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***THE INFLUENCE OF FIXED ASSET INVESTMENTS AND
BANK PENETRATION ON ACCESS TO CAPITAL
FOR SMES IN LATIN AMERICA.***

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Applied Work presented to Escola de
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Fundação Getúlio Vargas as a requirement to
obtaining the Master Degree in Management
Research Field: Finance and Controlling.
Advisor: Victor Eduardo da Motta

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To everyone that helped me and special to my Advisor, for patience, understanding and support in this challenge. Thank you!

God, First of all!

I dedicate this work to all small-sized entrepreneurs in Latin America that, in the face of several challenges that hinder growth, still help the economy and generate jobs for many families.

ABSTRACT

Small and medium-sized enterprises (SMEs) need financing for their activities and operational growth through investments in fixed assets. Developing countries, like most Latin American countries cannot have sufficient banking penetration to meet the demand for financing for SMEs. The difficulties of obtaining access to financing for this type of company can be diverse, among them the need to guarantee, informality, various legal rules, and lack of access to financial institutions. Small businesses that have fixed assets can find easier to obtain loans because they can use these assets as guarantee, Land investment is one of the main forms of guarantee accepted by banks, as well as equipment. The objective was to examine the impact of fixed assets on the likelihood of SMEs accessing bank loans. We then separate the effects of fixed assets into land, including buildings and equipment, such as vehicles, machinery and other equipment. In addition, we investigate the impact of banking penetration on access to capital for SMEs that lack fixed assets investments. The results showed that the increase in banking penetration practically does not reflect more access to financing for SMEs that have fixed assets, different than expected and this can be explained by the fact that SMEs do not use new accesses to financing and use the credit history already obtained to obtain new loans.

RESUMO

Pequenas e médias empresas (PMEs) podem precisar de financiamento para suas atividades e crescimento operacional através de investimentos em ativos fixos. Países em desenvolvimento como a maioria dos países da América Latina podem não possuir uma penetração bancária suficiente para atender a demanda de financiamento para as PMEs. As dificuldades de obter acesso a financiamento para esse tipo de empresa podem ser diversas dentre elas se destacam a necessidade de garantia, a informalidade, as diversas regras jurídicas, e a falta de acesso a instituições financeiras. Pequenas Empresas que possuem ativos fixos podem ter uma maior facilidade em obter empréstimos, pois podem utilizar esses ativos como garantias, investimento imobiliário é uma das principais formas de garantias aceitas pelos bancos, assim como máquinas e equipamentos. O objetivo era avaliar se PMEs que possuem investimentos em ativos fixos tem maior facilidade de obter acesso ao crédito, desmembrando esses ativos em terrenos e equipamentos, que inclui máquinas, veículos e equipamentos, e principalmente se a inclusão financeira através da penetração bancária por meio do aumento do número de caixas eletrônicos e agências bancárias influenciam essas pequenas empresas que possuem ativos fixos a obter acesso a financiamento. Os resultados mostraram que o aumento da penetração bancária praticamente não reflete em maior acesso ao financiamento para PMEs que possuem ativo fixo, diferente do esperado e isso pode ser explicado pelo fato das PMEs não utilizarem novos acessos a financiamento e recorrerem ao histórico de crédito já obtidos para obter novos empréstimos.

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1 INTRODUCTION

The need for financing of small and medium-sized enterprises (SMEs) to carry out their working capital and fixed asset related activities may depend on the development of financial markets. An enterprise is defined as SMEs by the number of employees and it is the most frequent characteristic used to defined SMEs at the national governments and statistical agencies. (Ardic, Mylenko, & Saltane, 2011). SMEs play an important role in the recovery of the global economy, and access to financing is the key to development of these companies (Ayyagari, Beck, & Demirguc-Kunt, 2007). SMEs develop an important role in job creation. However, SMEs need financing to carry out their necessity of investing in fixed asset to improve their activities, and the difficulty in accessing is a barrier that hinders SMEs from expanding their operations (The World Bank, 2014). Therefore, financial institutions play a key role in providing credit to foster firm growth, especially small and medium-sized enterprises. However, there are several factors that may influence access to bank loans. For instance, on one hand, SMEs may not always have reliable financial information to signal quality to financial institutions. On the other hand, banks may find difficult to assess SME risk due to the higher presence of soft financial information. (OECD, 2010).

A possible reason for the limited availability of access to capital may be the presence of information asymmetries between borrowers and lenders that lead to credit rationing (Stiglitz & Weiss, 1981). Asymmetric information poses the challenge of adverse selection, as banking financial institutions may not have the adequate tools to assess both the skills of SME owners applying for finance and the quality of their projects. To offset the magnitude of information asymmetry between financial institutions and SMEs, the availability of lending technologies, or loan contract mechanisms that minimize information asymmetry (Berger & Udell, 2006), may signal banks higher-quality projects, risk profile, and provide an incentive for SMEs to perform according to contractual stipulations (Bester, 1987). As a result, firms with access to fixed asset investments may be in a better position to obtain access to external financing (Islam, Muzi, & Rodriguez Meza, 2017). For firms that lack adequate access to fixed asset investments, however, higher levels of financial inclusion through bank penetration, measured by the number of branch or ATMs per inhabitant or squared kilometer, may mitigate credit constraints and facilitate greater access to capital (Berger and Udell, 2006).

