FDI as a source of finance in imperfect capital markets
Firm-Level Evidence from Argentina

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Abstract

In this paper I analyze the financing and ownership structure of Argentinean firms to understand whether credit constraints cause capital flows from developed countries to take the form of FDI instead of being channeled through the credit market. For that purpose, I first show that the measure of external finance dependence (EFD) developed by Rajan and Zingales (1998) can be used as an exogenous measure of credit constraints, as Argentinean firms in sectors with higher need of external finance are less likely to finance their investment with external funds. Second, I show that FDI is more likely to occur in sectors with high EFD, that is where firms are more credit constrained. Finally, I report that foreign-owned firms are more capital and technology-intensive than domestically-owned firms within the same industry, and grow faster in the period following capital account liberalization, which is consistent with the idea that foreign-ownership alleviates credit constraints.

1. Introduction

There is evidence that credit market imperfections are prevalent in developing countries, and that they tend to slow down growth. In particular, Rajan and Zingales (1998) show that sectors with high external finance dependence (EFD) grow faster in financially developed countries because financial development reduces the cost of external finance to firms. At the same time, empirical studies have documented that within industries, foreign-owned firms have better performance characteristics than domestically-owned firms. These findings raise the question whether multinationals can overcome credit market imperfections through internal capital markets.

In this paper I analyze the financing and ownership structure of Argentinean firms to understand whether credit constraints cause capital flows from developed countries to take the form of FDI instead of being channeled through the credit market. For that purpose, I first show that the measure of EFD developed by Rajan and Zingales (1998) can be used as an exogenous measure of credit constraints and later establish that FDI is more likely to occur in sectors with high EFD, that is where firms are more credit constrained.

I analyze a panel of firms in the Argentinean industrial sector covering the capital account liberalization period (1992-1996) that contains information on foreign ownership and the sources of financing investment in technology.

I establish a connection between EFD and credit constraints by relating the financing structure of Argentinean firms to the EFD of the industry they operate in. If Argentina had a well functioning capital market we should observe that firms in need of external finance are more likely to finance their investment with external funds and operate with higher leverage ratios. Surprisingly, I find the exact opposite patterns in the data, which suggests that firms in these sectors are more credit rationed.

Second, I investigate whether the inability of firms in need of external funds to obtain them through the credit market is a driving force for foreign direct investment. Indeed, I find that firms in sectors with high EFD are more likely to be foreign owned and to finance their investment with funds from their parental firms.

Finally, I perform within sector comparisons of the level of technology investment of domestic and foreign-owned firms, and show that the later sustain a higher level of spending in technology, and grow faster in the period 1992-1996. The results above suggest that this asymmetry is partly caused by the better access to finance of foreign-owned firms, as domestic firms in sectors with high EFD finance their technology spending with their own funds, which suggests that their ability to invest is limited by their cash flow and wealth of their owners.

In sum, the empirical findings suggest that entry in sectors with high EFD is restricted to foreign firms and wealthy local entrepreneurs, and that the growth of the later is restricted by their lower capabilities to finance investment.

Additionally, I uncover some new patterns in the data that can be useful to guide theoretical work on the workings of credit markets in developing countries and their relationship to multinational activity.

I decompose the impact of EFD on the share of investment financed externally on an extensive and intensive margin: the first is its impact on the probability of obtaining external finance and the second is its effect on the leverage ratio conditional on it taking positive values. I find that EFD has a sizable negative impact on the probability of obtaining external finance but a very small impact on the leverage ratio, which suggests that credit market problems are not solved by giving entrepreneurs a higher stake on the project but by denying loans to some firms. By definition, firms in sectors with high EFD invest in projects that do not generate immediate cash flow, thus are in need of long term loans. The relative scarcity of loans for these types of firms suggests that credit market imperfections arising from asymmetric information or moral hazard are more acute for long term loans.

I also compare the financing structure of foreign and domestically-owned firms and find that EFD reduces the likelihood of obtaining external finance in the same magnitude for both types of firms, but only domestically-owned firms rely more heavily on their own funds to finance investment while foreign-owned firms use funds from their parental firms. Then, foreign ownership alleviates credit constraints through internal capital

markets but does not appear to have a significant effect on the firm's capabilities of obtaining external finance.

This paper contributes to the literature on the relationships between financial development, multinational activity and growth. Rajan and Zingales (1998), and Acemoglu, Johnson and Mitton (2005) show that financial development influences growth and financial structure. Manova (2006) develops and tests a model where financially developed countries are more likely to export bilaterally and ship greater volumes when they export, and this effect is more pronounced in financially vulnerable sectors. This paper complements this literature by providing direct evidence that firms in sectors with high external finance dependence face more stringent credit constraints in a developing country, and that firms with better access to finance, namely foreign-owned firms, invest more in technology and capital and grow faster.

The evidence reported in this paper is closely related to the findings in Antras, Desai and Foley (2006). They develop model where financial underdevelopment gives rise to multinational activity and FDI flows and test its predictions using firm-level data on the activities of U.S. multinationals. They find that MNCs are more likely to serve countries with higher levels of financial development through licensing as opposed to only through a foreign affiliate and that the share of affiliate assets financed by the parent is higher in countries with lower FD. These results are related to the results reported in this paper that foreign-owned firms are concentrated in sectors with high EFD, and that firms in sectors with high EFD are more likely to finance their investment with funds from their parental firm. The analysis differ in the sources of identification of these effects: in Antras et al. (2006) the source of identification is cross-country variation in measures of financial development while the source I use is cross-industry variation in EFD. An additional difference is that I decompose the effect of EFD in an extensive and intensive margin and find that EFD has a positive impact on the probability of receiving funds from the parental firm, but no significant impact on the share of investment financed by the parental firm conditional on it being positive, while they do not differentiate between these two margins in their estimation of estimate the impact of financial development on the share of affiliate assets financed by the parent.

The remaining of the paper is organized as follows. The next section describes the trade and capital account liberalization in Argentina in the 1990's. Section 3 describes the data set. Section 4 presents the empirical strategy and results on the impact of EFD on the financing and ownership structure of firms. Section 5 presents patterns in the data consistent with the hypothesis that FDI alleviates financing constraints. Section 6 concludes.

2. Trade and Capital Account Liberalization

At the beginning of the 1990's, Argentina took a broad reform program that included trade and capital account liberalization. In 1989 all restrictions on entry and exit of foreign capital were eliminated, along with the requirement of previous authorization for Foreign Direct Investment (FDI). Equal treatment of foreign and national capital was guaranteed by law. In 1991, the Convertibility Law established a fixed parity between the peso and the dollar, and the commitment of the Central Bank to sell and buy currency at that parity. The plan also authorized deposits, debt and contracts to be denominated in dollars establishing a bi-monetary system that eliminated all restrictions on the use of foreign currency.

