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ACCESO AL FINANCIAMIENTO DE PYMES EN ARGENTINA
Pasquini, Ricardo y De Giovanni, Martín
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RESUMEN

En esta investigación, examinamos a las PYMES en Argentina con el objeto de medir aquellas que se encuentran restringidas al crédito. Estimamos un modelo de los determinantes de rechazo de crédito tomando en cuenta aquellas firmas autoexcluidas. Encontramos que el 7% de las PYMES que solicitan un crédito bancario es rechazado; y que adicionalmente, casi el 37% se autoexcluyen del mercado de crédito bancario, a pesar de requerir financiamiento externo y poseer proyectos de inversión rentables. El tamaño de la firma, bajos niveles de endeudamiento y la condición de exportador, aumentan la probabilidad de aprobación del crédito. Sorprendentemente, no encontramos un rol para otros estados financieros, tomando en cuenta variables como el colateral o flujo de caja, en la decisión por parte del banco. Además, las variables basadas en la hoja de balance no explican la autoexclusión del mercado. Esta se encuentra fuertemente relacionada con las expectativas privadas de la firma de la existencia de oportunidades rentables y la necesidad/deseo de financiamiento externo.

Palabras clave: pequeñas y medianas empresas, Argentina, acceso al financiamiento

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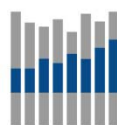CAF Working paper N° 2010/08
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ABSTRACT

In this paper, we examine SMEs in Argentina in search for a measurement of those who are credit constrained. We also estimate a model for the determinants of credit rejection taking into account those that are self-excluded. In addition to the 7 percent of SMEs that request credit from banks and face rejection, we find that there is at least a percentage of nearly 37 percent of SMEs that are self-excluded from the credit market, although they seem to be in need of external financing (by several indicators); while having profitable investment projects. We find that the size of firms, low levels of leverage, and an exporting condition, all increase the probability of being granted a bank credit. Surprisingly, we do not find a role for other financial statements based variables such as collaterals or cash flow in the explanation of bank's approval/rejection decision. Even more surprising is the fact that neither of the balance sheet based variables help to explain the self-exclusion from bank credit. The self-exclusion from the credit market is strongly related with firms' private expectations on the existence of profitable opportunities, and their needs/desire for external financing.

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Access to Financing of SMEs in Argentina
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Abstract

In this paper, we examine SMEs in Argentina in search for a measurement of those who are credit constrained. We also estimate a model for the determinants of credit rejection taking into account those that are self-excluded. In addition to the 7 percent of SMEs that request credit from banks and face rejection, we find that there is at least a percentage of nearly 37 percent of SMEs that are self-excluded from the credit market, although they seem to be in need of external financing (by several indicators); while having profitable investment projects.

We find that the size of firms, low levels of leverage, and an exporting condition, all increase the probability of being granted a bank credit. Surprisingly, we do not find a role for other financial statements based variables such as collaterals or cash flow in the explanation of bank's approval/rejection decision. Even more surprising is the fact that neither of the balance sheet based variables help to explain the self-exclusion from bank credit. The self-exclusion from the credit market is strongly related with firms' private expectations on the existence of profitable opportunities, and their needs/desire for external financing.

I. Introduction

The relatively low degree of access to the credit market of firms in developing countries has traditionally been highlighted as a serious obstacle for economic development (See for example the recent study by Ayyagari *et al.*, 2006). The economic literature shows that this problem is particularly important in the case of Small and Medium Sized Enterprises (SMEs), exhibiting the lowest access to external sources of funding. In this paper, we aim to explore the extent to which SMEs are constrained in their access to bank credit in the case of Argentina, and the effects that this limitation has on their performance. With this purpose we exploit a very rich dataset of SMEs from the Observatorio Pyme Survey (2004-2009).

The presence of asymmetric information and its related problems (moral hazard, adverse selection) has been pointed out, since the literature in the 80's (Majluf, 1984; Greenwald, Stiglitz, and Weiss, 1984; Myers, 1984), as the most important problem recognized behind the limited access to credit markets. The literature suggests that the asymmetric information problem affects several outcomes of credit markets, including prices and quantities, the requirement of guarantees, and the way firms engage relationships with banks in order to overcome the informational problem. In the case of SMEs, which are relatively less diversified, they face a higher default probability, and in turn the resulting interest rates and maturities offered by the market tend to mismatch their financial needs.

In this paper, we exploit a rich dataset containing bank credit requests information to explore the percentage of SMEs that can be considered credit constrained. In the methodological section, we discuss on the issue of which firms should be considered credit constrained. We argue that in addition to those that have been rejected from credit requests, we need to take into account those self-excluded from the market that also seem to face difficulties in obtaining financing. But also, we need to incorporate a measurement of those that seem to face profitable opportunities in order to distinguish those that (at least from an economic efficiency perspective) *should* receive financing.

Taking these into considerations, we find that nearly 7 percent of SMEs have requested credit from banks and have faced rejection (in a given year). Also, we find that there is about 37 percent of SMEs that are self-excluded from the credit market; they seem to need external financing (by several indicators); while having profitable investment projects.

Since the understanding of both rejection rates and (perhaps more importantly because of the observed percentages) self-exclusion rates seem very important, our analysis is then focused on the determinants of both decisions and how they interact. Building on economic theory we select those variables that have an effect on the credit request, and those that have an effect on the banks approval (rejection) decision. We test our hypothesis by estimating an econometric model of credit approvals that incorporates an adjustment for those that do not participate in the credit market. We find that the firm's size is one of the main explanatory variables of the approval rate, and more importantly, one of the key factors explaining the self-exclusion from the market. As our theoretical hypothesis suggest, the (private) expectations of profitable projects and the need of external financing are also found to have a positive effect on the probability of requesting a credit.

We finally provide some preliminary evidence on the relationship between access to financing and firms' performance variables. We perform some exercises incorporating the reporting of external financing needs and the growth rate (in terms of sales and number of employees) of the firms. In this case, our estimations have not found clear results.

The paper is organized as follows: Section II reviews the main economic literature on credit constraints. There has been much debate in the literature around the appropriate measurement of financial constraints. We learn from these discussions and suggest which should be the key factors to be incorporated in the subsequent analysis. Section III presents some stylized facts about the access to external financing by SMEs. We include measures on their sources of investment financing and their reporting needs of external financing. Section IV discusses our methodology for measuring credit constrained firms and the theoretical approach behind our model of credit request and credit approval rates. Finally, Section V presents the results and conclusions follow.

II.   Brief Literature Review

Under perfect international capital mobility, no restrictions and no taxes, there should be no cost differential between internal and external finance[2]. In the presence of adjustment cost, the traditional investment model derives a formal relationship between a firm's investment and its cost of capital. The cost of capital, it is represented in this literature by Tobin's Q, using the ratio of asset market value of the firm to its replacement cost as a proxy. More importantly, the Q theory establishes that a firm's marginal Q should be the only determinant of investment. In other words, investment should not be sensitive to a firm's cash flow after controlling for marginal Q.

When firms and potential investors have asymmetric information about firms' prospects, however, it is possible that some sources of external finance may have higher costs or even be completely unavailable to certain categories of firms. Myers and Majluf (1984) and Greenwald, Stiglitz, and Weiss (1984) explain why asymmetric information either eliminates any reliance on external equity finance in the market or causes suppliers of new equity to demand a large premium. These results are referred to as either "pecking order" theories of finance (Myers, 1984) or as "financing hierarchy" theories[3].

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[2] The existence of transaction costs gives some advantage to internal finance, but these costs appear to be small.

