the case when the independent and dependent variables are simultaneously determined or when there is double causality or feedback between them. In our equation for example, investment and working capital might be simultaneously determined or, as well, investment may have an impact on future cash flow of firms. In such a case, good estimators ask for using the instrumental variable model (IV), and this requires finding appropriate instruments that are highly correlated with the independent variables but not with the dependent one -in our equation: variables correlated to the cash flow but not to firms' investment.[11]

Choosing right instrumental variables is a complex task and an accurate instrumentalisation is essential to obtain convergent estimators. Sargan test allows verifying a correct choice of instruments. If we reject the test, IV model is the one properly specified.

[8] That means estimators consistent (without bias) and efficient (minimal variance).

[9] It is worth noting that FE models are preferable in our empirical work, since they correct for potential problems that could appear when working with unbalanced panel data (Green 2003, Sevestre 2002).

[10] Different models have been proposed to deal with endogeneity problems: Arellano & Bond (1991) and Anderson & Hsiao (1981). Our IV estimation follows the last one.

[11] According to whether we choose RE or FE models, our instrumental variables model will be IVRE or IVFE correspondingly. As usual, the instrumentalisation is carried out adding lags of independent variables, sectoral dummies and all other independent variables of the investment equation. In our case, instrumental variables can be to five lags what is reasonable given that we work with quarterly data.

3 Data sample and summary statistics

3.1 Database

We work with an unbalanced panel with information from 74 large firms covering 40 consecutive quarters (1992q1-2001q4), the period when Argentina implemented a currency board. The information in the database is that of the balance sheets of non-financial firms listed in Buenos Aires' Stock Exchange -*Bolsa de Valores de Buenos Aires*- complemented with additional balance-sheet information published by the firms themselves.[12]

Our sample classification between exportable and non-exportable firms is determined by whether a firm commercialises its products in foreign markets. Since balance sheets in Argentina do not directly include exports information but only the sector activity of each firm, we split up the sample between tradable and non-tradable. Tradable sectors basically refer to manufacturing and agricultural production, while non-tradable sectors cluster real services and construction[13]. However, in the particular case of our database, tradable firms are easily associated with exportable since we work with large quoted firms, which are those more likely to be exporter. We actually confirm the validity of this statement in additional sources of information (we checked it using the ECT -*Encuesta Nacional sobre la Conducta Tecnológica de las Empresas Industriales Argentinas - INDEC*- and firms' published information, as well.

It is worth noting that tradable firms are over-represented in the sample, partly due to our deliberate exclusion of financial and banking institutions since we are not focusing our study in those kind of firms. However, the difference between the two groups diminishes with time (cf. appendix, table 7).

[12] According to our knowledge, our database is the best source of information for tradable and non-tradable firms since it contains a large proportion of total listed firms in domestic stock market (107 firms).

[13] The exact classification is as follows. *Tradable Sectors* are: agricultural product, oil extraction and mining, food production and tobacco, textile industry and shoes production, wood and paper; chemistry and plastic, minerals and metals, still and iron, machinery, automobile industry. *Non-tradable sectors*: services; gas electricity and water; construction.

The empirical analysis is carried out excluding outliers (at 1%) for key variables: investment, cash flow, debt, sales and working capital, whereas all data is deflated using the producer price index (1993 $), published by the Argentinean Ministry of Finance.

Before proceeding, it is worth noting that although our sample of firms is not representative of the entire population of Argentinean enterprises, we claim that if the large firms quoted in the stock market are financially constrained, other firms would likely suffer similar constraints.

3.2 Descriptive Statistics

Table 2 summarises some characteristics of the firms from the sample used in our econometric work. In the first place, we can see that the profit rate of exportable sectors, which is defined as the cash flow to capital stock ratio, is larger than that of non-exportable firms; whereas there are no significant differences between the groups in relation to capital accumulation (investment to capital stock ratio). Secondly, exportable firms show a weaker indebtedness profile: not only they have larger debt to capital stock ratios but also their debts tend to be dominated by short-term liabilities (short-term debt over total liabilities). Finally, both sales and working capital to capital stock ratios are higher in non-exportable firms.

Figures 1 to 6 show time-series for some key variables (cf. appendix). As we can see, non-exportable sectors obtained a higher profit rate all through the decade (figure 1). In terms of investment behaviour, the figures show that firms from the exportable sector outperformed non-exportable firms during the first years of analysis, although this difference disappeared in the final years when both groups had very low values of capital accumulation (figure 2).