The purpose of this article was to investigate the impact of fixed asset investments on access to capital for SMEs in Latin America. In addition, we examined the role of financial inclusion, through bank penetration, in mitigating SME constraints. We anticipated that SMEs that invest in fixed assets and apply for a bank loan will be more likely to obtain access to capital in countries from Latin America with higher bank penetration. The contributions of this study are twofold. First, we show that financial inclusion, through higher levels of bank penetration, may mitigate credit constraints for SMEs that lack adequate access to fixed asset investments. A second contribution relates to the understanding of the impact of fixed asset investments on access to capital for SMEs in Latin America. This is an understudied area in the region due to the lack of both quality and consistency in the availability of data.

This paper proceeds as follows. The second section reviews the issue of access to financing for SMEs in developing economies from Latin American and the influence of bank penetration in financing to small and medium-size enterprises. The third section describe the methodology, the fourth section presents results, the fifth section discusses the results and the sixth section concludes the article.

2 LITERATURE REVIEW

We separate this section in two parts. In the first part, we review the literature on the issue of access to financing for small and medium-sized enterprises. In the second part, we further describe the issue of bank penetration, taking into account its influence on SME finance.

2.1 Access to financing for SMEs

A study by the International Finance Corporation (2011) estimated the number of SMEs in the world and determined the degree of access to credit and use of accounts for deposits by SMEs. Based on information from the World Bank this study shows that there are around 36 to 44 million SMEs in the world. About 65-70% of these are in the developing economy. About 35% to 45% are not served by banks and 20% to 25% are underserved. This study showed that there is a GAP in credit for financing SMEs in developing countries of about \$ 1.1 trillion (IFC, 2011). These data show the size of the market for SMEs that will need credit to financing their activities and how much financial inclusion will achieve to facilitating access to financing for small and medium sized enterprises.

SMEs have sought to acquire credit in order to finance their operations. The growth of SMEs is impeded by limited access to credit. A survey by The World Bank showed that some SMEs have restricted access to financing and often resort or opt by informal lending, hindering growth and performance (Chavis, Klapper, & Love, 2011). The greatest difficulty in having access to finance occurs in less developed economies like countries from Latin America.

SMEs mostly cannot access formal financial services as these enterprises face several barriers to get access to financing from formal financial institution. Barriers like insufficient legal documentation, cost, and distance from bank hamper SME access to financing (Bruhn & Love, 2014). A study by the World Bank Global Index (2012) investigated that in developing countries, the problem of lack of adequate access to capital for SMEs harmed their businesses development (Allen, F. Demirgüç-Kunt, A. Klapper, L. Soledad, Martinez-Peria, 2012). This situation can be solved by facilitating access for SMEs to formal financial institution. Providing technology, widening financial access through bank branches in in development countries, education about financial institutions and greater availability of financial products and services

may reduce the issue of access to credit (Allen, F. Demirgüç-Kunt, A. Klapper, L. Soledad, Martinez-Peria, 2012).

Both access and cost of financing are ranked as one of most resources that constraint SME development (Beck, 2007). For instance, the cost of financing is rated by over 35% of small and medium enterprises as a major growth constraint in the developing world, and the access to financing is rated as a major obstacle by 30% of SMEs. This kind of companies report higher financing obstacles. The probability that the small firms list financing as a major obstacles is 39% compared to 32% for large firms, and that difficult have almost twice the effect on their growth that large firms' financing obstacles do (Beck, 2007). The main financial obstacles faced by SMEs to obtains financing credit are collateral requirements, bank paperwork, interest rate payments, the need for special connections and banks' lack of lending resources (Beck, 2007).

The greatest funding difficulties related by SMEs compared to large firms are reflected in financing patterns. SMEs finance less than 10% of their need for long-term financing to invest mainly in fixed assets with bank-financing. Large companies finance more than 20%. Small businesses often finance their need for long-term financing with informal financing or internal resources, such as through retained earnings (Beck & Maksimovic, 2002). The lack of access to specific forms of financing like export, leasing and long-term finance is a generated fact to difficult the growth.

Access to financing to SMEs, depends on the infrastructure that supports financial transactions, including the legal system, cost and the system of information. Companies in countries with higher levels of financial development have less financing obstacles than companies in countries with less developed financial institutions (Beck & Demirguc-Kunt, 2006; Bruhn & Love, 2014). In addition, SMEs suffer more from lack of financial development than large firms. Financial developments help close the gap of development between large and small companies (Beck & Demirguc-Kunt, 2006; Bruhn & Love, 2014).