[3] As Kaplan and Zingales (1997) explains: The primary reasons because the supply of funds to firms may be imperfect are: 1) hidden information problems: these kind of models assume that managers act in the interest of shareholders, but firms face a high cost of external funds because investors are unsure about firm quality. Firms that lack internal funds, therefore, will be unable or will find it too expensive to raise externally the capital necessary to undertake all positive present value investments (that they would undertake if financial markets were perfect). Such financially constrained firms, therefore, under-invest. 2) Agency problems: these models emphasize the conflict of interest between managers and shareholders, assuming that managers derive private benefits from investments and, therefore, will invest more when internal cash flow permits. As a result, unconstrained forms over-invest while constrained firms invest optimally. Both models predict a "pecking order" in financing choices: firms prefer internal finance and if external finance is required, they issue the safest security first. They predict a higher sensitivity of investment to cash flow for financially constrained firms and models tend to share the characteristic that more constrained firms are those that face a higher shadow cost of external funds today (although not necessarily in the future).

It follows that information asymmetries are more pronounced for new firms or SMEs and for firms whose stocks are traded (if they are traded at all) in less organized markets. Many case studies have suggested that small firms have more limited access to external finance than large firms (see, for example, the literature beginning with Butters and Lintner, 1945). They find striking differences in the reliance on internal and external finance across firms. Small and medium—sized manufacturing corporations (those with assets less than $100 million) are very dependent on internal finance; this source accounted for over 85 percent of their total finance over the period from 1960 to 1980.

The paper of Fazzari *et al*. (FHP, 1987) aims to prove the proposition that in the presence of informational asymmetries, firms will have a preference for internal financing. Their strategy is to explore the relationship between the level of investment of a firm and their cash flow, when also incorporating the cost of capital (Q) as an explanatory variable. If once controlling for Q, the cash flow is found to explain the investment, this would suggest that the availability of internal funding is vital for the financing and the determination of investment.

Their strategy also entails the classification of firms into groups according to their level of (cash) retention. For example, under the mentioned assumptions, rapidly growing firms with current investment demands that exceed their current cash flow (i.e., firms paying no dividends) should exhibit a relatively higher sensibility of cash flow to their investments. Also they should display larger average values of Q, since these firms are not able to respond appropriately to these investments. In contrast, they state that if the cost disadvantage of external finance is slight, then retention behavior should contain little or no information about Q or the relationship between investment and cash flow.

FHP use a single criterion to identify firms that may face financing constraints-firms' retention behavior over the sample period. The classification scheme divides firms into four groups as follows:

Class 1: Dividends/Income < 0.1 for at least 10 years;
Class 2: Dividends/Income < 0.2 for at least 10 years, but not in class 1;
Class 3: Dividends/Income < 0.4 for at least 10 years, but not in class 1 or 2; and
Class 4: All others.

This classification implies, for example, that those firms with the highest retention rate (Class 1) generally retain an average of 95 percent of their income, have paid a dividend on average in only 35 percent of the years, and have paid no dividends for the first seven to ten years and a small dividend in the remaining years. These firms also show a higher mean rate of investment and higher volatility of capital spending, so that potential financial constraints on this kind of firm will be important for aggregate manufacturing investment.

FHP also exhibits these firms to display the highest debt-to-capital ratios, consistently with the hypothesis that constrained firms borrow up to their debt capacity[4]. Finally, FPH find that higher average Q values for the Class 1 firms. They suggest that is also related to growth rates. Their high

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[4] The pattern of debt leverage across classes also holds for debt-equity ratios measured as the book value of debt divided by the book value of common equity. The effect on investment of debt service measures that emphasize interest expense relative to cash flow are discussed by Minsky (1975), Eckstein and Sinai (1986), and Fazzari and Athey (1987).

Q values, however, pose the question of why these firms did not invest even more. As an alternative to financing constraints, high adjustment costs could slow convergence of Q to a full—information equilibrium.

FHP also explores the pattern of correlations and estimate an econometric model in order to test their predictions. In the first case, their theory predicts that the deviations from trend for cash flow should be more closely linked with deviations of investment from trend in those classes of firms with higher retention level (lower dividend ratios). They find precisely this: for firms with higher retention rates, aggregate deviations from the investment trend are found to be highly correlated with aggregate deviations from the cash flow trend. The correlation drops off substantially, however, for firms with a higher rate of dividend payments.

Regarding their econometric results, their theoretical model implies the estimation of an investment equation where, in addition to the Q as the standard explanatory variable, the cash flow is added to the equation. The equation is similar to the following:

$$\left(\frac{I}{K}\right)_{it} = \mu + \mu_1 \times Q_{it} + \mu_2 \times \left(\frac{CF}{K}\right)_{it} + \mu_3 \times \left(\frac{CF}{K}\right)_{it-1} + u_{it}$$

Their results show positive coefficients on the cash flow variables (i.e., an apparent "excess sensitivity" of investment to cash flow). Also, their most notable result is that the pattern of the coefficients on current cash flow across classes shows that they increase with higher retention rates.

As mentioned previously, these effects are magnified by the fact that cash flow is highly variable for the rapidly growing firms in Class 1, while mature firms in Class 4 experience very small variation in cash flow. Internal funds contribute to explaining investment in all classes—even for firms that have much more cash flow than investment[5]. For our purposes, however, the fundamental result is the substantial difference across classes in the impact of cash flow on investment.

The implication of FHP findings is that for many firms - particularly developing firms in rapidly growing industries - there may be a significant range of Q values over which no dividends are paid and external finance is very costly to obtain. Their results seem to suggest that while variations in Q may have little effect on investments; investments are constrained by current cash flow.

A great amount of subsequent literature has followed FHP by splitting firms according to an a priori proxy for financial constraints in order to isolate the effect of imperfect capital markets. And these studies have confirmed the central FHP result by dividing samples according to other a priori measures of financial constraint. [Hoshi *et al.* (1991), Rudebusch (1992), Schaller (1993), Whited (1992), and Bond & Meghir (1994) employ an Euler equation approach to directly test the first-order condition of an intertemporal maximization problem, which does not require the

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[5]For FHP this result likely indicates the pitfalls in using average Q in empirical studies. Their data measures average Q, whereas the theory pertains to marginal Q. Cash flow could contain information about movements in marginal Q not captured in average Q. Then they conclude that their results might not imply that capital-market imperfections are important.

measurement of Tobin's Q. The strategy is implemented by imposing an exogenous constraint on external finance and testing whether that constraint is binding for a particular group of firms. Both of these studies find the exogenous finance constraint to be particularly binding for the constrained groups of firms, which supports the basic FHP result[6].

The Kaplan and Zingales Critique

Kaplan and Zingales (KZ, 1997) criticize the paper of FHP by questioning whether their findings can be considered an evidence of financing constraints. They examine an extensive set of information belonging to the same group of firms that FHP have classified as having the highest retention rates (FHP Class 1 firms). Their data includes, for example, managerial statements and quantitative measures such as the interest coverage ratio. They find that in only 15 percent of firm-years, there appear to have difficulties to access internal or external funds to increase investments. In the remaining 85 percent, on the basis of cash holdings and unused credit lines, they suggest that the firms could have increased their investment if they had chosen to. KZ, also show that (always within the Class 1 group) those firms classified as less financially constrained exhibit a significantly greater investment-cash flow sensitivity than those firms classified as more financially constrained.

In the KZ analysis, they recognize unconstrained or less constrained firms as those firms with relatively large amounts of liquid assets and net worth. For the authors, this classification is compatible to a definition stating that a firm is financially constrained if the cost or availability of external funds precludes the company from making an investment it would have chosen to make had internal funds been available. Or in other words, those firms with relatively few amounts of liquid assets and net worth can be recognized as relatively more financially constrained.

According to qualitative and quantitative information, including cash dividends, repurchased stock, debt, and cash holdings, the authors propose a classification in five groups: Not Financially Constrained (NFC); Likely not to be Financially Constrained (LNFC); Possibly Financially Constrained (PFC); Likely to be Financially Constrained (LFC); and Undoubtedly Financially Constrained (FC). For example, LFC includes firm years that mention to have difficulties in obtaining financing and FC group include firm years that have been found to be in violation of debt covenants, have been cut out of their usual source of credit, were renegotiating debt payments, or declared that they were forced to reduce investments because of liquidity problems.