We consider firms' indebtness profile. In figure 3 we look at a conventional measure of firm's leverage, such as total debt over total assets. The figure shows that this ratio increased in both exportable and non-exportable firms, being the leverage slightly larger in non-exportable firms. Our descriptive statistics show other interesting results. On the one hand, we observe in

figure 4 that exportable firms were never able to overcome their short-term liability profile. On the other hand, empirical information suggest that the non-exportable sector had greater access to financial markets: not only the share of financial debt -which include corporate bonds- in total debt grew more in this firms than in exportable firms (figure 5), but also non-exportable firms obtained debt with longer term maturity (figure 6).

In the end, it is interesting to note that if working capital acts as a buffer for investment in fixed capital, the within-firm variance of the first variable should be larger than the second one (Fazzari & Peterson 1993): page 334). We actually find out, for the firms included in the empirical study, a higher variance for working capital-investment ratio (0.042) than investment over capital ratio (0.335).

4 Econometric Results

Tables 3, 4 and 5 present our results using the three alternative techniques. The Random Effects model (RE) allows us to control for some firms' specific characteristics, what is not possible with the Fixed Effects model (FE). For instance, we tested whether the firm belongs to a conglomerate, whether it is owned by foreign capital or whether it is listed in the New York Stock Exchange. Since these dummy variables were not significant and results showed no major differences, results in the table do not include them.[14]

We run Hausman and Sargan tests as well, which allowed us to select the most appropriate estimation. The rejection of the first test indicates that the FE models must be chosen, while the rejection of the second one confirms the correct instrumentalisation of endogenous variables. Since Hausman test always indicates that FE models are more accurate and results with RE regression hold, in the sake of simplicity we do not include RE results in Table 4.

As we can see in Table 3, the cash flow coefficient is always significant and positive for sector exportable firms, while it is negative for non-exportable

[14]We controlled using sectoral dummies as well, but we do not include the result on tables to make them easily readable.

firms (though not always significant). The effect of lagged sales is significant and positive, working capital is significant and negative and Tobin's Q is significant and positive (unless when we control for endogeneity). Our results suggest that after controlling for future profitability variables, the cash flow of a firm continues to be a crucial determinant of investment suggesting that exportable firms are more financially constrained. Size variable is almost always significant and positive, even though its coefficient is relatively low. Finally, the table confirms somewhat the presence of an inverted U-shaped curve for indebtedness variables: investment has a positive relation with debt when debt is low, but a negative relation for large debt ratios.

Tables 4 and 5 summarise the estimation of equations 2 and 3, using the sub-sample of exportable firms. The fundamental conclusion is that cash flow is always significant and positive, and in both cases results hold after controlling for future profitability, using both lagged sales and Tobin's Q, though this second variable is not robust and usually not significant for IV estimations, i.e. see critics to Tobin's Q in section 2.1. Cash Flow coefficient is higher when we use IVFE, a model that is likely to control for endogeneity problems. In all cases the Sargan test suggests a correct variable instrumentalisation.

In particular, Table 4 displays estimations of equation 2, where we can see that, as expected, working capital is significant and negative. This confirms that, as suggested by Fazzari & Peterson (1993), working capital fulfils the role of adjustment variable in order to sustain projected investment amount by firms. On the other hand, estimation of equation 3 in Table 5 shows that liquid assets are positive and significant as well, reinforcing our financial constraint hypothesis. Finally, in both cases, indebtedness coefficient has the expected sign and similar values confirming that, if it is present, the effect of leverage changes according to the size of the debt ratio.

In short, our results confirm the presence of financial constraints on sector exportable firms, given that the cash flow coefficient is always significant and positive, even after controlling for future profitability (as represented by Tobin's Q and lagged sales). Moreover, since liquid assets and working capital are both significant variables (positive and negative respectively), this

provides additional support to our hypothesis of frictions in credit market. Finally, leverage effects can be found but with an inverse U-shaped function between indebtedness and investment level.

Note that our results hold under alternative empirical models, econometric techniques and variables construction. For instance, following Devereux & Schiantarelli (1989), we estimate equation 3 in first differences and the cash flow coefficient is still significant and positive (with a value of around 0.20). Besides, we run the regressions with a more restrictive definition of cash flow (net income after taxes plus depreciation) and the coefficient is positive and significant. We additionally include lagged investment ratio along the different empirical models and its coefficient is always significant and positive, suggesting a certain path-dependent dynamics. Though since the other variables' coefficient remain similar and our objective is not explain investment but detect the presence of financial constraints, we do not include those results in the tables.

