
# Is Access to Credit a Constraint for Latin American Enterprises? An Empirical Analysis with Firm-Level Data

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**Abstract**

An intense process of deregulation and financial liberalization in Latin America has increased competitive pressures and led to bank restructuring and consolidation. This paper looks at firm access to credit in the region, focusing on the role of credit market structure. Using firm-level data from the World Bank Enterprise Survey, we find that access to bank credit is very heterogeneous. On average, smaller and less productive firms are less likely to apply for credit and more likely to be financially constrained. We also find that a high degree of bank penetration and competition are significantly correlated with a lower probability that borrowers are financially constrained. Foreign banks penetration has a negative effect on access to credit particularly in less developed and more concentrated markets, while it has a positive influence in more competitive and financially developed markets.

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## 1. Introduction

Access to bank credit is often indicated as one of the main constraints impairing firm growth, productivity, innovation, and export capacity, affecting particularly small- and medium-sized enterprises (SMEs). As most of the literature on small business lending is focused on the US and Europe (Berger and Udell, 2002; Berger et al., 2005; Beck and Demirgüç-Kunt, 2006), results are not be easily applicable to emerging and developing countries, because of differences in firm size distributions and characteristics as well as in institutional, macroeconomic and financial structures.

The extent to which firms may be financially constrained varies across countries according to both micro and macro factors. Based on the World Bank Enterprise Surveys (WBES), which provide cross-country comparable firm-level data, several studies investigate the existence of common micro determinants of financing constraints (see, for instance, Beck et al., 2006 and for a recent comprehensive survey, Ayyagari, Demirgüç-Kunt and Maksimovic, 2012) as well as how different institutional frameworks and credit market structures affect access to credit (Beck, Demirgüç-Kunt and Maksimovic, 2004; Clarke, Cull and Martinez Peria, 2006; Beck, Demirgüç-Kunt, and Martínez Pería, 2011).

Among the few studies available on Latin America, Galindo and Schiantarelli (2003) have undertaken a number of country-case studies to examine how firm and credit market characteristics shape the access to external finance. In another study, Stallings (2006) reports that access to finance is a key problem for SMEs in Latin America and that there are significant variations across countries. A similar picture is recently shown by the OECD (2013) which argues that, notwithstanding recent improvements in the depth of the financial systems in the region, a significant proportion of Latin American SMEs still have limited access to finance.

Given that economic growth largely depends on the dynamics of productivity (Crespi, Grazzi and Pietrobelli, 2015), it is important to investigate the sources and the constraints to productivity growth at the firm level, this paper provides a detailed picture of the extent and the determinants of firms' financing constraints in 31 countries from Latin America and the Caribbean (LAC). As a matter of facts, the lack of an adequate access to finance represents an important constraint for firm productivity growth (De Mel, McKenzie and Woodruff,

2008; Banerjee and Duflo, 2014) and undermines aggregate output growth. The general aim of the article is to uncover possible heterogeneities across firms and countries, and to explain them according to differences in the firm-level characteristics and in the institutional, macroeconomic and financial settings at country level. The empirical analysis uses the comprehensive data from the WBES, matched with macroeconomic data on credit market structure and the institutional setting.

The research questions addressed are the following. First, on the extent of firm financing constraints: Which is the share of firms lacking access to bank finance? How do firms finance themselves? How diffuse are different forms of credit? Second, on the characteristics of the financially constrained firms: Which are the firms more likely to be financially constrained? To address this issue, we focus on the differences across several characteristics at firm level, such as size, age, ownership structure, location, gender, productivity, and financial structure. Third, on the role of the external factors: Do differences across countries in terms of macroeconomic, financial and institutional variables (income levels, presence of credit registries, financial development, presence of foreign banks, market competition) contribute to explain the variability in access to finance?

The article is organized as follows. In the next section we review the literature about firm financing constraints and credit market structure. Then, the following sections present the empirical analysis on Latin America and the Caribbean. Section 3 provides some information about the data sources. In Section 4 there is a description of the main characteristics of the banking systems in the region. Section 5 presents an overview about the financing structure and the access to bank finance by firms in LAC. Section 6 looks at the firm-specific characteristics and at the country-specific credit market features associated with firm financing constraints. Section 7 concludes.

## 2. The literature

### *2.1 Firm financing constraints and credit market structure*

Credit markets are characterized by asymmetric information between borrowers and lenders, imperfect screening and monitoring technologies, and paucity of pledgeable collateral.

Therefore financial constraints emerge as an equilibrium phenomenon (Jaffee and Russell 1976; Stiglitz and Weiss 1981). In such a setting, firms that are more informational opaque are more likely to be financially constrained, given that they are not able to communicate to lenders their actual creditworthiness. This problem is particularly binding for small and young firms, which cannot overcome the informational asymmetry pledging a collateral, and for firms that are located in countries where there are no credit registries, as it is the case in many LAC countries (see Section 3).

On the lender side, banks do use imperfect screening technologies and rely as much as possible on transactional lending schemes, addressing the informational opacity of potential borrowers using *hard*, codified information. Lending technologies may overcome informational asymmetries through the use of *soft*, non-codified information, but this requires the build-up of a long-term lending relationship.

Therefore, the pervasiveness of firm financing constraints would depend not only on their characteristics, but also on the structure of the local credit markets in which they operate. The degree of market concentration, the proximity between lenders and borrowers, and the types of banks operating locally affect firm access to credit. In fact, different banks may apply different lending technologies and adopt different organizational structures (Berger et al., 2005; Beck, Demirgüç-Kunt, and Martínez Pería, 2011). Moreover, the bank-borrower distance and the degree of market competition also affect the collection and transmission of *soft* information and lender market power (Petersen and Rajan, 1994; Degryse and Ongena, 2005; Cetorelli and Strahan, 2006).

Among all these factors, the growing importance of foreign-owned banks in a number of emerging and developing countries has sparked a broad discussion about the effect of foreign bank penetration, market competition and credit availability (Claessens and Van Horen, 2014). On the one hand, the size of the bank together with the distance that separates its decisional center from local firms could reduce the capacity and willingness of foreign banks to engage in SME lending and induce them to "cherry pick" borrowers, especially in developing countries (Mian, 2006; Detragiache, Tressel, and Gupta, 2008). On the other hand, it is argued that foreign multi-service banks are more efficient, especially when operating in developing and emerging markets, and they have a comparative advantage in

offering a wide range of products and services through the use of new technologies, business models and risk management systems, so their entry could be associated with a reduction in firms financing constraints (de la Torre, Martínez Pería, and Schmukler, 2012). In addition, foreign banks penetration could increase credit availability because it increases market competition and exerts competitive pressures on domestic banks, which could be forced to re-orient their lending activity to informational opaque borrowers, with respect to whom they have a relative advantage, compared to their foreign competitors (Dell'Ariccia and Marquez, 2004).[2]

Finally, the literature stresses the role that the institutional setting and the legal infrastructure can play in easing access to finance. The efficiency of the legal system, the enforcement of contracts, and mechanisms that enable information sharing among lenders can attenuate adverse selection and moral hazard, improving credit availability (Beck et al., 2006; Pagano and Jappelli, 1993; Padilla and Pagano, 1997).

*2.2 Selected empirical evidence*

In this section we selectively review the large empirical literature on the determinants of firm financing constraints and the one investigating how credit market structures can affect access to finance. We give special attention to the empirical studies with a global perspective, using firm-level data – especially the WBES – and specifically focusing on LAC.

*Firm-level characteristics*

The literature has consistently showed that that older, larger, and foreign-owned firms are more likely to encounter financing obstacles. Beck et al. (2006) and Cole and Dietrich (2014) use the WBES database, showing that these results hold for a large sample of firms located in 80 developing and advanced economies. Galindo and Schiantarelli (2002) survey a number of empirical studies conducted in Argentina, Colombia, Costa Rica, Ecuador, Mexico and Uruguay to investigate the determinants of firm financing constraints and find that the

[2] Similar considerations hold when discussing the entry of large banks and the competitive pressure on small banks to orient their lending activity towards SMEs. Moreover, the literature has also stressed the importance of state-owned banks, but this aspect is beyond the scope of this article. A detailed discussion about the role of state-owned banks in developing countries is presented in Micco, Panizza, and Yanez (2007). Besides, some recent works suggest that state-owned banks could have played a pivotal counter-cyclical role in Latin America, during the recent global crisis (Cull and Martinez Peria, 2013).

empirical evidence supports the theoretical predictions about the importance of informational frictions.[3] The severity of financing constraints does not only depend on observable firm balance sheet characteristics (i.e. *hard* information), but also on the strength of the bank-firm relationship, on the firm credit history, and on firm characteristics that, on average, are correlated with creditworthiness. Specifically, they confirm that financing constraints are less binding for larger firms and for those that are foreign-owned or belong to a business group.

Makler, Ness and Tschoegl (2013) use the WBES for Argentina, Brazil, Chile and Mexico, and find support to the standard hypothesis that smaller and younger firms are at a disadvantage in securing bank credit with respect to larger and older enterprises.[4] Moreover, they find that firms with a more educated workforce and located in wealthier and more developed regions have better access to finance.

Using the same data, but for all the countries included in the survey, Kuntchev et al. (2013) show that there is a robust correlation across the world (including the LAC region) between firm size and access to finance. They also find that more productive and internationalized firms are less likely to be credit constrained, while age does not play a role in access to finance.[5]

*Credit market structure*

An important strand of the literature on bank credit investigates how financial development, market competition, and foreign bank presence affect firm access to finance. In a seminal contribution, Beck, Demirgüç-Kunt and Maksimovic (2004) combine firm-level data on 74 countries and show that market concentration is positively associated with financing obstacles, especially in developing countries. However, this negative effect of market concentration is mitigated in countries with a large presence of foreign banks and where credit registries facilitate information sharing, while it is magnified in countries with high government interference and a dominant presence of state-owned banks.

[3] These studies are collected in a volume edited by Pagano (2001).
[4] Using loan level data on Brazil, Claessens and Sakho (2013) find that collateral and previous bank-firm relationships are important drivers of access to credit.
[5] Interestingly, they also find that the association between labor productivity and an easier access to finance is stronger for larger than for smaller firms.

Clarke, Cull and Martínez Pería (2006) do not confirm the widespread concerns that foreign banks reduce credit availability for SMEs, as they show that in countries with a strong presence of foreign owned banks, access to bank credit is perceived as less constraining on enterprises, including SMEs. In a similar vein, focusing on Argentina, Chile, Colombia and Peru and using bank-level data, Clarke et al. (2005) show that the effect of foreign presence on small business lending is heterogeneous but, on average, small firms are more likely to take advantage from the presence of foreign banks when these institutions have a significant local presence.

Claessens and Van Horen (2014) have collected the most comprehensive dataset on foreign banks presence and have documented the sharp expansion of foreign banks since the mid-1990s, especially in emerging and developing countries. Their country-level data show that foreign bank presence is negatively related to private credit in developing countries, especially in countries where foreign banks have a low market share, high costs of contract enforcement and low credit information.