The difficulty of access to financing described in the previous paragraphs can influence the development of SMEs. The lack of short- or long-term credit, and especially long-term loans to finance fixed assets and enable these companies to develop, make SMEs grow at a lesser rate than large companies. One of the factors that can influence the financing to SMEs is the lack of access to financial services, in many cases SMEs doesn't have accesses to banks or financial institutions. The difficulty of access to finance for SMEs influences the development of small enterprises, the increase of financial inclusion through bank penetration impacts the difficulty

of access to financing. Developing the financial inclusion of SMEs by increasing bank penetration may facilitate greater access to credit for small enterprises enabling further development.

Among the relevant factors for lending to SMEs in developing countries such as Latin America, bank credit history is the second most important 16% (Beck, Demirgüç-kunt, & Martinez, 2008). The financial institutions that provide credit to SMEs, three-quarters of them require guarantees to make commercial loans. About 40% of financial institutions classify Land guarantees as the most often accepted for lending, independently of company size. Cash and other assets are the second most important guarantees. In developing countries such as Latin America, banks classify fixed asset like Land and equipment as an important type of guarantee for lending (Beck et al., 2008).

According to the Department for Business Innovation & Skills (BIS 2012), there was an increase in the use of financing by SMEs using fixed assets as a guarantee. Increase of lending is positioned as one of the riskiest lenders for financial institutions and is generally guaranteed by SMEs seeking growth through the invest in fixed assets. Many SMEs with adequate growth characteristics may be unable to obtain the necessary loan to develop (Schans et al., 2012).

SMEs are strong generators of employment of different income groups and have higher sales growth than large companies in the developing economies of Latin America (Ayyagari, Demirguc-Kunt, & Maksimovic, 2014). SMEs are responsible for generating between 40% and 60% of jobs, contributing between 30% and 50% of gross domestic product (GPD) growth relative to Latin America's economic production (World Bank, 2015). Access to credit by SMEs in Latin America faces more difficult than other regions. For example, bank concentration, regions with less banking concentration facilitates lending to small firms (Berger, Goulding, & Rice, 2014; Clarke, Cull, Martinez Peria, & Sanchez, 2005). Another example is the development of legal institutions (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2008) and rigid labor laws that difficult SMEs to develop in Latin American (Djankov & Ramalho, 2009). The difficulty of access financing by SMEs in Latin America restricts the growth of these small enterprises, and consequently hampering the growth of the economy in these developing countries.

2.2 Financial inclusion to SMEs through bank penetration

Banks and other financial institutions help on economic growth, poverty alleviation, income distribution and economic stability. The Financial inclusion through bank penetration can make financial services accessible to SMEs and influence the development of this kind of enterprises increasing access to credit. Banks are attracted to the SME segment due to its perceived high profitability and good prospects, banks are interested in SMEs in search of higher margins than in other segments (Beck et al., 2008).

Financial inclusion can be defined as both access and use of formal financial services. Financial inclusion can be summarized in three dimensions: access, use and quality of financial services (Allen, F. Demirgüç-Kunt, A. Klapper, L. Soledad, Martinez-Peria, 2012). Developing countries tend to have a large share of their SMEs without access to financial services for several reasons, including limited bank branches and ATMs, and relatively high costs (Morgan & Pontines, 2014). Many times, SMEs use the financial services only to movement their financial resources and not to development of their business through financing. Financial inclusion is when SMEs start using the bank as a tool to develop their business. Banks help SMEs to organize themselves financially, to obtain credit, to develop their businesses and to facilitate the movement of their resources.

The literature shows that there are some indicators to measure the evolution of financial inclusion. For example, the number of bank accounts (per 1000 adults), number of bank branches (per million people), number of ATMs (per million people), penetration of geographical agencies, loan accounts and per capita deposits are other indicators to measure financial inclusion (Allen, F. Demirgüç-Kunt, A. Klapper, L. Soledad, Martinez-Peria, 2012; Beck, Demirgüç-kunt, & Martinez Peria, 2007). A recent research of the International Finance Corporation (2017) estimated that small and medium-sized enterprises in emerging countries have a funding shortfall of \$ 2 trillion. This difficulty of access to financing has an impact on the development of these SMEs and consequently on the development of emerging countries. The survey estimates that 70% of SMEs in developing economies do not have access to financial services. Financial inclusion through increased bank penetration can reduce this deficit for SMEs (World Bank Group, 2017). Access to financial services is one kind of financial inclusion. Bank Penetration can be a way to both access financial services reduce the distance between development of SMEs and banks.

Bank penetration is one indicator of the evolution on the banking industry in the expansion of its services. Increasing the channels of attendance to enable more access to finance services helps small enterprises to get more credit to develop their activities. Bank penetration can increase the volume of financing available to SMEs, improve quality of financial services viability and reduce costs through competition between banks (Dages, Goldberg, & Kinney, 2000).

A study by the Central Bank of Kenya with data from The World Bank (2015) revealed that increased of access to financial system reflected the increased of volume of financing for SMEs. The study showed that growth in bank penetration reflected the increase in the volume of financing provided by these banks and that these financing were mostly intended for SMEs. Banks increase banking penetration through a larger network of banking agencies and more financial services channels to reach a customer base. Increasing financial access for SMEs can improve banks' knowledge of SMEs and encourage banks to innovate and make decisions more effectively and increase the volume of financing for SMEs (FS Deepening, 2015).