5 Why exportable firms are more financially constrained in Argentina? Some highlights and macroeconomic evidence

Together with trade liberalisation, Argentina held a currency board regime since 1991 that rapidly gave place to a real exchange rate appreciation (partially caused by large capital inflows during the period). We argue that exportable firms are likely to face deeper financial constraints in a context of recently liberalised economies with a strong currency appreciation.

Two elements of this constraint need to be differentiated: a) a negative impact of real exchange appreciation that affects tradable firms (*including* of course *all* exportable firms), because of traditional relative price effects; b) an accentuation of import competition because of trade liberalisation, what is more likely to affect firms that are exposed to competition (i.e. tradable firms that do not export). Since it is not the case of the firms analysed in the present article, we will concentrate in the currency appreciation, which

affect all tradable firms and include our exportable defined firms. We can effectively observe the unfavourable evolution of relative prices for tradable firms in figure 7, what enhance a process of profit squeeze for those firms[15]. Actually, due to the real exchange appreciation, firms selling tradable goods experienced difficulties to maintain their profitability levels what diminished their cash flows.[16]

As a consequence, balance sheet positions of firms deteriorated, which negatively affected their access to external finance and worsened their investment capacity. In other words, during the Convertibility period characterised by currency appreciation, firms from tradable sector had to deal with both diminishing internal funds as well as a more difficult access to external finance (not only in the quantity but also in the conditions to obtain loans from bank).[17]

In practice a lender takes into account the future profitability of a borrower at the moment of evaluating its future repayment capacity. In a context of real exchange appreciation and profit squeeze for tradable firms, it is logic for banks to perceive a weakness of potential profits and penalise tradable firms with respect to non-tradable ones. Interestingly, we detect this at a macroeconomic level in Argentinean data in Table 6, where tradable sectors reduced their weight in bank's credit distribution to the private sector during the 1990s.

[15]The idea that liberalisation process enhances tradable firms' profit squeeze have been verified by Ros & Lustig (2000) and Ros & Moreno-Brid (2004) for Mexico, a country that shows several similarities with Argentinean economy during the 1990s, in particular financial liberalisation process and real exchange rate appreciation.

[16]A complementary support can be found in data presented by Basualdo (2000), where he analyses relative profitability evolution for aggregate production sectors (of first two hundred firms). He observes that industrial (T) sectors had been penalised comparing to service sectors (particularly, recently privatised firms) and holdings (conglomerates of diversified economic activities), both groups enjoy from higher profitability levels. We argue that, if industrial sectors (T) show a remarkably profit deterioration for larger firms (which are likely to be less financial constraints), similar situation can be applied to the rest of Argentinean productive sector.
Besides, Fanelli & Keifman (2002) proved that in Argentina during the nineties non tradable firms were penalised, especially in terms of their access to financial markets.

[17]For broader analysis of peso appreciation consequences over Argentinean economy, particularly related to an "anti-export" bias on firms' investment behaviour, see Bonvecchi & Porta (2003).

Finally, we observe the sectoral evolution of investment as an indirect way of addressing financial constraints issues, using imported capital goods as a proxy for investment.[18] Figure 8 confirms our central idea: sector N largely increased their share of capital goods imports, which grew from 50% in 1991 to around 70% at the end of the decade. The emprical data suggests how an appreciated exchange rate biases resource allocation in favour of the non-tradable sector. As clearly explained in Frenkel (2004) such a change in the productive structure can have medium to long term macroeconomic effects, especially on the development strategies. Moreover, it can lead to larger unemployment rates and promote sustained and increasing current account deficits.

6 Conclusions

In this paper we carried out empirical work using an unbalanced panel built on balance sheets of 74 large firms over 40 quarters, covering the Convertibility period in Argentina (1992-2001). We start estimating an investment equation using three different econometric techniques (RE, FEW and IV) obtaining the following result: exportable firms are more financially constrained, as suggested by the positive and significant value of their coefficient representing internal finance (cash flow estimator). To further explore this puzzling outcome, we estimate a second set of regressions working only with a sample of exportable firms, which confirmes our previous results.