Trade liberalization reduced the price of imported capital goods and technology, and capital account liberalization reduced the interest rate. Imports of capital goods in the manufacturing sector accelerated after 1992. In 1991 they where only slightly above the average for the period 1987-1990, representing 1.9 % of Industrial GDP. They started increasing in 1992 when they became 3.2% of industrial GDP, and continued growing to reach 4.8% in 1996.

There was a considerable growth of FDI during the 1990's. The stock of FDI as a share of GDP increased from 7.7% in 1992 to 22.2% in 1999. FDI flows to the manufacturing sector increased from US$ 758 million per year in the period 1992-1993 to US$ 2,266 million in 1994-1996, and US$ 3,461 million in 1997-1999.

3. Data

3.1 Firm-level Data

I analyze a panel of Argentinean manufacturing firms covering the period 1992-1996. The baseline number of observations in the panel is 1528, but only 1426 firms in the panel have information on foreign ownership, age and belong to sectors where a measure of external finance dependence is available, thus I focus the analysis on those firms. The data set is described in detail in Bustos (2005), then I only describe the variables of interest in this section.

The survey reports whether the firm has foreign capital participation in 1996, and 263 of the 1426 firms report they do. In addition, the survey reports the sources of financing investment in technology for the period 1992-1996. This question has been answered only by 899 firms, partly because some firms have zero spending in technology and partly because 360 firms with positive spending did not answer it. Missing answers (for firms with positive technology spending) are not correlated with any observable firm and sector characteristics, thus it does not seem to be the case that missing values lead to a selected sample. Then, the results can be interpreted as the financing of investment on technology conditional on investment being positive.

The sources of financing investment in technology listed in the survey are: own funds, government banks, private banks, international financing, government programs, parental firm, clients, providers and other sources. The single most important source of financing are own funds, as 39% of firms finance all their spending with their own funds and 43% finance a positive share (smaller than one) covering on average 53% of their spending with them. Loans from private banks are the next source of finance in order of importance, as 41% of firms obtain a bank loan. Of those, 3% finance all their spending with bank loans while the remaining 38% cover on average 37% of their spending with them. Funds from foreign sources (excluding related parties) are also important, as 10% of firms use them and cover on average 30% of their technology spending with them. The next source in order of importance are funds from parental firms, as 6.5% of firms use them, of those 2% cover all their spending with them and the remaining 4.5% cover 40% of their spending with them. The rest of the sources are less frequent.

The financing sources can be classified as external or internal, according to whether they are provided by a party that has ownership participation on the firm. The main external sources are bank loans and loans from unrelated parties abroad, while the sources that can be classified as internal are own funds and funds from the parental firm. It is important to note that own funds does not only include cash flow but also includes contributions of firm's owners.

3.2 Industry Level Data

I use the measure of external finance dependence of an industry developed by Rajan and Zingales (1998). This measure builds on the assumption that there is a "(…) technological reason why some industries depend more on external finance than others. To the extent that the initial project scale, the gestation period, and the requirement for continuing investment differ substantially between industries, this is indeed plausible." (Rajan and Zingales, 1998). A simple way to think about this measure is that industries differ in the intensity with which they use inputs that have to be paid for before revenues are realized and inputs that are paid at the same time revenues accrue. In a steady state, current revenues minus payments to "simultaneous inputs" should be enough to cover payments to "in advance inputs" for next period, but at the beginning of a production project sectors with a higher "in advance inputs" intensity would have a higher need for external finance.[1]

Rajan and Zingales' external finance dependence (EFD) measure is calculated as capital expenditures minus cash flow from operations divided by capital expenditures for publicly traded U.S. firms over the 1980's.[2] As the capital market in the U.S. is one of most advanced in the world and publicly traded firms are relatively large, they can be assumed not to be credit constrained. Thus, they face a perfectly elastic supply of funds at the risk-adjusted interest rate, and their actual use of external finance reflects their demand (or desired amount at the market interest rate).

[1] "In advance inputs" intensity is conceptually different from capital intensity as it describes inputs that need to be used to start a production process. For example, a significant in advance expenditure in labor could be needed to develop a new product or to design marketing strategies to enter in a new market before revenues are realized. Still, "in advance inputs" intensity might be correlated with capital intensity, as usually capital needs to be set up in advance while labor is employed and paid simultaneously with production, thus I control for the capital intensity of the industry in the empirical work.

[2] They use data from Compustat (1994).

The EFD measure is meant to capture the amount of investment that cannot be financed through internal cash flows generated by the same business, given the technology and the product development stage in the U.S. in the 1980's. As Argentina opened up to trade and capital movements at the beginning of the 1990's, the interest rate, the price of capital goods and the cost of new technologies fell towards U.S. levels. Then, industries in Argentina would have an incentive to adopt production techniques closer to the ones employed in the U.S. as factor prices become closer to the ones in the U.S. In this sense, the external finance dependence of U.S. industries in the 80's is a measure of the desired external finance that Argentinean industries would have had in the 1990's in the absence of credit market frictions.[3]

In the empirical section I use controls for 4-digit-SIC industry characteristics that might be correlated with EFD. First, average capital and skill intensity in the industry in the U.S. in the 1980's obtained from the NBER productivity database. The measure of capital intensity is capital (real equipment plus real structures) per worker; alternative measures like only real equipment capital per worker, or capital over value added provide similar results. The measure of skill intensity is the ratio of non production to production workers in the industry; the relative wage share of non production workers was also used providing similar results. Finally, I use the elasticity of substitution in the industry as estimated by Broda and Weinstein (2006).

4. Empirics

In this section i first show that the measure of EFD developed by Rajan and Zingales (1998) can be used as an exogenous measure of credit constraints by relating it to the financing structure of Argentinean firms. The analysis is performed under two assumptions: first, that there is "a technological reason why some industries depend more on external finance than others" (Rajan and Zingales, 1998); second that as the U.S. is the more developed capital market in the world, the measure of EFD of U.S. firms is a good measure of the optimum leverage ratio in the absence of credit constraints.

[3] Note that all that is required for the external finance dependence in the U.S. to be a good measure of the desired external dependence in Argentina is that the ranking of industries by their financial dependence is preserved.

Second, I investigate whether the inability of firms in need of external funds to obtain them through the credit market gives rise to internal capital markets in the sense that EFD increases the probability of financing investment with funds from parental firms. Additionally, I show that firms in sectors with high external finance dependence are more likely to be foreign-owned.

Finally, I compare the financing structure of foreign and domestically-owned firms in sectors with high EFD to find that while both are less likely to obtain external finance, only domestically-owned firms rely more their own funds to finance their investment.