Using this classification they find that firms classified as never constrained (NFC or LNFC in every example year) exhibit the highest investment-cash flow sensitivity, exceeding that for the entire sample, for firms that were likely constrained, and for firms that were possibly constrained. This is the exact opposite result to FHP[7].

Their conclusion is that the greater sensitivity of investment to cash flow observed for certain firms do not provide reliable evidence of a larger differential cost between internal and external finance. They explain the results in FHP by saying that sorting firms by dividend payout ratios has

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[6] Cleary (1999).
[7] KZ so also test their predictions following the approach used by Bond and Meghir (1994). These authors explicitly model the wedge between internal and external finance. Their empirical implementation involves regressing investment on lagged investment and its square, sales, cash flow, and debt squared, and testing whether the coefficient on cash flow is different across firms with different dividend policies.

the effect of grouping together firms in very different financial positions. Therefore, they imply that policies designed to make credit more available in recessions will not lead to an increase of investments by firms with the highest investment-cash flow sensitivities. These firms reduce their investment in response to poor cash flow despite the current availability of internal and external funds.

More controversies around FHP results

Fazzari *et al.* (FHP, 1999) replied to KZ critiques. In their article they draw on some possible problems on KZ data[8] and analysis[9] but more importantly at all they argue that their new classification does not reflect *a priori* financial constraints and as such, their observation on the lack of monotonous increase in sensibilities is not informative.

FHP (1999) argue that cash stock, unused lines of credit, and leverage figures are unreliable measures of the relative degree of financing constraints. Financially constrained firms may, for example, rationally maintain some buffer stock of cash or unused debt capacity to protect against having to cancel or delay investment projects as well as to avoid the costs associated with financial distress[10]. This observation becomes especially important in the case of countries or within sectors that are especially volatile. The more financially constrained a firm is, the greater is its incentive to accumulate liquid buffer stocks. Such a firm may be able to invest more at the margin at a moment in time, but the firm is nonetheless financially constrained. Firms may also display low debt because they cannot convince lenders to provide them with credit, perhaps due to lack of collateral, and low-debt firms may therefore face more severe constraints.

Kaplan and Zingales (KZ, 2000) replied to FHP (1999) and highlight some misinterpretations of their results. At this point of the discussion, it becomes clearer that the practice of: (1) splitting the sample according to a measure of financing constraints, and then (2) comparing investment-cash flow sensitivities across groups, for the purpose of testing the degree of financial constraints, will be highly dependent on the selection of variables of the first stage. In other words, if the selection of variables for sorting groups fails to capture firms with financial constraints, the test of cash-sensibilities in the second stage will not be well constructed.

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[8] First, they highlight that one problem in their data comes from the reliance on managers' statements; since, according to Regulation S-K, it requires the firm to reveal the inability to invest due to financing constraints only when the firm fails to act on a previously announced investment commitment. Therefore, manager statements might not be an adequate source of data to search for the real inability of firms to undertake their investments. A second critique is that the 49 low-dividend FHP firms that they examine are indeed a poor choice for such a study, because they are relatively homogeneous, making it extremely difficult to classify these firms finely by degree of financing constraints. However, as KZ (2000) point out, other studies such as Cleary (1999) show similar results for a larger (over 1300) and heterogeneous sample of firms.

[9] In relation to the analysis, FHP (1999) point out problems in the interpretation of cash flow and cash stock ratios. While KZ suggest that both the cash flow and the cash stock positions for NFC and LNFC firm-years are large relative to fixed investment, they conclude that these firms could not be financially constrained. However, FHP (1999) suggest their calculations are misleading because they implicitly assume that firms use sources of financing only for fixed investment when, in fact, growing companies invest heavily in both inventories and accounts receivable. The authors recomputed these ratios with total investment, and find that the resulting ratios are too small to support the interpretation in KZ of the absence of financing constraints.

[10] FHP (1999) refer to Fazzari and Petersen (1993); Carpenter, Fazzari, and Petersen (1994); Calomiris, Himmelberg, and Wachtel (1995), as models papers arguing that it is costly for constrained firms to adjust fixed investment when internal funds fluctuate.

Confronting the critic posed by FHP (1999) in relation to the classification scheme relying, at least in part, on a company's cash balances or unused lines of credit, KZ (2000) state that: i) the observation of high stocks of cash or unused lines might not lead necessarily to think that the firm is taking precautionary savings because of being external financially constrained (i.e., firms with more cash holdings are more financially constrained). They state that methodology based on management's statements of liquidity was designed precisely to reduce the ambiguity that the level of these variables might imply. KZ (2000) state that they are confident that the detailed analysis that they performed allows distinguishing between precautionary savings and financial slack.[11] Moreover, KZ (2000) state that a firm might reflect a higher probability of being financially constrained if they have fewer internal funds than another, but also if the firm's intrinsic characteristics make it more costly to raise a given amount of external funds. In other words, they defend the view that financial distress is a form of being financially constrained.

As examples of the inability of investment-cash flow sensitivities to explain credit constraints, they recall the cases of firms like Hewlett-Packard (see KZ, 2000) and Microsoft, which exhibit high sensitivities, but it is difficult to consider them as being financially constrained.
In order to provide an explanation for the existence of those sensitivities they conjecture that these are at least partially caused by excessive conservatism by managers, which may arise because of the way firms are organized internally or because of non-optimizing behavior by managers as suggested by Hines and Thaler [1995].

III.   Access to Financing Stylized Facts

In this section we present some stylized facts related to the Access to finance of SMEs in Argentina, according to the Observatorio PyMEs' Annual Survey[12].

> 1- *"Internal sources account for nearly 65 percent (all years' average) of SMEs' investment financing"*

According to SMEs managers, several sources of funding are used in order to finance investment projects. Table 1 presents the estimations of managers to the percentages of funding coming from each source. The sources include internal funding such as Retained Earnings (RE) and Share Capital (SC) as well as external financing including: Financing from Banks (FB); Suppliers (FS), Clients (FC); Public Programs (FPP); and Capital Markets (CM)[13]. The table exhibits the percentage use of each

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[11] At the same time, the endogeneity of a firm's financial position strengthens the theoretical reasons why investment-cash flow sensitivities are not monotonically increasing in the degree of financial constraints, as recently shown by Almeida (1999). He analyzes the response of investment to profitability shocks when leverage is endogenously determined. Firms with more liquid assets borrow more and, thus, are more sensitive to profitability shocks because of the well-known leverage effect. Less financially constrained firms, then, exhibit higher investment-cash flow sensitivities than similar firms, which have less liquid assets, and thus are more financially constrained.

[12] The source and characteristics of the database are described in detail in the Methodology Section.

[13] Notice that although in this classification the percentage of funding coming from relatives has not been separately defined –this source of funding will be mostly included in 'share capital' category or in the category defined as 'other', in the case of small firms a significant percentage of investment funding will probably come from that source.

source in the years for which information is available (2006-9) and throughout groups generated according to firms' sizes (i.e., in this case number of employees).

The main striking fact arising from Table I is that **internal sources account for nearly 65 percent (all years average) of SMEs' investment financing**. Although both the use of RE and SC decreased in the last three years[14], the figures combined never represented less than 58 percent of the financing resources. Bank-backed financing represents the second largest source of investment financing. In this period of macroeconomic recovery, its participation increased from 16 percent in 2004? to 24 percent in 2009.

Another source that displays a significant participation is financing from suppliers, which are found to account for nearly one tenth of total investment financing (8.4 percent). Funding from clients, public programs, and other sources such as capital markets represents another 5 percent of total investment financing.