Future research might follow two possible paths. First, our explorative estimation calls for a more detailed study of explanations about larger financial constraints for exportable firms. Second, the analysis needs to be extended to explore the potential macroeconomic consequences of exportable firms' financial constraints, especially in relation to Argentina's historical external constraints.[19]

[18]This is a proxy commonly used in Argentina because: a) there is no direct measure of capital stock by sector at a macroeconomic level; b) Argentina implemented a drastic process of trade liberalisation and thus investment was largely driven by imports of machinery and equipment goods

[19]External constraint notion focuses on Argentinean constant need of foreign exchange

Indeed, the importance of financial constraints becomes even more important if we take into account the possibility of "financial accelerator" mechanisms (Bernanke & Gertler 1989, Bernanke, Gertler & Gilchrist 1996, Bernanke, Gertler & Gilchrist 1999). When firms experience important financial constraints, an initial shock tends to be reinforced at a firm level and then propagated to the macro sphere, which leads to a downturn of aggregate investment and production. This propagation phenomenon to the economy as a whole would be deeper the larger is the share of financially constrained firms in the economy. Therefore, investment, production and export at aggregate level will be affected.[20]

As a consequence, stronger financial constraints on exportable sector firms would not only reduce investment and production, but also undermine the capacity of the economy to face eventual external shocks.[21] This result is key to the Argentine economy for two reasons: on the one hand, Argentina is a country that has suffered recurrent balance of payments crises in the past fifty years (associated to trade deficits) and, on the other hand, the fast growing external debt during the 1990s has seriously tightened its external constraints.

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inflows in order to reach a sustainable growth path without falling in a balance of payments crisis.

[20]Financial accelerator mechanism can become visible in the pro-cyclicity of certain variables, as country risk or credit availability. This risk premium pro-cyclicity, together with credit procyclicity, are actually at the very heart of several financial crises during the 1990s (Boyer, Dehove & Plihon 2004, page:53)

[21]For a detailed analysis of macro-micro interactions, which link notions of competitiveness, sustainability of current account equilibrium and stability of aggregate economic activity, see Fanelli (2003).
In a more general framework for emerging countries, Kalantzis (2005) proposes a theoretical model where financial fragility emerges from the economy productive structure, i.e. the relative size of non-tradable and tradable sectors.

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7 Appendix: Tables and Figures

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total	43	47	51	56	58	61	62	64	63	60
Exporting	40	42	42	45	45	48	47	44	43	40
Non-Exporting	3	5	9	11	13	13	15	20	20	20

Table 1: Number of firms on database per year

	Exporting Firms		**Non-Exporting Firms**	
	median	mean	median	mean
Cash Flow over Capital Stock	4,9%	4,5%	4,9%	6,2%
Investment over Capital Stock	2,2%	3,2%	2,2%	3,7%
Total Debt over Capital Stock	100,4%	110,3%	65,2%	101,1%
Short Term Debt over Total Debt	78,7%	72,4%	47,0%	51,2%
Financial Debt over Total Debt	52,7%	47,4%	73,3%	66,4%
Short term financial debt over financial debt	72,7%	66,5%	31,0%	40,4%
Liquid Assets over Capital Stock	5,0%	16,8%	2,8%	9,5%
Working Capital over Capital Stock	17,8%	35,0%	-6,9%	-3,5%

Table 2: Sample Summary Statistics (1992-2001)

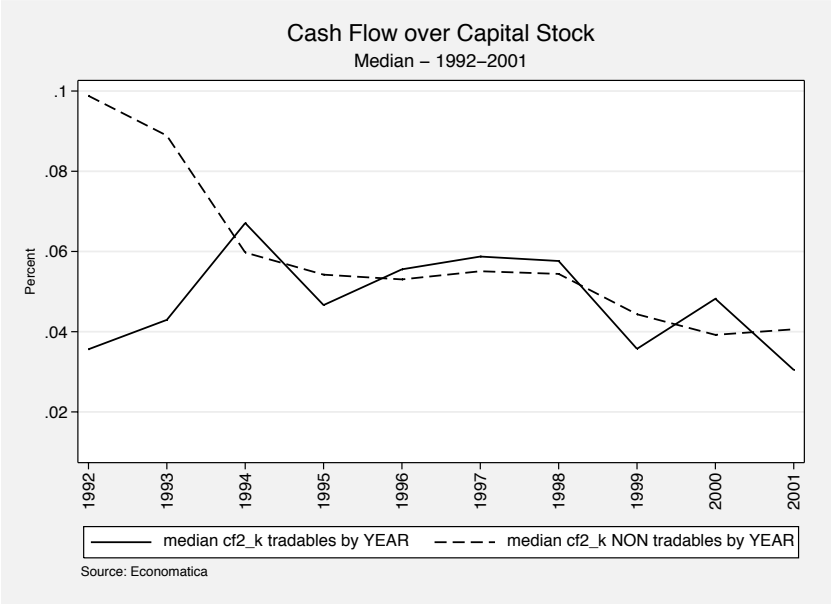


Figure 1:

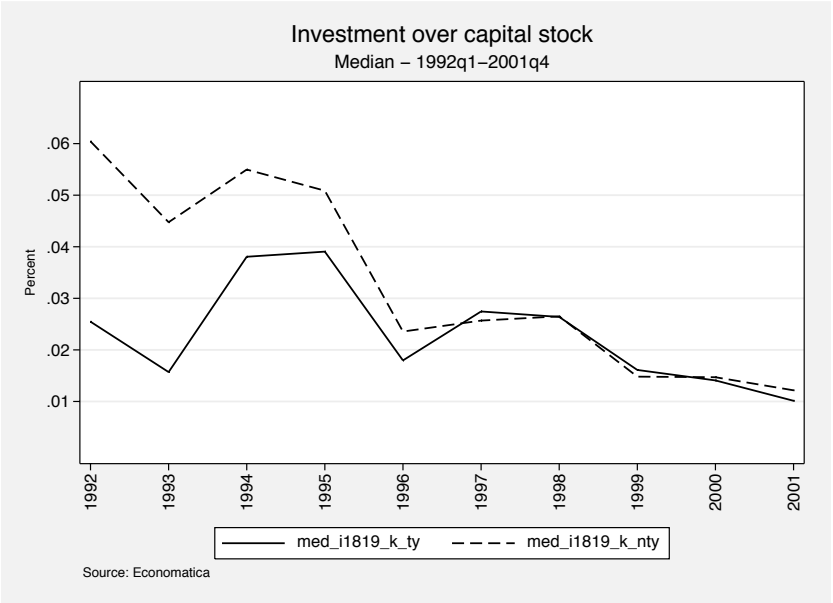


Figure 2:

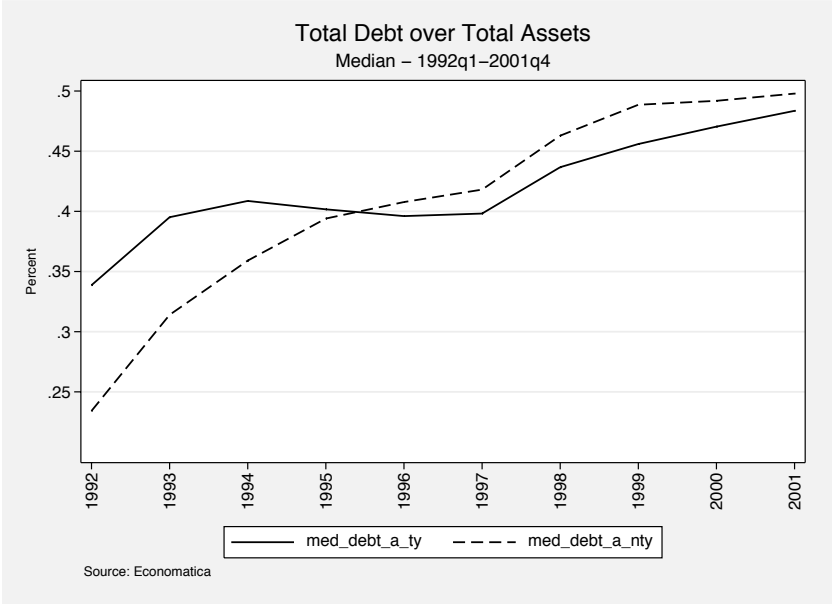


Figure 3:

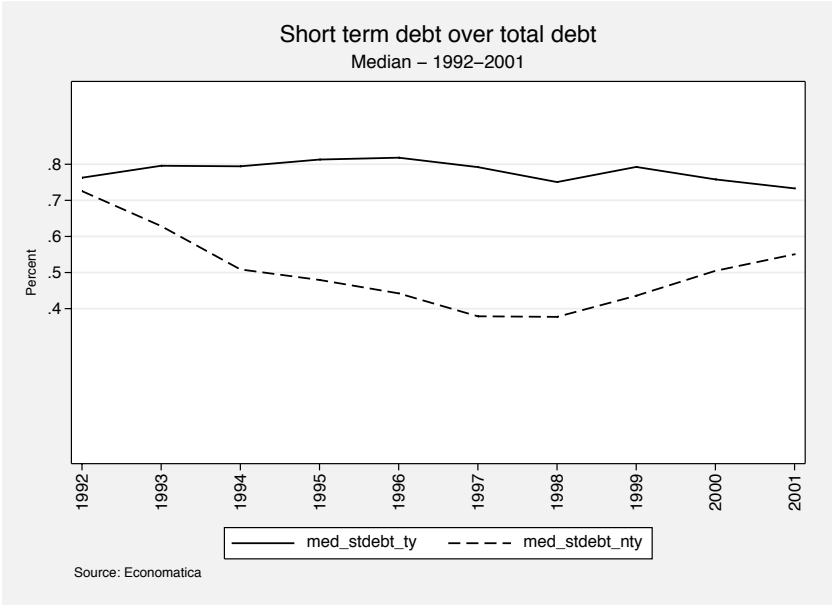


Figure 4:

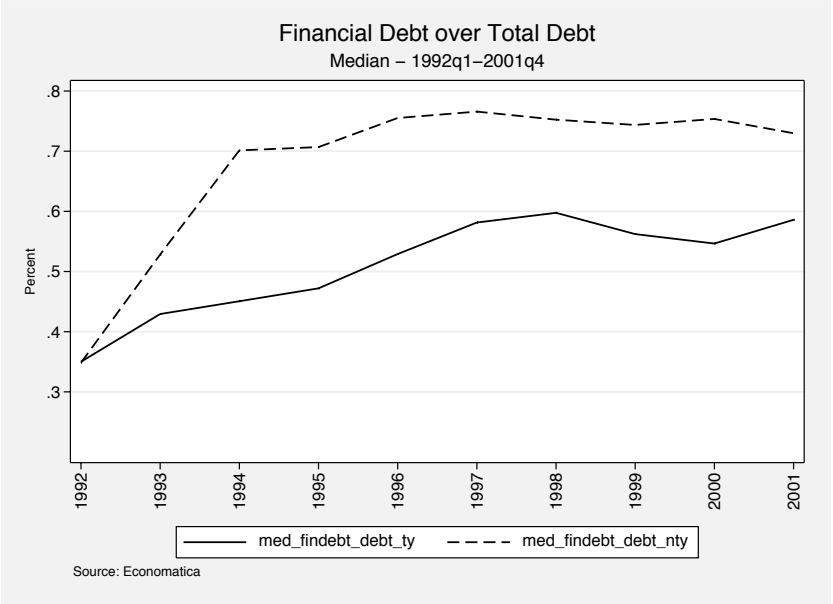


Figure 5:

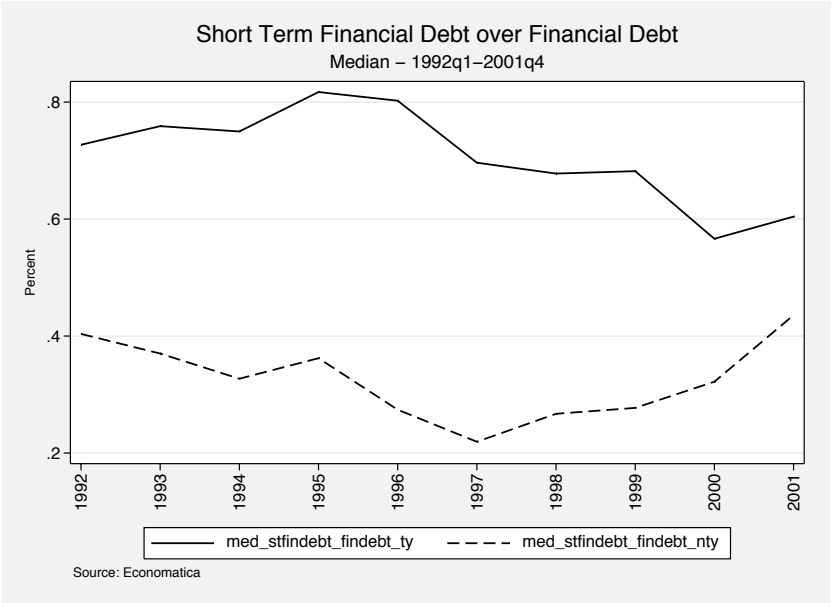


Figure 6:

Table 3: Baseline model regression: all sample. Equation (1)
Dependent variable Investment over Capital Stock (I-K)