4.1 The external financing of technology spending

Absent credit constraints we should observe that firms in industries with higher EFD are both more likely to finance their investment with external funds, and finance a higher share of their investment with them. In this section I report the estimation of the impact of EFD on both the probability of obtaining external finance and the leverage ratio.

The outcome of interest is the share of spending in technology financed by external sources (bank loans and funds from unrelated foreign parties). As this variable takes values between 0 and 100%, I first estimate a Tobit model with two censoring points to obtain the marginal effect of EFD on the leverage ratio conditional on it taking values between 0 and 100%; second I estimate a Probit model to obtain the marginal effect of EFD on the probability of obtaining external finance.

The Tobit model I estimate is:

$$y_{ij}^{*} = \beta_0 + \beta_{EFD}\, EFD_j + \beta_I I_j + \beta_C C_{ij} + \varepsilon_{ij} \tag{1}$$

$$y_{ij} = \begin{Bmatrix} 0 & if & y_{ij}^{*} < 0 \\ y_{ij}^{*} & if & y_{ij}^{*} \in (0,1) \\ 1 & if & y_{ij}^{*} > 1 \end{Bmatrix} \tag{2}$$

where i indexes firms; j indexes industries; y_{ij} is the observed share of investment financed with external funds that can take two corner solution outcomes, zero and 100%, and y_{ij}^{*} is the corresponding latent variable; EFD_j is external finance dependence of the industry; I_j is a vector of industry-level controls and C_{ij} is a vector of firm-level controls.

The external finance dependence of U.S. industries is the share of investment that can't be financed by current cash flows and thus corresponds to a measure of the desired share of external finance that Argentinean industries would have had in the absence of credit market frictions. This approach is based on the assumption that all firms within an industry have access to the same production technology and face the same factor prices. Then, absent credit constraints, they would choose the same production techniques (capital, technology and skill intensity) and have the same external finance dependence. As capital markets are not perfect in Argentina, the measure of the optimal production techniques and external finance dependence of industries is obtained from U.S. data, under the assumption that the ordering of industries according to EFD and factor intensity is preserved in Argentina.

The measure external finance dependence developed by Rajan and Zingales varies at the 3 and 4-digit-SIC industry classifications, meaning that within some 3-digit industries there is a unique measure while within others the measure varies for the finer 4-digit classification. In total, 73 industries present in the data set under study have information on external finance dependence. As this measure can be correlated with other industry characteristics several industry-level controls are included: average capital and skill intensity in the industry in the U.S. in the 1980's as capital needs to be set up before starting production and collecting revenues, and high skill intensity industries might also be R&D intensive industries that have high needs of external finance; the elasticity of substitution in the industry, and the changes in Argentina's import tariffs and Brazil's tariffs for imports from Argentina in the period 1992 -1996.

A potential problem in the estimation of equation (1) is the presence of within sector firm heterogeneity. That is, even if all firms within an industry have access to the same production technology, face the same factor prices, and are not credit constrained, they might not choose the same production techniques if they differ in some characteristic that is not a choice variable. Bustos (2005) presents an extension of Melitz (2003) model where ex-ante more productive firms choose a more technology intensive production technique. In the present framework, this would imply that within each industry there are two different technologies available and optimal technology choice would not only depend on factor prices but also on firm productivity. Then, omitting a control for firm-

level productivity might create a bias in the coefficient on external financial dependence if cross-industry variation in the equilibrium productivity distribution is correlated with EFD. I then include firm characteristics that proxy for this firm heterogeneity as controls in the regression: firm size (measured as employment) and labor productivity (measured as sales per worker). A potential problem with these firm-level controls is that, unlike the industry-level variables that are measured using U.S. data, they are endogenous in the sense of being affected by unobserved firm-level variables related to access to external finance. To avoid serious simultaneity problems the firm-level characteristics are lagged, so they take their 1992 value.

Estimation of equation 1 by Tobit is reported in the first column of Table 1. As the independent variable of interest (EFD) varies at the industry level and the dependent variable varies at the firm-level reported standard errors are clustered at the industry level. EFD has a negative impact on the share of spending in technology financed by external funds. Coefficients reported on column 1 of Table 1 correspond to the marginal effects of the independent variables on the latent variable (y^*), and thus lack an economic interpretation in this context. Then I focus the analysis on the effects of EFD on the leverage ratio conditional on the leverage ratio taking values bigger than zero but smaller than one and on the probability of obtaining external finance (estimated by Probit and reported in column 2).

The average probability of using external finance is 0.45, and firms in sectors with a one standard deviation higher EFD than the mean face a 0.074 lower probability of using it. In addition, conditional on using external funds, firms finance on average 39% of their investment with them,[4] and in sectors with a one standard deviation above the mean EFD firms finance a 2.4 p.p. lower share of their investment with them.[5]

Tables 2 and 3 report estimation of equation 1 for each of the two sources of external finance, bank loans and funds from unrelated parties abroad, to check whether the effects of EFD are different for each of these two sources of financing. The results obtained are

[4] More formally: $E(y \mid X, 0<y<100) = 39.16$, where X is the vector of independent variables evaluated at their mean value.

[5] That is, $E(y \mid X, 0<y<100) / \partial EFD = -7.94$, where X is evaluated at the mean value of the independent variables and a one standard deviation in EFD is 0.25.

similar to the ones reported above for the two sources combined. The results reported in columns 1 and 2 of Table 2 imply that the average probability of using bank loans is 0.41, but firms in sectors with a one standard deviation higher EFD than the mean face a 0.055 lower probability of financing their investment with a bank loan. In addition, conditional on having a bank loan, on average firms finance 37% of their investment with them, and in sectors with a one standard deviation above the mean EFD cover these loans finance a 1.6 p.p. lower share of their investment. The results reported in columns 1 and 2 of Table 3 imply that the average probability of obtaining funds from unrelated parties abroad is 0.10, but firms in sectors with a one standard deviation higher than the mean EFD face a 0.032 lower probability of using this source. Firms that use foreign funds finance on average 30% of their investment with them, while firms in sectors with a one standard deviation above the mean EFD finance a 1.54 p.p. lower share of their spending with foreign funds.

Then, firms with high needs for external funds rely less on local bank loans or funds from foreign unrelated parties to finance their investment in technology. Note that the effect is stronger on the extensive margin, in the sense that EFD has a sizable impact on the probability of using external finance, as it reduces it 16%, while its impact on the share financed by these sources conditional on using them is small, reducing the leverage ratio only 6%.

