Foreign Ownership, Financial Frictions and Size Distribution of Plants*

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Abstract

In this paper, I explore a novel channel through which countries can benefit from FDI: the presence of foreign firms can diminish the misallocation of resources caused by the existence of domestic distortions. Borrowing from their home countries, foreign firms are isolated from domestic financial frictions and hence achieve optimal size. Then, the higher the presence of foreign firms, the lower the amount of domestic factors allocated to small unproductive domestic firms. I show that in cross-country data, foreign ownership explains a sizeable fraction of variation in plant size distribution. In particular, it is associated to a lower share of employment accounted by small plants, and this association is magnified in countries where financial frictions are large. Then, I write a model where foreign firms can enter in a small open economy. I assume that domestic firms are financially constrained and foreign firms can borrow from abroad and hence are not affected by domestic financial frictions. I calibrate the model to account for the cross-country empirical findings and I use it to quantify the effects of a policy of openness. I find that lowering barriers to foreign entry increases aggregate income and productivity in all economies. However, national income and hence consumption and welfare increases only in economies with a high level of financial frictions. After the openness, domestic labor income increases due to higher wages, and domestic entrepreneurial income decreases due to stronger foreign competition. In economies where financial frictions are low, a high proportion of the income used for consumption comes from domestic entrepreneurial profits. National income falls when the increase in labor income is not high enough to compensate the decrease in entrepreneurial profits.

JEL classification: O40; E23; L11; F23; G28

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1 Introduction

The recent literature studying the quantitative impact of FDI openness in developing economies finds large output and welfare gains, derived from the entrance of better technologies. McGrattan and Prescott (2007) provide a theoretical support for the view that gains from openness are large, showing the potential benefits of allowing multinationals to bring technological capital into a country to produce there. Burstein and Monge-Naranjo (2009) estimate the gains of reallocating managerial know-how across countries. Ramondo (2010) estimate the gains of lower barriers to foreign firms that bring its technological advantages to produce in the host economies. In this paper I explore a novel channel through which countries can benefit from FDI: the presence of foreign firms diminishes the misallocation of resources caused by the existence of domestic financial frictions.

A recent strand of literature has started to emphasize misallocation of resources across firms as a source of aggregate income differences.[1] In these studies, the existence of distortions implies inefficiencies driven by too many resources being allocated to small unproductive firms. The size distribution of firms is distorted, and hence aggregate productivity falls. Here, I show that the presence of foreign firms can minimize such inefficiencies even if foreign firms are not more productive ex-ante. Foreign firms can borrow from abroad and hence operate at their optimal size, employing resources that would otherwise be misallocated to unproductive domestic firms.

In the first part of the paper, I show that foreign ownership is crucial to understand the size distribution of plants across low-income countries. I exploit the *Enterprise Survey of the World Bank* (ESWB), that contains representative samples of plants of around 115 countries. I construct cross-country measures of foreign ownership and study its association to plant size distribution statistics. I find that the share of employment controlled by foreign plants accounts for around 20% of the explained variation, and 8% of the total variation of the share of employment accounted by small plants. Additionally, I find that foreign ownership is strongly negatively (positively) correlated to the employment controlled by small (large) plants. Conditional on everything else, in an economy where the share of employment controlled by foreign plants is around one standard deviation higher than the average, the share of employment accounted by small (large) plants is a 0.05 lower (0.08 higher). More importantly, such associations are magnified when the levels of domestic financial frictions of countries are high.

These findings suggest that the presence of foreign firms is particularly important in

[1]Some examples are Restuccia and Rogerson (2008), Guner, Ventura, and Yi (2008), Hsieh and Klenow (2009) and Garcia-Santana and Pijoan-Mas (2011)

explaining the firm size distribution in countries where domestic firms are very financially constrained. In a country as Madagascar financial frictions are very high. Domestic firms are affected by these frictions, being financially constrained and remaining small. Therefore, the size distribution of firms in Madagascar is particularly sensitive to the presence of foreign firms. The reason is that, being isolated from financial frictions, foreign firms achieve much larger sizes than domestic firms. On the other hand, in a country as Poland where financial frictions are very low, domestic firms are as large as foreign firms. Consequently, the importance of foreign firms in explaining the shape of size distribution of firms in Poland negligible.

In the second part of the paper, I write a simple model where foreign firms can enter in a small open economy. I assume that domestic firms are financially constrained and foreign firms can borrow from abroad and hence are not affected by domestic financial frictions. I think about this model as a model of multinationals producing in low income countries. These multinationals finance their investments with capital from their home countries where I implicitly assume that financial frictions are low. Both domestic and foreign firms produce the same final consumption good using domestic labor. I model domestic production à la Lucas (1978). Every period the domestic representative household has to choose which individuals are workers and which individuals are entrepreneurs. This framework allows to model both the domestic labor supply and the domestic distribution of firms in a very tractable way. My theoretical contribution is to extend this framework allowing entry of foreign firms: every period a set of foreign potential entrants decide whether or not to produce in the domestic market. As in Hopenhayn (1992), these potential entrants are ex-ante identical and have to pay a fixed cost to learn about their productivity and be able to enter. I consider this entry cost as a policy parameter that reflects the level of barriers to entry.

I fully calibrate the model to cross-country data. I simulate my model many times assuming that each simulation represents a fictitious economy. I assume that all these economies are equal except for the level of domestic financial frictions and the barriers to foreign entry. Then, I use variation in these two objects, jointly with the rest of parameters, to match some important cross-country statistics in the data: (a) the cross-country average share of employment controlled by foreign firms is around 0.27, with a standard deviation of 0.19; (b) on average, the mean size of foreign firms is around 4 times higher than the mean size of domestic firms; the standard deviation of this ratio is 5.5; (c) on average, the minimum size required for a foreign firm to produce is around 14 employees; (d) the cross-country average of the share of employment accounted by small (5-19 employees) firms is 0.13.

Using the calibrated version of the model, I run a policy experiment to analyze the effects on aggregate productivity, income per capita and welfare of a reduction in barriers to foreign entry. The main goal of the paper is to study the potential heterogeneous effects of the policy of openness is one of the main goals of this paper. After an openness reform, the model predicts aggregate productivity and GDPpc gains for all economies. This result is driven by a positive net effect of a decrease in production by domestic firms and an increase in production by foreign firms. The reallocation of labor from domestic to foreign firms implies an efficiency gain due to the existence of domestic financial frictions. The higher the domestic financial frictions, the higher the efficiency gain that comes from the reallocation process. For instance, in those economies where the level of financial frictions is above the 75 percentile in the distribution of financial frictions, the increase in GDPpc is of around 3.6 percent on average. This gain is not as high in economies where level of financial frictions is lower: in economies where level of financial frictions is between 50 and 75 percentile, the increase in GDPpc is of around 2.8 percent. In contrast to the change in GDPpc, the effects of the reform on national income of the host economy are not always positive. After the reform, the number of domestic entrepreneurs decreases and hence domestic entrepreneurial income falls. In economies where financial frictions are not very high, the importance of entrepreneurial income on total national income is high. Then, its decrease after the reform is not compensated by the increase in labor income and hence total national income falls. For instance, for economies between 25 and 50 percentile national income decreases around 0.80 percent on average. The decrease is larger for economies below 25 percentile: 1.22 percent on average.

In the third part of the paper, I study some implications delivered by model regarding the allocation of foreign firms and composition of national income for low-income countries. First, the model predicts a higher presence of foreign firms in countries where domestic firms are more financially constrained: conditional on barriers to entry, the higher the level of financial frictions, the more constrained domestic firms are. This implies a lower domestic aggregate demand for labor, implying a lower potential equilibrium wage. Under lower wages, operating in the domestic economy is more profitable for foreign firms and more of them decide to enter. I show that this prediction is supported by the data. Second, the model predicts that in those economies where financial frictions are high, the composition of national income will be biased towards labor. Under high financial frictions, very few domestic individuals will become entrepreneurs: only the most talented ones are able to afford being constrained under foreign competition. This implies that entrepreneurial income will be a low proportion of total national income. This implication of the model will be crucial in order to understand some of the results of the policy experiment. To check this implication in the data, I use ESWB to construct measures of domestic labor income across countries and study its association to financial frictions. I find that in economies where financial frictions are higher, labor share tends to be higher.

The potential gains of FDI have been already analyzed in the literature. However, there is no study that shows the potential gains from openness in a context where foreign and domestic firms are ex-ante identical. In my model foreign firms become more productive than domestic ones in equilibrium. This is due to the fact that domestic firms are financially constrained and hence do not produce in their optimal size. I emphasize that this is not the only potential difference between domestic and foreign firms. Gains from openness could be potentially larger if foreign firms use more advance technologies or have managerial advantages, as highlighted by McGrattan and Prescott (2007), Burstein and Monge-Naranjo (2009) and Ramondo (2010). But this is not the topic of the paper, which focuses on the gains that comes from foreign firms diminishing the negative effects of distortions that affect allocation of resources in low-income countries.

The paper is organized as follows: in section 2, I present cross-country correlations between plant size distribution statistics, foreign ownership and financial frictions. In section 3, I present the model. In section 4, I explain my calibration strategy. In section 5, I present the policy experiment. In section 6, I test empirically some predictions of the model. In section 7, I conclude.