Finally, there is a large strand of evidence supporting the importance of credit registries for business lending. Djankov, McLiesh, and Shleifer (2007) show that private and public registries are associated with more private credit, especially in poor countries. Similarly, Jappelli and Pagano (2002) use aggregate data to show that bank lending is higher in countries where lenders share information, regardless of the private or public nature of the information sharing mechanism.

## 3. Data sources

The main data sources are the World Bank Enterprise Surveys, which are collecting data based on firms' experiences and enterprises' perception about the environment in which they operate.

To enable global comparisons, the WBES use a standard methodology of implementation, sampling and quality control as well as a homogeneous questionnaire with some adaptations to take into account regional and country specificities. The questionnaire is organized in 14 sections and in this paper we rely in particular on Section K providing information on

sources of finance and access to credit (World Bank, 2013a).

The WBES is based on stratified (geographical location, firm size, and sector of activity) random based sampling strategy. Under geographical location the stratification aims at having the representativeness in the core economic centers in each country. Stratification by firm size divides the population into three strata: small (5–19 employees), medium-size (20–99 employees), and large firms (100 or more employees). The degree of stratification by economic activity is determined by the size of the economy (World Bank, 2013a).

In the survey, only firms with five or more employees are included[6], and firms with 100% state ownership are excluded. Besides, only registered firms are comprised, and registration is defined as registration for taxation purposes. The sectors included are manufacturing and service while agriculture and extractive industry are excluded.

In 2006, firms in 15 LAC countries were surveyed using this methodology and in 2010, 14,657 firms were surveyed in 31 countries, 3,535 of which had been interviewed previously in 2006.[7]

## 4. Credit markets in LAC

The last two decades have witnessed a structural change in credit markets around the world. Financial liberalization has contributed to a general contraction of the role played by state-owned banks and to an increasing penetration of foreign banks in domestic credit markets. Latin America and the Caribbean are not an exception. After the financial crises in the 1990s, LAC banking systems underwent significant changes. Deregulation and opening of financial markets to foreign competition have increased competitive pressures and led to an intense process of bank restructuring, privatization and consolidation (Cardim De Carvalho, De Paula, and Williams, 2012).

The process of transformation in the LAC credit markets is characterized by high

[6] The exclusion of micro enterprises and of the informal sector could represent a relevant issue in some countries, especially given that micro and informal firms are more likely to be financially constrained and to be less productive. Bruhn and McKenzie (2014) provide a broad and accessible discussion of some important issues about informal firms in developing countries, including access to finance.
[7] For a full list of the countries included see World Bank (2013a).

heterogeneity in the levels of financial development and competition. The development of banking systems in LAC-7[8], with the exception of Chile, is lagging behind other regions and countries at similar level of income. Instead, other countries, especially the offshore centers in the Caribbean region, show more developed credit markets (World Bank, 2012; Čihák et al., 2012; Didier and Schmukler, 2014). According to a recent study by the World Bank (2012) benchmarking the financial development in LAC-7 countries with other countries at comparable level of economic development and with advanced countries, during the last decade there was a general deepening of the domestic financial systems but there are still significant gaps and in general, there is not a convergence toward the indexes of financial development observed in more developed countries.

A useful bird-eye view of financial development across LAC is provided by the *ratio between bank credit and GDP* (Figure 1a), a measure of financial depth, which is on average 40%, ranging from very low values in Argentina, Mexico, Peru and Uruguay – similar to what we find in much poorer countries such as Tanzania, Ghana and Mozambique[9] – to high ratios in Chile (64%) and in some of the Caribbean countries, especially in the offshore centers (e.g. The Bahamas, Barbados and Panama) behaving as clear outliers.

Other indicators available for investigating the structure of the domestic credit markets are the number of bank branches per 100,000 adults as a standard measure of the development and access to the credit markets (Figure 1b); the degree of competition measured by the share of the banking assets of the three largest national banks over total banking assets (Figure 1c); c) the presence of foreign banks, measured as the share of the total number of banks, operating in the country (Figure 1d).

The *number of bank branches per 100,000 adults* can be considered as a prerequisite for financial inclusion, facilitating individuals and firms to access financial services. According to World Bank (2012), the median number of branches (13) and ATMs (37) per 100,000 adults in LAC-7 is smaller than in Eastern European countries (22 branches and 54 ATMs) and also in the G-7 economies (24 and 118) but it is similar to the Asian economies (11 and

[8] LAC-7 are the seven largest countries in the region, namely, Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela, which account for 90% of Latin America's GDP.

[9] For a recent analysis about the development of the financial systems around the world, see World Bank (2013c, Chapter 1).

34). Considering Latin America as a whole, the median number is 20 branches per 100,000 adults with very large differences among countries. In LAC-7 only Brazil and Peru have a number branches above the regional median (Figure 1b). The other countries with a very large number of branches per capita are some small Caribbean island countries.

In contrast to what has happened in other regions during the last decade, credit markets in LAC-7 countries have become more concentrated (Didier and Schmukler, 2014): Peru and Argentina are the countries that present, respectively, the most and the least concentrated banking sectors (Figure 1c). In the rest of the region, the *share of bank assets held by the three largest banks* is relatively high, especially in many Caribbean small countries – i.e. Suriname, Guyana, Barbados, Antigua, Belize, Trinidad and Tobago and Jamaica.

The LAC financial systems show a very high penetration of foreign banks: the *share of foreign banks in total banks* has increased sharply since 1995 (when it was equal to 28%) and has reached 42% in 2009, a share similar to Eastern Europe (47%) and much higher than East Asia (24%) and OECD countries (24%). When considering the share of banking assets hold by foreign banks the differences between LAC (29%), East Asia (4%) and OECD countries (11%) are even larger (Claessens and Van Horen, 2014). As shown in Figure 1d, among LAC countries there is a great heterogeneity. Taking into account LAC-7, Mexico and Peru have a large presence of foreign banks, which this is more limited in Brazil and Colombia.

Finally, the region is also characterized for a certain degree of heterogeneity in the presence of credit registries.[10] According to the World Bank data presented in Bruhn, Farazi and Kanz (2013), public credit registries are present in 47% of the countries included in the survey.

## 5. An overview on firm financing in LAC

In this section we present a set of stylized facts about the financing structure and access to bank finance by firms in LAC, disentangling across a set of well-defined firm characteristics:

- Firm *size*, separating micro firms (10 or less employee), from small (11 to 50

[10] A credit registry is defined as an entity managed by the public sector (central bank or superintendent of banks), which collects information on creditworthiness of borrowers and shares this information with banks and other regulated financial institutions (Bruhn, Farazi, and Kanz, 2013).

employees), medium (51 to 250 employees), and large (more than 250 employees);

- Firm *productivity*, measured by the logarithm of labor productivity (we define low and high productive firms splitting the sample below and above the median of labor productivity);
- *Age* of the firms, separating between new (3 years of less since inception), young (4 and 10-year old) and mature (older than 10 years) firms;
- The degree of internationalization identifying *foreign-owned enterprises*, as the ones in which foreign private individuals or companies own 10% or more of the firm, and *exporters*, as the ones in which direct exports account for 10% or more of annual sales;
- Female ownership, i.e. *female owned firms* are the ones in which there is at least a woman among the firm's owners.
- The sector specialization distinguishing between firms operating in the *service* and in the *manufacturing sector*.[11]

*5.1 The financing structure*

The WBES provides information about the sources of finance for working capital expenditures in a sub-sample of 13,676 firms, distinguishing between: a) internal funding and retained earnings; b) borrowing from banks; c) borrowing from other financial institutions; c) trade credit and other sources of external finance (such as family and money lenders). Table 1 presents the differences across firm characteristics and across countries.[12]

A clear finding is that firms finance their working capital mainly through internal sources, followed by trade credit (21% of working capital) and bank credit comes only as the third source (on average, it accounts for 17% of working capital expenditures).

Moreover, the use of bank credit shows a significant degree of variability on the basis of the different firm characteristics taken into account. With regard to *size* and *age*, its use is

[11] The WBES provides a more detailed 2-digit disaggregation. For the purpose of the descriptive analysis we limit to the disaggregation between services and manufacturing.

[12] For the sake of brevity, Table 1 (as well as Tables 2 and 3) does not report the values of the t-test statistics for the differences in the values across firms' characteristics. However, when discussing the main results we mention if they are statistically significant or not (at the usual 90% level of confidence).

extremely limited for micro[13] and young firms, while it is the second source of finance for large firms and it accounts for 17.4% of working capital for mature firms. The difficulty of small firms to access bank credit is statistically significant and it is confirmed by OECD (2013), according to which less than 15% of lending in the region goes to smaller firms even though they provide almost 80% of jobs.

More productive firms rely less on internal funding to fund working capital, while they use more bank and trade credit. Exporters are significantly more likely to use bank credit than non-exporting firms (possibly as their size is larger), while foreign-owned firms rely significantly less on bank credit than domestically owned ones and finance their working capital mainly through internal finance, a result that could be driven by the internal availability of resources in multinationals. No significant differences emerge between businesses with exclusive male ownership and those with female participation and across sectors, even if firms working in manufacturing are on average more dependent on internal finance and less on trade credit than service enterprises.

*5.2 Access to banking products*

In terms of access to finance, 90% of LAC firms in the sample have a bank account, a share similar to the one in Europe and Central Asia, somewhat larger than in Asia and Africa. However, there is a certain degree of variability (Table 2). For instance, almost 18% of micro-enterprises do not have either a *saving or a checking account*. With regard to country heterogeneity, while almost all sampled firms in Argentina, Brazil, Chile and Colombia have a banking account, only 60 % of Mexican firms do have one.

Moving to *bank credit*, access is less widespread and more heterogeneous. On average, less than two firms out of three have an overdraft facility, with this instrument being less frequent among micro (46%), new (52%) and non-exporter (62%) firms. In addition, only 54% of LAC firms have a line of credit or a loan and the diffusion of these instruments is again significantly different across firm size, productivity, age and export status. Access to bank credit is also highly heterogeneous across countries: in Mexico only 24% of firms have an

[13] In developing countries micro firms typically address their requests for credit to microfinance institutions. (Hulme and Arun, 2009).

overdraft and 30% have a line of credit or a loan. These shares are much higher in Brazil, Colombia and Chile, while Argentinian firms are somewhat in the middle. In the Caribbean, there is an almost universal access to a bank account, even if loans and overdraft facilities are far less diffused (see, for instance, Barbados and Jamaica in Table 2).[14]

*5.3 The extent of firm financing constraints*

The surveys collect information about loan applications and their outcomes in the previous fiscal year. Hence, differently from most of the literature which looks at access to finance as an obstacle to business activities (Beck et al., 2006), we exploit the richness of information about loan applications to measure the demand for credit and the extent of credit availability across firms and countries (Cole and Dietrich 2014). In particular, we define the following four binary indicators:

- *LOAN DEMAND* is a dummy identifying firms that have applied for a bank loan or a line of credit;
- *LOAN DENIAL* is a dummy identifying firms that have applied for a bank loan or a line of credit but whose request has been denied by the bank;
- *CONSTRAINED* is a dummy identifying the borrowers whose loan application has been denied and those who decided of not applying because interest rates and collateral requirements are too high, the size of loan and the maturity are insufficient, or in general, they believe that the loan would not be approved (Hansen and Rand, 2014; Presbitero, Rabellotti and Piras, 2014);
- *DISCOURAGED* is a dummy identifying firms not having applied for credit because the procedures are too complex, interest rates and collateral requirements are too high, the size of loan and the maturity are insufficient, or in general, they believe that the loan would not be approved (Kon and Storey, 2003).