4.2 External finance dependence and parental firm financing

In this section I document that the relative lack of external finance of firms in sectors with high EFD gives rise to internal capital markets: firms in these sectors are more likely to finance their spending with funds from their parental firm. First I estimate the Tobit model described in equation 1 where the outcome variable is the share of spending in technology financed with parental funds. Second I estimate the impact of EFD in the probability of this share being positive through a Probit and a LPM based on equation (1). Finally, I estimate the impact of EFD on the probability of this share being equal to one.

Estimation results are reported in Table 4. EFD has a positive and significant effect on the probability of obtaining funds from the parental firm, both in the Probit and LPM (reported in columns 2 and 3). The Probit coefficients imply that the average probability

of receiving funds from the parental firm is 0.046, and firms in sectors with a one standard deviation higher than the mean EFD have a 0.016 higher probability of receiving them. Firms that receive funds from their parental firms finance on average 40.11% of their spending in technology with them but EFD has no significant impact on the share financed by parental firms, conditional on this share being positive, as reported in Column 1.

4.3 External finance dependence and foreign ownership

The results presented above suggest that lack of financial development is a driving force for FDI. In this section I perform an additional test of this relationship by estimating the impact of EFD on the probability of a firm being foreign owned. This measure of FDI has two advantages over the one discussed above: first, this question was answered by all firms, not only the ones with positive spending in technology, thus it permits to perform a test in the full sample; second, as the question does not restrict the use of foreign funds to technology investment, it permits to evaluate FDI more broadly.

As the survey only provides information on whether firms have participation of foreign capital in 1996, being difficult to determine the year when foreign capital participation started, I focus on explaining whether the cross-industry variation in the probability of observing a foreign-owned firm in 1996 can be explained by the external financial dependence of that industry in the U.S. in the 1980's.

I estimate an equation analogous to (1) where the dependent variable is a dummy indicating whether the firm is partly owned by foreigners. Probit estimation results are reported in Table 5, and Linear Probability Model (LPM) results are reported in Table 6.

I first report estimation of equation (1) excluding the firm-level controls (Cij), and including only the industry-level exogenous variables: the measure of external finance dependence and the capital and skill intensity of industries in the U.S. are exogenous in the sense that they can't be caused by the share of foreign firms in a given sector in Argentina. I later include the firm-level controls to assess the importance of omitting ex-ante heterogeneity in productivity. Including firm-level controls might induce a downward bias in the coefficient on EFD, as part of the impact of EFD on foreign ownership might be captured by the size and productivity controls through the following

mechanism: high EFD causes foreign ownership which releases credit constraints and thus permits firms to invest in technology and became larger and more productive. Lagging firm characteristics to their 1992 value mitigates this problem, but not fully as some firms are already foreign owned in 1992. Then, the coefficient on EFD in this specification can be taken as a lower bound on the effect of EFD on foreign ownership.

Table 5 presents estimation of equation 1 by Probit, reporting the effect of the marginal change in each variable on the probability that a firm is foreign owned. Columns 1 to 4 report the coefficient on EFD when no firm-level controls are included, and adding industry level controls one at a time. The coefficient on EFD is always significant, and the only industry-level control variable that is significant is capital intensity. The estimated coefficient on EFD when all industry level controls are included is significant (t=3.74) and implies that a firm in a sector with a one standard deviation over the mean external finance dependence would have a 5.2 percentage points higher probability of being foreign owned, while the average probability is 16.6 percentage points.

Column 5 reports estimation of equation 1 when firm size and labor productivity are included as proxies for firm-level heterogeneity in productivity. Both have a positive effect on the probability of observing a foreign-owned firm, but as these variables are endogenous for firms that were already foreign owned in 1992 these coefficients can't be interpreted causally. Their inclusion attempts to control for omitted sector-level factors that might be correlated with external finance dependence. After their inclusion the marginal effect of EFD remains significant at 1%, and falls slightly (from 0.217 to 0.183). A possible interpretation for the drop in this coefficient is that only the most productive firms generate sufficient cash flow to survive in sectors with high EFD, thus the exit productivity cutoff at the industry level is positively correlated with EFD. In this case, as long as these firm-level controls are a good proxy for firm heterogeneity the coefficient of 0.183 would be correct. Another interpretation is that firm characteristics in 1992 are endogenous for firms that were already foreign owned in that year, in which case the firm-level controls would be capturing part of the effect of EFD. In sum, 0.217 can be thought of as an upper bound and 0.183 as a lower bound for the effect of EFD on foreign ownership.

Column 6 of Table 5 reports estimation of equation 1 when also firm skill-intensity is included as a control. This variable has a positive effect on the probability of observing a foreign-owned firm, and reduces the coefficient on EFD significantly (from 0.183 to 0.135) although it is still significant at 1%. This control variable has a similar role as firm size and productivity in the sense of controlling for firm heterogeneity and inducing an endogeneity bias, but it also performs another role: controlling for sector skill intensity in a better way than the measure of skill intensity in the U.S. The reason is that the measure for skill intensity in the U.S. included in the sector-level controls is not as good as the one in the firm-level controls, as the first measures skill intensity only by the ratio of non production to production workers while the later measures skill intensity as the ratio of college plus tertiary educated workers over high school plus primary school educated workers. Then, 0.135 is better lower bound for the estimated marginal effect of EFD on foreign ownership. This coefficient implies that the average probability of observing a foreign-owned firm is 0.114 and a firm in a sector with a one standard deviation higher than the mean EFD has a 0.033 higher probability of being foreign-owned.

The last two columns in Table 5 control for changes in Argentina's import tariffs and Brazil's tariffs for imports from Argentina in the period 1992-1996, but these are not significant and the estimated coefficients on EFD are very similar to the ones estimated without these controls.[6]

Table 6 reports estimation of equation 1 by the linear probability model, with very similar results as the Probit model.

4.4 Differences in the financing structure of foreign and domestically-owned firms

The evidence discussed so far shows that firms in sectors with high EFD are less likely to obtain external finance, and more likely to be foreign owned and obtain funds from their parental firms. In this section I explore whether foreign ownership changes the effect of EFD on the financing structure of firms.

First, I explore whether foreign-owned firms in sectors with high EFD have better access to external finance than domestically-owned firms. For that purpose, I include in

[6] These regressions are estimated over a smaller sample of firms as data on tariffs is not available for all industries.

the specification of equation (1) an interaction between the EFD of the sector and a dummy variable indication whether the firm is foreign owned. Results are reported in columns 5 and 6 of Table 1. The interaction of EFD and foreign ownership is not significant, meaning that foreign-owned firms in sectors with high EFD are as unlikely as domestically-owned firms to obtain external finance.