2- *"Although rejection rates are low, accounting for only 20 percent of total requests, only 1/3 of firms actually request a bank credit in a given year"*

Credit rejection rates are not as high as it is usually believed[15]. According to firms' descriptions of the success of their credit requests[16], the rejection rate averages nearly 20 percent of bank loan requests, 10 percent for current account overdrafts requests and 30 percent for leasing requests (Table 2). Nonetheless, only one third of firms actually request a credit (30 percent for loans, 40 percent for current account overdrafts, and 15 percent for leasing), which suggest that the self-exclusion of firms from the credit market is a relatively more important phenomenon to understand[17].

Consistent with the analysis of "funding sources", this breakdown shows that a minority of SMEs look to financial institutions for funding. Also, consistently with the evolution shown for the last years, credit request figures (for the three types of credit considered) seem also to have increased in the last four years (excluding the first 2004-05 period when they have decreased)[18] [19]. Interestingly, credit approval rates seem not to have increased in the last four years. Bank loans, for example, show a nearly strict decreasing pattern in the approval rates during the considered period.

The larger the size of the firm is, the more likely it is that the company applies for external financing. Request of bank loans increase from 20 percent for micro-sized firms (1 to 10 employees) to 48 percent for medium sized firms (more than 42 employees). Similar patterns are also found for current account overdrafts and leasing (28 to 53 percent and 6 to 31 percent, respectively when comparing the same employees' categories). The largest the size of the firm is, the largest the percentage of approved credit applications will be. A medium sized firm with more

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[14] The figure for the percentages of RE and SC separately is not displayed in the table.

[15] It is common to find in the media articles suggesting that most firms are rejected from their credit requests, as this article in a local newspaper exemplifies: "El crédito a pymes nuevas casi no existe" Diario La Nación, 17/07/2010.

[16] The Observatorio (annual) Survey asks firms if they have requested financing to banks in the year under consideration.

[17] It is worth noting that *factoring,* another credit source that is used for an increasing number of firms, is not included in the Observatorios' survey questionnaire.

[18] The exception is leasing, which does not show a positive trend.

[19] The correlation between the use of external sources of financing and credit requests seems interesting to our purpose of using credit requests and approval/rejection rates to measure the degree of investment constrained firms.

than 42 employees applying for a bank loan will obtain a credit with 25 percentage points more probability than a micro firm of less than 10 employees (from 55 percent to 80 percent of approval probability), a current account overdraft with 16.8 more percentage points and a leasing request with nearly 30 percent more probability.

Finally, the table also reports the request and approval rates according to the firm main activity. Although only a minority of firms in our sample are services firms[20] (mostly dedicated to industrial manufactures or machinery repair), it is interesting to note that these firms seem to display larger credit request rates and slightly lower approval rates.

3- *"Nearly a third of SMEs report to have projects that are stopped because of lack of financing"*

Another interesting measure for the understanding of access to bank credit and credit constrained firms, comes from a question in the Survey asking firms if they have projects that are stopped because of lack of financing[21]. Furthermore, considering the sample period, the companies with projects that are stopped because of lack of financing represent 32 percent (Table 3). The figure has declined in the period along with the recovery of external financing, reaching its minimum value in 2008[22].

Interestingly, between the largest firms (more than 20 employees) there seem to be a (slightly) larger percentage of them with projects stopped. In relation to age, there is no clear relationship with older firms (more than 19 years) reporting the largest percentage[23].

4- *"Access to financing is not necessarily the most important problem that SMEs claim to face, having rated it as the 8th most severe problem (from 13 main problems). More importantly, it has been rated as one of the three most severe problems only by 30 percent of the firms".*

When asking about the main problems the firm has to face, access to financing is not necessarily the most important[24]. These results come from two questions that were included in the surveys for 2004-2006 and 2007-2009 (when the question was re-written).

As Figure I shows, between 2004 and 2006 the problem of access to financing was implicitly ranked by firms as the 5th most severe problem, lagging behind the increase of production costs[25]

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[20] The Survey, as it is explained below, is targeted only to industrial activity firms. However, some services firms are also reported.

[21] We discuss in the next section that although this might be considered a measure of credit constraints, many firms might report they have a stopped project, although not having a profitable enough investment opportunity underlying it.

[22] The increase in the period 2008-2009 (2.11 percentage points), as well as the similar time series patterns that were observed until here, might be explained by the financial crisis unleashed by the end of 2008.

[23] An interesting result is the percentage found for Cooperatives (although, with only 23 observations might bias the result), where more than half of firms report to have stopped because of lack of bank financing.

[24] Notice that the included categories in this survey might differ from those incorporated in other studies (e.g., WBES based studies).

[25] This could be read as the counterpart of the higher rates of inflation and devaluations that the country has been experiencing in the last years.

(nearly 70 percent of firms include it between the three most severe), high level of taxes (nearly 50 percent) decrease in profitability (nearly 40 percent), and strong competition in internal markets (30 percent). More importantly, for the objective of this paper, is the fact that less than one third of firms consider the access to financing as between the most difficult problems, since this could also be read as evidence that only a third of firms can be considered to be financially constrained at all.

For the years 2007-2009, when the question asked to rate the problems from 1 to 10 (being 1 not a relevant problem and 10 a severe problem) the difficulties in access to financing did not reach on average a value of 6. Moreover, those firms that rated the problem as severe (8, 9, or 10) account for nearly 40 percent of firms[26].

A related problem, "high financial costs" obtained a similar average rating in the period 2007-2009, and was selected as being between the three main problems only by one tenth of the firms in 2004-2006.

This section has shown some insights on the access to external financing from SMEs. To properly account for the firms that face (external) financial constraints we need to take into account several factors, including a proper understanding of the reasons for the self-exclusion from the credit market. For example, the fact that while some firms might self-exclude themselves because they expect to be rejected (or not find appropriate conditions such as rates and other terms), others might do the same just because of the availability and preference for alternative sources of funding. In order to deal with these issues, we elaborate on a methodology of analysis in the following section.

IV.   Methodology

Our aim is to explore the available information on credit requests for signals of credit constraints.

i.   Measuring the Percentage of Credit Constrained Firms

As described in the Literature Review section, one of the main approaches when exploring financing constraints has been based on the analysis of the sensibilities of investment to cash flow. As previously explained the literature exhibits numerous papers in favor and against the validity of the approach; and the debate is still going on.

When credit requests information is available, we might use an alternative strategy[27] to recognize those firms that are credit constrained, or in other words, to recognize those firms that face problems in obtaining external financing.

First, in many studies credit constrained firms are recognized as those firms requesting a credit and being rejected (See, for example, Love 2007[28], Chakravarty and Yilmazer, 2007). We recognize

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[26] This figure is not included in the graphic but it is reported in the Results Section below.

[27] This approach is suggested by Bebczuk (2009)

[28] Love (2007) uses a similar approach to measure the percentage of credit constrained firms. He suggests adding the percentage of those firms that have applied for a bank loan and have been rejected, plus those firms that have not

that these firms face credit constraints, but for policy purposes, our interest is to differentiate those firms that should be rejected (i.e., their underlying projects were not profitable, the so called *lemons*) from those that although having good projects have been rejected because of the informational asymmetries present in the market.

Second, given the fact that there is a positive probability of being rejected, and typically there is a cost of applying (e.g., complying with requirements, monitoring, and formality), many firms might not apply for a bank credit. From a policy perspective it is therefore important to recognize those firms with profitable (creditworthy) projects but which are discouraged to ask for a bank loan.
It is important to notice here, that we cannot recognize as credit constrained firms all creditworthy firms that have not applied for a loan, since the desire of external financing should also be accounted for[29]. Many arguments might be said in relation to the preference for internal financing of firms (See, for example, Bebczuk, 2009).

Summarizing, as a first approach in order to measure the extent of credit constrained firms by summing the firms' percentages that correspond to each of the following questions:

    i)   Which percentage of firms has been rejected in an application for a credit, but do also have good business opportunities (i.e., is credit worthy)?

and

    ii)   Which percentage of firms has not applied for a bank loan; however, aims at obtaining external financing while having good business opportunities (is credit worthy)?