Table 3 confirms for Latin American firms the common patterns observed in the literature: larger and older firms, as well as exporters, are more likely to demand for bank credit. This

[14] In a recent study using the WBES, Didier and Schmukler (2013) confirm that the use of bank deposit products is widespread in Latin America with some heterogeneity among different groups of firms, and they especially point to the less pervasive use and access to bank credit among SMEs. Moreover comparing access and use of bank credit in Latin America (especially those in LAC-7 countries) with other developing countries they find that there are not large differences.

pattern is reflected in a higher share of discouraged borrowers in *smaller*, *younger* and *more domestically oriented* companies. These firms are also more likely to be financially constrained.[15] By contrast, the breakdowns by the *gender of the owner* and between *manufacturing and services firms* do not provide clear-cut indications. In particular, firms with at least a female owner are more likely to demand for credit and to perceive access to finance as an obstacle than other firms, but the shares of denied, discouraged and financially constrained firms are not statistically different across the gender variable.

We also observe that labor productivity is statistically associated with a better access to credit. *High productive firms* are significantly more likely to demand credit and less likely to be financially constrained, regardless of the definition adopted (i.e. discouraged borrowers or firms with a denied loan application, see Figure 3), than low productive firms. While we are not able to identify any causal impact running from high productivity to better access to finance (or the other way around), this finding seems to suggest the presence of a sort of low-productivity-financing constraints trap, as low productive firms are also more likely to be financially constrained and therefore they cannot invest for improving their performance. While only a correlation, this hypothesis is consistent with evidence on SMEs about a causal impact going from lack of finance to increase in productivity (De Mel, McKenzie and Woodruff, 2008; Banerjee and Duflo, 2014).

Access to finance is also extremely heterogeneous across LAC countries, as shown in Figure 2. A first significant difference emerges across LAC-7 countries and the rest of the sample, with the former having a much smaller share of financially constrained firms. Second, large differences are still present within the group of the seven largest Latin American countries: access to finance is a relevant problem in Argentina (25% of firms are financially constrained, largely above the LAC-7 average, which is 15%) and Mexico (where the share of rationed firms is 23%), while in Chile, Colombia and Peru the shares of firms whose loan applications have been denied and of financially constrained firms are the among lowest in the region. Among the remaining countries, the Caribbean is, on average, the region in which access to finance is the most pressing.

[15] This pattern is confirmed – to a similar extent – when considering the subjective indicator of access to finance as an obstacle to business activity, which is not reported in the paper.

To investigate the correlation between credit market structure and firm financing constraints at the country level, we plot the country-average residuals of a simple linear regression in which the variable *CONSTRAINED* is function of a standard set of firm-specific characteristics, over specific measures of credit market structure (see Section 3). In this way, we purge all individual-specific effects that may affect access to credit (e.g. some countries may have a large share of micro firms, resulting in an aggregate larger share of financially constrained firms) and we can assess the association between credit market structure and access to finance. In Figure 4 we report the results showing that countries with a larger presence of bank branches per capita and with less concentrated credit markets have a smaller share of financially constrained firms (panels a and b). The presence of foreign banks, instead, shows a positive correlation with the extent of financing constraints (panel c).

Finally, we also look at the relationship between financially constrained firms and the institutional settings. The panel (d) of Figure 4 shows that there is no significant correlation between the variation of the share of financially constrained firms across countries and the strength of the rule of law.[16] In Figure 5, instead, we plot the average values of the four variables used to measure access to credit depending on the presence or not of a public credit registry in the country. We observe that the presence of credit registries is associated with a higher demand for credit and with lower financing constraints, consistently with the theoretical predictions that an institutional setting which facilitates information sharing can make a difference in term of access to credit.

## 6. The determinants of firm financing constraints

### *6.1 The empirical models*

This section investigates the association between firm-specific characteristics and country-specific credit market features with firm financing constraints, estimating the following model:

[16] We measure the rule of law using one of the Worldwide Governance Indicators published by the World Bank (Kaufman, Kraay and Mastruzzi, 2010). Specifically, the rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

(1) $\Pr(OUTCOME)_{ijt} = f(FIRM_{it}, COUNTRY_{jt})$

where *OUTCOME* is one of the two binary indicators identifying whether the *i*-th firm located in country *j* in year *t* is, alternatively, financially constrained or discouraged. *FIRM* is a vector of firm-specific characteristics including labor productivity productivity (measured by the logarithm of labor productivity), size (measured by a categorical variable based on the number of employees and by a dummy for establishments which belong to a large firm), age, location, legal status, the tenure of the top manager, and a set of dummies about foreign ownership, exporting capacity (more than 10% of the production), gender of the firm (at least one woman among the owners), and the possession of a quality certification.[17] *COUNTRY* is a set of (time-varying) country-level variables that measure to what extent differences in credit market structure, legal infrastructure and economic development affect access to credit. The focus of the analysis is on credit market structure, which is measured by: 1) the number of branches per capita, as a measure of bank penetration, 2) the share of the three largest banks assets over total commercial bank assets, as a measure of credit market concentration, and 3) the share of foreign bank assets in total bank assets as a measure of foreign banks presence. To minimize the possibility that the credit market structure variables pick up some other macroeconomic and institutional effects, we also include in Equation (1) a measure of rule of law, a dummy for the presence of a credit register, the log of GDP per capita, the GDP growth rate and the share of the agricultural value added in total GDP.[18]

When considering firms whose loan applications have been denied, the *OUTCOME* variable is censored, given that we observe the bank decision about granting credit only for the sub-sample of firms that have applied for a bank loan or a line of credit. Hence, we estimate the following binary selection model *à la* Heckman (1979):

(2a) $\Pr(LOAN\ DEMAND)_{ijt} = f(FIRM_{it}, Sales\ growth_{it}, COUNTRY_{jt})$

(2b) $\Pr(LOAN\ DENIAL)_{ijt} = f(FIRM_{it}, COUNTRY_{jt})$

[17] Given that the measure of labor productivity is not available for a quite substantial number of firms, for checking the robustness of our findings we have also estimated Equation (1) on a larger sample of firms, excluding labor productivity. The results are broadly unchanged.

[18] When controlling for these variables we cannot add country-fixed effects to Equation (1) as only for a few countries we have more than a survey repeated over time.

where *LOAN DEMAND* is the dummy variable identifying the *i*-th firm in country *j* that has applied for bank credit in year *t* and *LOAN DENIAL* is the binary indicator for the same firm, whose application has been denied by the bank. The set of explanatory variables used in the two-equation model is the same as the one discussed for Equation (1), with the exception of the variable *Sales growth*, which measures the annual change in sales and that is included as an excluding restriction because it is expected to influence the demand for credit, being a proxy of the firm's level of economic activity.

We estimate models (1) and (2) on a sample of data collected between 2006 and 2010 in 30 LACs (see Table A1), including a large set of dummies to control as much as possible for the unobserved firm-level heterogeneity that may affect the credit market outcomes. In particular, we include a set of dummies for industry and year, which control for the possibility of year- and industry-specific shocks. Given that in the first set of regressions we do not include any country-specific variables, we add country fixed effects and we interact them by year and by a dummy identifying manufacturing from service sectors, so that we allow for sector-specific fixed effects varying by countries and over time.[19] Finally, to deal with possible serial correlation across firms interviewed in each survey, we cluster the standard errors at the country-year level.

*6.2 The relative role of firm-level and country-level characteristics*

Tables 4 and 5 present the estimates of models (1) and (2) including firm-specific control variables and checking for unobserved heterogeneity with country, year and industry dummies. For each model we present the results for the whole sample and also for two sub-samples - LAC-7 and the remaining countries - to inspect if significant differences emerge between the largest economies in the region and other smaller countries.

Considering firm level characteristics, our results confirm the existing evidence (Brown et al., 2011; Cole and Dietrich, 2014) showing that smaller and less productive firms are less likely to apply for credit and more likely to be financially constrained. Foreign-owned firms

[19] We are not able to go beyond this degree of granularity in modeling the unobserved heterogeneity, as using country x year x industry dummies would make a number of cells without variation in the dependent variable. For the same reasons, when estimating model (2) we just have country x manufacturing sectors dummies and, separately, year dummies. See the notes in the Tables presenting the results of the regression tests for details.

and exporters are also less likely to apply for bank credit than domestically-oriented firms, while there is no robust evidence that they are more likely to be financially constrained.[20]

Moving to country-specific characteristics, we can assess the relative importance of firm- and country-specific factors in explaining the variability of firm financing constraints estimating a linear probability model and comparing the R-squared when: 1) using only firms-specific factors (used previously in the regressions reported in Tables 4 and 5), and 2) including also country fixed-effects. In line with the previous evidence using the WBES (Beck, Demirguc-Kunt and Maksimovic, 2004; Beck et al., 2006), our results (Table 6) show that the firm-level variables are able to explain only a small fraction of the variance of the dependent variables, irrespective of the measure of financing constraints adopted. The inclusion of country fixed effect does not improve dramatically the fit of the model in absolute terms, as the R-squared is still lower that 0.10. However, in relative terms the increase in the explanatory power of the model is quite relevant, as the R-squared increases by around 55-80%, depending on the measure of financing constraints considered.

This exercise points to two important considerations for interpreting our findings. First, a lot of the variability in firm financing constraints is due to unobservable heterogeneity at the firm level. Second, country-specific factors are potentially able to explain about 40% of the "explained part" of the variability of firm financing constraints. From a policy perspective, even if the role of unknown and unobservable firm-specific factors is dominant, there is still a significant role for policy at the country level directed at easing firm financing constraints. Therefore, in what follows we try to assess whether some specific structural characteristics of the credit markets are more likely to be associated with better access to bank credit.

*6.3 The role of credit market structure*

The estimation of models (1) and (2) adding country-specific controls indicates that the macroeconomic and institutional setting is a significant predictor of access to credit. Financing constraints seem to be stronger in richer countries, but are weaker in countries that

[20] We have also controlled for innovation at the firm level and find that there is not any significant correlation between different measures of innovation (R&D spending, the introduction of process or product innovations) and firm financing constraints. This regression is not included because data availability significantly reduces the sample size. In addition, there are not significant differences in terms of access to credit across sectors, especially separating manufacturing from market and non-market services.

experience faster GDP growth rates. Moreover, contract enforcements, property rights and the quality of courts, as measured by the rule of law indicator, are associated with a stronger demand for bank credit and with a lower share of financially constrained and discouraged borrowers (Beck et al. 2006). The presence of credit registries is associated with a worse access to bank credit. This result, apparently counterintuitive and in contrast with the descriptive evidence (Figure 5), is driven by the heterogeneity of firms in different countries, as the positive association between credit registries and better access to finance vanishes once firm characteristics are taken into account.