Second, I report that although both domestic and foreign-owned firms in sectors with high EFD obtain less external finance, only domestically-owned firms rely more on their own funds to finance their investment. Table 7 reports estimation of equation 1 where the dependent variable is the share of spending financed with own funds. Interestingly, EFD has no significant effect on the share of investment financed with own funds (Column 1) and only a marginally significant positive effect on the probability of financing all spending with own funds (Column 2). When the interaction between EFD and foreign ownership is included in the regression, the coefficient on EFD becomes bigger and more significant for domestically-owned firms and negative and very significant for foreign-owned firms (Columns 5 and 6). The coefficient on EFD is of similar size but opposite signs for both types of firms, then in sectors with high EFD only domestically-owned firms rely more on their own funds to finance their investment. Domestically-owned firms in sectors with a one standard deviation above the mean EFD are have a 0.08 higher probability to finance all their spending in technology with their own funds, while the average probability is 0.40. EFD has also a significant impact on the intensive margin but is very small: the average share financed with own funds, conditional on this share being strictly between zero and one, is 53% and a one standard deviation increase in EFD raises it only in 1.86 p.p.

In sum the results altogether suggest that all firms in sectors with high EFD are less likely to obtain external finance, domestically-owned firms finance their investment with their own funds and foreign ownership does not seem to facilitate access to external finance, but instead facilitates access to funds through internal capital markets

4. Patterns in the Data Consistent with FDI as a source of finance

In this section I compare foreign-owned firms to domestically-owned firms in the same 4-digit industry in terms of capital-intensity, technology-intensity, and labor

productivity. The comparison is performed within industries in an attempt to hold optimal external finance dependence and optimal capital intensity constant. Still, differences can't be interpreted as causal as they could be driven by unobserved firm heterogeneity in productivity. The differences reported in this section are just consistent with the hypothesis that foreign ownership alleviates credit constraints permitting a higher investment in capital and technology.

Table 8 reports OLS estimates of the differences in size, labor productivity and skill intensity between foreign and domestically-owned firms. Foreign-owned firms are larger, more productive and more skill intensive both in 1992 and 1996. Also, their sales and labor productivity grow faster in this period.

Table 9 reports OLS estimates of the differences in spending in capital goods per worker between foreign and domestically-owned firms.[7] Foreign-owned firms do not have a higher level of spending in capital goods per worker in 1992, but increase their capital intensity faster between 1992 and 1996.

Table 610reports OLS estimates of the differences in spending in technology per worker between foreign and domestically-owned firms.[8] Foreign-owned firms have a higher level of spending in technology per worker in 1992, and increase it faster between 1992 and 1996.

The finding that foreign-owned firms sustain higher levels of investment in technology and capital goods than other firms in the same 4-digit industry is consistent with the hypothesis that their access to internal capital markets relaxes their credit constraints.

5. Concluding Remarks

In this paper I provide empirical evidence that alleviating credit constraints in underdeveloped capital markets is a driving force for FDI, in the sense that foreign-owned firms are concentrated in industries with high external finance dependence, and although they are as unlikely as domestically-owned firms to obtain external finance they obtain funds from their parental firm to finance spending in technology. In addition, I

[7] These differences are calculated for the sub sample of firms that report positive spending in capital goods in 1992 and 1996.
[8] These differences are calculated for the sub sample of firms that report positive spending in technology in 1992 and 1996.

report patterns in the data that are consistent with this view: foreign-owned firms have higher technology and capital labor ratios than domestically-owned firms in the same 4-digit industry, and increase these ratios faster in the period following capital account liberalization, which suggests that their better performance can be partly explained by their better access to funds to finance investment.

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Table 1

LHS variable: Share of Spending in Technology financed by Bank Loans or Foreign Sources (excluding related parties)

	1 Tobit	2 Probit : Prob of y>0 Marginal effects	3 Tobit	4 Tobit	5 Tobit	6 Probit : Prob of y>0 Marginal effects
External finance dependence	**-43.797**	**-0.290**		**-43.474**	**-45.496**	**-0.306**
	[20.278]**	**[0.120]****		**[20.518]****	**[22.245]****	**[0.125]****
Foreign-owned firm			-5.909	-3.426	-5.546	-0.079
			[6.895]	[6.122]	[10.682]	[0.061]
EFD* Foreign-owned firm					6.706	0.079
					[27.694]	[0.131]
Industry -level controls						
Log(capital per worker) in the U.S.	-9.378	-0.064	-4.737	-9.521	-9.383	-0.057
	[6.059]	[0.045]	[4.433]	[5.547]*	[6.195]	[0.045]
Log(skill intensity) in the U.S.	15.565	0.124	4.460	15.771	15.710	0.122
	[12.272]	[0.067]*	[6.838]	[12.573]	[11.861]	[0.066]*
Elasticity of substitution	0.984	0.004	1.802	1.041	1.040	0.004
	[1.645]	[0.011]	[1.529]	[1.581]	[1.643]	[0.011]
Firm-level controls						
Log(age)	-11.787	-0.086	-16.378	-10.292	-10.186	-0.090
	[10.525]	[0.078]	[11.144]	[11.322]	[12.388]	[0.079]
Log (age square)	1.628	0.016	2.557	1.394	1.375	0.016
	[1.933]	[0.014]	[2.003]	[2.041]	[2.305]	[0.014]
Log (Employment)	6.944	0.033	8.001	7.423	7.402	0.039
	[2.191]***	[0.013]**	[1.964]***	[2.171]***	[2.086]***	[0.013]***
Log(Labor productivity)	3.718	0.024	4.016	4.000	3.934	0.026
	[3.760]	[0.021]	[3.470]	[3.713]	[3.537]	[0.022]
Skill Intensity	7.803	0.007	-1.283	9.830	10.219	0.033
	[19.157]	[0.110]	[14.699]	[18.224]	[19.284]	[0.111]
Observations	899	899	899	899	899	899
Log-pseudo likelihood value	-2384.838	-605.760	-2392.211	-2384.694	-2384.644	-604.91
Pseudo R-squared	0.0073	0.021	0.0042	0.0073	0.0074	0.023
Sigma	62.335		63.061	62.325	62.320	
	[3.654]		[3.603]	[3.512]	[3.324]	
Observed Probability		0.452				0.452
Predicted Probability		0.451				0.451

Bootstrap standard errors clustered at the level of external finance dependence reported for Tobit (200 replications, number of clusters: 72.).
Robust standard errors clustered at the level of external finance dependence reported for Probit.
* significant at 10%; ** significant at 5%; *** significant at 1%
Observation censoring summary: 493 left censored observations, 363 uncensored observations, 43 right censored observations.
Note: In Tobit 1 ∂ E(y | X, 0<y<100) /∂EFD= -7.936 and E(y | X, 0<y<100)= 39.158 where X is the vector of independent variables is evaluated at their mean value.