As we explain below, we measure each of these concepts with related variables and determine the sensibility to each choice of variable.

    ii.   **Estimating a Model for the Probabilities of Requesting a Bank Loan and Being Granted/Rejected**

As a second approach to explore credit constrained firms, we will estimate a model of the factors that explain the probability of requesting a bank loan and the probability of it being granted (rejected). We next discuss the theoretical determinants, differentiating those determinants of the request (expected value of a profitable project) and those that could explain the grant/rejection decision. We then discuss the econometric specification.

When facing the decision of requesting a bank loan, the firm will rationally balance the expected benefits and costs of such a decision. In terms of expected benefits, they will be given by the probability of being accepted and (multiplied) by the benefits of financing the project (i.e., its expected return). Since we assume that there exists imperfect information in the credit market,

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applied for a bank loan and reported they "don't need a loan". Notice that in both cases an incorporation of a variable measuring creditworthiness is missing.

[29] Notice that we did not have this problem in the first case, since a firm applying for a bank loan is implicitly reflecting its desire for external financing.

the probability of being accepted will only depend on the observable characteristics of the firm and its underlying project (those that the bank can analyze, such as the collateral, the size of the firm, its age and its reputation). We are also assuming that the firm privately knows many aspects of their finance and its projects, so certain variables such as their expectations on the profitability of their projects will only affect their decision to apply (i.e., directly affecting the benefit of the project and therefore its *expected* benefit) but not the probability of being granted.

In terms of the costs of applying, the firm will have to face the costs related to the process (formalities, monitoring, etc).

Private Information Variables

The following variables will only be incorporated in the specification of the model of the probability of requesting a bank loan:

> *Existence of a profitable project indicator (EPPI)*: If the firm faces a profitable project opportunity, the firm will search to finance it. As described in the literature review section, the empirical work exploring investment decisions in the case of listed firms has used as a proxy for its investment opportunities, for example, the Tobin's Q ratio, the ratio of the market value of the firm to its replacement cost (its book value). As SMEs are generally not listed in stock markets, we cannot replicate such a measure. However, our data provides valuable information on the investment opportunities faced by the SMEs. The survey ask firms if they expect increases in their sales; the number of their employees; working hours; exports; and investments. We assume that a firm that has reported positive expectations along these variables will more likely be facing a profitable project. Using this data we will construct an indicator measuring the *Existence of a Profitable Project (EPPI).*
> As we assume that all of these variables measure in some extent the existence of this opportunities, in order to combine these variables into a single indicator, we employ Principal Components Analysis to reduce dimensionality.

- *Average Weather Indicator (AWI):* We build an alternative indicator of firms' expectations on profitable opportunities and growth. This indicator measures the overall perception of the firm in relation to the problem it faces. In the Observatorio Survey, firms rate (assigning values from 1 to 10) fifteen of commonly cited problems. We are assuming here that firms reporting less severity throughout all problems are more likely to be facing good investment opportunities and expecting growth. We construct this indicator in two steps. For a given firm, first we take the average of all its ratings of problems[30]. Second, for each year, we group firms according to average rating (using the 33 and 66 percentiles). We call these groups: "clear sky"; "partially clouded"; and "clouded and wet".

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[30] Problems include: i) Insufficient installed capacity; ii)Drop in sales; iii)Difficulties for obtaining financing; iv) High tax rates; v) Reduction in profitability; vi) Cannot pay to suppliers on time; vii) Increase in production costs (including labor); viii)Strong competition in the domestic market; ix) Strong competition in international markets; x) High financial costs; xi) High degree of evasion of local producers competing with; xii) Difficulties in energy supplies (electricity, natural gas and / or liquid fuel); xiv) High logistics costs; and xv) Others.

As we assume these variables to measure financing opportunities, we expect (hypothesize) the EPPI and the Average Weather Indicator to display a positive effect on the probability of requesting a credit.

In the case of the model of probability being accepted for a credit –recall we are not including this variable as a determinant since we have assumed the indicator remains as private information-, we notice that this variable could be included in order to test for the existence of a high degree of credit rationing. The related intuition is that, in the case credit rationing of certain types of firms is high, many firms with profitable projects will consequently be rejected by the banks. Therefore, if once controlling for the factors that are used by the banks to make the decision of whom to grant a credit (e.g., collateral, size, debt, see below), the existence of a profitable project in the firm is found not to explain the probability of obtaining a credit, this observation might suggest that credit rationing by the banks is strong.

- *Desire/Need of External Financing:* If there is a cost of external financing (as the hierarchy of financing sources literature suggests), even in the case of having a profitable project, the firm may not search for bank financing and use other internal resources (e.g., own resources, financing from suppliers). It is reasonable then to incorporate to the analysis a variable measuring the desire/need of external financing.

    We approximate the need of financing using the three related variables:
    i)   Each year the firm answers to the question: "Do you have any investment project hampered by lack of financing?" We build a dummy taking the value of 1 in case there is a positive response[31].
    ii) In case on a given year the firm has not searched for external financing, the survey asks to choose between several reasons why they didn't[32]. We build a dummy variable taking the value of 1 in case the firm has reported any reason other than it does not need financing[33].
    iii) Finally, we create another proxy using the firm rating to the problems faced by the firm. In this case, we build a dummy variable taking the value of 1 if the firm has rated the difficulty in obtaining financing as being a severe problem (A high value of 8, 9 or 10 in the 1 to 10 range)[34].

    As we assume, these variables will capture a stronger desire of external financing, we expect them to display a positive effect on the probability of requesting a bank loan[35].

Finally, notice that when incorporating these variables into the probability of request model, they might also provide signals of the existence of a high degree of credit rationing. The intuition is that the probability of obtaining a bank loan for certain types of firms might be low

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[31] Variable name: *need finance proxy stopped project*
[32] For example, the firm might have answered: because it believes that its application would be denied; because of insufficient collateral; because high financial cost and short terms for cancellation; because the processes are too long or too much paperwork; because of uncertainty about the evolution of the national economy.
[33] Since this variable is only available for those that have not applied, we will not incorporate it in our econometric estimates.
[34] Variable name: *need financing proxy_severe difficulties*.
[35] As an alternative specification both the EPPI and the desire of external financing variable might be jointly incorporated in the model through an interaction effect.

because of credit rationing. Hence, we might hypothesize that even in the presence of a very profitable project the firm will be discouraged to apply for one. Therefore[36], if once controlling for the reported need of receiving external financing by the firm, the EPPI turns out not to explain the probability of requesting a bank loan, this observation might suggest that the existence of credit rationing is discouraging firms to apply for a credit.

Public Information Variables

- *Availability of Internal Funding:* When examining the determinants of requesting a bank loan, it might be reasonable to think that firms with fewer cash stocks might display more incentives to search for external financing when an investment opportunity emerges. As described in the previous section, some authors, most notably KZ (2000) have used the availability of internal funding (as measured by cash flow, cash stock ratios, or unused credit lines) for classifying firms that are more likely to exhibit (less) credit constraints. In the opposite perspective, other authors (e.g., FHP, 1999) have argued that financially constrained firms may rationally maintain some buffer stock of cash or unused debt capacity to protect against having to cancel or delay investment projects as well as to avoid the costs associated with financial distress, and therefore the availability of internal funding should not be considered a proxy of being financially constrained.
  As theoretically this effect might not be clear, we will add a proxy for this variable as an additional explanatory variable in some of the specifications and compare the results. We measure cash flow as the ratio of net income (prior to taxes and excluding interest payments) on non-current assets[37] [38].

The following variables will be added as explanatory variables both on the probability of request model and the probability of being accepted (rejected) model.