2 Empirical Evidence

A central hypothesis in this paper is that resource misallocation shows up in plants size distribution. One of the contributions of this paper is to uncover cross-country correlations between the size distribution of plants and foreign ownership, and how the magnitude of this association depends on the level of domestic financial frictions.

2.1 Data and Measures

I use the Enterprises Survey of the World Bank (ESWB). This is a unique data-set that contains a collection of plant-level surveys of different countries conducted by the World Bank since 2002. The goal of this survey is to collect information about business environment and how it affects plant performance. In particular, I use the Standardized data 2006-2010, whose main advantage is that questionnaires are completely standardized allowing cross-country comparisons. The main disadvantage of this data-set is that only registered plants with more than 5 employees are surveyed. I try to solve this problem controlling for the size of the informal sector in the regressions.

Measures of Foreign Ownership. For each plant I know "What percentage of the firm (to which the plant belongs) is owned by private foreign individuals, companies or organizations". Then, I define a plant as foreign if that variable is equal or greater than fifty percent. Any reasonable choice of this cutoff point to identify foreign plants would generate the same distribution of domestic/foreign plants. The reason is that in the data almost all plants are one hundred percent domestic or one hundred percent foreign.

Are foreign and domestic plants different in any dimension? In order to address this question I run the following regression:

$$ln(L_i) = \alpha + \beta \mathbf{1}\{Foreign_i\} + \sum_{j=1}^{J} \gamma_j \mathbf{1}\{Sector_{j(i)}\} + \sum_{l=1}^{L} \theta_l \mathbf{1}\{Country_{l(i)}\} + u_i \quad (1)$$

where L_i is the total number of employees of firm i and $Foreign_i$ is a dummy variable that takes value 1 if firm i is foreign according to my definition. I also include sector and country dummies.[2]

Table 1: OLS : Dep.Variable (lnL)

	(1)
Constant	3.24***
	(0.11)
Foreign Dummy	0.81***
	(0.07)
Sector Dummies	YES
Country Dummies	YES
N	53,693
R^2	0.26

*** sig.at 1%, ** sig.at 5%, * sig.at 5%

Robust standard errors clustered at sector-country level

Table 1 shows that, conditional on everything else, foreign plants are around 80 percent larger than domestic plants. This implies that, even conditional on general equilibrium

[2]Sectors are: manufacturing, construction, retail & wholesale, and other services

effects, variation in presence of foreign ownership will mechanically generate variation in plant size distribution statistics. Previous papers had already pointed out differences between domestic and foreign plants. Aitken and Harrison (1999) show that foreign plants are around 10% more productive than domestic plants in Venezuela. Javorcik (2004) finds similar results for plants operating in Lithuania. In a more recent work, Alfaro and Chen (2011) show that economic performance of multinational subsidiaries has been less affected by the recent crisis than local establishments with similar economic characteristics.

Now I construct sector-country measures of foreign ownership. For each country a and sector j, I calculate share of employment accounted by foreign plants:[3]

$$S_{a,j}^{foreign} = \frac{\sum_{i=1}^{N} L_{i,a,j} \mathbf{1}\{Foreign_{i,a,j}\}}{\sum_{i=1}^{N} L_{i,a,j}} \tag{2}$$

I compute these measures at the sector level to avoid sectoral composition effects.[4] In figure 1, I plot the relationship between this measure of foreign ownership in manufacturing sector and GDPpc relative to US.[5] This graph shows that, although the average is not too high (around 25%), there is a extremely large variation of foreign ownership across these countries, specially at very low levels of GDPpc. In countries as Madagascar and Rwanda, around 70 percent of total employment in manufacturing is accounted by foreign plants. In countries as Eritrea or Afghanistan, almost no employment is accounted by foreign plants.

Measures of Plant Size Distribution. Now I compute statistics related to plants size distribution. I am interested in how employment is allocated across plants of different sizes. In the recent resource misallocation, misallocation is associated to too much employment allocated to small plants. I compute the share of employment accounted by small (less than 20 employees), medium (between 20 and 99 employees) and large (above 100 employees) plants. I use the same definition of size as the one provided in ESWB. Results are not sensitive to changes in these definitions.

For each country a and sector j I calculate:

$$S_{a,j}^{s} = \frac{\sum_{i=1}^{N} L_{i,a,j} \mathbf{1}\{L_{i,a,j} \in [5,19]\}}{\sum_{i=1}^{N} L_{i,a,j}} \tag{3}$$

[3]McGrattan (2011) computes the same measure averaged over 2000-2005 for some OCDE countries. Some examples are: Italy (around 12%), US (around 11%), France (around 27%), Sweden (around 33%), Ireland (around 50%).

[4]According to ESWB, manufacturing sector presents higher proportion of foreign plants than other sectors

[5]GDPpc PPP adjusted from World Development Indicators

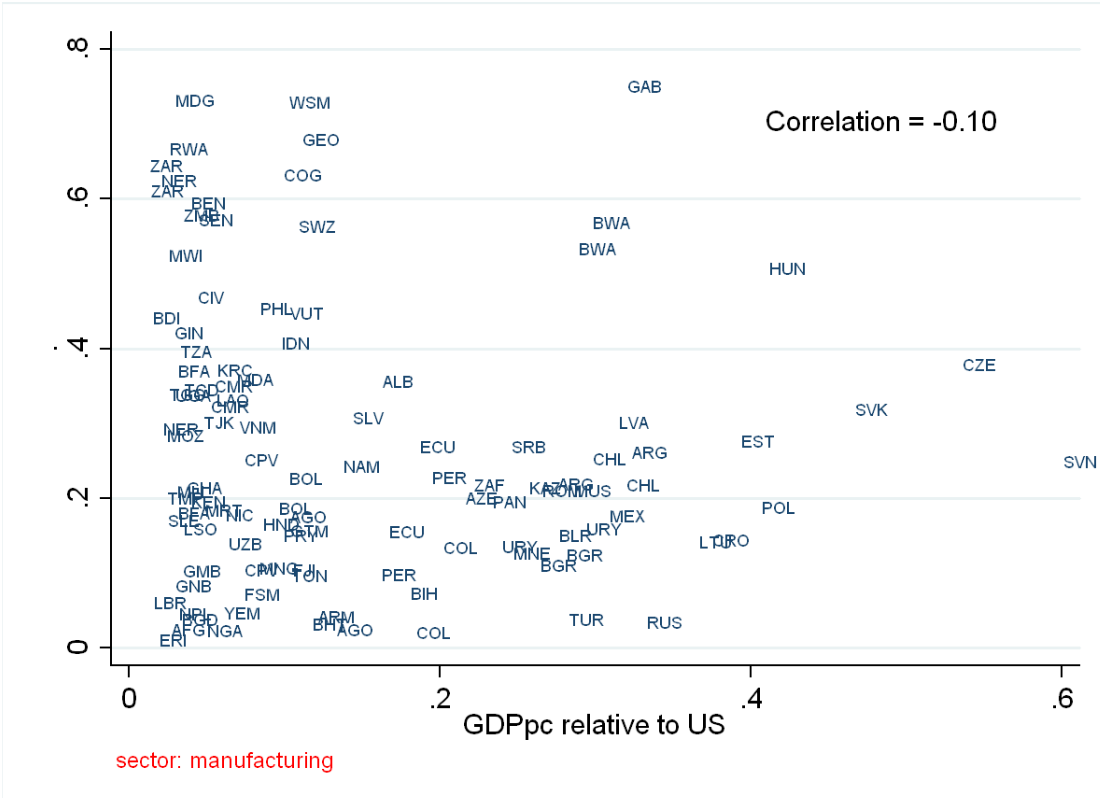


Figure 1: Share of employment accounted by foreign plants

$$S^m_{a,j} = \frac{\sum_{i=1}^{N} L_{i,a,j}\mathbf{1}\{L_{i,a,j} \in [20,99]\}}{\sum_{i=1}^{N} L_{i,a,j}} \tag{4}$$

$$S^l_{a,j} = \frac{\sum_{i=1}^{N} L_{i,a,j}\mathbf{1}\{L_{i,a,j} \geq 100\}}{\sum_{i=1}^{N} L_{i,a,j}} \tag{5}$$

Figure 2 (3) shows the relationship between the share of employment controlled by small (large) plants in manufacturing and GDPpc. The graph suggests a negative (positive) relationship between these two variables: in low-income countries, the employment allocated to small (large) plants is higher (lower). Again, I find a high variation of this measure at low levels of GDPpc. In a country as Sierra Leone, around 70 percent of employment in manufacturing is accounted by small plants. However, in a country as Madagascar the share of employment accounted by small plants is almost zero. Where do these differences come from? Does foreign ownership matter in understanding such differences? Answering those questions is the goal of next sub-section.