Table 2

LHS variable: Share of Spending in Technology financed by Bank Loans

	1 Tobit	2 Probit : Prob of y>0 Marginal effects	3 Tobit	4 Tobit	5 Tobit	6 Probit : Prob of y>0 Marginal effects
External finance dependence	**-33.256**	**-0.217**		**-32.709**	**-35.669**	**-0.248**
	[16.954]**	**[0.115]***		**[18.855]***	**[18.661]***	**[0.122]****
Foreign-owned firm			-6.558	-4.645	-7.831	**-0.099**
			[5.760]	[5.664]	[7.563]	**[0.046]****
EFD* Foreign-owned firm					9.930	0.131
					[17.971]	[0.099]
Industry -level controls						
Log(capital per worker) in the U.S.	-10.976	-0.082	-7.534	-11.042	-10.847	-0.074
	[4.583]**	[0.039]**	[4.415]*	[5.060]**	[4.676]**	[0.040]*
Log(skill intensity) in the U.S.	15.610	0.113	7.332	15.775	15.696	0.110
	[10.164]	[0.061]*	[7.052]	[11.721]	[9.228]*	[0.059]*
Elasticity of substitution	1.387	0.009	2.046	1.454	1.461	0.009
	[1.829]	[0.011]	[1.445]	[1.652]	[1.612]	[0.011]
Firm-level controls						
Log(age)	-17.037	-0.108	-20.123	-15.655	-15.495	-0.111
	[10.259]*	[0.076]	[11.338]*	[12.894]	[12.101]	[0.077]
Log (age square)	2.484	0.019	3.117	2.264	2.235	0.019
	[1.864]	[0.013]	[2.058]	[2.222]	[2.187]	[0.013]
Log (Employment)	5.242	0.026	6.299	5.867	5.838	0.033
	[1.621]***	[0.011]**	[2.091]***	[1.949]***	[1.654]***	[0.012]***
Log(Labor productivity)	-0.029	0.009	0.230	0.287	0.183	0.010
	[3.649]	[0.022]	[3.442]	[3.858]	[3.829]	[0.023]
Skill Intensity	8.026	0.027	2.315	10.564	11.131	0.058
	[16.605]	[0.112]	[16.042]	[20.792]	[19.478]	[0.114]
Observations	899	899	899	899	899	899
Log-pseudo likelihood value	-2220.43	-599.80	-2224.71	-2220.15	-2220.03	-598.57
Pseudo R-squared	0.0056	0.016	0.0036	0.0057	0.0057	0.018
Sigma	59.350		59.803	59.340	59.337	
	[3.868]		[3.975]	[4.192]	[3.646]	
Observed Probability		0.412				0.412
Predicted Probability		0.411				0.411

Bootstrap standard errors clustered at the level of external finance dependence reported for Tobit (200 replications, number of clusters: 72).
Robust standard errors clustered at the level of external finance dependence reported for Probit.
* significant at 10%; ** significant at 5%; *** significant at 1%
Observation censoring summary: 528 left censored observations, 338 uncensored observations, 33 right censored observations.
Note: In Tobit 1 ∂ E(y | X, 0<y<100) /∂EFD= -6.342 and E(y | X, 0<y<100)= 37.039 where X is the vector of independent variables is evaluated at their mean value.

Table 3

LHS variable: Share of Spending in Technology financed by Foreign Sources (excluding related parties)

	1 Tobit	2 Probit : Prob of y>0 Marginal effects	3 Tobit	4 Tobit	5 Tobit	6 Probit : Prob of y>0 Marginal effects
External finance dependence	**-55.528**	**-0.128**		**-55.176**	-61.294	**-0.139**
	[26.154]**	**[0.055]****		**[29.320]***	[38.242]	**[0.065]****
Foreign-owned firm			-4.643	-1.321	-5.894	-0.019
			[11.475]	[11.358]	[20.797]	[0.043]
EFD* Foreign-owned firm					16.842	0.036
					[54.791]	[0.108]
Industry -level controls						
Log(capital per worker) in the U.S.	0.232	0.003	7.109	0.408	0.756	0.005
	[11.045]	[0.021]	[8.517]	[10.693]	[11.306]	[0.021]
Log(skill intensity) in the U.S.	-2.885	-0.011	-17.738	-3.002	-3.197	-0.012
	[17.656]	[0.026]	[13.870]	[17.703]	[18.747]	[0.026]
Elasticity of substitution	-0.345	-0.002	0.434	-0.355	-0.382	-0.002
	[3.261]	[0.006]	[2.976]	[3.193]	[3.024]	[0.006]
Firm-level controls						
Log(age)	41.028	0.091	32.461	40.454	40.722	0.090
	[25.562]	[0.051]*	[29.150]	[25.343]	[27.460]	[0.052]*
Log (age square)	-6.434	-0.014	-4.885	-6.350	-6.399	-0.014
	[4.236]	[0.008]*	[4.785]	[4.128]	[4.575]	[0.008]*
Log (Employment)	9.644	0.023	10.616	9.787	9.742	0.024
	[4.498]**	[0.009]**	[4.124]**	[4.525]**	[4.652]**	[0.009]***
Log(Labor productivity)	20.534	0.045	20.955	20.538	20.399	0.045
	[6.524]***	[0.013]***	[7.274]***	[6.136]***	[6.135]***	[0.013]***
Skill Intensity	10.859	0.028	-2.004	11.321	11.858	0.033
	[27.716]	[0.056]	[23.789]	[23.989]	[30.304]	[0.055]
Observations	899	899	899	899	899	899
Log-pseudo likelihood value	-696.591	-281.42	-700.22	-696.58	-696.481	-281.25681
Pseudo R-squared	0.0276	0.065	0.0225	0.0276	0.0278	0.0661
Sigma	72.213		72.995	72.215	72.183	
	[5.884]		[6.278]	[5.959]	[5.683]	
Observed Probability		0.105				0.105
Predicted Probability		0.089				0.089

Bootstrap standard errors clustered at the level of external finance dependence reported for Tobit (200 replications, number of clusters: 72).
Robust standard errors clustered at the level of external finance dependence reported for Probit.
* significant at 10%; ** significant at 5%; *** significant at 1%
Observation censoring summary: 805 left censored observations, 90 uncensored observations, 4 right censored observations.
Note: In Tobit 1 ∂ E(y | x, 0<y<100) /∂ EFD= -6.060 and E(y | x, 0<y<100)= 30.239 where X is the vector of independent variables is evaluated at their mean value.