	FEW	RE	IVFE	FEW2	RE2	IVFE2
	(1)	(2)	(3)	(4)	(5)	(6)
cf-k-t	0.033***	0.036***	0.099***	0.033*	0.046**	0.136***
	(0.009)	(0.009)	(0.036)	(0.019)	(0.018)	(0.041)
cf-k-nt	-.011	-.025***	-.041**	-.017*	-.026***	-.023
	(0.007)	(0.005)	(0.018)	(0.009)	(0.006)	(0.016)
dwk-k	-.023***	-.021***	-.036***	-.034***	-.033***	-.037***
	(0.004)	(0.004)	(0.01)	(0.006)	(0.006)	(0.009)
lsales-k	0.028***	0.029***	0.087***	0.024***	0.024***	0.104***
	(0.006)	(0.005)	(0.019)	(0.008)	(0.006)	(0.02)
size	0.01***	0.003**	0.019**	0.006	0.004**	0.018**
	(0.004)	(0.002)	(0.009)	(0.006)	(0.002)	(0.009)
debt-k	0.024***	0.018***	-.057	0.029***	0.02***	-.041
	(0.007)	(0.005)	(0.043)	(0.009)	(0.006)	(0.032)
debt-k2	-.005***	-.004***	0.014	-.007***	-.005***	0.012
	(0.002)	(0.001)	(0.011)	(0.002)	(0.001)	(0.008)
q				0.002**	0.002***	-.002
				(0.0009)	(0.0008)	(0.002)
cons	6.217***		7.423	5.257***		7.994
	(1.173)		(5.741)	(1.768)		(5.768)
Observations	2069	2069	1188	1440	1440	1106
R^2	0.147			0.159		

Note: Standard errors appear in parentheses. ***: Significant at 1%. **: Significant at 5%. *: Significant at 10%.

Table 4: Baseline model regression: exportable sector firms. Equation (2)
Dependent variable Investment over Capital Stock (I-K)

	FEW	IVFE	FEW2	IVFE2	FEW3	IVFE3
	(1)	(2)	(3)	(4)	(5)	(6)
cf-k	0.054**	0.198***	0.07***	0.241***	0.063**	0.251***
	(0.022)	(0.052)	(0.022)	(0.068)	(0.028)	(0.077)
lsales-k	0.033***	0.062***	0.031***	0.095***	0.025***	0.096***
	(0.007)	(0.013)	(0.007)	(0.017)	(0.008)	(0.02)
size	0.014***	0.014**	0.013***	0.012	0.007	0.019*
	(0.005)	(0.007)	(0.005)	(0.008)	(0.007)	(0.01)
debt-k	0.023**	0.032***	0.023**	0.022*	0.031***	-.003
	(0.009)	(0.011)	(0.009)	(0.013)	(0.011)	(0.02)
debt-k2	-.005**	-.008***	-.006**	-.008**	-.009***	-.003
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.005)
dwk-k			-.027***	-.054***	-.034***	-.053***
			(0.005)	(0.009)	(0.007)	(0.009)
q					0.002*	0.001
					(0.001)	(0.002)
cons	3.288**	2.771	3.608***	0.609	3.113*	0.629
	(1.285)	(3.562)	(1.275)	(4.091)	(1.845)	(4.196)
Observations	1615	1290	1615	978	1172	902
R^2	0.109		0.125		0.131	

Note: Standard errors appear in parentheses. ***: Significant at 1%. **: Significant at 5%. *: Significant at 10%.

Table 5: Alternative model regression: exportable sector firms. Equation (3) Dependent variable Investment over Capital Stock (I-K)

	FEW	RE	IVFE
	(1)	(2)	(3)
cf-k	0.046*	0.078***	0.21**
	(0.027)	(0.024)	(0.087)
liqas-k	0.025***	0.022***	0.05***
	(0.005)	(0.005)	(0.008)
size1	0.003	0.006***	0.004
	(0.007)	(0.002)	(0.009)
q	0.002**	0.002**	0.004*
	(0.001)	(0.0009)	(0.002)
debt-k	0.032***	0.024***	0.017
	(0.011)	(0.007)	(0.019)
debt-k2	-.009***	-.006***	-.007
	(0.003)	(0.002)	(0.004)
cons	3.903**		4.896
	(1.805)		(3.891)
Observations	1181	1181	921
R^2	0.125		

Note: Standard errors appear in parentheses. ***: Significant at 1%. **: Significant at 5%. *: Significant at 10%.