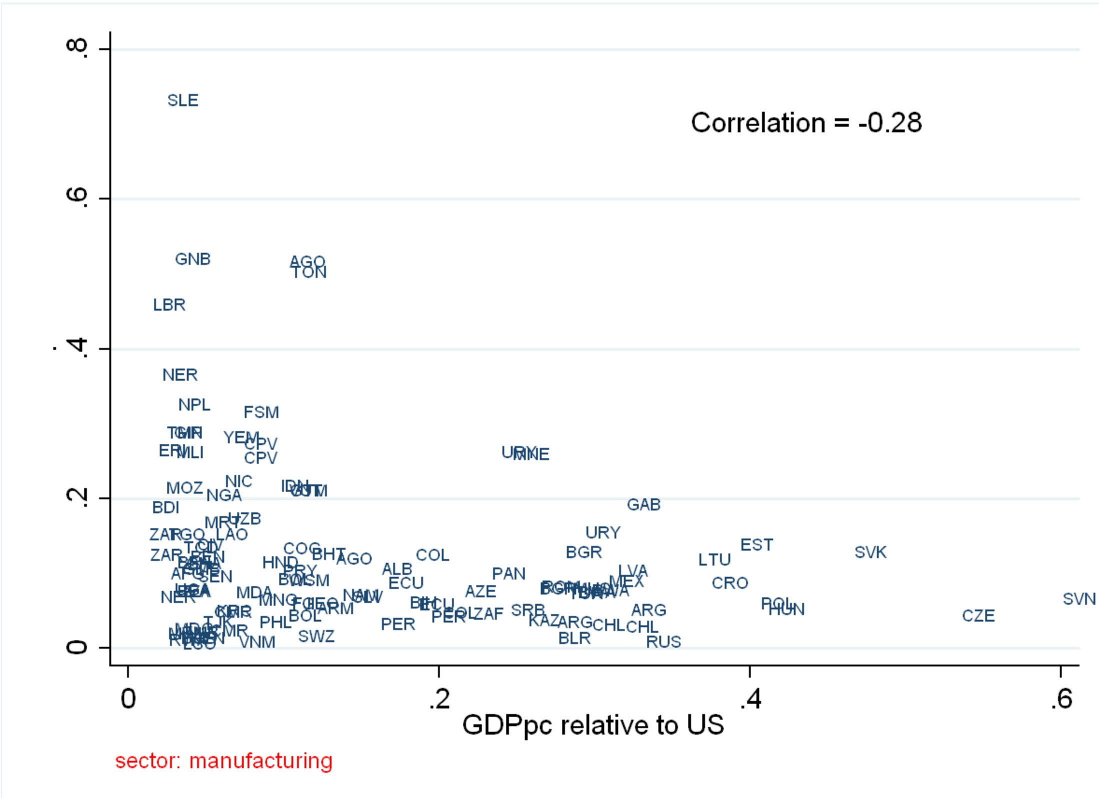


Figure 2: Share of employment accounted by small plants

Financial Frictions Measures: Getting Credit Index. Measuring financial frictions is not an easy task. The main measure I use is the *Getting Credit Index* that measures the legal rights of borrowers and lenders with respect to secured transactions through one set of indicators and the sharing of credit information through another.[6] The first set of indicators describes how well collateral and bankruptcy laws facilitate lending. The second measures the coverage, scope and accessibility of credit information available through public credit registries and private credit bureaus. The ranking on the ease of getting credit is based on the percentile rankings on its component indicators: the depth of credit information index and the strength of legal rights index. A higher value of the index means a higher level of financial frictions. As expected, figure 4 shows a negative relationship between level of financial frictions and GDPpc. Additionally, I have used two different measures of domestic financial frictions: *proportion of domestic firms with a line of credit* and *proportion of firms using banks to finance investment*. The former is reported by *World Development Indicators* and both of them can be self-constructed

[6]Reported by Doing Business of the World Bank

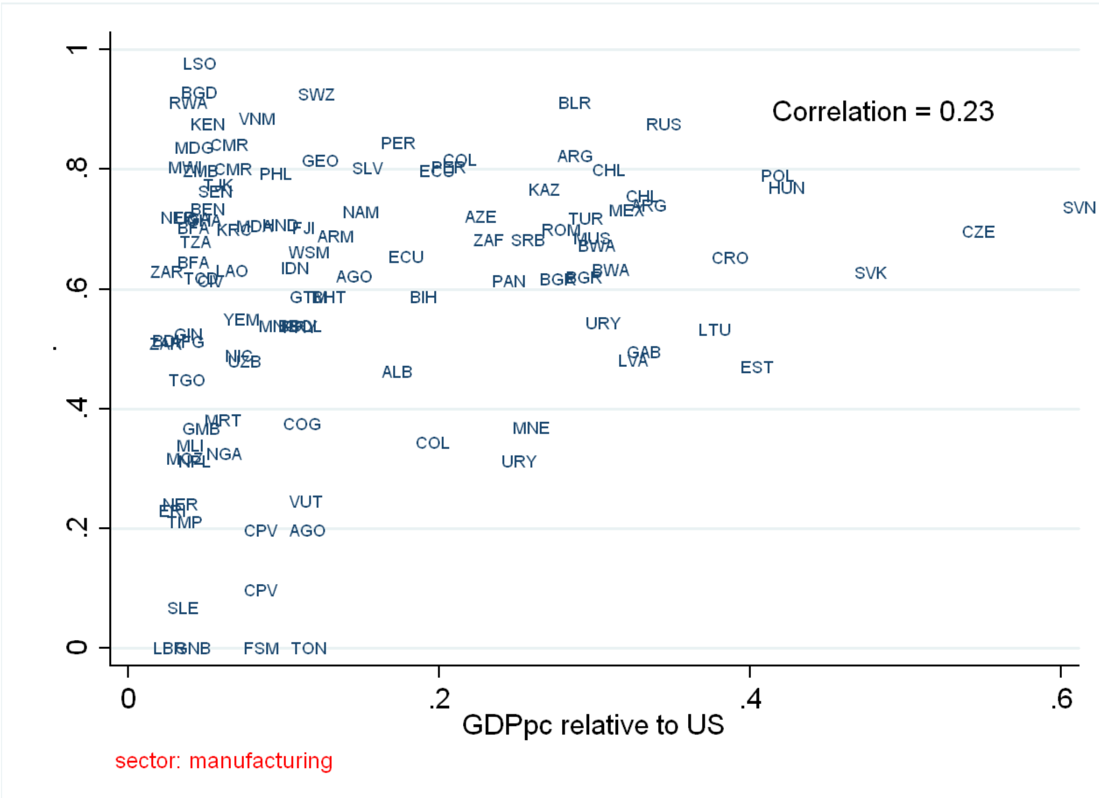


Figure 3: Share of employment accounted by large plants

using the ESWB. These two measures are strongly positively correlated to GDPpc.

2.2 Plants Size Distribution Regressions

Now I study the relationship between foreign ownership and size distribution of plants. In particular, I want to study whether or not foreign ownership is an important determinant of the variation in plant size distribution across countries. As shown above, very low income countries tend to have more labor allocated to small plants. However, this does not necessarily imply a higher level of employment misallocation in poor countries. Low-income economies features as low technological progress or lack of entrepreneurial skills, may force the economy to allocate resources on small plants even in the absence of distortions. As pointed out by Garcia-Santana and Pijoan-Mas (2011), the distribution of entrepreneurial talent may depend on the distribution of education quality in the population or the type of available business opportunities. What it is really interesting is that, even for countries with the same level of GDPpc, I still find a very high variation in plant size distribution. I want to show that presence of foreign plants is crucial in

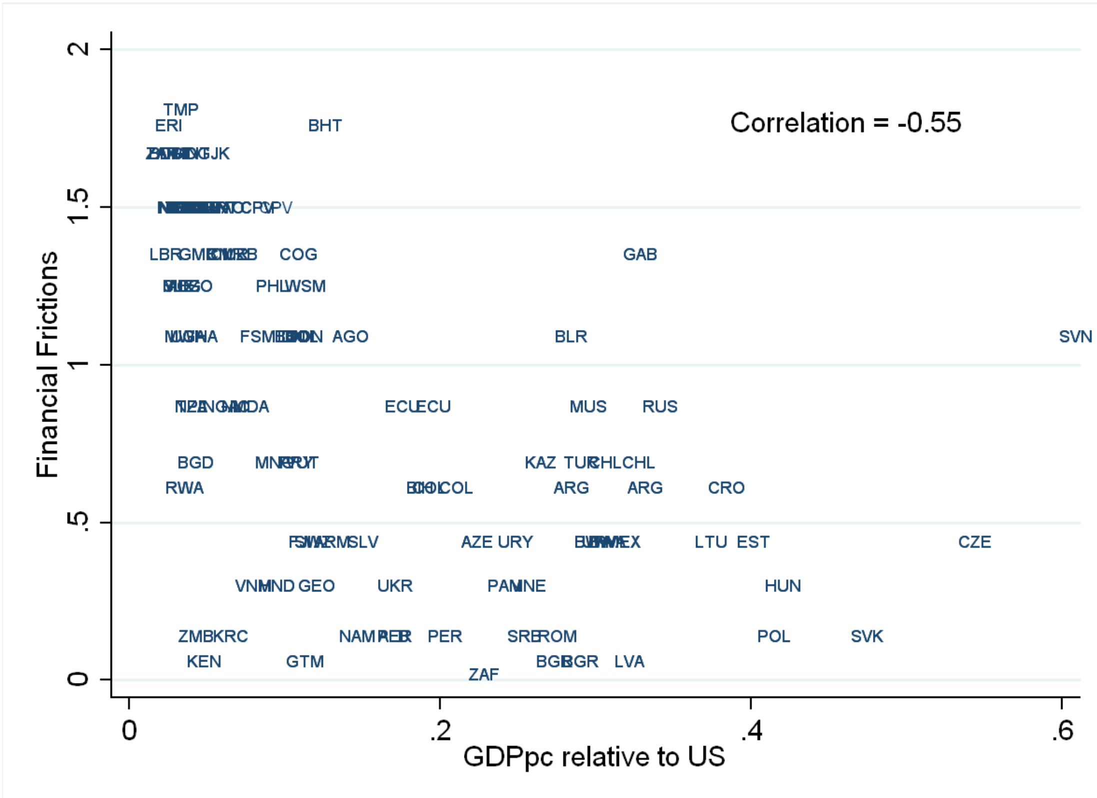


Figure 4: Getting Credit Index

understanding such variation. I run the following regressions:

$$S_{a,j}^{s/l} = \alpha + \beta_1 GDPpc_a + \beta_2 FF_a + \mu S_{a,j}^{foreign} + \sum_{j=1}^{J} \gamma_j \mathbf{1}\{Sector_j\} + u_{a,j} \tag{6}$$

where $S^{s/l}$ is the share of employment accounted by small (or large) plants in country a and sector j, FF_a is the Getting Credit Index in country a and $S_{a,j}^{foreign}$ is the share of employment accounted by foreign plants in country a and sector j. I also introduce sector dummies.[7]

Table 2 reports results of these regressions. Columns 1 and 2 (3 and 4) represent regression results where the explained variable is the share of employment accounted by small (large) plants. We can see in column 1 that, conditional on everything else, higher levels of financial frictions are associated to higher level of employment accounted by small plants. Remember that the support of financial frictions variable is [0,1.81]. With

[7]For results reported in table 2, I also control for the size of informality at country level, measured as the proportion of employees not subject to pension system. See appendix B for different specifications and alternative measures of financial frictions

Table 2: Dep.Variable: Share of Employment accounted by:

	Small Plants			Large Plants		
	1	*2*	*3*	*4*	*5*	*6*
FF	0.06*	0.07*	0.12*	-0.03	-0.05	-0.08
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.05)
ShareEmp.Foreign		-0.21**	0.01		0.37**	0.23*
		(0.04)	(0.04)		(0.07)	(0.10)
FF*ShareEmp.Foreign			-0.23**			0.15
			(0.06)			(0.11)
$GDPpc$	-0.74**	-0.69**	-0.63*	1.34**	1.26*	1.21*
	(0.23)	(0.26)	(0.27)	(0.41)	(0.49)	(0.50)
$GDPpc^2$	1.21*	1.21*	1.10	-2.13*	-2.14*	-2.06*
	(0.48)	(0.54)	(0.56)	(0.86)	(0.99)	(1.00)
Constant	0.13**	0.15*	0.09	0.54**	0.50**	0.53**
	(0.04)	(0.06)	(0.06)	(0.08)	(0.11)	(0.11)
Sector Dummies	YES	YES	YES	YES	YES	YES
Informality	YES	YES	YES	YES	YES	YES
N	321	321	321	321	321	321
$adjR^2$	0.29	0.35	0.37	0.18	0.25	0.25

** sig.at 1%, *sig.at 5%

Rob. s.e clustered at the country level

a coefficient of 0.06, this implies that in economies where financial frictions are very low (GCindex = 0), we observe a share of employment in small plants around 0.10 lower than in a country where financial frictions are very high (GCindex = 1.81). Additionally, we see from column 4 that financial frictions is negatively correlated to employment allocated to large plants, although the relationship seems to be not significant. Foreign ownership is crucial in understanding plant size distribution across countries: the fraction of the explained variance of share of employment accounted by small plants increases by 20% when I include foreign ownership in the regression. This number is even larger for the explained variance of share of employment in large plants (around 40%). Conditional on everything else, in an economy where the share of employment controlled by foreign plants is around one standard deviation higher than the average, share of employment accounted by small (large) plants is a 0.05 lower (0.08 higher). In column 3 we see that the association between foreign ownership and plant size distribution is magnified under high domestic financial frictions: when financial frictions are very low (GCindex = 0) the effect of foreign ownership on the share of employment accounted by small plants is zero. On the other hand, conditional on very high financial frictions (GCindex = 1.81), in an economy where the share of employment controlled by foreign plants is around one standard deviation higher than the average, share of employment accounted by small is around 0.11 lower. The intuition of this result is the following: in an economy as Madagascar where financial frictions are very high (GCindex = 1.67), most productive plants will be constrained and remain small so almost no domestic plant will be large. Then, the impact of foreign large plants on the size distribution will be very high. On the other hand, in an economy as Poland where financial frictions are low (GCindex = 0.14) almost all employment is already allocated to domestic large plants so the importance of foreign plants on explaining size distribution is low. The empirical findings presented in this section show that in economies where the presence of foreign plants is higher the employment allocated to small plants is lower. This association is specially strong for countries where domestic plants are very financially constrained. This suggests that presence of foreign plants alleviates the misallocation of resources due to domestic financial frictions. In next section I construct a model that is able to account for these empirical findings.

3 The Model

I consider a small economy open to foreign entrants. I assume that domestic firms are financially constrained and foreign firms can borrow from abroad and hence are not affected by domestic financial frictions. Both domestic and foreign firms have access to a decreasing returns to scale technology to produce the same final good. Labor is not internationally mobile so all the labor used in the economy is supplied by domestic workers.

3.1 Domestic vs Foreign production

I model domestic production a la Lucas (1978): there is a representative household with a continuum of members that differ in entrepreneurial talent. Most talented members will become entrepreneurs and the rest will become workers. This means that every entrepreneur in this economy has the outside option of being worker and receive equilibrium wage which does not depend on entrepreneurial talent. I assume that the representative household has measure one. I model foreign production à la Hopenhayn (1992). There is an unlimited mass of ex-ante identical foreign producers. In order to know about their productivity they have to pay a sunk entry cost. Conditional on having paid the entry cost, there is an additional cost of operating. This operation cost can be seen as an outside option equivalent to the equilibrium wage for domestic agents: only those foreign producers with profits above the operation cost will actually produce. There is an asymmetry between these two different specifications: the mass of potential entrants is unlimited in Hopenhayn (1992) whereas is limited in Lucas (1978). In my calibration, the total share of employment allocated to domestic vs foreign firms will be the same as in the data. Therefore, this asymmetry will not make any difference in the results.

3.2 Domestic Production

Each period, a domestic entrepreneur with ability z has access to the production function:

$$y_t^d = z^{1-\gamma} l_t^\gamma \qquad 0 < \gamma < 1 \tag{7}$$

where γ is the span of control parameter that measures the degree of returns to scale. Domestic managers choose labor to maximize profits:

$$\pi_t^d(z, w_t, r) = \max_{l_t} \{z^{1-\gamma} l_t^\gamma - (1+r) w_t l_t\} \tag{8}$$

where w and r are the prices of labor and working capital respectively. The first order condition of this problem lead to the following optimal demand labor demand:

$$l_t^d(z, w_t, r) = z \Big[\frac{\gamma}{w_t(1+r)}\Big]^{\frac{1}{1-\gamma}} \tag{9}$$

This equation shows that optimal demand of labor is increasing and linear on the entrepreneurial talent z. This will imply that both output $y_t^d(z, w_t, r)$ and profit $\pi_t^d(z, w_t, r)$ functions are also increasing and linear on z.

Financial Frictions. As mentioned above, domestic firms have to pay workers before production takes place. To do that, they borrow the entire wage bill from the domestic representative household at an exogenous interest rate. However, enforceability of these contracts is imperfect and domestic entrepreneurs can default, keeping a fraction of revenue. In particular, a working capital rental $w_t l_t$ by a entrepreneur with talent z is enforceable if and only if:

$$z^{1-\gamma} l_t^\gamma - (1+r) w_t l_t \;\; \geq \;\; (z^{1-\gamma} l^\gamma)(1-\phi)$$

where ϕ represents the fraction of the revenue that the entrepreneur can not keep if default takes place. This implies that, in equilibrium, domestic firms cannot borrow so much that they would want to default. The upper bound on working capital that is consistent with managers choosing not to default on their contracts will be implicitly determined by the following upper bound labor demand function:

$$\hat{l}_t(z, w_t, r; \phi) = z\left[\frac{\phi A}{w_t(1 + r_t)}\right]^{\frac{1}{1-\gamma}} \tag{10}$$

Under some circumstances, this upper bound will be higher than the optimal labor demand and hence domestic entrepreneurs will be constrained. Next proposition states formally this result:

Proposition 1 *For a given set of parameters Φ, two kind of situations can emerge in equilibrium:*

(a) If $\phi \geq \gamma$: no domestic entrepreneur is constrained

(b) if $\phi < \gamma$: all domestic entrepreneurs are constrained

This result comes from the fact that both the upper and optimal labor demand are linear and monotonically increasing in entrepreneurial talent z. The intuition is quite simple: in an economy where decreasing returns to scale are not very strong (γ high), entrepreneurs optimal labor demands will be high for a given level of entrepreneurial talent. This implies that, if the level of financial frictions is not sufficiently low (ϕ sufficiently high), entrepreneurs will not be able to demand labor optimally and hence will be constrained.