The results on the credit variables lend support to the descriptive evidence presented in Section 3 (see Figures 4 and 5) and to the hypothesis that credit market structure is not neutral with respect to firm financing constraints (Table 7).

Bank penetration, measured by the number of branches per capita, is significantly correlated with a lower probability that borrowers are financially constrained (column 1) and discouraged (column 2). This finding is consistent with the hypothesis that physical proximity in credit markets helps mitigating informational asymmetries between lenders and borrowers. Controlling for the degree of competition, a larger number of branches per capita reduces the average distance between firms and banks and a smaller distance reduces informational asymmetries and facilitates the screening and monitoring activities of banks. However, the number of bank branches per capita is not statistically associated with the likelihood of loan demand and loan denial (columns 3 and 4).

Market concentration shows a negative correlation with the measures of financing constraints, even if the coefficient is significant only when explaining the probability that a firm is discouraged from demanding credit. In other words, more concentrated markets seems to favor access to finance, in line with the hypothesis that a certain degree of market power is necessary for banks to invest in lending relationship, especially with informational opaque firms (Petersen and Rajan 1995). Finally, the positive coefficients on foreign banks would suggest that their larger presence is associated with a higher probability that domestic borrowers are financially constrained (Gormley, 2010), but it is not statistically significant. Given the relevance of foreign banks in a number of countries in the region., in the next

section will dig deeper into their role, to assess whether the not significance average effect masks some possible non-linearities.

*6.4 A focus on the role of foreign banks*

To shed light on how the presence of foreign banks could affect access to credit we inspect the possibility that their effect could differ across markets depending on the degree of domestic competition and on some institutional features. Thus, we interact the share of foreign banks with: 1) a dummy that signals the existence of a public credit registry, 2) the number of bank branches per capita, and 3) a measure of market concentration.

The results – reported in Table 8 – show that indeed the correlation between foreign banks and financing constraints depends on the development and institutional setting of national credit markets. The association between foreign banks and the share of financially constrained and denied borrowers turns from positive to negative moving from countries without to those with a public credit registry (columns 1 and 4). Moreover, in countries where there are public credit registries, a larger share of foreign banks is associated with a higher likelihood that firms demand for bank credit and a lower probability that their loan applications are denied (columns 7-8).

We also find that the correlation between foreign bank presence and financing constraints turns from positive to negative when the number of branches per capita in the country increases and the degree of market concentration decreases. While Brown et al. (2011) find that foreign banks are associated with a larger share of discouraged borrowers we find that this correlation holds exclusively in countries lacking credit registries and in concentrated credit markets. Hence, foreign banks seems to have a detrimental effect on access to credit in less developed and more concentrated markets, but they are indeed beneficial in more competitive and financially developed ones.

To asses the economic relevance of these effects, Figure 6 plots the results of Table 8 (columns 1-3), considering the differentiated effects of foreign bank penetration on the probability that the average firm is financially constrained. Panel (a) shows that foreign banks are associated with more binding financing constraints only in countries that do not have a credit registry. In the other countries, instead, there is not evidence that a larger presence of foreign banks penalize local firms, consistently with what recently shown by

Claessens and Van Horen (2014). Panels (b) and (c) show that the average partial effect of foreign banks on the probability of being credit rationed decreases from being positive (and statistically significant) to negative values when the number of branches per capita increases. By contrast, the same average partial effect increases with the share of bank assets hold by the three largest banks and move from negative to positive and statistically significant values when the asset share of the top-3 banks is above 60%.

## 7. Conclusions

This paper provides a thorough analysis of firm credit access in LAC countries based on the data available in the WBES and aimed at exploring the role played by heterogeneity in micro firm characteristics and in macro institutional credit market structures. Three main sets of issues are addressed: a) firm financing constraints and the types of credit accessed; b) the characteristics of the financially constrained firms; and c) the role of the differences across countries in terms of their financial development and credit market structure. Access to bank credit among LAC firms is very heterogeneous with a lot of variety according to firm characteristics such as size, productivity and informational transparency and a very differentiated picture across the region. Larger, older and less export-oriented firms are more likely to demand for bank credit and consequently less likely to be discouraged and to be financially constrained. Labor productivity is also positively associated with higher demand for credit and better access to finance. Even if we are unable to identify the causality of the relationship, this is an important result signaling the existence of a low-productivity-financing constraints trap, which needs to be addressed with policies targeted at strengthening economic growth in the region.

Apart from firm characteristics, credit market structure is also important for explaining the heterogeneity in credit access. In particular, we find that a high degree of bank penetration and competition are significantly correlated with a lower probability that borrowers are financially constrained. Interestingly, we find that the presence of foreign banks have a differentiated effect of firm financing constraints: foreign banks penetration has a negative effect on access to credit particularly in less developed and more concentrated markets, while it has a positive influence in more competitive and financially developed markets.

Some interesting policy implications can be drawn from our findings. In LAC there is a widely acknowledged low productivity trap, which impedes economic growth. Improving access to credit can help to escape this trap. Our empirical results underline the importance of improving the functioning of domestic credit market structure. Interventions aimed at increasing the degree of bank penetration and the competition in credit markets can be expected to positively impact on access to credit and firm productivity. From this point of view, the large heterogeneity in LAC financial markets opens up a crucial space for intervention in many countries in the region.

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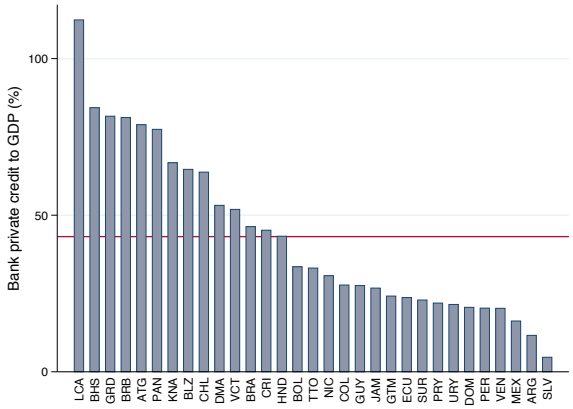
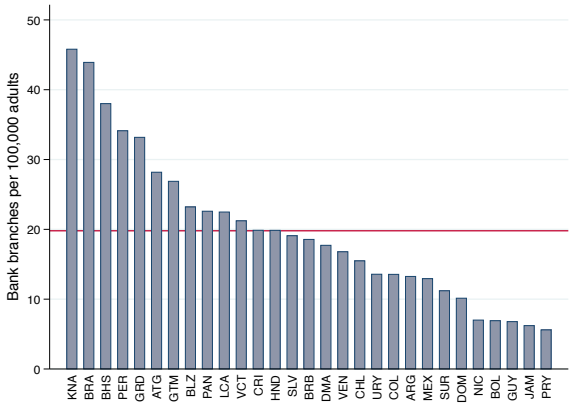
# Appendix: Figures and Tables

## Figure 1: Credit market structure in LAC

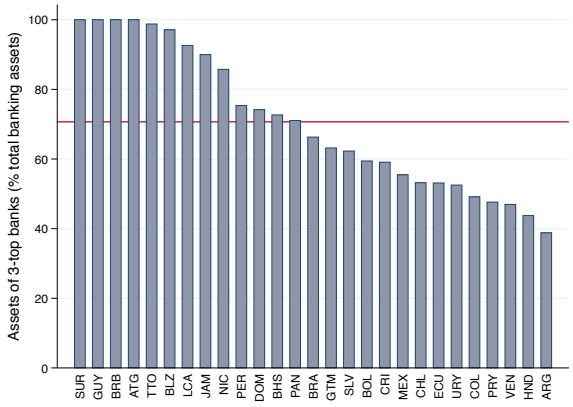
(a) Bank credit to the private sector (% GDP)



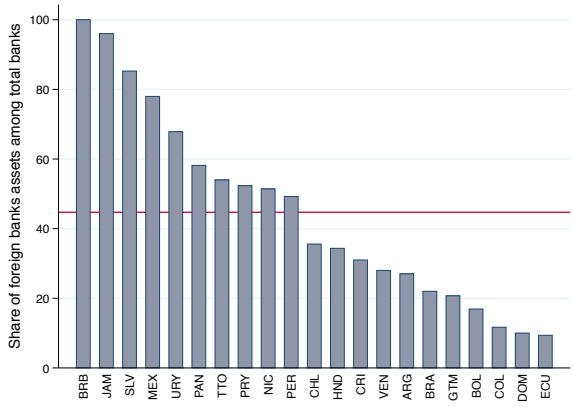

(b) Bank branches per 100,000 adults




(c) Credit market concentration

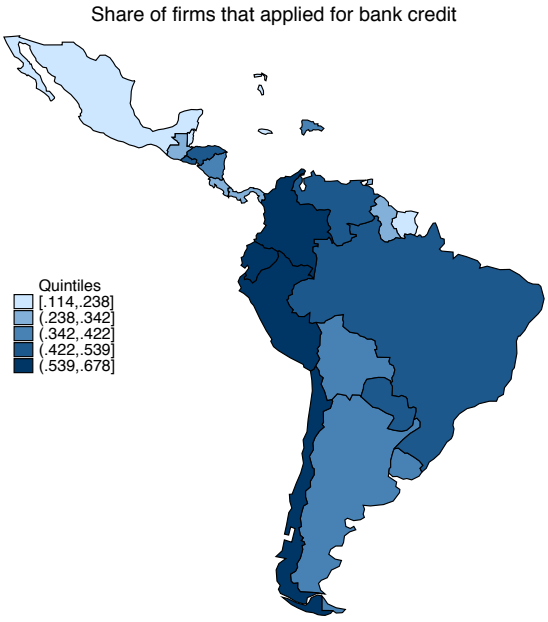



(d) Share of foreign banks

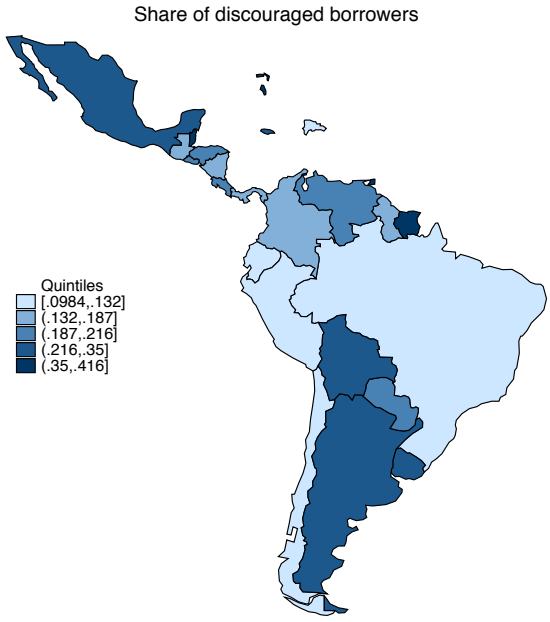



*Source*: Global Financial Development Database. Values are averages over the period 2006-2010