- *Size.* In this case measure by the number of employees, it is usually argued that these firms are more diversified and face a lower default probability.
- *Sales.* As an alternative proxy for the size of the firm we use the total amount of sales for the current year (incorporated in logs in the equation).
- *Age.* A higher age might be a sign to the bank of survival skills, greater knowledge of the industry, and so on. It could also be considered a proxy for the relationships that the firm has made with banks.
- *Exports:* The export condition is a variable typically associated with a higher productivity, and might be also identified by banks when screening the firm. We use alternatively a dummy variable taking the value of one if the firm exports and the percentage of sales that are exported.
- *Collateral.* In this case, we measure it by the ratio of fixed assets to total assets.

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[36] Once we have accepted that the EPPI is a good proxy of the existence of profitable projects and therefore an incentive to search for its financing.

[37] Unfortunately the survey does not provide data on other variables that have been frequently used in the literature such as unused lines of credit, and dividend payments.

[38] We consider this variable and all other coming from balance sheets information as public information, or in other words, we also include them as determinants of the probability of grant/rejection of the credit request.

Leverage: Ambiguous effect: Increases the probability of default, it also reveals that prior lenders have found the borrower reliable enough: We will postulate here a quadratic relationship. Measured as the ratio of total liabilities to net worth.

Other industry level controls

- Main Activity: (Sale of goods and products produced by the firm; Repairing machinery; Resale of products sale of services or other).
- Knowledge Base: Rational: More knowledge base industries require more flexible financing (tend to want less external financing).
- Competitive Uncertainty Rational: Firms in more uncertain environments will want less external financing.

Finally, in order to account for movements in the interest rate and other macroeconomic factors that may affect the credit request or credit rejection decision, we incorporate annual dummies in both specifications.

Econometric Specification

When estimating the models for the request and the granting/rejection, the second model will be based on a non-random selected sample. In other words, since only those applying for a loan are the one that are granted or rejected for a credit, the estimation of the second model is based on a limited and biased sample. Therefore, omitting the information of non-appliers will lead to significant bias in the relationship with its explanatory variables. In order to deal with the self-selection bias of the first stage, we will incorporate the correction proposed by Heckman (1979).

The Heckman correction is a two-step statistical approach. In our setting, the first step involves the specification of an equation for the probability of applying to a credit:

$$\text{Prob}(A = 1|Z) = \varphi(Z\gamma)$$

Where: A is the dummy variable indicating the firm has applied for a credit ($A = 1$ if the firm has applied and $A = 0$ otherwise), Z is the vector of explanatory variables that has been described above and γ is the vector of unknown parameters. The function φ is the cumulative distribution function of the standard normal distribution. Therefore, an assumption of normality is implicit in the model[39].

In the second stage, the self-selection bias is corrected by the incorporation of a transformation of the predicted probabilities as an additional explanatory variable. The granting/rejection equation is specified as:

$$G^* = X\beta + u$$

Where: G * denotes a rejection/granting decision, which is not observed if the firms does not apply. The conditional expectation of the grant/rejection decision given the firm applies is then:

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[39] Notice that the estimation of the model will allow us to predict this probability for each firm in the sample.

$$E[G|X, A = 1] = X\beta + E[u|X, A = 1]$$

Under the assumption that the error terms are jointly normal, we have:

$$P[G = 1|X, A = 1] = X\beta + \rho\sigma_u\lambda(Z\gamma)$$

Where: ρ is the correlation between unobserved determinants of propensity to apply and the unobserved determinants granting/rejection equation u. σ_u is the standard deviation of u, and λ is the inverse Mills ratio evaluated at $Z\gamma$[40]. Conditional on variables X and λ the resulting equation can be estimated as if the sample were randomly selected.

The granting/rejection equation can then be estimated by replacing γ with Probit estimates from the first stage, constructing the λ term, and including it as an additional explanatory variable in the estimation of the Probit equation[41].

Non-reporting bias correction

A feature of our data is that not all respondents of the survey actually report some required balance sheet variables and indicators, as asked by some of its questions. Balance sheet related variables such as collateral, leverage, and cash-flow are necessary for the estimation of our (credit request/acceptance) model, so it is important to test whether non-reporting firms might be a source of bias in our estimations. We estimate for the existence of this kind of bias and propose a correction for our model.

On average, for the whole sample, only half of the respondents answer to the questions asking for the main balance sheet information (Table 5). This implies a significant loss in the number of observations available for the estimation of the model. When exploring the pattern of non-reporting across some key variables we notice, for example, that the percentage of firms reporting their balance sheet numbers increases significantly with firm size. For the smaller group of firms (1 to 11 employees) only 32% of firms report their numbers, while the percentage increases to 68% for the largest firms in the sample (more than 42 employees). The non-reporting percentage that is related with size might reflect, for example, that smaller firms are not sufficiently well organized and do not have their balance sheet information ready when responding to the survey. But if smaller firms are not reporting because they do not want to reveal bad balance sheet information, the estimation of our model of credit rejection (acceptance) will be biased.

In order to correct the estimation of the model, we proceed in two steps by following a standard inverse probability adjustment. In the first step, we estimate a Probit model for the probability of reporting the balance sheet indicators. In addition to size, age and other sector and main activity related variables, we incorporate our proxies for the existence of profitable opportunities (i.e., EPPI and the weather indicator). In the case of these last variables, we hypothesize that firms that do not report their balance sheet indicators tend to do so because they are facing unattractive

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[40] This equation demonstrates Heckman's insight that sample selection can be viewed as a form of omitted-variables bias, as conditional on both X and on λ it is as if the sample is randomly selected.

[41] Notice that Heckman (1979) also provides a test for sample selection bias. Since $\sigma_u > 0$, the coefficient on λ can only be zero if $\rho = 0$, therefore, to test for sample selection it is equivalent to test the null that the coefficient on λ is zero.

business opportunities and they do not want to reveal this situation to the surveyor. So, therefore, we expect a negative coefficient. With the outcome of this first regression we estimate the reporting probabilities and use them as weights in the second set of regressions (i.e., the Heckman procedure). The probabilities are incorporated as inverse weights in the model, as it is the standard approach in statistics.

iii. Access to Financing and Performance

We finally provide some preliminary evidence on the relationship between access to financing and firms' performance variables. In this first approach, we follow a (simplified) version of the econometric model estimated by Ayyagari *et al.* (2006), and estimate the relationship between the growth rate of firms (in terms of sales and number of employees) and the firms' reporting having difficulties obtaining external financing.

In the baseline model, we estimate the firm growth rate using the firms' ratings of problems they face (previously shown on stylized facts section), and adding some controls such as sector, dummies for years, and firm size.
In addition to a standard model estimated by Ordinary Least Squares (OLS), in order to avoid the problem of reverse causality, we instrument the financing problem with the average value of problems for the same industry, as an instrument that should isolate the desired causal effect.

Summarizing[42]:

MCO Model:

$$gr_i = \beta + \beta_1 nemp + \beta_2 sfall + \beta_3 dif + \beta_4 tax + \beta_5 dprof + \beta_6 pcl + \beta_7 hfcost$$

In the IV Model:

$$gr_i = \beta + \beta_1 nemp + \beta_2 [dif = finprob]$$

iv. General Characteristics of the Database

Our source of SMEs data is Observatorio Pyme, a local foundation that monitors SMEs situation throughout the country. The Annual Structural Surveys from 2004 to 2009 were combined in order to generate an (unbalanced) panel database. The Survey focuses on SMEs in the industrial sector (although there are also some firms in the services sector), and has been sampled in order to have representation of the existent universe of industrial SMEs in Argentina[43]. According to the last available economic Census (2005), the universe of SMEs in Argentina comprised a total of 14,127

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[42] Variables: **gr$_1$**: Growth Rate in Sales Model; **gr$_2$**: Growth Rate in Number of Employees Model; **nemp**: nemployees; **sfall**: Sales fall; **dif**: Difficulties in obtaining financing; **tax**: High share of taxes on the final cost; **dprof**: Declining profitability; **pcl**: Late payments from clients; **hfcost**: High financial costs; **finprob**: Average rating of the firms from the same economic sector (CIIU) to the access to financing problem.
[43] The sample was designed also for the purpose of covering all industrial sub-sectors, including CIIUs from 10,003 to 25,503,273.