The impossibility of access to financial services is one obstacle to the growth of SMEs, international surveys show that small enterprises are more limited by credit than other segments of the economy. Bank penetration creates financing access for SMEs by providing financial conditions for the development of these companies. Facilitating access to credit through a greater volume of access channels to financial services (Bataa, 2008).

3 METHODOLOGY

The methodology of this paper is designed to test the impact of fixed assets on access to capital as well as to understand the role of financial inclusion through bank penetration in mitigating the constraints of SMEs that lack access to loans. The study used an enterprise survey in a firm-level of a representative sample of an economy's private sector collated in 2010 by The World Bank. The 2010 World Bank Enterprise Survey (WBES) includes business environment topics access to finance, corruption, infrastructure, crime, competition, and performance measures in 15 countries in Latin America: Brazil, Ecuador, Honduras, Argentina, Chile, Bolivia, Colombia, El Salvador, Mexico, Guatemala, Paraguay, Nicaragua, Uruguay, Venezuela and Peru. Other countries in Latin America that did not have enough observation of SMEs were left out of the study. The surveys have been conducted since the 1990's by different units within the World Bank. The raw individual country datasets, aggregated datasets (across countries and years), panel datasets, and all relevant survey documentation are publicly available. All surveys have country-specific questions and the aggregated dataset across countries does not include these country-specific questions.

The survey is conducted by private contractors on behalf of the World Bank. The confidentiality of the survey respondents and the sensitive information they provide is necessary to ensure the greatest degree of survey participation, integrity and confidence in the quality of the data. The Survey is answered by business owners and top managers. Typically 1200-1800 interviews are conducted in larger economies, 360 interviews are conducted in medium-sized economies, and for smaller economies, 150 interviews take place.

The manufacturing and services sectors are the primary business sectors of interest. Formal (registered) companies with 5 or more employees are targeted for interview. Firms with 100% government/state ownership are not eligible to participate in an Enterprise Survey.

The strata for Enterprise Surveys are firm size, business sector, and geographic region within a country. Firm size levels are 5-19 (small), 20-99 (medium), and 100+ employees (large-sized firms). Since in most economies, the majority of firms are small and medium-sized, Enterprise Surveys oversample large firms since larger firms tend to be engines of job creation. Sector breakdown is usually manufacturing, retail, and other services.

This study used data about access to finance by 7311 SMEs in Latin America that applied loan banking and received the loan versus SMEs that applied loan banking and not

received the loan from the 2010 Word Bank Enterprise Survey. Due to the dependent variable of obtaining or not the bank loan be represented in binary form, we used logistic regression at statistical analysis of data to specify the probability of these small business received the loan. If the SME received the loan it assumes the value of 1 and if it does not receive it assumes the value of 0, respecting the binary response where the coefficient is used as exponent in calculation of probability, defined as the probability that an event occur divided by the probability that it does not occur. In the logit model, the coefficient is used as the exponent in calculation of odds ratio (Wooldridge, 2002). The Logit link function normally is given as follows:

$$\ln \left[\frac{p(y_i^*)}{1 - p(y_i^*)} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i$$

3.1 Dependent variable (Financial necessity)

This paper used as dependent variable the *bank loan* as a binary variable. We compare when the SMEs have fixed asset and applied a loan, If the companies obtained bank loan we coded the variable as 1, and if the SMEs applied a loan and did not obtained a bank loan we coded the variable as 0.

3.2 Independent variable (Use of credit)

This paper used as independent binary variable whether SMEs invested in fixed asset new or used such as machinery, vehicles, equipment, land or buildings, including expansion and renovations of existing structures (coded as 1) or not (coded as 0). For this paper we used the investments in fixed asset and additionally, we decomposed into continuous log-transformed variables Land and Equipment, to take into account the total value of different categories of fixed assets: Land and buildings are the first category, while equipment, machinery and vehicles are grouped together in the second category.

3.3 Control variable (SMEs Characteristics)

This paper utilizes several control variables that define some characteristics of SMEs, like firm size and age in terms of employee number and year respectively, ownership, business segment, location, experience and kind of owner (Nichter and Goldmark, 2009).

The variable *Firm Size* that we used was data on logarithmic basis, this variable was measure with the number of employees and this data is not a normal data, so we converted this data to logarithmic to transforms in a normal data. The variable *Firm Age* we used data on logarithmic basis too, in the same situation as the firm size. The variable *Service* are binary data where considered if the firm is services segment (code as 1) or not (code as 0). *Ownership* is the variable that define if the SMEs have one or more owner and this is a binary data. *City* is the binary variable that consider if have until 250.000 inhabitants (code as 1), or more (code as 0), where are SMEs. Another binary variable is the *Women owned SME*, if the owner is a woman (code as 1) or not (code as 0). The *Experience* is a continuous variable that considered the years of experience of SMEs.