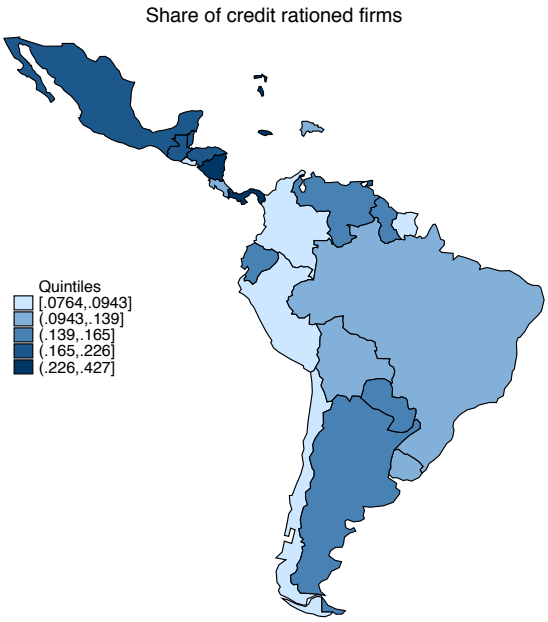
**Figure 2: Access to finance across the LAC region**



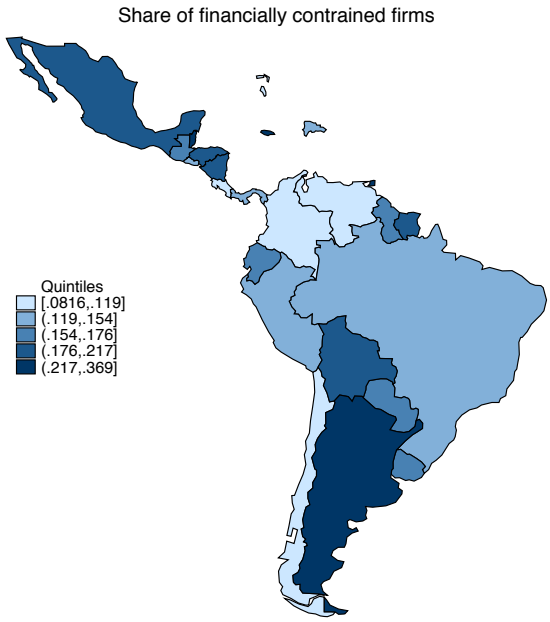

(a) LOAD DEMAND




(b) DISCOURAGED



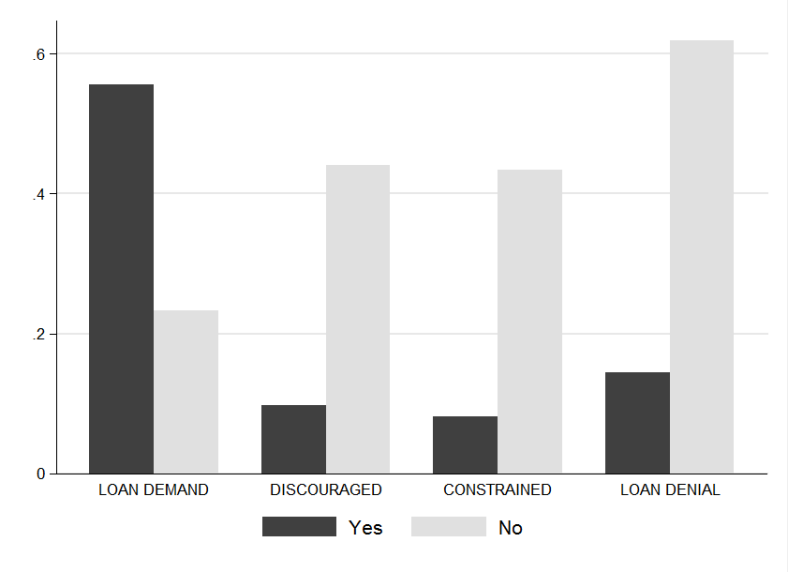

(c) LOAN DENIAL




(d) FINANCIAL CONSTRAINED

*Source*: WBES

**Figure 3: Firms' financing constraints and labor productivity**

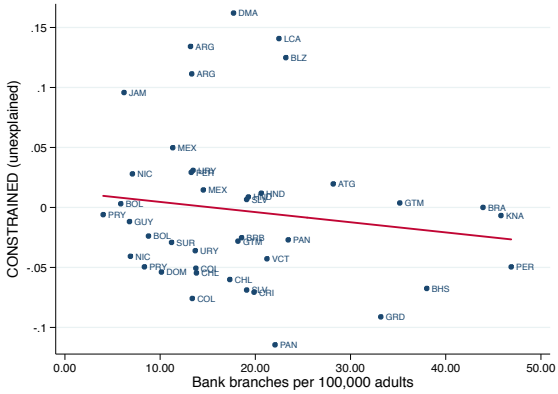



*Notes*: elaboration on WBES. For each category of firms we report the logarithm of labor productivity (minus 10, to improve the readability of the picture). The differences between firms with and without access to finance are statistically significant at 95% level of confidence

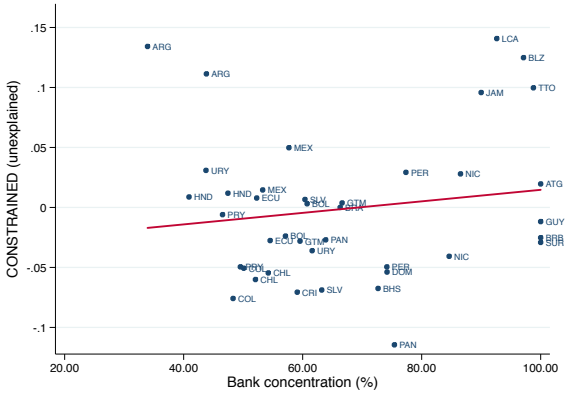
*Source*: WBES

## Figure 4: Financially Constrained Firms and Credit Market Structure, by Country

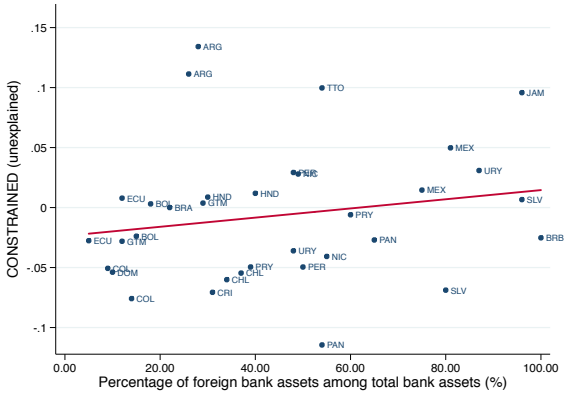
(a) Bank branches per capita



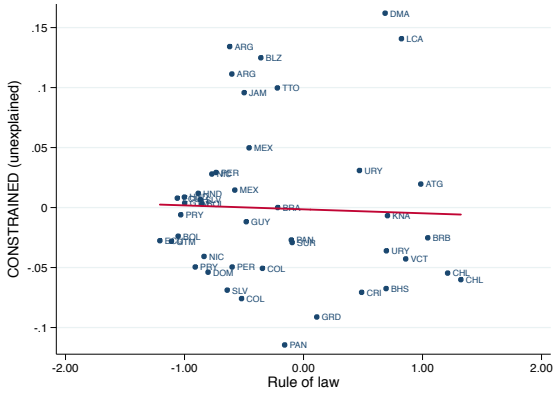

(b) Credit market concentration




(c) Foreign banks penetration

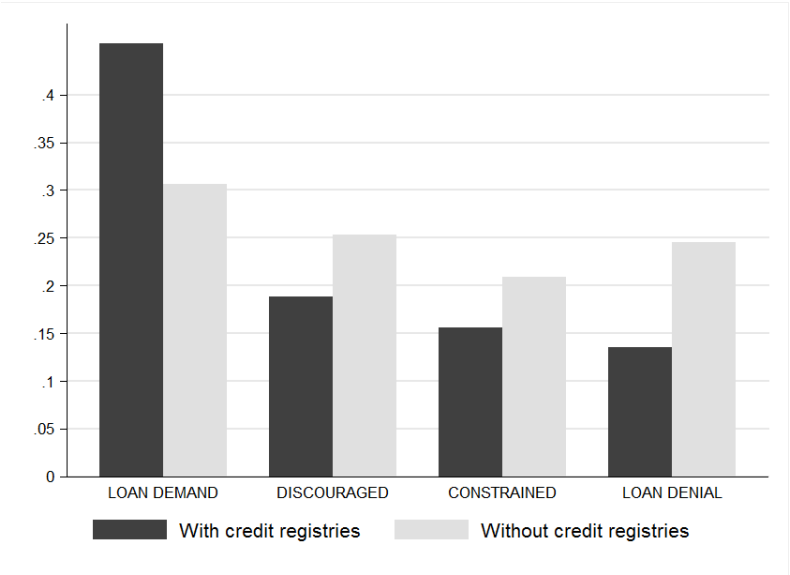



(d) Rule of law




*Notes*: Each panel plots: 1) on the vertical axis the OLS residuals from a firm-level regression in which the variable CONSTRAINED (dummy identifying the financially constrained borrowers, see Section 4.3) is a linear function of a set of firm-level characteristics (as the ones reported in Table 1 and a set of year and industry dummies; and 2) on the horizontal axis, the number of bank branches per 100,000 adults (panel a), the share of top-3 banks in total commercial bank assets (panel b), the share of foreign bank assets in total bank assets (panel c), and the rule of law index (panel d).
*Source*: WBES, Global Financial Development Database and Worldwide Governance Indicators (Kaufman, Kraay and Mastruzzi, 2010).

**Figure 5: Public credit registries and access to finance**

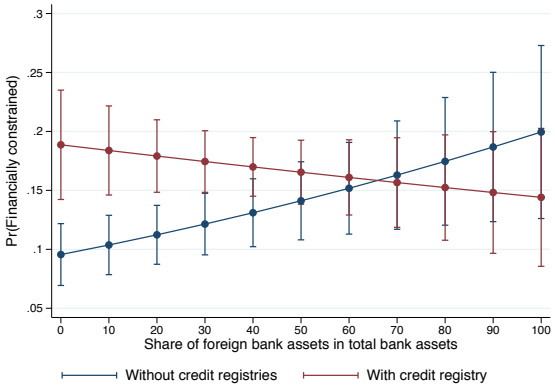



*Notes*: The share of firms which apply for bank credit (LOAN DEMAND), are discouraged from applying (DISCOURAGED), are financially constrained (CONSTRAINED) and which applied but had their request denied (LOAN DENIAL) are calculated for each survey. Then, we calculate the average between country-year in which there are or not public credit registries. The differences are all statistically significant at the 5% level.