3.3 The domestic representative household

There is a representative household with a continuum of members who differ in entrepreneurial ability. Each period, the household decides how much to consume, how much to save and the occupational choice of its members. Savings will be used as working capital for those members that decide to be entrepreneurs.

Occupational choice. The occupational choice of the household requires to allocate each member into the two mutually exclusive jobs: worker or entrepreneur.[8] Domestic firms profits are monotonically increasing in entrepreneurial ability z and wages are constant over it. Then, as in Lucas (1978), those members of the household with $z \geq \tilde{z}_t$ will be entrepreneurs and those with $z < \tilde{z}_t$ will be workers. Formally, the cutoff $\tilde{z}_t$ will be given by the following expression:

[8] Given that domestic and foreign firms pay the same wages, the household is indifferent about to which type of firm to send its workers. However, the fraction of domestic workers allocated to domestic and foreign firms will be determined in equilibrium

$$w_t = \pi(\tilde{z}_t, w_t, r_t) \tag{11}$$

The dynamic problem The objective function of the household is given by,

$$\sum_{t=0}^{\infty} \beta^t log\,(c_t) \tag{12}$$

and the budget constraint,

$$c_t + a_{t+1} = I\,(\tilde{z}_t, w_t, r) + (1 + r)\,a_t \tag{13}$$

where

$$I\,(\tilde{z}_t, w_t, r_t) = w_t\,F\,(\tilde{z}_t)\, + \int_{\tilde{z}_t}^{\infty} \pi\,(z_t, w_t, r_t)\,f\,(z)\,dz \tag{14}$$

refers to labor and entrepreneurial income of the household. Note that a_{t+1} are units of the final good provided to the firms to finance working capital in $t + 1$. At the end of $t + 1$, after production takes place, domestic firms repay to the household the principal a_{t+1} plus interest ra_{t+1}. For simplicity, I assume working capital does not depreciate so aggregate stock of a_t evolves as,

$$a_{t+1} = a_t + x_t \tag{15}$$

where x_t is investment.

3.4 Foreign firms

Every period there will be a set of -ex-ante identical- foreign potential entrants thinking about entering and producing in the domestic market. Within this unlimited number of potential entrants, there will be a mass M of them that will pay a sunk entry cost to make a draw in order to learn about their productivity in the domestic market. Then, within this mass M of entrants, only the most productive ones will finally produce due to the existence of an operation cost. I assume that at the end of each period all foreign incumbent firms die and a new set of potential entrants emerges. In other words, foreign firms face a sequence of static problems.

Production decision taking entry and operation as given At time t, a foreign firm with entrepreneurial talent s has access to the technology:

$$y_t^f = s^{1-\gamma_f} l_t^\gamma \qquad 0 < \gamma < 1 \tag{16}$$

where γ is the span of control parameter that measures the degree of returns to scale. Entrepreneurs that decide to enter and produce choose labor to maximize profits:

$$\pi(s, w_t, r_t) = \max_{l_t}\{s^{1-\gamma} l_t^\gamma - (1 + r_t) w_t l_t\} \tag{17}$$

The first order condition of this problem lead to the following labor demand:

$$l_t^f(s, w_t, r_t) = s\Big[\frac{\gamma}{(1 + r_t)w_t}\Big]^{\frac{1}{1-\gamma}} \tag{18}$$

This equation shows that optimal demand of labor is increasing and linear on the entrepreneurial talent s. This will imply that both output $y_t^f(s, w_t, r)$ and profit $\pi_t^f(s, w_t, r)$ functions are also increasing and linear on s.[9]

Operation decision taking entry as given I assume that foreign firms have to pay a fixed cost C_o in order to operate. Given that C_o is constant over entrepreneurial talent s and $\pi_t^f(s, w_t, r)$ is monotonically increasing over s, there will be a cutoff $\tilde{s}$ such that for $s < \tilde{s}$ a foreign firm will not produce and with $s > \tilde{s}$ a foreign firm will. Formally, every period this cutoff is determined by the following equation:

$$C_o = \pi_t^f(\tilde{s}, w_t, r) \tag{19}$$

Entry decision Every period, there will be a set of foreign potential entrants that have to pay a sunk fixed cost in order to make a productivity draw. The value of a potential entrant is determined by the following equation:

$$W_t^e = \int_{\tilde{s}_t}^{\infty} \Big[\pi_t^f\,(s, w_t, r_t) - C_o\Big] g(s) ds \tag{20}$$

Free entry implies that in equilibrium:

$$W_t^e \leq C_e \tag{21}$$

with equality if $M_t > 0$.

[9]Note I assume that foreign firms borrow from abroad at the same exogenous interest rate as domestic firms but are not subject to financial imperfections For simplicity, I do not model the supply of foreign firms working capital

3.5 Steady State Equilibrium

Two kind of steady state equilibria can arise. First, if the financial frictions are not too high (enforcement is easy) no domestic entrepreneur will be affected and will demand labor according to $l_t^d(z, w_t, r)$. Second, if financial frictions are sufficiently high (enforcement is difficult) all entrepreneurs will be affected and will demand labor according to the upper bound imposed by the market $\hat{l}_t^d(z, w_t, r; \phi)$.

Definition 1 **($\phi \geq \gamma$)** *A steady state equilibrium is characterized by a set of prices $\{w, r\}$, labor demands for both domestic and foreign firms $\{l_d(z, w, r), l_f(s, w, r)\}$, an aggregate working capital stock a, an occupational and operation choice $\{\tilde{z}, \tilde{s}\}$, a mass of entrants M and household consumption and investment plans $\{c, x\}$ such that,*

1. *The household solves its optimization problem*
2. *Domestic firms solve their optimization problem*
3. *Foreign firms solve their optimization problem*
4. *The working capital,labor and final good markets clear,*

$$\begin{aligned} a &= w \int_{\tilde{z}}^{\infty} l^d(z, w, r) f(z) dz \\ F(\tilde{z}) &= \int_{\tilde{z}}^{\infty} l^d(w, z, r) f(z) dz + M \int_{\tilde{s}}^{\infty} l^f(w, s, r) g(s) ds \\ c + NX &= \int_{\tilde{z}}^{\infty} y^d(w, z, r) f(z) dz + M \int_{\tilde{s}}^{\infty} \Big[y^f(w, s, r) - C_o \Big] g(s) ds - MC_e \end{aligned}$$

5. *Balance of Payments holds,*

$$NX = M(1+r)w \int_{\tilde{s}}^{\infty} l_f(w, s, r) g(s) ds - Mw \int_{\tilde{s}}^{\infty} l_f(w, s, r) g(s) ds$$

Definition 2 **($\phi < \gamma$)** *The equilibrium description when labor demand upper-bouds are binding is identical to the one described above. I can rewrite the market clearing equations for working capital,labor and final good as,*

$$
\begin{aligned}
a &= w \int_{\tilde{z}}^{\infty} \hat{l}^{d}(z, w_t, r; \phi) f(z) dz \\
F(\tilde{z}) &= \int_{\tilde{z}}^{\infty} \hat{l}^{d}(z, w_t, r; \phi) f(z) dz + M \int_{\tilde{s}}^{\infty} l^{f}(w, s, r) g(s) ds \\
c + NX &= \int_{\tilde{z}}^{\infty} \hat{y}^{d}(z, w_t, r; \phi) f(z) dz + M \int_{\tilde{s}}^{\infty} \left[y^{f}(w, s, r) - C_o \right] g(s) ds - M C_e
\end{aligned}
$$

4 Calibration

In order to exploit the cross-country information I have, I simulate my model many times assuming that each simulation represents a ffctitious economy. I assume that all these economies are equal except for the fact that they differ in domestic financial frictions and entry costs for foreign firms. In particular, I assume that ϕ and C_e are independently normally distributed across countries. Then I use the variation in these two parameters in order to force my model to generate some important cross-country statistics. I assume that domestic and foreign firms are are ex-ante identical: their implicit distribution of talent and technology parameters are the same. With this strategy, I want to study how far the model can get on explaining the data in a world where the only difference between firms is that domestic ones are subject to financial frictions.

Strategy. As mentioned above, I assume that productivity and technology functional forms and parameters values are equal for domestic and foreign firms. Under this assumption, I have to assign value to 9 parameters: the Pareto shape parameter, span of control parameter, operation cost parameter, interest rate and 4 more parameter governing the normal distributions that generate values of ϕ and C_e. I take 2 of them from outside the model and I calibrate the remaining 6 parameters to ensure that the simulations of my economy displays cross-section statistics values similar to those I observe in the data.[10]

Table 3 summarizes the parameter values and table 4 shows my targets and the performance of the model in terms of them. Now I explain in a detailed way the calibration process.