SMEs, of which nearly 77 percent were small (i.e., with number of employees between 10 and 50), and the remaining 23 percent where medium (51-200 employees).

Table 4 reports some of the main characteristics of the database. As it is natural, the number of SMEs answering the Structural Survey changed each year, starting with 605 in 2004, and averaging nearly 1,000 in the subsequent years. The number of available observations will determine the precision with which the statistics of the universe are estimated. The total number of different SMEs covered in the panel is approximately 2395. The panel is unbalanced and the average number of observations by firm is 2.31.

Table 4 also displays some of the main characteristics of the sample (and because of its design, also of the universe) of Argentinean SMEs. The Survey covers SMEs from all over the country, with nearly 40 percent from the Buenos Aires Metropolitan (AMBA) region. The smallest regional percentages are North-West (NOA, 5.2 percent), North-East (NOE, 6 percent) and South (3.8 percent). In terms of the age of firms, it is interesting to note that nearly a half (48.5 percent) of the firms in the sample was born after the last major macroeconomic crisis (2001-2002). Nearly 20 percent of the firms were born in the 1990's (1992-2001). Finally, in our sample less than 21 percent of the sampled firms belong to the medium sized category and the remaining can be considered small or micro firms.

V. Results

i. Measuring the Percentage of Credit Constrained Firms

Rejected firms and their growth expectations

Nearly 1/3 of firms that request a credit each year reveal its desire/need of external financing. We know that nearly 20 percent (for 2009) of them have been rejected. Combining these two numbers we know that 7 percent of the SMEs face some kind of restriction in their access to financing. An interesting issue here is to examine how many of those firms indeed expected growth opportunities or have been experiencing recent growth[44]. Using our EPP indicator and separately its main components, we show in Figures 3.a to 3.c that, at least in economical terms, there is no relationship between them and the rejection rates[45].
If the theory we have assumed holds, and these are indeed private information variables, it is reasonable to observe this result, since rejection/granted rates should only be related to those characteristics that are observable by the banks. In either case, at least taking the sample as a whole, the results show that these variables are not related to the rejection rate in an economically meaningful way.

More than one half of the firms that are self-excluded from banks credit report needs of external financing

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[44] As we previously discussed, from a policy perspective we are interested in financing only those *good* projects.

[45] As our main interest here is on magnitudes, we do not test for a statistical relationship.

As we know from the stylized facts section, at least a third of the firms each year report to need external financing since they have claim to have investment projects stopped because of lack of financing. As we will test in the econometric analysis next, the need for financing is indeed related to the request of credit. As Figures 4.a and 4.b illustrate, there seems to be a relationship between the need for financing and the request in each year. The interesting thing here is to see that although these firms actually report needing financing, not all of them request it! In this sense, we can reasonably say that between the self-exclusion from the credit market (2/3 of firms according to Stylized Fact 2), there is still a percentage of firms of at least 55 percent (66 percent according to Figure 4.b) that are credit constrained. Therefore, at least 37 percent of the total number of SMEs might be considered credit constrained.

Among non-appliers and in need of financing we might still find an economically important participation of firms with high growth expectations

Finally, it is interesting to explore, between the 37 percent non-appliers firms, what percentage of them expect profitable opportunities. As shown in Figures 5.a to 5.c (right bar), according to our EPP Indicator, there seem to be a significant number of firms with moderate or high growth expectations. If we assume that the EPP indicator is capturing business opportunities, it would follow that nearly 2/3 of the mentioned 37 percent of the total number of SMEs face credit constraints that would be (at least from a planners perspective) desirable to overcome.

ii.   Econometric Results

Non-reporting bias correction

Table 6 reports the results of our model of the probability of reporting balance sheet information. With the outcome of this model we construct the adjustment weights for the request and being granted/rejected models.

As expected, larger and older firms tend to report more their balance sheet indicators. The estimation predicts that the group of largest firms (more than 42 employees) exhibit 30% more probability of reporting their balance sheet information than the smallest firms. In the case of age, the model also finds a positive and significant effect, but the magnitude of the estimated coefficients is very low.

In the case of the expectation of profitable projects indicator (EPPI) the estimation also found a positive and significant coefficient, suggesting that those firms that expect growth opportunities tend more to report their balance sheet indicators. However, in the case of the *average weather* indicator, we do not find a significant effect.

Using the coefficients of the estimated model we proceed then to compute the inclusion probabilities and weight the estimation of the model of the probability of requesting/ being granted a credit.

Estimating a Model for the Probabilities of Requesting a Credit and Being Granted/Rejected

Table 8 and 9 reports the results of the two-step procedure of estimation. Table 8 presents the results for the model of granting/rejection of a credit (the second stage of the model), while Table 9 presents the model for the credit request decision. As explained in the Methodological Section, public information assumed variables were incorporated in both models, and private information assumed variables (i.e., the case of expectations on business/growth opportunities and need of financing variables) were incorporated only in the (first-step) model of the probability of request.

In the case of Table 8, Column I presents a baseline specification, where we incorporate the public information variables as explanatory variables (number of employees as the proxy of size, age, collateral, leverage ratio, cash-flow ratio, and regional and year dummys). The estimation under Column I, however, was performed without the self-selection of firms correction (See Methodological Section), and is displayed with the purpose of visualizing the magnitude of the incurred bias. Column II presents the same specification, but where the correction has been introduced. Column III adds the second proxy of size, the amount of Sales (which naturally is expected to be correlated with number of employees). Columns IV and V add the variables related to exporting behavior. In Column IV, the export rate has been added, and in Column V a dummy for the export/no export condition has been added. Finally, Column VI reports the marginal effects of the baseline model.

In the case of the model of requesting credit in Table 9, Columns I, and II, show specifications where we have alternated our proxies of the firm needing external financing. In Column I, we include the dummy variable (*Need _financing_difficulties*) taking the value of 1 if the financing problem has been rated as severe (for the period 2007-2009) and if the firm has chosen the access to financing problem between the three most challenging problems it faces (for the period 2004-2006). In Column II, we present an alternative specification where the average perception on problems (the *average-weather* indicator, see the definition above) is used instead of our proxy of existence of business opportunities (EPPI). Then, in Column III, instead of the need of financing proxies, we alternatively include a dummy variable taking the value of 1 if the firm claims to have an investment project stopped because of lack of financing (*need_stoppedproject*). In Column IV, we combine the two alternative variables used in Columns II and III. Column V and VI adds to the specification Sales (in logs) as a second proxy of size, and the export condition related variables (measured as percentage of sales and as a dummy variable). Finally, Column VII reports the average marginal effects corresponding to the baseline specification.

In general, the size of the firm (measured in first case by the log of the number of employees) has been found to display a positive and significant relationship with the probability of being accepted, and also (as Table 9 shows) with the probability requesting a credit. In terms of the probability of being granted a credit, a 100% percentage increase (i.e., a duplication) in the number of employees is related with increases in the probability of being accepted of 12%[46]. Note that as suggested by Column I, if the self-selection correction is not incorporated, then the variable appears as non-significant. This result suggests that part of the self-selection is explained by size, as is also confimed in the following table. The significance of the coefficient of the size variable is lost when adding Sales, which is an expectable result given the correlation between both variables. In return, Sales turns to be positive and significant, which reinforces the notion that size matters in explaining access to credit. Similar results are shown in Table 9, where the number of

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[46] The significant effect of the log of size also implies that the marginal positive effect of size in the probabilities is decreasing.

employees is found to be positively related to the probability of request a credit. Taken together the findings support the theoretical idea that a larger firm faces higher incentives to request a credit, given by the fact it assumes that it has a larger probability of being accepted. The predicted probabilities are illustrated in Figures 6, Panels A and B. In the case of the bivariate probability, a strong positive relationship with the (log) number of employees suggests that larger firms have more probability of both requesting and actually accessing to financing. In Panel B, however, (the conditional probability of having applied), the trend is not so clear. Once the firm has requested a credit, the effect of size is less strong, suggesting that a strong self-selection of firms according to size is given in the first stage (i.e., when requesting).