3.4 Country-level Bank Penetration Variables

This study controlled for variables at the country level with test of bank penetration through the influence increase of number of ATMS per 10.000 square kilometers - *ATMs(Km)*, increase of number of ATMs per 100.000 habitants - *ATMs(pop)*, increase of number of Bank Branch per square 10.000 square kilometers - *Branch(Km)* and increase of number of Bank Branch per 100.000 inhabitants - *Branch(pop)*. The reference data of the number of ATMs per square kilometers and per habitant as well as the bank branch number were taken from the Financial Access Survey (FAS) survey issued by the International Monetary Fund (IMF) in 2010.

4 RESULTS

Table 1 shows the logit model in the obtaining bank loan by SMEs that have fixed assets and applied a bank loan with the increment of bank penetration. The presented statistical results showed that SMEs that have fixed asset investments are on average 2.26 times more likely to obtain a loan from a formal financial institution. Table 1 shows additionally the influence of controls variables at the SMEs to obtaining bank loan. The statistical analyses demonstrated that firm size, SME location and experience have a positive influence on SMEs to obtain a bank loan. Companies with more employees are 1.4 times more chance to obtain bank loan. These results are statistically significant at the 1% level. SMEs located in cities with more than 250.000 inhabitants are 1.4 times more likely to obtain bank loan at the 1% level. SMEs with more experience have more influence to obtain access to capital in average 1 times, with low statistical relevance. This analysis showed that firm age and firms in the service sector, as a kind of SMEs are less likely to obtain access to capital. Sole proprietors are also less likely to obtain bank loans. These results are statistically significant. Although women-owned SMEs are more likely to obtain access to financing through formal institutions, the results are not statistically significant. This table shows too the four bank penetration variables used to measure the influence on bank penetration in SMEs that invest in Fixed Assets. ATM per square kilometers, ATMs per 10.000 inhabitants, Bank Branch per square kilometers and Bank Branch per 100.000 inhabitants, all these with significant statistical relevance for the independent variable and for most of the control variables.

Table 2 shows the interaction effects between fixed asset investments and bank penetration on access to financing. This table was created to analyze the influence of banking penetration to obtain access to capital by SMEs that have Fixed Asset and applied a bank loan. The results showed that, different from expected, the increase of number of ATM and Bank Branch per square kilometers do not have statistical relevance to obtain a bank loan by SMEs that have Fixed Asset and applied a bank loan. The results of table 2 showed additionally, differently from what we expected, that the increase of number of ATMs per 10.000 inhabitants influence negatively to obtain bank loan by SMEs that have Fixed Asset and applied a bank loan in 0,99 times with low statistical relevance. The increase of variable of number of Banc Branch per 100.000 inhabitants have a negative low statistical relevance to influence of SMEs that have a Fixed Asset to obtain a bank loan in 0,98 times.

Table 3 showed the decomposed of fixed assets on land variable to take into account value of different categories of fixed asset, and the result was that the SMEs that invest in Land and applied a bank loan are more likely to obtain access to capital, with marginal statistical significance. The analyses of bank penetration to influence the obtaining access to capital by SMEs that invest in land showed that the increase of number of ATMs per square kilometers and ATMs per 10.000 inhabitants, different from expected, do not have statistical relevance to influence obtain a bank loan by SMEs. The results of table 3 showed additionally that increment of number of Bank Branch per square kilometers and per 100.000 inhabitants has a small influence on SMEs that own land as their fixed asset and applied for a bank loan to obtain access to loan with strong statistical relevance.

Table 4 showed the decomposed of fixed assets on equipment that include equipment, machinery and vehicles to take into account value of different categories of fixed asset, and the result was that the SMEs that invest in Equipment and applied a bank loan have in average 1,15 times more chance to obtain a loan with robust statistical significance. The bank penetration through increase of number of ATMs per square kilometers, ATMs per 10.000 inhabitants and increase of Bank Branch per square kilometers, different from expected, does not have statistical relevance to influence obtain a bank loan by SMEs that have equipment in their fixed assets and applied a bank loan. The increase of Bank Branch per 100.000 inhabitants is the only variable that have a small influence of access to capital by SMEs that have equipment and applied a bank loan with strong statistical significance.

5 DISCUSSION

This paper examined the increased access to financing for SMEs in Latin America that need capital for use in fixed assets through increase bank penetration. The analyzed forms of increase bank penetration were number of ATMs per square kilometer, number of ATMs per 10,000 inhabitants, number of Bank Branch per square kilometer and number of Bank Branch per 100,000 inhabitants. Additionally, to take into account the total value of different categories of fixed assets, this paper investigated the increase in access to financing for SMEs in Latin America that have land as their fixed assets. Another part was to analyze the SMEs that invest in equipment, included equipment, vehicle and machine, that apply a bank loan and if obtain access to capital and if the increase at banking penetration influenced the obtain loan for this SMEs that apply a bank loan.