Entrepreneurial talent distributions. I want the distributions of talent $f(z)$ and $g(s)$ to reproduce cross-country statistics related to firm size distribution. I assume that both domestic and foreign talent are distributed according to a Pareto distribution:

[10] All data statistics used in the calibration are from manufacturing sector

Table 3: Parameter values

Param.	Definition	Source	value
k	Pareto Shape Entrepreneurial talent	Calibrated	1.09
γ	Span of control	Predetermined	0.85
C_o	Fixed cost of operation	Calibrated	2.74
μ_ϕ	Mean of ϕ normal distribution	Calibrated	0.91
σ^2_ϕ	Variance of ϕ normal distribution	Calibrated	0.20
μ_{C_e}	Mean of C_e normal distribution	Calibrated	0.25
$\sigma^2_{C_e}$	Variance of C_e normal distribution	Calibrated	0.06

$$\begin{aligned} f(z) &= \frac{k z_m^k}{z^{k+1}} \qquad \text{with} \;\; z_m > 0,\; k > 1 \\ g(s) &= \frac{\alpha s_m^\alpha}{s^{\alpha+1}} \qquad \text{with} \;\; s_m > 0,\; \alpha > 1 \end{aligned}$$

where I normalize $z_m = s_m = 1$. As mentioned above I assume that both domestic and foreign firms are ex-ante identical in this sub-section. This implies that $k = \alpha$. Therefore, I only have one free parameter that I use to match the cross-country average share of employment accounted by small firms: 0.13.

Decreasing returns to scale. I assume $\gamma_d = \gamma_f = \gamma$. I take the value of this parameter from outside the model. I choose $\gamma = 0.85$. This value is consistent with the one obtained by Atkenson&Kehoe(2005).

Entry cost and financial frictions. I assume that ϕ and C_e are independently normally distributed across countries.[11] Then, I use the mean and variance of financial frictions μ_ϕ and $\sigma^2_{C_e}$ to match the cross-country mean and standard deviation of the ratio $(AFSf/AFSd)$. In the data, these two numbers are 3.92 and 5.10 respectively. To match statistics related to the presence of foreign firms across countries, I use the mean and variance of the entry costs μ_ϕ and $\sigma^2_{C_e}$. In particular, I use them to match the mean and standard deviation of the share of employment accounted by foreign firms. These two numbers are 0.27 and 0.31 in the data.

[11]Both normal distributions are truncated in order reproduce reasonable values for ϕ and C_e. In particular, ϕ has to take vales between 0 and 1 and C_e has to take positive values. Reported means and standard deviations are the ones for the implicit un-truncated normal distributions

Table 4: Calibration targets

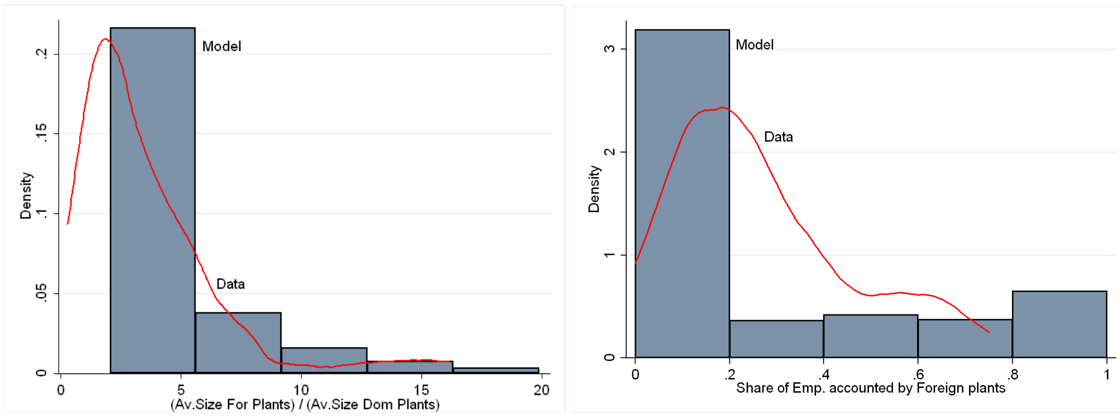
Param.	Statistic	Data	Model
k	mean(Share of emp. accounted by Small firms)	0.13	0.13
C_o	mean(Smallest foreign plant)	14.01	13.21
μ_ϕ	$\text{mean}\left(\frac{AFSfor}{AFSd}\right)$	3.92	4.21
σ^2_ϕ	$\text{sd}\left(\frac{AFSfor}{AFSd}\right)$	5.10	4.77
μ_{C_e}	mean(Share of emp. accounted by For. firms)	0.27	0.25
$\sigma^2_{C_e}$	sd(Share of emp. accounted by For. firms)	0.19	0.33

Operation Costs. I calibrate C_o to match an statistic related to the size distribution of foreign plants across countries. Note that this parameter determines in the model which of those foreign firms that pay the entry cost to make a productivity draw finally decide to produce. In particular, it determines the minimum level of productivity that a foreign firm needs in order to produce. When C_o is very low, it means that conditional on having made the productivity draw, opportunity cost of producing is very low so almost all firms will actually produce. On the other hand, if C_o is very high only most productive firms will produce. I use this parameter to match the cross-country average of the size of the smallest foreign plant. In my data this number is 13.21. This means that, on average, the minimum level of productivity that foreign plants need to produce in the countries of my sample is implicitly associated to a plant size of around 13 employees.

4.1 Summary of calibrations results

My model simulations produce a good description of the relevant cross-country statistics of my sample (see table 4). Simulations reproduce specially well the averages of the relevant statistics. Panel (a) plots the histograms of the ratio of average size of foreign plants to average size of domestic plants reproduced by real and model simulated data. Panel (b) plots the same kind of histograms for share of employment accounted by foreign plants. The calibrated cost of operation parameter C_o is equal to 2.74. This result, jointly with the calibrated mean of the entry cost equal 0.25, it yields an average total fixed cost for foreign firms of around 3. The average GDPpc across my simulated economies is 1.37. This implies that the total fixed cost per period that a foreign firm has to afford to produce is around 2.2 times (on average) the income per capita of the host country.

Figure 5: Distribution of cross-country statistics



(a) Ratio of sizes (b) Share Emp. accounted by foreign plants

Notes:

Simulated data regressions. Given the nature of my data set, a good way of testing the validity of the model is to look out of calibration targets to see whether or not the model is able to reproduce correlations between relevant variables we observe in the data. To this end, I use data simulated with my model to run the same kind of regressions I presented in the empirical section. Table 5 shows regression results both for the data and the model. The cross-country correlations implied by my model are very similar to those observed in the data. In those economies where the share of employment accounted by foreign plants is larger the share if employment accounted by small plants is lower. This association is specially strong under high domestic financial frictions.

5 Policy Experiment

In this section I want to measure the effects on aggregate productivity, income per capita and welfare of a reduction in entry costs. To do so, I decrease by 25% the entry cost C_e for all my simulated economies and solve for the new steady states. Remember that the economies are different in level of financial frictions and initial levels of entry costs. Studying the potential heterogeneous effects of the policy is the main goal of this section.

Table 5: OLS : Share of Employment accounted by Small Plants:

	Data	Model
ShareEmp.Foreign	0.01	0.03
FF	0.12	0.15
Interaction	-0.23	-0.18
N	321	1000
$adj.R^2$	0.37	0.68

As mentioned in the introduction, the potential gains of an openness crucially depend on the level of domestic financial frictions.

5.1 Aggregate productivity and aggregate income

In this subsection I present the impact of the policy on aggregate productivity and aggregate income. I measure aggregate income as GDP per capita which is simply the production carried out by domestic firms plus production carried out by foreign firms.[12] I measure aggregate productivity as total GDP divided by total number of workers. In table 6 I show average percentage changes in GDPpc and GDP per worker across different levels of domestic financial frictions.

Table 6: Heterogeneous effects across different levels of financial frictions

	Δ (%) Y_d	Δ (%) Y_f	Δ (%) GDPpc	Δ (%) GDP per worker
Above 75 percentile	-25.31	7.76	3.59	3.40
Between 50 and 75 percentile	-25.31	17.60	2.81	2.36
Between 25 and 50 percentile	-25.20	61.23	2.70	2.20
Below 25 percentile	-22.75	145.04	1.55	1.37

Notes: Percentile computed from the distribution of level financial frictions measures as $1-\phi$; Y_d= production by domestic firms; Y_f =domestic by foreign firms

This kind of policy implies an increase in GDPpc for all simulated economies. This result is driven by a positive net effect of a decrease in domestic production and an increase in foreign production. After a decrease in entry costs, more foreign firms enter and hence foreign production increases. This implies an increase in the equilibrium wage which

[12]Note that population in the model is normalized to one

affects domestic production through two different channels. First, the opportunity cost of being a domestic entrepreneur increases so the number of domestic firms fall. Second, labor demand falls for those domestic individuals that remain as entrepreneurs. This policy also implies an increase in aggregate productivity measured as GDP per worker. After the decrease in entry costs, the share of labor allocated to foreign firms increases. This reallocation of labor from domestic to foreign firms implies an efficiency gain due to the existence of domestic financial frictions. The higher the domestic financial frictions, the higher the efficiency gain that comes from the reallocation process generated due to the decrease in entry costs. This positive relationship between domestic distortions before the reform and efficiency gains due to the reform is which is behind the pattern showed in table 6.

For instance, in those economies where level of financial frictions is very high, the increase in GDPpc is of around 3.6 percent on average. This gain is not as high in economies where level of financial frictions is lower: in economies where level of financial frictions is between 50 and 75 percentile, the increase in GDPpc is of around 2.8 percent. In those economies that are between 25 and 50 percentile of financial frictions distribution, the increase is of around 2.7 percent. The economies that are below 25 percentile are the ones that benefit least, having an increase in GDPpc of around 1.5 on average.