Table 4

LHS variable: Share of Spending in Technology financed by Parental Firm

	1 Tobit	2 Probit: Prob of y>0 Marginal effects	3 LPM: Prob of y>0	4 Probit: Prob of y=1 Marginal effects	5 LPM: Prob of y=1
External finance dependence	103.289	0.062	0.083	0.029	0.029
	[77.514]	[0.029]**	[0.036]**	[0.018]	[0.022]
Industry -level controls					
Log(capital per worker) in the U.S.	14.740	0.007	0.007	0.003	0.003
	[23.606]	[0.012]	[0.012]	[0.005]	[0.007]
Log(skill intensity) in the U.S.	-64.648	-0.026	-0.033	-0.039	-0.047
	[74.658]	[0.035]	[0.038]	[0.017]**	[0.026]*
Elasticity of substitution	3.059	0.003	0.005	-0.001	-0.001
	[7.708]	[0.004]	[0.007]	[0.001]	[0.002]
Firm-level controls					
Log(age)	-73.924	-0.042	-0.044	-0.014	-0.028
	[51.623]	[0.024]*	[0.042]	[0.010]	[0.031]
Log (age square)	9.895	0.006	0.006	0.002	0.004
	[8.352]	[0.004]	[0.007]	[0.002]	[0.005]
Log (Employment)	34.604	0.021	0.023	0.006	0.009
	[13.506]**	[0.005]***	[0.006]***	[0.002]**	[0.003]***
Log(Labor productivity)	23.157	0.014	0.019	0.004	0.006
	[17.250]	[0.011]	[0.012]	[0.003]	[0.005]
Skill Intensity	214.730	0.144	0.255	0.020	0.042
	[71.152]***	[0.032]***	[0.070]***	[0.015]	[0.037]
Observations	899	899	899	899	899
Log-pseudo likelihood value	-414.027	-189.379		-76.397	
Pseudo R-squared / R-squared	0.059	0.130	0.07	0.134	0.02
Sigma	161.203				
	[32.678]				
Observed Probability		0.065		0.020	
Predicted Probability		0.046		0.009	

Bootstrap standard errors clustered at the level of external finance dependence reported for Tobit (200 replications, number of clusters: 72.).
Robust standard errors clustered at the level of external finance dependence reported for Probit.
* significant at 10%; ** significant at 5%; *** significant at 1%
Observation censoring summary: 840 left censored observations, 41 uncensored observations, 18 right censored observations.
Note: In Tobit E(y | x, 0<y<100)= 40.116 where X is the vector of independent variables is evaluated at their mean value.

Table 5
The impact of external finance dependence on foreign-ownership

Probit Model, marginal effects.
LHS variable =1 if firm is foreign owned in 1996

	1	2	3	4	5	6	7	8
External finance dependence	0.156	0.218	0.223	0.217	0.183	0.135	0.189	0.144
	[0.077]**	[0.049]***	[0.059]***	[0.058]***	[0.051]***	[0.040]***	[0.057]***	[0.047]***
Industry level control vars.								
Log(capital per worker) in the U.S.		0.145	0.147	0.150	0.075	0.061	0.077	0.064
		[0.019]***	[0.021]***	[0.022]***	[0.018]***	[0.017]***	[0.018]***	[0.017]***
Log(skill intensity) in the U.S.			-0.007	-0.010	-0.005	-0.028	0.004	-0.021
			[0.042]	[0.044]	[0.034]	[0.030]	[0.036]	[0.034]
Elasticity of substitution				-0.006	-0.002	-0.003	-0.002	-0.003
				[0.005]	[0.006]	[0.006]	[0.006]	[0.006]
Change in Brazil's tariffs 1992-1996							0.001	0.001
							[0.001]	[0.001]
Change in Argentina's tariffs 1992-1996							-0.028	0.087
							[0.537]	[0.478]
Firm level control vars.								
Log(age)					-0.060	-0.052	-0.049	-0.051
					[0.057]	[0.057]	[0.062]	[0.062]
Log (age square)					0.010	0.010	0.008	0.009
					[0.011]	[0.011]	[0.012]	[0.012]
Log (Employment)					0.097	0.089	0.097	0.090
					[0.012]***	[0.010]***	[0.011]***	[0.010]***
Log(Labor productivity)					0.062	0.052	0.057	0.049
					[0.019]***	[0.019]***	[0.017]***	[0.017]***
Skill Intensity						0.294		0.287
						[0.063]***		[0.067]***
Observations	1426	1426	1426	1426	1426	1426	1348	1348
Log-pseudo likelihood value	-674.105	-633.671	-633.645	-633.166	-517.226	-501.418	-492.578	-479.290
Pseudo R-squared	0.011	0.070	0.070	0.071	0.241	0.264	0.239	0.260
Observed Probability	0.184	0.184	0.184	0.184	0.184	0.184	0.186	0.186
Predicted Probability	0.182	0.166	0.166	0.166	0.119	0.114	0.121	0.117

Robust standard errors in brackets Standard errors clustered at the level of external finance dependence. Number of clusters: 73.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6
The impact of external finance dependence on foreign-ownership

Linear Probability Model
LHS variable =1 if firm is foreign owned in 1996

	1	2	3	4	5	6	7	8
External finance dependence	0.172	0.213	0.217	0.211	0.227	0.167	0.233	0.184
	[0.091]*	[0.071]***	[0.078]***	[0.078]***	[0.054]***	[0.044]***	[0.059]***	[0.053]***
Industry level control vars.								
Log(capital per worker) in the U.S.		0.141	0.143	0.145	0.088	0.074	0.093	0.079
		[0.023]***	[0.023]***	[0.025]***	[0.017]***	[0.017]***	[0.021]***	[0.019]***
Log(skill intensity) in the U.S.			-0.005	-0.008	-0.011	-0.037	-0.006	-0.039
			[0.043]	[0.045]	[0.036]	[0.031]	[0.040]	[0.038]
Elasticity of substitution				-0.005	-0.002	-0.002	-0.002	-0.001
				[0.006]	[0.006]	[0.006]	[0.006]	[0.006]
Change in Brazil's tariffs 1992-1996							0.000	0.000
							[0.001]	[0.001]
Change in Argentina's tariffs 1992-1996							-0.232	-0.115
							[0.604]	[0.522]
Firm level control vars.								
Log(age)					-0.111	-0.094	-0.090	-0.085
					[0.057]*	[0.056]	[0.058]	[0.059]
Log (age square)					0.019	0.017	0.015	0.015
					[0.012]	[0.012]	[0.012]	[0.012]
Log (Employment)					0.102	0.092	0.103	0.093
					[0.011]***	[0.011]***	[0.011]***	[0.011]***
Log(Labor productivity)					0.060	0.050	0.056	0.048
					[0.018]***	[0.019]***	[0.016]***	[0.017]***
Skill Intensity						0.382		0.367
						[0.097]***		[0.095]***
Constant	0.135	-0.446	-0.459	-0.455	-0.819	-0.781	-0.829	-0.808
	[0.031]***	[0.087]***	[0.128]***	[0.130]***	[0.120]***	[0.119]***	[0.149]***	[0.135]***
Observations	1426	1426	1426	1426	1426	1426	1348	1348
R-squared	0.01	0.06	0.06	0.06	0.21	0.23	0.21	0.23