The results showed that the SMEs that invest in fixed assets and apply a bank loan have in average 2.26 more chance to obtain a loan with a significant statistical relevance, as expected. This result can be the fact of fixed assets can be used like a guarantee of payment of the loan (Beck et al., 2008). Firm size is one variable that can influence the SMEs to obtain a loan with significant statistical relevance and is the same situation of city size where the SMEs is located, and Experience of SMEs. These results can be explained by the guarantee that these variables can be represent. Firm size can influence financial institutions to allow more access to capital by SMES. The size of the city can influence to SMEs to obtain a loan due to greater accessibility to the financial system in a large city, and experience can be explained because of the more facility to SMEs of process the loan.

We also found that other control variables influence negatively SMEs to obtain a bank loan. For instance, firm age is has a negative relationship with the probability of SMES to have bank loans. The results are statistically significant at the 1% level. We expected that the greater the age, the easier it would be to obtain a loan, but the results showed the opposite, one possible explanation for this opposite result is that older firms tend to face higher negative cash flow stages and how long they can still cope with this situation before they moving back to the expansion, and so SMEs financing is concentrated in start-up and growth stage (Le, 2012). Service is the other variable that influence negatively to obtain a loan and it were expected because normally this kind of SMEs do not have fixed assets as a guarantee. Ownership showed influence negatively the SMEs to obtain access to finance, this result can be the fact of SMEs that have only one owner and can be increase the risk for default (Schans et al., 2012). The

results of women-owned SME do not have significant statistical relevance to influence the SMEs to obtain a bank loan.

The results of interaction between increase of bank penetration and SMEs that have fixed asset investments showed that increases in both the number of ATMs per square kilometers and the number of bank branch per square kilometers does not have significant statistical relevance to influence the obtaining a loan by SMEs. The increase of number of ATMs and bank branch per inhabitants have a little negatively influence with low statistical relevance at access to financing by SMEs that apply a loan, different than expected. A viable explanation for this results can be the possibility that SMEs that invest in fixed assets do not use the new financial institutions to obtain a loan, although of banking penetration, the historical of credit with bank is relevant for banks to lend (Beck et al., 2008).

The analysis specific of SMEs that invest in Land in their fixed assets showed that this kind of companies have more chance to obtain loan, in average 1,05 times, as expected, Land is an important form of guarantee. And the results of interaction with the banking penetration showed that the increase of ATMs per square kilometers and per habitants do not have a significant statistical relevance to SMEs whit this kind of fixed assets to obtain a loan. The increase of number of bank branch have significant statistical relevance but do not have significant influence of increase of obtain a loan by this SMEs, the results showed that the increase of bank penetration to SMEs that invest in Land do not influence to obtain a loan, different than expected. A viable explanation for these results can be the possibility that SMEs that invest in land in their fixed assets do not considered new ATMs or bank branch as form to obtain a loan and used the current financial institutions to obtain a loan, using a historical credit with bank, that is a relevant factor for the release of credit in developing countries (Dennis, 2008).

The results of analysis of SMEs that invest in equipment, such as vehicles, machine and other equipment, showed that this SMEs have more chance to obtain loan, in average 1,11 times at 1% level, as expected in the literature. The results of interaction of banking penetration with SMEs that invest in equipment showed that the increase of ATMs and bank branch per square kilometers and ATMs per inhabitants do not have a significant statistical relevance to this kind of SMEs when applied a loan. The increase of number of Bank Branch per inhabitants have small influence of obtain a loan by SMEs that invest in equipment, in average 1.01 times at 1% level. A possible explanation for this result is the bank penetration do not influence SMEs to obtain a loan because this kind of SMEs cannot tried to obtain access to credit through new

finance institutions generated by the increase of ATMs and Bank Branches, , and use the current bank and credit history to make easier to get a loan (Dennis, 2008).

The results of applying the methodology in the research by the World Bank showed that SMEs that invest in fixed assets and apply a bank loan have more chance to obtain a loan as expected, and a possible explanation is that fixed assets are a normal guarantee to financial loans. The second result found different than expected, the increase of bank penetration does not influence the SMEs that invest in fixed assets to obtain a loan, including when we separated only invest in land or equipment, a possible explanation is that SMEs that invest in fixed assets do not seeks for a new options of finance institutions created by bank penetration, and possible this SMEs used the historical credit with bank to obtain a loan (Beck et al., 2008), different from the anticipated results.

The results also present an unexpected variation for the Firm Age control variable, studies show that older SMEs generate more jobs than younger (Aga, Francis, & Rodriguez-Meza, 2015), it was expected that older companies have more access to bank loan too, however the statistical analysis showed that this relation is the opposite, the higher the age the less the chance of obtain bank loan for SMEs.