5.2 National income composition and welfare

Being aware of the fact that GDPpc is a relevant measure to look at, it is not a sufficient statistic to measure welfare of these economies. A high proportion of production carried out by foreign firms is not consumed by domestic agents. After producing and paying domestic workers, foreign firms have to cover entry costs and repay their debt with foreign lenders. This means that all profits made by foreign firms are repatriated. Assuming a log utility function for the representative household, steady state level of consumption is a good measure of welfare.

Formally, I can express consumption as:

$$c = wF\left(\tilde{z}\right) + \int_{\tilde{z}}^{\infty} \pi(z, w, r) f(z) dz + ar$$

The representative household consumes all its income in steady state.12 Income of the representative household is composed by labor income, entrepreneurial profits and capital income. It is important to remark that in this model, consumption can be seen as gross national income per capita (GNPpc). The main finding in this section is that consumption decreases for some economies after the openness. The reason is that the drop in entrepreneurial income is not always compensated by the increase in labor income. In column 2 and 3 of table 7 I show average shares and values of national income and its components before the policy. In column 4 I show percentage changes of values after the policy. As before, I report all these measures across different levels of financial frictions. We can see that on average, for those economies above the median in the financial frictions distribution GNPpc (and consumption) increases. In economies above 75 percentile GNPpc increases around 3 percent on average. In economies between 50 and 75 percentile the increase is lower: around 1%. However, economies below the median suffer a drop in GNPpc. For economies between 25 and 50 percentile GNPpc decreases around 0.80 percent. The decrease is larger for economies below 25 percentile: 1.22 percent on average. The intuition behind this heterogeneous effect of the openness is as follows: in those economies where financial frictions are very high, very few domestic entrepreneurs operate. Higher financial frictions implies lower profits for a given level of entrepreneurial talent. This implies a decrease in domestic labor demand. Then, foreign firms take advantage of this potentially lower equilibrium wage and more of them decide to enter. This means that under possibility of foreign entry, the higher the level of financial frictions, the lower the proportion of population that become entrepreneurs. The occupational composition of the population is transmitted to the composition of national income. Economies with a very high level of financial frictions do not suffer from the decrease of entrepreneurial income after openness because its importance in total income is very low. On the other hand, in economies where financial frictions are low, entrepreneurial income represents a high fraction of total national income. Then, the drop in entrepreneurial incomes that takes place after openness is not fully compensated by the increase in labor income.

Table 7: Heterogeneous effects across different levels of financial frictions

	Share before policy	Value before policy	Δ (%) of Value
(a) Above 75 percentile			
Total National Income	1.00	1.12	3.00
Labor Income	0.94	1.06	4.93
Entrepreneurial Income	0.06	0.06	-25.31
Capital Income	0.00	0.00	-25.31
(b) Between 50 and 75 percentile			
Total National Income	1.00	1.21	1.02
Labor Income	0.86	1.05	5.12
Entrepreneurial Income	0.12	0.15	-25.31
Capital Income	0.02	0.01	-25.31
(c) Between 25 and 50 percentile			
Total National Income	1.00	1.29	-0.80
Labor Income	0.79	1.03	5.29
Entrepreneurial Income	0.17	0.23	-25.20
Capital Income	0.03	0.03	-25.20
(c) Below 25 percentile			
Total National Income	1.00	1.34	-1.22
Labor Income	0.77	1.04	4.56
Entrepreneurial Income	0.19	0.26	-21.74
Capital Income	0.04	0.04	-21.74

Notes: Percentile computed from the distribution of level financial frictions measures as $1 - \phi$

6 Testable implications

The model generates some interesting testable predictions. First, the model predicts that, conditional on barriers to entry, the presence of foreign firms will be higher in countries where domestic firms are very financially constrained. Second, the model predicts that in countries where financial frictions are high, total domestic income will be biased towards labor. In this section I check whether or not these associations are present in the data.

Financial frictions and presence of foreign firms. One of the implications of my model is that, conditional on everything else, presence of foreign firms will be higher in economies where domestic firms are financially constrained. To measure presence of foreign firms in the data, I use the same measure I computed in the empirical section: for each sector-country I calculate the *share of employment controlled by foreign plants*. To measure financial frictions I consider two different variables. First, as in the empirical section, I use *"getting credit index"* computed by the World Bank. Remember that this variable is an index that takes values from 0 (no financial frictions) to 1.8 (highest level of financial frictions). Second, I take the variable *"Percentage of foreign firms that use banks to finance investments"* from World Development Indicators. With this variable I try to measure how easy is to get access to credit in these economies. Almost no firm is public listed in the countries of my sample. This means that borrowing from banks might be the only source of external funding. The more developed is the financial system, the higher the proportion of firms that can get access to it. I assume that, the lower the proportion of firms using banks, the higher the level of financial frictions. I also include some additional controls. First, in order to control for the presence of foreign plants on barriers to entry, I include the variable *"doing business index"* reported by the World Bank.[13] Including this variable, I want to control for other distortions that can affect foreign firms entry choices. I also include GDPpc because it can be potentially correlated to the ex-ante productivity distribution of domestic firms and hence explain some of the variation on entry of foreign firms. Table 8 shows that different specifications to study the association between presence of foreign firms and financial frictions. In panel (a) I show the results when I only have into account manufacturing sector. Panel (b) show the regressions results when I consider all the sectors.[14] Results are as expected: higher level of financial frictions- higher values of GCindex or lower proportion of firms using banks- is associated to a higher share of employment accounted by foreign plants. The coefficient associated to the variable firms using banks remains significant in all specifications. This is not the case for the coefficient associated to the variable GCindex which is significant only when I consider manufacturing and when controls are not included in the regression.

Domestic Income Shares The model predicts that in those economies where financial frictions are higher, the total domestic income is biased towards labor. In order to check

[13]This index tries to measure how easy is to create and run a business in a particular country: number of procedures required to start a business, level of corporate taxes, ease of getting construction permits, etc.

[14]As in the empirical section I consider manufacturing, construction, retail, and other services

Table 8: OLS : Share of Employment controlled by foreign plants

	(a) Manufacturing				(b) All sectors			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FirmsUsingBanks (%)	-0.24**	-0.23*			-0.20***	-0.22**		
	(0.11)	(0.13)			(0.06)	(0.10)		
GCindex			0.06*	0.06			0.02	-0.02
			(0.03)	(0.05)			(0.02)	(0.03)
GDPpc		0.01		-0.06		0.15		0.07
		(0.23)		(0.20)		(0.15)		(0.14)
DoingBusiness		0.01		-0.01		0.02		0.08*
		(0.06)		(0.07)		(0.03)		(0.05)
Constant	0.32***	0.32***	0.21***	0.24***	0.31***	0.28***	0.25***	0.21***
	(0.03)	(0.09)	(0.03)	(0.09)	(0.02)	(0.06)	(0.02)	(0.06)
Sector Dummies	-	-	-	-	YES	YES	YES	YES
N	97	95	108	106	387	378	429	420
R^2	0.04	0.05	0.03	0.03	0.10	0.10	0.07	0.08

this implication empirically, I exploit the micro-level information of *Enterprises Survey of the World Bank*. As mentioned above, in terms of my model *Gross National Income* (GNI) can be expressed as the sum of labor, entrepreneurial and capital income. Formally,

$$GNI = wF(\tilde{z}) + \int_{\tilde{z}}^{\infty} \pi(z, w, r) f(z) dz + ar$$

where $F(\tilde{z})$ is the total number of domestic workers. Some of them are employed by domestic firms and some of the are employed by foreign firms. Then, I can rewrite this equation as:

$$GNI = w(L^d + L^f) + \int_{\tilde{z}}^{\infty} \pi(z, w, r) f(z) dz + ar$$

where L^d is total amount of labor allocated to domestic firms and L^f is total amount of labor allocated to foreign firms. Given that total domestic production has to be equal to wages, cost of capital and entrepreneurial profits:

$$GNI = wL^f + Y^d$$

Then GNI income can be expressed as the sum of total production carried out by domestic firms plus wages earned by domestic individuals employed by foreign firms. Then, I can express labor income as:

$$LaborShare = \frac{wL^f + wL^d}{wL^f + Y^d}$$

In the data I have information about total sales and total labor cost for every firm. Then, for a country a I compute labor share as follows:

$$LaborShare_a = \frac{\sum_{i=1}^{N} W_{i,a}}{\sum_{i=1}^{N} Y_{i,a}\mathbf{1}\{i = domestic\} + \sum_{i=1}^{N} W_{i,a}\mathbf{1}\{i = foreign\}}$$

where W_i equals *Total annual cost of labor* and Y_i equals *Total annual sales.* I define firms as domestic or foreign using the same criterium I used in the empirical section. Then I study the association between this measure and the level of financial frictions in the economy.[15]Table 9 shows a positive association between the level of financial frictions and the share of labor in my measure of GNI. In this regressions, controlling for the size of informal sector is particularly important. I use *"Proportion of the labor force not covered by a pension system"* as a measure of informality. In countries where this measure of informality is high, the measured labor share in my data set will be lower simply because not registered workers are not recorded in the survey. In column 1 I regress the share of labor on financial frictions, controlling for the level of informality. In column 2 I also include GDPpc as a control variable.