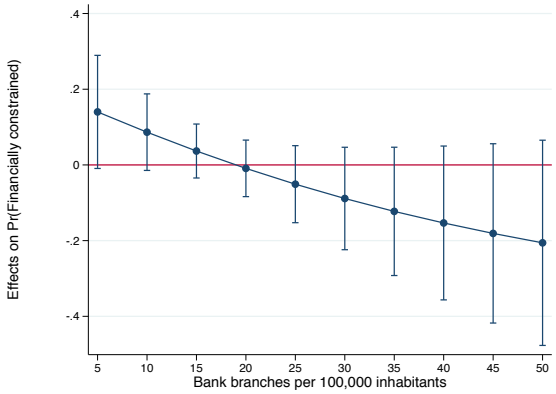
*Source*: WBES and Credit Reporting Database (Bruhn, Farazi and Kanz, 2013).

## Figure 6: The Heterogeneous Effect of Foreign Banks on Financing Constraints

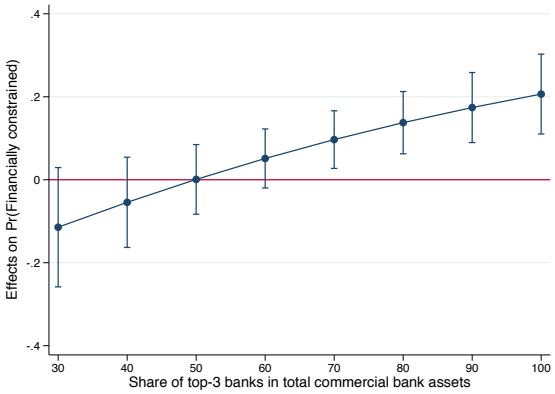
(a) Credit registries




(b) Bank branches per capita




(c) Credit market concentration




*Notes*: Panel a) plots the estimated probability that a firm is financially constrained for different shares of foreign bank assets in total bank assets, disaggregating between countries with and without a credit registry. Panels b) and c) plot the effects of the share of foreign bank assets in total bank assets on the probability that a firm is financially constrained, for different values of the number of bank branches per 100,000 adults (panel b), and the share of top-3 banks in total commercial bank assets (panel c). The vertical lines represent the 95 percent confidence intervals. The diagrams are based on the estimates reported in Table 8, respectively Columns 1, 2 and 3.
*Source*: WBES, Global Financial Development Database, and Credit Reporting Database (Bruhn, Farazi and Kanz, 2013)

## Table 1: The financing structure by firm characteristics and countries

| | Internal funds | Banks | Other financial institutions | Trade credit | Other (money lenders, friends) |
|---|---|---|---|---|---|
| Whole sample | 57.52 | 17.01 | 1.66 | 21.35 | 2.45 |
| **Size** | | | | | |
| Micro | 62.04 | 12.63 | 1.71 | 19.95 | 3.67 |
| Small | 57.44 | 16.35 | 1.71 | 21.88 | 2.62 |
| Medium | 55.84 | 19.40 | 1.57 | 21.54 | 1.64 |
| Large | 51.66 | 23.80 | 1.55 | 21.96 | 1.03 |
| **Productivity** | | | | | |
| Low | 58.31 | 16.15 | 1.77 | 20.43 | 3.34 |
| High | 54.58 | 18.99 | 1.56 | 23.26 | 1.61 |
| **Age** | | | | | |
| New | 60.34 | 13.63 | 1.58 | 19.28 | 5.18 |
| Young | 59.31 | 15.92 | 1.89 | 19.66 | 3.22 |
| Mature | 56.99 | 17.40 | 1.61 | 21.84 | 2.17 |
| **Ownership** | | | | | |
| Domestic | 57.22 | 17.06 | 1.64 | 21.55 | 2.53 |
| Foreign | 62.24 | 14.46 | 1.33 | 19.96 | 2.00 |
| **Gender** | | | | | |
| No female ownership | 58.06 | 16.65 | 1.60 | 21.25 | 2.44 |
| At least one female owner | 57.12 | 16.99 | 1.60 | 21.71 | 2.58 |
| **Internationalization** | | | | | |
| Exporter | 52.30 | 20.54 | 1.41 | 23.36 | 2.40 |
| Non-Exporter | 58.44 | 16.37 | 1.71 | 21.02 | 2.46 |
| **Sector** | | | | | |
| Manufacturing | 61.26 | 16.17 | 1.45 | 18.91 | 2.21 |
| Service | 55.12 | 17.56 | 1.79 | 22.92 | 2.61 |
| **Country** | | | | | |
| Antigua & Barbuda | 69.80 | 14.37 | 0.00 | 12.90 | 2.93 |
| *Argentina* | *58.09* | *11.76* | *1.15* | *26.81* | *2.19* |
| Bahamas | 64.72 | 13.54 | 1.27 | 19.42 | 1.06 |
| Barbados | 69.78 | 14.94 | 0.36 | 13.53 | 1.40 |
| Belize | 62.24 | 19.50 | 0.13 | 15.64 | 2.48 |
| Bolivia | 62.14 | 15.94 | 2.24 | 16.52 | 3.17 |
| *Brazil* | *50.79* | *23.82* | *2.81* | *20.32* | *2.26* |
| *Chile* | *54.33* | *19.02* | *1.51* | *23.24* | *1.90* |
| *Colombia* | *38.08* | *21.25* | *1.42* | *35.13* | *4.12* |
| Costa Rica | 74.56 | 11.77 | 1.39 | 11.00 | 1.28 |
| Dominica | 77.08 | 9.36 | 0.00 | 12.26 | 1.30 |
| Dominican Rep | 48.18 | 22.17 | 1.52 | 26.51 | 1.61 |
| Ecuador | 49.49 | 18.67 | 1.48 | 26.83 | 3.53 |
| El Salvador | 46.32 | 21.61 | 2.24 | 25.70 | 4.13 |
| Grenada | 51.85 | 19.72 | 2.10 | 21.03 | 5.30 |
| Guatemala | 60.15 | 10.98 | 1.96 | 24.07 | 2.84 |
| Guyuna | 48.82 | 19.97 | 0.38 | 24.63 | 6.19 |
| Honduras | 69.11 | 16.01 | 1.34 | 11.07 | 2.48 |
| Jamaica | 63.88 | 14.99 | 0.24 | 20.05 | 0.85 |
| *Mexico* | *61.61* | *9.14* | *1.38* | *24.89* | *2.99* |
| Nicaragua | 75.47 | 12.52 | 0.83 | 10.29 | 0.89 |
| Panama | 89.05 | 3.75 | 1.88 | 3.63 | 1.68 |
| Paraguay | 62.71 | 15.94 | 3.94 | 15.87 | 1.54 |
| Peru | 41.77 | 29.29 | 2.29 | 23.87 | 2.78 |
| St Kitts & Nevis | 54.07 | 20.72 | 0.39 | 21.28 | 3.54 |
| St Lucia | 73.23 | 12.18 | 0.00 | 12.89 | 1.70 |
| St Vincent & Grenadin | 63.66 | 25.67 | 1.02 | 8.97 | 0.68 |
| Suriname | 56.22 | 17.93 | 1.58 | 21.35 | 2.93 |
| Trinidad & Tobago | 50.37 | 26.64 | 2.79 | 18.51 | 1.69 |
| Uruguay | 67.88 | 8.52 | 1.01 | 20.64 | 1.95 |
| Venezuela | 57.94 | 15.28 | 1.66 | 22.92 | 2.20 |

*Source*: WBES

## Table 2: Access to finance by firm characteristics and countries

| | Checking/savings account | Overdraft | Line of credit/loan |
|---|---|---|---|
| Whole sample | 90.68 | 63.62 | 54.18 |
| **Size** | | | |
| Micro | 82.34 | 46.19 | 37.75 |
| Small | 91.69 | 64.78 | 53.9 |
| Medium | 92.62 | 73.91 | 65.11 |
| Large | 94.34 | 81.78 | 76.26 |
| **Productivity** | | | |
| Low | 86.29 | 55.42 | 49.13 |
| High | 94.58 | 74.15 | 61.95 |
| **Age** | | | |
| New | 85.93 | 51.56 | 40.02 |
| Young | 88.47 | 58.15 | 49.08 |
| Mature | 90.23 | 65.74 | 56.41 |
| **Ownership** | | | |
| Domestic | 88.64 | 61.96 | 54.97 |
| Foreign | 94.18 | 71.59 | 51.47 |
| **Gender** | | | |
| No female ownership | 88.47 | 62.39 | 53.56 |
| At least one female owner | 90.71 | 64.12 | 56.58 |
| **Internationalization** | | | |
| Exporter | 94.75 | 74.1 | 65.63 |
| Non-Exporter | 88.76 | 61.76 | 52.19 |
| **Sector** | | | |
| Manufacturing | 92.21 | 65.94 | 51.25 |
| Service | 88.14 | 62.3 | 55.94 |
| **Country** | | | |
| Antigua & Barbuda | 100 | 63.89 | 48.55 |
| *Argentina* | 98.48 | 76 | 49.95 |
| Bahamas | 97.28 | 60 | 34.27 |
| Barbados | 99.32 | 82.88 | 55.1 |
| Belize | 100 | 71.72 | 45.27 |
| Bolivia | 93.28 | 48.86 | 55.7 |
| *Brazil* | 97.87 | 82.89 | 65.54 |
| *Chile* | 96.22 | 86.6 | 75.42 |
| *Colombia* | 98.07 | 86 | 70.89 |
| Costa Rica | 96.16 | 38.28 | 59.23 |
| Dominica | 100 | 49.32 | 41.38 |
| Dominican Rep | 99.16 | 83.66 | 64.12 |
| Ecuador | 98.85 | 87.47 | 59.64 |
| El Salvador | 92.23 | 57.63 | 60.74 |
| Grenada | 98.68 | 57.53 | 49.66 |
| Guatemala | 70.87 | 52.76 | 46.36 |
| Guyuna | 100 | 66.04 | 50.94 |
| Honduras | 87.63 | 56.34 | 52.19 |
| Jamaica | 99.19 | 69.72 | 29.94 |
| *Mexico* | 60.53 | 23.83 | 30.73 |
| Nicaragua | 79.46 | 33.51 | 43.41 |
| Panama | 86.26 | 58.92 | 41.77 |
| Paraguay | 87.78 | 67.78 | 52.18 |
| Peru | 94.26 | 69.92 | 75.83 |
| St Kitts & Nevis | 100 | 60.54 | 49.66 |
| St Lucia | 100 | 53.42 | 40 |
| St Vincent & Grenadin | 98.68 | 60.26 | 58.94 |
| Suriname | 100 | 76.32 | 44.74 |
| Trinidad & Tobago | 99.72 | 78.85 | 61.1 |
| Uruguay | 89.47 | 62.62 | 52.66 |
| Venezuela | 97.33 | 38.89 | 30.94 |