5.1 Limitations and future research

This paper was based on the 2010 Word Bank Enterprise Survey, a data set that was 8 years old and could be interpreted as outdated and could distort the presented results. In addition, it is possible that the political and economic situations of the 15 analyzed countries from Latin America may have changed in the last few years, reflecting potential modifications in the results we found using the 2010 data. The other important aspect is that this work made a specific analysis of SMEs that have fixed assets demonstrating that bank penetration does not influence the access to credit for this type of company. However, the result suggests a complementary analysis to understand if the increase of bank penetration influence the other SMEs that do not have fixed assets, such as service companies for example. If the bank penetration can influence SMEs in the service segment or SMEs that do not have fixed assets as a guarantee to obtain a bank loan. Future studies can complement what drives the Firm Age reduce the chance of obtain credit for SMEs according to results found, like a large period of negative cash flow, stagnation and lack of growth.

6 CONCLUSION

Drawing from the difficulties of financing faced by SMEs in Latin America, due to the various restrictions such as excessive bureaucracy, lack of asymmetric information and needs for guarantees, the objective of this study was to identify if companies with fixed assets have more access to credit and if the increase of financial inclusion through bank penetration with the increase of ATMs and Bank Branch influence the access to credit for these small companies.

The results of this paper make us conclude that SMEs from Latin American that have fixed assets have more access to bank loans, including analyzing separately that SMEs that invest in Land, one of the most important form of guarantees for bank loans, and those that invest in equipment, which is often used as a guarantee in developing countries, also have more access to credit. On the other hand, the increase in bank penetration, does not influence the access to credit for SMEs that have fixed assets, different from that expected in the objective of this paper. A possible explanation for this contradiction is the fact that SMEs use historical credit to obtain access to banking loan (Beck et al., 2008) and therefore, small companies that use banking loans, can resort to financial institutions where they already have a relationship and not use the new accesses created by banking penetration.

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8 TABLES

Table 1: The Impact of Fixed Assets on Access to Capital

	Base Model	ATMs(km)	ATMs(pop)	Branch(km)	Branch(pop)
Fixed Asset	0.817*** (0.0526)	0.809*** (0.0527)	0.816*** (0.0528)	0.789*** (0.0530)	0.811*** (0.0528)
Firm Size	0.349*** (0.0275)	0.351*** (0.0275)	0.349*** (0.0275)	0.358*** (0.0277)	0.350*** (0.0275)
Firm Age	-0.0766*** (0.0289)	-0.0790*** (0.0290)	-0.0765*** (0.0290)	-0.0789*** (0.0290)	-0.0774*** (0.0290)
Service	-0.204*** (0.0532)	-0.207*** (0.0533)	-0.201*** (0.0546)	-0.194*** (0.0533)	-0.211*** (0.0535)
Ownership	-0.180** (0.0709)	-0.173** (0.0709)	-0.178** (0.0712)	-0.145** (0.0713)	-0.182** (0.0708)
City	0.364*** (0.0792)	0.361*** (0.0801)	0.364*** (0.0792)	0.395*** (0.0804)	0.376*** (0.0799)
Women- owned SME	0.0514 (0.0520)	0.0601 (0.0520)	0.0499 (0.0523)	0.0569 (0.0521)	0.0539 (0.0520)
Experience	0.00543** (0.00212)	0.00512** (0.00212)	0.00544** (0.00212)	0.00506** (0.00212)	0.00540** (0.00212)
ATMs(km)		-0.00833*** (0.00263)			
ATMs(pop)			0.000269 (0.000878)		
Branch(km)				-0.0201*** (0.00381)	
Branch(pop)					-0.00313 (0.00274)
<i>N</i>	7311	7311	7311	7311	7311
chi2	605.6	611.8	605.9	622.9	606.3

* p<0.10, ** p<0.05, *** p<0.01

Dependent variable: Bank Loan

Marginal effects as coefficients

Robust standard errors in parentheses

Table 2: Interaction effects between fixed assets and bank penetration on access to capital

	ATMs(km)	ATMs(pop)	Branch(km)	Branch(pop)
Fixed Assets	0.706*** (0.0859)	0.992*** (0.0972)	0.748*** (0.0692)	1.001*** (0.110)
Firm Size	0.351*** (0.0275)	0.349*** (0.0275)	0.358*** (0.0277)	0.349*** (0.0275)
Firm Age	-0.0789*** (0.0290)	-0.0758*** (0.0290)	-0.0791*** (0.0290)	-0.0764*** (0.0290)
Service	-0.208*** (0.0533)	-0.198*** (0.0548)	-0.195*** (0.0533)	-0.213*** (0.0535)
Ownership	-0.172** (0.0709)	-0.168** (0.0715)	-0.143** (0.0713)	-0.182** (0.0709)
City	0.356*** (0.0800)	0.359*** (0.0793)	0.392*** (0.0804)	0.376*** (0.0802)
Women-owned SME	0.0570 (0.0521)	0.0542 (0.0523)	0.0568 (0.0521)	0.0545 (0.0520)
Experience	0.00505** (0.00212)	0.00535** (0.00212)	0.00501** (0.00212)	0.00543** (0.00212)
ATMs(km)	-0.0135*** (0.00465)			
Asset*ATM(km)	0.00848 (0.00567)			
ATMs(pop)		0.00287* (0.00149)		
Asset*ATM(pop)		-0.00386** (0.00179)		
Branch(km)			-0.0242*** (0.00585)	
Asset*Branch(km)			0.00703 (0.00769)	
Branch(pop)				0.00283 (0.00413)
Asset*Branch(pop)				-0.0107** (0.00539)
N	7311	7311	7311	7311
chi2	605.9	606.3	619.9	608.7