Table 9: OLS : Labor Share in gross national income:

	(1)	(2)
FF (GCindex)	0.05**	0.04*
	(0.02)	(0.02)
Informality	-0.04	-0.11
	0.04	(0.07)
GDPpc		-0.19
		0.13
Constant	0.15***	0.23***
	(0.03)	(0.06)
N	80	79
R^2	0.04	0.05

Given the low number of observations in the regression, it is important to check that the effect is not driven by outliers. In figure 6 I plot the orthogonal component of financial frictions against the orthogonal component of the labor share. Note that the slope in this

[15]Reported results are for manufacturing sector

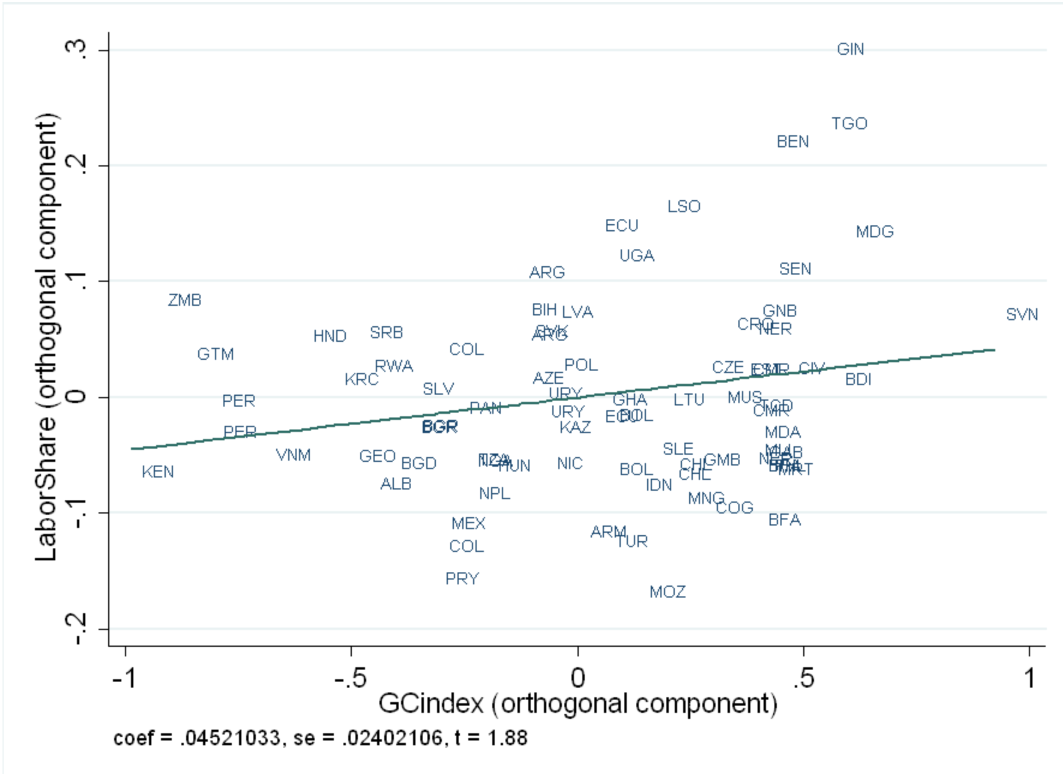


Figure 6: Labor share vs financial frictions

graph is precisely the coefficient of $FF(GCindex)$ in column 2 of table 9.

7 Conclusions

Here, I have studied the importance of foreign ownership in understanding plant size distribution, productivity, and aggregate income in low-income countries. Presence of foreign firms mitigate some of the negative effects of financial frictions that we observe in poor countries. After a openness reform, my model predicts aggregate productivity and GDPpc gains for all the economies. This result is consistent with the recent. However, the effects of the reform on welfare of the host economy are not always positive. After the reform, the number of domestic entrepreneurs decreases and hence domestic entrepreneurial income falls. In economies where financial frictions are not vary high, the importance of entrepreneurial income on total national income is big. Then, its decrease after the reform is not compensated by the increase in labor income and hence consumption falls. This result is driven by the fact that none of the foreign firms profits are consumed by domestic agents. Some of these profits are used to cover fixed costs and some of them are repatriated to pay back lenders. There have been many examples of countries carrying out FDI openness, specially since the beginning of the 90's. According to Shatz (2000), several developing countries experienced a liberalization in foreign ownership restrictions.[16]. The model developed in this paper opens new insights under which we can look at the effects of openness to FDI. In particular, it would be crucial to study whether or not different levels of financial frictions are associated to differences in the effects of the liberalization on GDPpc and national income across countries. This is left for further research.

[16]Some examples are Argentina (1990), Colombia (1992), Ecuador (1991), Peru (1992), etc.

A Robustness for plant size distribution regressions

Table 10: Dep.Variable: Share of Employment accounted by:

	Small Plants					Large Plants				
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
GCindex	0.06*	0.12**				-0.02	-0.07			
	(0.02)	(0.03)				(0.03)	(0.05)			
PropPlants w/credit			-0.19**	-0.25**	-0.31**			0.14	0.18	0.22
			(0.04)	(0.06)	(0.05)			0.08	(0.11)	(0.12)
ShareEmp.Foreign	-0.20**	0.06	-0.21**	-0.31**	-0.35**	0.34**	0.14	0.36**	0.44**	0.44**
	(0.05)	(0.06)	(0.04)	(0.06)	(0.06)	(0.07)	(0.11)	(0.06)	(0.11)	(0.11)
Interaction		-0.27**		0.27*	0.32**		0.20		-0.20	-0.07
		(0.07)		(0.11)	(0.11)		(0.11)		(0.29)	(0.29)
$GDPpc$	-0.71**	-0.68*	-0.76**	-0.74**	-0.70**	1.27**	1.25**	1.25**	1.23**	1.32**
	(0.26)	(0.30)	(0.18)	(0.18)	(0.19)	(0.43)	(0.44)	(0.32)	(0.32)	(0.37)
$GDPpc^2$	1.05*	1.00	1.20**	1.17**	1.41**	-1.82*	-1.79*	-1.80**	-1.78**	-2.30**
	(0.51)	(0.52)	(0.32)	(0.32)	(0.34)	(0.84)	(0.84)	(0.63)	(0.62)	0.76
Constant	0.18**	0.13**	0.33**	0.34**	0.50**	0.42**	0.46**	0.33**	0.32**	0.34**
	(0.04)	(0.04)	(0.03)	(0.03)	(0.11)	(0.07)	(0.07)	(0.04)	(0.05)	(0.09)
Sector Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Informality	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES
N	425	425	414	414	310	425	425	414	414	310
$adjR^2$	0.29	0.31	0.39	0.40	0.48	0.22	0.22	0.26	0.26	0.30

** sig.at 1%, *sig.at 5%

Rob. s.e clustered at the country level

B List of Countries in ESWB

Africa	Africa	Europe	Asia	America	Oceania
Tanzania2006	Cameroon2006,2009	Armenia2009	Vietnam2009	Uruguay2006,2010	Micronesia2009
SouthAfrica2007	Botswana2006	Bulgaria2009	Mongolia2009	Ecuador2006	Samoa2009
Niger2005	Namibia2006	Estonia2009	Turkey2008	Chile2006	Tonga2009
CapeVerde2009	Senegal2007	Kosovo2009	KyrgyzRepublic2009	Colombia2006	Vanuatu2009
Ghana2007	DRC2006	Ukraine2008	Kazakhstan2009	Argentina2006,2010	Fiji2009
Cameroon2009	IvoryCoast2009	Montenegro2009	Uzbekistan2008	ElSalvador2006	
Zambia2007	BurkinaFaso2009	Serbia2009	Bangladesh2007	Honduras2006	
Gabon2009	Nigeria2007,2009	Albania2007	Azerbaijan2009	Mexico2006	
Mauritania2006	BurkinaFaso2006	SlovakRepublic2009	Yemen2010	Panama2006,2010	
Burundi2006	Liberia2009	FyrMacedonia2009	Tajikistan2008	Brazil2009	
Swaziland2006	Congo2009	Lithuania2009	Indonesia2009	Paraguay2006	
Mauritius2009	Kenya2007	Latvia2009	LaoPDR2009	Peru2006,2010	
Niger2009	Angola2006	Belarus2008	Nepal2009	Philippines2009	
Chad2009	Malawi2009	Georgia2008	Afghanistan2008	Guatemala2006	
Uganda2006	CapeVerde2006	Romania2009	TimorLeste2009	Venezuela2006	
Benin2009	Lesotho2009	Bulgaria2007,2009		Nicaragua2006	
SierraLeone2009	Guinea2006	Poland2009		Bolivia2006	
Mozambique2007		Slovenia2009			
Madagascar2009		CzeckRepublic2009			
Gambia2006		Croatia2007			
Rwanda2006		Moldova2009			
Eritrea2009		Hungary2009			
Mali2007		Russia2009			
GuineaBissau2006		BosHerzegovina2009			
Togo2009					

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