Robust standard errors in brackets Standard errors clustered at the level of External finance dependence. Number of clusters: 73
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7

LHS variable: Share of Spending in Technology financed by Own Funds

	1 Tobit	2 Probit: Prob of y=100 Marginal effects	3 Tobit	4 Tobit	5 Tobit	6 Probit: Prob of y=100 Marginal effects
External finance dependence	37.568	**0.207**		41.169	**61.451**	**0.316**
	[27.472]	**[0.122]***		[30.634]	**[28.463]****	**[0.130]****
Foreign-owned firm			**-17.644**	**-20.001**	1.741	0.077
			[7.911]**	**[7.744]*****	[11.159]	[0.062]
EFD* Foreign-owned firm					**-66.695**	**-0.358**
					[33.394]**	**[0.129]*****
Industry -level controls						
Log(capital per worker) in the U.S.	9.451	0.054	6.932	11.478	10.036	0.050
	[7.944]	[0.044]	[8.199]	[8.106]	[8.045]	[0.045]
Log(skill intensity) in the U.S.	-6.632	-0.036	3.672	-7.553	-6.922	-0.035
	[26.262]	[0.091]	[20.863]	[24.756]	[19.921]	[0.089]
Elasticity of substitution	24.821	-0.009	28.654	22.559	21.595	-0.009
	[13.568]*	[0.014]	[14.255]**	[13.662]*	[13.063]*	[0.014]
Firm-level controls						
Log(age)	-3.580	0.214	-4.418	-3.269	-3.096	0.209
	[2.284]	[0.083]***	[2.413]*	[2.287]	[2.278]	[0.085]**
Log (age square)	-6.216	-0.036	-4.420	-3.920	-3.722	-0.035
	[2.886]**	[0.014]**	[3.108]	[2.959]	[2.780]	[0.014]**
Log (Employment)	-1.536	-0.024	-0.771	-0.734	-0.039	-0.018
	[4.936]	[0.015]	[4.746]	[4.665]	[4.731]	[0.016]
Log(Labor productivity)	-4.394	-0.005	14.359	3.721	0.099	0.001
	[28.753]	[0.021]	[27.720]	[25.673]	[24.406]	[0.021]
Skill Intensity	-2.832	0.034	-3.603	-2.851	-2.849	0.029
	[3.674]	[0.114]	[3.990]	[3.487]	[3.647]	[0.113]
Observations	899	899	899	899	899	899
Log-pseudo likelihood value	-2699.93	-593.102	-2695.76	-2691.53	-2688.29	-589.55
Pseudo R-squared	0.0042	0.018 0	0.0037	0.0053	0.0065	0.0239
Sigma	81.702		81.944	81.475	81.116	
	[3.898]		[3.776]	[3.494]	[3.839]	
Observed Probability		0.397				0.397
Predicted Probability		0.395				0.395

Bootstrap standard errors clustered at the level of external finance dependence reported for Tobit (200 replications, number of clusters: 72.).
Robust standard errors clustered at the level of external finance dependence reported for Probit.
* significant at 10%; ** significant at 5%; *** significant at 1%
Observation censoring summary: 156 left censored observations, 386 uncensored observations, 357 right censored observations.
Note: In Tobit 5 ∂ E(y | x, 0<y<100) /∂ (EFD*Domestically-owned firm) = 7.343 and E(y | x, 0<y<100)= 53.134 where X is the vector of independent variables is evaluated at their mean value.

Table 8
Differences in firm characteristics between foreign and domestically-owned firms

LHS variable is the following firm characteristic:

	Log Sales 92	Log Sales 96	Growth in sales 96-92	Labor Productivity 92	Labor Productivity 96	Growth in Labor Ptiv. 96-92	Skill Intensity 92	Skill Intensity 96	Change in Skill Intensity 96-92
Foreign-owned firm	1.067	1.222	0.154	0.195	0.352	0.157	0.071	0.078	0.007
	[0.100]***	[0.102]***	[0.047]***	[0.055]***	[0.054]***	[0.039]***	[0.014]***	[0.015]***	[0.005]
Firm belongs to a	0.941	1.026	0.085	0.268	0.299	0.031	0.064	0.061	-0.003
domestic group of firms	[0.087]***	[0.093]***	[0.041]**	[0.048]***	[0.049]***	[0.036]	[0.011]***	[0.011]***	[0.004]
4-digit-SIC industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1408	1408	1408	1408	1408	1408	1408	1408	1408
R-squared	0.44	0.45	0.18	0.31	0.35	0.15	0.36	0.36	0.09

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9
Differences in spending in capital goods per worker between foreign and domestically-owned firms

LHS variable is the following firm characteristic:

	Log (Spending in capital goods per worker) 92	Log (Spending in capital goods per worker) 96	Growth in Spending in capital goods per worker 96-92	Growth in sales 96-92	Growth in Labor Ptiv. 96-92	Change in Skill Intensity 96-92
Foreign-owned firm	-0.095	0.328	0.424	0.089	0.094	0.007
	[0.164]	[0.153]**	[0.157]***	[0.049]*	[0.038]**	[0.005]
Firm belongs to a domestic conglomerate of firms	0.219	0.184	-0.034	0.061	0.055	-0.004
	[0.143]	[0.140]	[0.131]	[0.045]	[0.037]	[0.004]
Observations	951	951	951	951	951	951
IV digit industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.16	0.17	0.14	0.23	0.20	0.15

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10
Differences in spending in technology per worker between foreign and domestically-owned firms

LHS variable is the following firm characteristic:

	Log (Spending in technology per worker) 92	Log (Spending in technology per worker) 96	Growth in Spending in technology per worker 96-92	Growth in sales 96-92	Growth in Labor Ptiv. 96-92	Change in Skill Intensity 96-92
Foreign-owned firm	0.515	0.762	0.247	0.091	0.089	0.003
	[0.150]***	[0.132]***	[0.102]**	[0.051]*	[0.041]**	[0.006]
Firm belongs to a domestic conglomerate of firms	0.408	0.394	-0.014	0.085	0.070	-0.004
	[0.134]***	[0.118]***	[0.095]	[0.047]*	[0.040]*	[0.005]
Observations	912	912	912	912	912	912
4-digit-SIC industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.30	0.33	0.15	0.24	0.18	0.13

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%