* p<0.10, ** p<0.05, *** p<0.01

Dependent variable: Bank Loan

Marginal effects as coefficients

Robust standard errors in parentheses

Table 3: Interaction effects between fixed assets and bank penetration on access to capital

	Base Model	ATMs(km)	ATMs(pop)	Branch(km)	Branch(pop)
Land	0.0507*** (0.0118)	0.0317 (0.0208)	0.0401* (0.0228)	0.0188 (0.0169)	-0.0880*** (0.0263)
Firm Size	0.341*** (0.0396)	0.338*** (0.0400)	0.340*** (0.0399)	0.354*** (0.0402)	0.355*** (0.0405)
Firm Age	-0.173*** (0.0483)	-0.173*** (0.0483)	-0.174*** (0.0484)	-0.167*** (0.0483)	-0.157*** (0.0486)
Service	-0.233*** (0.0798)	-0.218*** (0.0809)	-0.230*** (0.0815)	-0.176** (0.0812)	-0.236*** (0.0817)
Ownership	-0.0308 (0.116)	-0.0359 (0.116)	-0.0365 (0.116)	0.0338 (0.117)	0.0231 (0.117)
City	0.471*** (0.109)	0.449*** (0.111)	0.466*** (0.109)	0.474*** (0.112)	0.442*** (0.112)
Women-owned SME	-0.129* (0.0763)	-0.126* (0.0766)	-0.126 (0.0774)	-0.135* (0.0766)	-0.0725 (0.0775)
Experience	0.000524 (0.00328)	0.000410 (0.00328)	0.000428 (0.00328)	0.000249 (0.00328)	-0.000501 (0.00332)
ATMs(km)		-0.0214 (0.0195)			
Land*ATM (km)		0.00184 (0.00171)			
ATMs(pop)			-0.00261 (0.00492)		
Land*ATM (pop)			0.000227 (0.000411)		
Branch(km)				-0.102*** (0.0289)	
Land*Branch(km)				0.00624*** (0.00220)	
Branch(pop)					-0.157*** (0.0205)
Land*Branch(pop)					0.00899*** (0.00131)
N	3091	3091	3091	3091	3091
chi2	141.1	141.1	141.2	151.3	188.3

* p<0.10, ** p<0.05, *** p<0.01

Dependent variable: Bank Loan

Marginal effects as coefficients

Robust standard errors in parentheses

Table 4: Interaction effects between fixed asset value (machinery, vehicles and equipment) and bank penetration on access to capital

	Base Model	ATMs(km)	ATMs(pop)	Branch(km)	Branch(pop)
Equipment	0.109*** (0.0230)	0.146*** (0.0348)	0.0952** (0.0423)	0.106*** (0.0330)	-0.0472 (0.0493)
Firm Size	0.278*** (0.0630)	0.283*** (0.0627)	0.277*** (0.0637)	0.278*** (0.0630)	0.298*** (0.0636)
Firm Age	0.0231 (0.0803)	0.0260 (0.0816)	0.0231 (0.0803)	0.0237 (0.0803)	0.0300 (0.0802)
Service	-0.0510 (0.131)	-0.0817 (0.133)	-0.0398 (0.135)	-0.0476 (0.133)	-0.0355 (0.134)
Ownership	-0.369** (0.171)	-0.347** (0.171)	-0.372** (0.171)	-0.370** (0.171)	-0.392** (0.171)
City	0.324* (0.178)	0.365** (0.181)	0.315* (0.179)	0.318* (0.182)	0.292 (0.179)
Women-owned SME	-0.0443 (0.127)	-0.0523 (0.127)	-0.0414 (0.128)	-0.0446 (0.127)	-0.0200 (0.128)
Experience	0.00138 (0.00572)	0.00157 (0.00574)	0.00126 (0.00572)	0.00136 (0.00572)	-0.000263 (0.00573)
ATMs(km)		0.0397 (0.0281)			
Equip*ATM (km)		-0.00295 (0.00242)			
ATMs(pop)			-0.00408 (0.0105)		
Equip*ATM (pop)			0.000371 (0.000863)		
Branch(km)				-0.00747 (0.0534)	
Equipm*Branch(km)				0.000615 (0.00401)	
Branch(pop)					-0.163*** (0.0435)
Equip*Branch(pop)					0.00978*** (0.00271)
N	1140	1140	1140	1140	1140
chi2	76.73	76.92	76.54	77.29	82.96

* p<0.10, ** p<0.05, *** p<0.01

Dependent variable: Bank Loan

Marginal effects as coefficients

Robust standard errors in parentheses