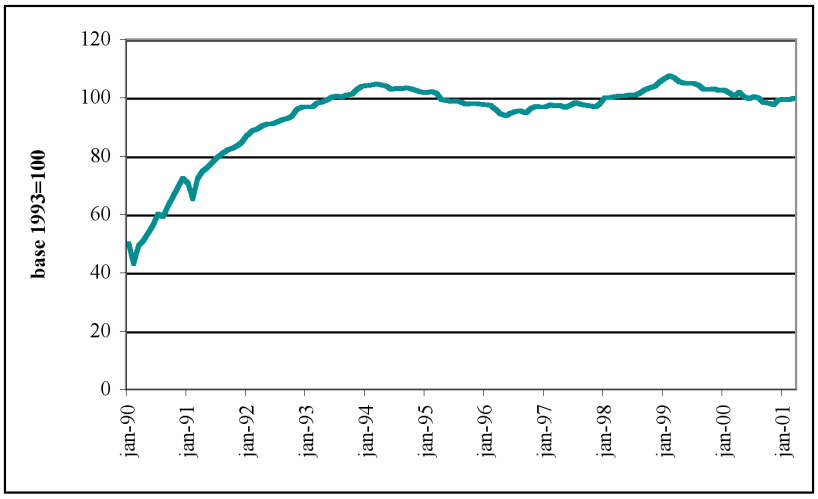
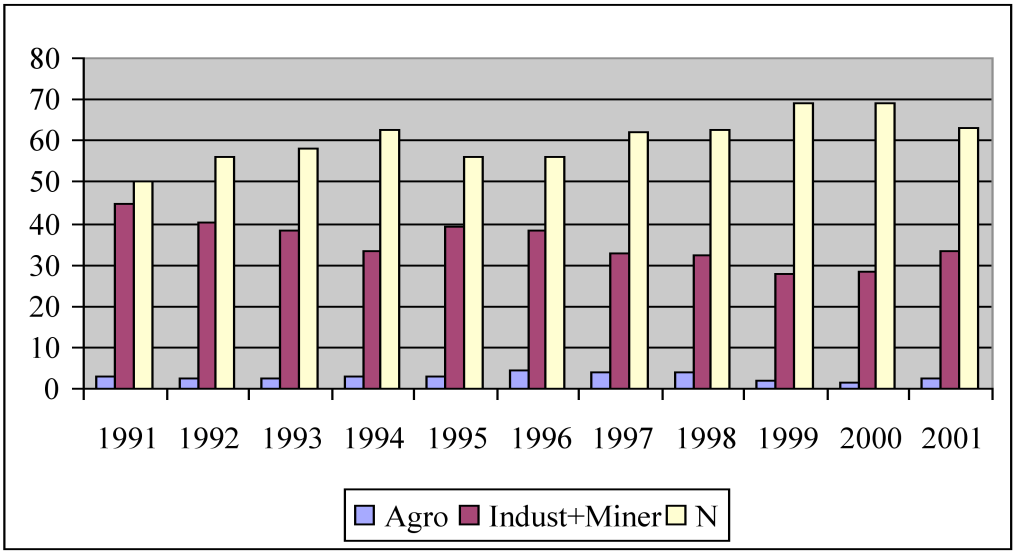


Figure 7: Consumption Price Index/ Producer Price Index (proxy of Non-tradable Sector Price /Tradable Sector Price)
Source: Authors' calculation based on INDEC data, Argentina.

	Production primaire	Industrie manufacturière	Services, commerce et autres
1990	13,8	36,7	49,5
1991	16,7	31,3	52,0
1992	17,4	28,4	54,3
1993	16,3	25,6	58,2
1994	15,3	25,6	59,1
1995	14,8	26,7	58,5
1996	13,4	28,2	58,4
1997	13,5	26,9	59,5
1998	14,0	25,5	60,5
1999	13,9	25,0	61,1
2000	13,9	19,7	66,4
2001	17,3	19,6	63,1

Table 6: Distribution of bank loans to private sector (excluding household) 1991-2001 (%)
Source: Authors' calculation based on data of Argentinean Central Bank (BCRA).



Source: Authors' calculation based on data of Argentinean Ministry of Economy
Non-tradable sectors include: Electricity; Gas and Water; Construction; Retailed Trade, Bank and Insurances; Communications; Health; Research.

Figure 8: Capital Goods Imports by Sectors. (%)