*Source*: WBES

## Table 3: Firms' financing constraints by firm characteristics and countries

| | *CONSTRAINED* | *LOAN DEMAND* | *DISCOURAGED* | *LOAN DENIAL* |
|---|---|---|---|---|
| Whole sample | 17.01 | 42.59 | 19.70 | 14.04 |
| **Size** | | | | |
| Micro | 23,47 | 29,97 | 27,36 | 24,56 |
| Small | 18,31 | 41,58 | 20,88 | 15,79 |
| Medium | 11,47 | 50,89 | 13,54 | 8,95 |
| Large | 6,37 | 62,73 | 7,8 | 4,65 |
| **Productivity** | | | | |
| Low | 20.37 | 37.84 | 23.38 | 17.65 |
| High | 13.18 | 49.72 | 15.30 | 9.78 |
| **Age** | | | | |
| New | 20,55 | 35,24 | 23,3 | 23,81 |
| Young | 19,73 | 38,99 | 22,13 | 16,9 |
| Mature | 16,07 | 43,96 | 18,84 | 12,96 |
| **Ownership** | | | | |
| Domestic | 17,47 | 42,76 | 20,36 | 13,93 |
| Foreign | 13,25 | 39,24 | 15,89 | 14,5 |
| **Gender** | | | | |
| No female ownership | 17,05 | 41,62 | 20,07 | 14,23 |
| At least one female owner | 17,4 | 44,06 | 19,78 | 13,75 |
| **Internationalization** | | | | |
| Exporter | 13,2 | 51,74 | 15,64 | 8,9 |
| Non-Exporter | 17,72 | 40,99 | 20,43 | 15,23 |
| **Sector** | | | | |
| Manufacturing | 17,24 | 43,99 | 19,85 | 13,25 |
| Service | 16,59 | 40,12 | 19,43 | 15,58 |
| **Country** | | | | |
| Antigua & Barbuda | 26,85 | 22,15 | 31,54 | 12,9 |
| *Argentina* | *25,85* | *42,00* | *29,96* | *14,53* |
| Bahamas | 11,89 | 13,99 | 40,56 | 25 |
| Barbados | 18,06 | 18,06 | 25 | 38,46 |
| Belize | 36,91 | 11,41 | 41,61 | 17,65 |
| Bolivia | 17,67 | 41,16 | 23,71 | 13,91 |
| *Brazil* | *15,36* | *53,85* | *13,25* | *11,9* |
| *Chile* | *8,16* | *59,35* | *9,84* | *7,86* |
| *Colombia* | *11,91* | *62,16* | *14,51* | *7,64* |
| Costa Rica | 10,62 | 34,17 | 21,62 | 9,6 |
| Dominica | 41,33 | 24 | 38 | 38,89 |
| Dominican Rep | 12,85 | 42,18 | 13,13 | 12 |
| Ecuador | 15,61 | 57,07 | 10,65 | 16,51 |
| El Salvador | 13,09 | 43,66 | 19,88 | 9,43 |
| Grenada | 15,75 | 30,82 | 21,23 | 26,67 |
| Guatemala | 17,37 | 32,73 | 18,71 | 20,88 |
| Guyana | 15,82 | 31,65 | 18,35 | 16 |
| Honduras | 18,57 | 42,44 | 21,35 | 16,93 |
| Jamaica | 26,93 | 23,84 | 34,98 | 42,67 |
| *Mexico* | *19,58* | *23,13* | *22,7* | *22,59* |
| Nicaragua | 20,15 | 37,24 | 17,73 | 25,43 |
| Panama | 13,63 | 28,79 | 13,3 | 31,03 |
| Paraguay | 17,64 | 45,27 | 18,81 | 15,13 |
| *Peru* | *13,21* | *67,76* | *12,71* | *8,07* |
| St Kitts & Nevis | 21,68 | 33,57 | 25,87 | 29,79 |
| St Lucia | 39,33 | 24 | 31,33 | 52,78 |
| St Vincent & Grenadin | 18,79 | 34,23 | 20,13 | 13,73 |
| Suriname | 21,71 | 23,68 | 36,18 | 8,33 |
| Trinidad & Tobago | 27,48 | 25,78 | 38,81 | 19,78 |
| Uruguay | 16,4 | 35,42 | 24,51 | 11,69 |
| Venezuela | *11,47* | *42,2* | *20,18* | *15,56* |

*Source*: WBES

## Table 4: Constrained and discouraged borrowers

| Dep. Var.: | *CONSTRAINED* | | | *DISCOURAGED* | | |
|---|---|---|---|---|---|---|
| Sample: | ALL | LAC-7 | OTHERS | ALL | LAC-7 | OTHERS |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Labor productivity | -0.107*** | -0.096*** | -0.123*** | -0.115*** | -0.134*** | -0.094*** |
| | (0.021) | (0.029) | (0.024) | (0.013) | (0.025) | (0.014) |
| Firm size (ref: micro) | | | | | | |
| Small | -0.131*** | -0.149** | -0.116*** | -0.144*** | -0.140* | -0.149*** |
| | (0.038) | (0.074) | (0.038) | (0.037) | (0.072) | (0.035) |
| Medium | -0.387*** | -0.434*** | -0.339*** | -0.373*** | -0.391*** | -0.352*** |
| | (0.055) | (0.091) | (0.069) | (0.048) | (0.086) | (0.059) |
| Large | -0.689*** | -0.681*** | -0.765*** | -0.763*** | -0.731*** | -0.802*** |
| | (0.071) | (0.101) | (0.117) | (0.085) | (0.122) | (0.109) |
| Large establishment | -0.157*** | -0.144** | -0.181*** | -0.069 | -0.094 | -0.041 |
| | (0.036) | (0.056) | (0.050) | (0.044) | (0.066) | (0.054) |
| Exporter | 0.060 | 0.079 | 0.049 | 0.076** | 0.101 | 0.054 |
| | (0.037) | (0.053) | (0.053) | (0.037) | (0.069) | (0.037) |
| Firm age (ref: new) | | | | | | |
| Young | 0.028 | -0.019 | 0.076 | 0.030 | -0.041 | 0.096 |
| | (0.070) | (0.111) | (0.087) | (0.069) | (0.078) | (0.110) |
| Mature | -0.078 | -0.124 | -0.026 | -0.057 | -0.147 | 0.030 |
| | (0.071) | (0.106) | (0.093) | (0.078) | (0.091) | (0.120) |
| Foreign ownership | 0.071 | 0.172* | 0.013 | 0.081** | 0.112 | 0.064* |
| | (0.056) | (0.092) | (0.067) | (0.033) | (0.072) | (0.038) |
| Female ownership | -0.005 | 0.004 | -0.014 | -0.043* | 0.003 | -0.088** |
| | (0.029) | (0.027) | (0.050) | (0.024) | (0.023) | (0.037) |
| Top manager tenure | 0.016 | 0.091** | -0.051 | -0.001 | 0.043 | -0.042 |
| | (0.031) | (0.043) | (0.038) | (0.030) | (0.046) | (0.035) |
| Quality certification | -0.057 | -0.072 | -0.043 | -0.117*** | -0.131*** | -0.097 |
| | (0.044) | (0.052) | (0.063) | (0.040) | (0.046) | (0.062) |
| Locality size (ref: capital) | | | | | | |
| Over 1million | -0.027 | -0.046 | 0.039 | 0.025 | 0.027 | 0.022 |
| | (0.060) | (0.078) | (0.093) | (0.058) | (0.074) | (0.098) |
| Between 250,000 and 1million | -0.018 | -0.003 | -0.033 | 0.076* | 0.115** | 0.035 |
| | (0.055) | (0.067) | (0.096) | (0.043) | (0.050) | (0.066) |
| Between 50,000 and 250,000 | -0.012 | 0.053 | -0.046 | -0.011 | 0.085** | -0.056 |
| | (0.053) | (0.060) | (0.066) | (0.059) | (0.042) | (0.075) |
| Less than 50,000 | -0.118** | -0.290*** | -0.075 | 0.008 | -0.114** | 0.035 |
| | (0.054) | (0.058) | (0.062) | (0.069) | (0.051) | (0.081) |
| Observations | 16,200 | 8,243 | 7,957 | 16,200 | 8,243 | 7,957 |

*Notes*: Each regression includes country x year x manufacturing sector dummies, sector and legal status dummies and a constant. Standard errors (in parentheses) are clustered at the country-year level. *** p<0.01, ** p<0.05, * p<0.1.

## Table 5: Credit rationed borrowers

| Sample: | ALL | | LAC-7 | | OTHERS | |
|---|---|---|---|---|---|---|
| Dep. Var.: | ***RATIONED*** | ***DEMAND*** | ***RATIONED*** | ***DEMAND*** | ***RATIONED*** | ***DEMAND*** |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Sales growth | | -0.039 | | -0.057 | | 0.001 |
| | | (0.053) | | (0.085) | | (0.057) |
| Labor productivity | -0.117*** | 0.086*** | -0.074** | 0.084*** | -0.169** | 0.082*** |
| | (0.039) | (0.015) | (0.030) | (0.022) | (0.074) | (0.021) |
| Firm size (ref: micro) | | | | | | |
| Small | -0.230** | 0.255*** | -0.187* | 0.249*** | -0.261 | 0.260*** |
| | (0.111) | (0.036) | (0.097) | (0.053) | (0.266) | (0.051) |
| Medium | -0.583*** | 0.511*** | -0.466** | 0.551*** | -0.688* | 0.472*** |
| | (0.188) | (0.046) | (0.183) | (0.051) | (0.418) | (0.081) |
| Large | -0.780*** | 0.855*** | -0.492*** | 0.899*** | -1.266** | 0.779*** |
| | (0.241) | (0.059) | (0.162) | (0.083) | (0.639) | (0.079) |
| Large establishment | -0.110** | -0.018 | -0.088 | 0.003 | -0.142 | -0.056 |
| | (0.054) | (0.041) | (0.064) | (0.061) | (0.103) | (0.051) |
| Exporter | 0.003 | -0.144*** | 0.009 | -0.172*** | -0.001 | -0.116** |
| | (0.069) | (0.034) | (0.064) | (0.045) | (0.146) | (0.055) |
| Firm age (ref: new) | | | | | | |
| Young | 0.035 | -0.015 | -0.190 | 0.066 | 0.259 | -0.079 |
| | (0.245) | (0.105) | (0.311) | (0.160) | (0.316) | (0.137) |
| Mature | -0.038 | -0.034 | -0.216 | 0.068 | 0.148 | -0.119 |
| | (0.232) | (0.109) | (0.297) | (0.165) | (0.316) | (0.139) |
| Foreign ownership | 0.210 | -0.277*** | 0.249 | -0.333*** | 0.179 | -0.238*** |
| | (0.135) | (0.051) | (0.189) | (0.070) | (0.267) | (0.073) |
| Female ownership | -0.054 | 0.052* | -0.077 | 0.008 | -0.047 | 0.099*** |
| | (0.063) | (0.028) | (0.076) | (0.043) | (0.131) | (0.033) |
| Top manager tenure | -0.017 | 0.015 | 0.024 | 0.010 | -0.067 | 0.021 |
| | (0.046) | (0.025) | (0.072) | (0.037) | (0.060) | (0.035) |
| Quality certification | 0.018 | 0.058 | -0.019 | 0.048 | 0.070 | 0.055 |
| | (0.065) | (0.044) | (0.060) | (0.068) | (0.133) | (0.050) |
| Locality size (ref: capital) | | | | | | |
| Over 1million | -0.154*** | -0.072** | -0.132*** | -0.049 | -0.219 | -0.107 |
| | (0.050) | (0.033) | (0.043) | (0.032) | (0.142) | (0.079) |
| Between 250,000 and 1million | -0.125 | -0.077 | -0.099 | -0.100 | -0.212 | -0.026 |
| | (0.080) | (0.067) | (0.072) | (0.093) | (0.169) | (0.094) |
| Between 50,000 and 250,000 | -0.023 | -0.018 | 0.075 | 0.010 | -0.038 | -0.044 |
| | (0.077) | (0.051) | (0.089) | (0.070) | (0.141) | (0.077) |
| Less than 50,000 | -0.059 | -0.111 | -0.248*** | -0.156 | 0.043 | -0.115 |
| | (0.127) | (0.070) | (0.082) | (0.097) | (0.164) | (0.092) |
| Observations | 13,835 | | 7,195 | | 6,640 | |
| Censored | 7,814 | | 3,613 | | 4,201 | |

*Notes*: Each regression includes country x manufacturing sector dummies, year, industry and legal status dummies and a constant. Standard errors (in parentheses) are clustered at the country-year level. *** p<0.01, ** p<0.05, * p<0.1.

## Table 6: The relative importance of firm- and country-specific effects

| Dep. Var.: | *CONSTRAINED* | | *DISCOURAGED* | | *LOAN DENIAL* | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Observations | 16,200 | 16,200 | 16,200 | 16,200 | 6,958 | 6,958 |
| R-squared | 0.034 | 0.061 | 0.041 | 0.069 | 0.064 | 0.099 |
| Industry x year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | Yes | No | Yes | No | Yes |
| F-test (p-value) | | 0.000 | | 0.000 | | 0.000 |

*Notes*: For each dependent variable, two linear probability models have been estimated including the standard set of firm-level control variables (see Table 4, in addition there are industry x year dummies), with and without the country fixed effects. The bottom row reports the p-value of an F-test for the joint significance of the country dummies.

## Table 7: The role of credit market structure

| Dep. Var.: | *CONSTRAINED* | *DISCOURAGED* | *LOAN DENIAL* | *LOAN DEMAND* |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Agriculture (% GDP) | 0.663 | 1.380 | -0.468 | -3.859 |
| | (1.931) | (2.059) | (2.269) | (2.919) |
| GDP | 0.328*** | 0.341** | 0.116 | -0.597*** |
| | (0.115) | (0.147) | (0.215) | (0.208) |
| GDP growth | -0.016 | -0.038*** | -0.009 | 0.052** |
| | (0.016) | (0.012) | (0.027) | (0.026) |
| Rule of law | -0.327*** | -0.275*** | -0.136 | 0.285*** |
| | (0.069) | (0.079) | (0.095) | (0.087) |
| Credit Register | 0.188* | 0.196** | 0.028 | -0.062 |
| | (0.114) | (0.097) | (0.079) | (0.145) |
| Bank branches | -0.991*** | -0.690* | -0.654 | 0.848 |
| | (0.383) | (0.393) | (0.505) | (0.656) |
| Bank concentration | -0.377 | -0.534* | -0.059 | -0.291 |
| | (0.316) | (0.291) | (0.300) | (0.354) |
| Foreign banks | 0.133 | 0.136 | 0.130 | -0.372 |
| | (0.160) | (0.157) | (0.257) | (0.263) |
| Observations | 11,909 | 11,909 | 11,899 | 11,899 |

*Notes*: Each regression includes all firm-level characteristics as in the baseline (Table 4), year, sector and legal status dummies and a constant. Standard errors (in parentheses) are clustered at the country-year level. *** p<0.01, ** p<0.05, * p<0.1.

## Table 8: The differentiated effect of foreign banks on financing constraints

| Dep. Var.: | ***CONSTRAINED*** | | | ***DISCOURAGED*** | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Agriculture (% GDP) | 1.692 | -0.043 | 0.343 | 2.104 | 1.095 | 1.074 |
| | (2.274) | (2.231) | (2.109) | (2.168) | (2.239) | (2.162) |
| GDP | 0.286** | 0.270* | 0.287*** | 0.314** | 0.317* | 0.302** |
| | (0.114) | (0.144) | (0.093) | (0.154) | (0.172) | (0.136) |
| GDP growth | -0.021 | -0.006 | -0.008 | -0.042*** | -0.034*** | -0.031*** |
| | (0.013) | (0.012) | (0.013) | (0.010) | (0.010) | (0.009) |
| Rule of law | -0.266*** | -0.313*** | -0.322*** | -0.235** | -0.270*** | -0.270*** |
| | (0.080) | (0.076) | (0.060) | (0.104) | (0.099) | (0.088) |
| Credit Register | 0.451*** | 0.197 | 0.218 | 0.363*** | 0.199* | 0.223* |
| | (0.106) | (0.128) | (0.138) | (0.120) | (0.109) | (0.114) |
| Bank branches | -0.652** | 0.776 | -0.950*** | -0.459 | 0.014 | -0.652* |
| | (0.287) | (1.109) | (0.338) | (0.340) | (1.232) | (0.371) |
| Bank concentration | -0.579** | -0.391 | -1.499*** | -0.677** | -0.539* | -1.540*** |
| | (0.295) | (0.291) | (0.532) | (0.274) | (0.278) | (0.456) |
| Foreign banks | 0.493*** | 0.748* | -1.116** | 0.370** | 0.382 | -0.956* |
| | (0.169) | (0.420) | (0.473) | (0.172) | (0.424) | (0.519) |
| Foreign banks x Credit register | -0.683*** | | | -0.443* | | |
| | (0.238) | | | (0.230) | | |
| Foreign banks x Bank branches | | -3.942* | | | -1.572 | |
| | | (2.346) | | | (2.424) | |
| Foreign banks x Bank concentration | | | 2.239*** | | | 1.968** |
| | | | (0.724) | | | (0.781) |
| Observations | 11,909 | 11,909 | 11,909 | 11,909 | 11,909 | 11,909 |

| Dep. Var.: *LOAN* | ***DENIAL*** | ***DEMAND*** | ***DENIAL*** | ***DEMAND*** | ***DENIAL*** | ***DEMAND*** |
|---|---|---|---|---|---|---|
| | (7) | (8) | (9) | (10) | (11) | (12) |
| Agriculture (% GDP) | 1.280 | -6.909*** | -1.186 | -2.102 | -0.473 | -4.047 |
| | (2.773) | (2.145) | (1.816) | (3.680) | (2.479) | (3.381) |
| GDP | 0.136 | -0.493*** | 0.116 | -0.460* | 0.127 | -0.616** |
| | (0.172) | (0.132) | (0.160) | (0.244) | (0.239) | (0.264) |
| GDP growth | -0.024 | 0.066*** | 0.002 | 0.029 | -0.008 | 0.056* |
| | (0.025) | (0.017) | (0.016) | (0.027) | (0.032) | (0.031) |
| Rule of law | -0.103* | 0.122* | -0.167* | 0.260*** | -0.149 | 0.286*** |
| | (0.063) | (0.068) | (0.085) | (0.073) | (0.109) | (0.089) |
| Credit Register | 0.470** | -0.788*** | 0.047 | -0.077 | 0.062 | -0.042 |
| | (0.210) | (0.115) | (0.081) | (0.166) | (0.089) | (0.171) |
| Bank branches | -0.222 | -0.158 | 3.378 | -3.266 | -0.701 | 0.854 |
| | (0.614) | (0.369) | (2.753) | (2.252) | (0.568) | (0.571) |
| Bank concentration | -0.272 | 0.270 | -0.093 | -0.264 | -0.873 | -0.935 |
| | (0.243) | (0.207) | (0.261) | (0.385) | (0.551) | (0.711) |
| Foreign banks | 0.756* | -1.380*** | 1.614 | -1.818** | -0.836** | -1.113** |
| | (0.405) | (0.140) | (1.080) | (0.763) | (0.421) | (0.541) |
| Foreign banks x Credit register | -1.123* | 1.959*** | | | | |
| | (0.584) | (0.242) | | | | |
| Foreign banks x Bank branches | | | -8.993 | 9.199** | | |
| | | | (6.117) | (4.681) | | |
| Foreign banks x Bank concentration | | | | | 1.747** | 1.319 |
| | | | | | (0.753) | (0.915) |
| Observations | 11,899 | | 11,899 | | 11,899 | |

*Notes*: Each regression includes all firm-level characteristics as in the baseline (Table 4), year, sector and legal status dummies and a constant. Standard errors (in parentheses) are clustered at the country-year level. *** p<0.01, ** p<0.05, * p<0.1.

## Table A1: Regression sample

| Country - year | | Obs. | Country - year | | Obs. |
|---|---|---|---|---|---|
| Antigua & Barbuda - 2010 | | 128 | Guyana - 2010 | | 127 |
| Argentina | | 1,417 | Honduras | | 533 |
| | 2006 | 553 | | 2006 | 308 |
| | 2010 | 864 | | 2010 | 225 |
| Bahamas - 2010 | | 102 | Jamaica - 2010 | | 235 |
| Barbados - 2010 | | 121 | Mexico | | 2,135 |
| Belize - 2010 | | 144 | | 2006 | 885 |
| Bolivia | | 474 | | 2010 | 1,250 |
| | 2006 | 292 | Nicaragua | | 641 |
| | 2010 | 182 | | 2006 | 378 |
| Brazil - 2009 | | 1,043 | | 2010 | 263 |
| Chile | | 1,274 | Panama | | 340 |
| | 2006 | 519 | | 2006 | 171 |
| | 2010 | 755 | | 2010 | 169 |
| Colombia | | 1,309 | Paraguay | | 564 |
| | 2006 | 572 | | 2006 | 283 |
| | 2010 | 737 | | 2010 | 281 |
| Costa Rica - 2010 | | 384 | Peru | | 1,065 |
| Dominica - 2010 | | 140 | | 2006 | 314 |
| Dominican Republic - 2010 | | 304 | | 2010 | 751 |
| Ecuador | | 605 | St. Kitts & Nevis - 2010 | | 111 |
| | 2006 | 289 | St. Lucia - 2010 | | 139 |
| | 2010 | 316 | St. Vincent & Grenadines - 2010 | | 116 |
| El Salvador | | 760 | Suriname - 2010 | | 148 |
| | 2006 | 514 | Trinidad & Tobago - 2010 | | 280 |
| | 2010 | 246 | Uruguay | | 689 |
| Grenada - 2010 | | 113 | | 2006 | 263 |
| Guatemala | | 759 | | 2010 | 426 |
| | 2006 | 385 | | | |
| | 2010 | 374 | | | |

*Notes*: sample used in Table 4, column 1.