Interestingly, the *age* variable is found to display a negative effect in some specifications of the probability of requesting (Table 9), and in the case of the probability of being accepted no significant effect appears. The hypothesis consisting on age as proxy of the survival probability of a firm or the length relationship with banks (and therefore increases the probability of both requesting and being granted) should be rejected according to this evidence. The negative result on the probability of request might suggest that older firms find new and more convenient sources of funding (than banks). Nevertheless, the effect remains very small: a 10 year older firm faces a 1% less probability of requesting a credit.

A surprising result has been that balance-sheet related variables have not (with the exception of leverage) reported significant relationships in any of the models. In the case of collateral (measured by the fixed-to-total assets ratio), a (somewhat surprising) result shows non-significant coefficients. On the basis of that measure, we then reject the hypothesis that firms with a higher level of collateral apply more, and that they are more accepted.

In the case of leverage, the estimations have tended to display a negative coefficient across both models, although consistently significant results have been found mostly for the probability of being granted a credit. Firms that are relatively more leveraged display a relatively larger probability of being rejected, and only in some specifications, the magnitude of the effect seem to discourage firms to request a credit..

Finally, in the case of cash flow, the variable has been found to display a non-significant relationship across both models and in most specifications. We conclude that balance sheet information do not add significantly to the explanation of the rejection probability and (with the exception of leverage) does neither suggest a significant role in the explanation of the self-exclusion of the market.

In the case of the variables related with the export behavior of the firm, exporters are found to be granted credit with a higher probability. This is also the case for firms exporting a higher percentage of their sales. Similar positive effects are also found in the model for the request of a credit. Taking altogether these results convalidate the hypothesis that exporters are better seen by banks than non-exporters, probably reflecting a higher repayment rate, or a higher productivity as the literature suggests.

In relation to the variables that we have assumed to be private information (the profitable opportunities expectations indicator, and the need of financing proxies), we find the expected significant coefficients. Recall that, following the theoretical assumptions, these variables have

been only incorporated in the request model. In the case of the EPP Indicator, the effect of this variable has been found to be positive and significant in most specifications (but not all of them, disappearing when incorporating other proxies for the need of financing) suggesting that the perception of profitable opportunities is translated into a larger probably of requesting a credit. Our alternative proxy for expectations of profitable opportunities, the *Average Weather Indicator* also displays positive and significant effects.

In the case of the *need of financing* proxies, we find clear results suggesting that those firms in need of financing reflect a larger probability of requesting a credit. This effect is confirmed with both of our alternative proxies, as specifications in Columns I and II show. For example, the significant coefficient (at 1% error level) found for those firms that have reported the access to financing as severe or have ranked this problem between their three most difficult problems (Need_difficulties variable) predicts that these firms face a 14% increase in the probability of requesting a credit.

Finally, the test for the null hypothesis of $\rho = 0$ (absence of correlation between equations) has been rejected at 1 percent confidence level in nearly all our specifications (not all though), suggesting that self-selection in the application for the loan exists. The estimations for this parameter display values close to 1 in nearly all specifications, suggesting a strong degree of self-selection[47].

Access to Financing and Performance

Our preliminary results for the effect of access to financing on the performance of firms have not corroborated the expected hypothesis.

Table 10 reports the results of the model of one of the selected performance variables, the growth in sales, where the ratings of firms to the problems they face have been included as explanatory variables. Similarly to Ayyagari *et al*. (2006), when the problems are added separately into the regression (Columns 1-14) some of them appear as negatively (and significantly) related to the growth rate. This is the case of the problem of fall in sales (negatively related nearly by construction); high share of taxes on the final cost; declining profitability; increase in production costs; high financial costs; "other" rated problems; and our key objective variable: "difficulties in obtaining financing". The coefficient of this variable is negative and significant (at 5 percent confidence level) and predicts a 1 percent point decrease in the growth rate of the firm for each increase in the severity with which it rates the access to financing problem.

When incorporating all ratings simultaneously, however, the effect of most variables disappear. Moreover, the difficulties in obtaining financing show now a positive coefficient, suggesting that now all problems have been controlled for, those firms with higher growth rates are those that also need more financing.

Of course, two problems immediately appear in this exercise. The first problem is the high degree of co-linearity among ratings, which might unmask some of the statistical effects. Also, since in this

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[47] Estimations for the (combined coefficient) of the Inverse Mills Ratio have been found positive and significant at 1% level, although are not reported here.

case we do not have theory behind the causality of these effects (Ayyagari *et al.* (2006) implement a causality algorithm to deal with a probable relationship between them), we might be incorporating biases in the estimation for the inclusion of theoretical inappropriate variables. The second problem is the reverse causality problem. Many firms with declining sales might tend to report lower ratings. In order to deal with the reverse causality problem, we estimate a model where we instrument the individual rating of the firm, by the rating that is reported in its corresponding economic sector (this is also an instrument suggested by Ayyagari *et al.* (2006)). The results are shown in the first column of Table 11. This robustness check does not report a significant result.

As an additional robustness check, we employ the "need of financing" proxies that have been used in the previous Section. Columns 2-4 report the results. Once again, we do not find a (theoretically) expected negative effect of the need of external financing on the growth rate of the firm. Finally, similar (non-significant) results have been found when changing the dependent variable for the growth rate in the number of employees.

VI.   Conclusions

In addition to a 7 percent of SMEs that request loans from banks and face rejection, there is at least a percentage of nearly 37 percent of SMEs that are self-excluded from the banking credit market and claim to need external financing (by several indicators). Moreover, among these 37 percent of firms, our indicators of profitable projects opportunities suggest that several of these firms seem to be facing this kind of opportunities. These firms are, from the perspective of the theory of imperfect information in credit markets, the group of firms that should be tackled in order to achieve an efficient equilibrium. It is therefore important to further explore and understand the determinants of credit request successes and self-exclusion.

In this paper, we have approached the credit constraints measurement by exploring SMEs information on credit requests and rejection rates. When estimating a model for the determinants of the firms credit request decision and banks credit approval (rejection) decision, we have found evidence that size plays an important role in the determination of both the request and the approval probabilities. Larger firms face more probability of receiving a bank credit and decide accordingly to request with larger probability. But the largest size effect is found in the probability of request, which suggest that smaller firms will tend to self-exclude themselves from the bank credit market, and this in part reflects their lower probability in obtaining one. The exporting condition of firms seems also to be (positively) screened by banks, showing a positive correlation with the probability of obtaining a credit and it is also found to encourage credit requests. On the other hand, the estimations have not corroborated some expected effects of variables that are supposed to be monitored by banks in the approval/rejection rate. In the case of collateral, for example, the evidence does not show an associated larger probability of approval. The role of collateral as a guarantee (at least according to our measure of fixed to total assets ratio) is not confirmed by our sample. The exception is the leverage ratio, which shows a negative effect in the probability of being granted a credit. It follows that the 20% of SMEs that are rejected from bank credit can be at least partially explained by firms that are too small or are highly leveraged. Regarding the significant self-exclusion of firms, neither of the balance-sheet based variables can explain the probability of requesting a bank loan.

On the other side, the evidence seem clear in indicating that those firms with (private) expectations of profitable projects and those in need of external financing request a bank credit with larger probability. We confirm these results using different proxies. These two observations show that bank credit rationing is not as high as to completely discourage firms to apply. More importantly, these findings suggest that a significant amount of the self-exclusion of the market is related with negative expectations of performance (no profitable opportunities expected) or simply no desire/need of external financing (no project stopped because of lack of financing).

Finally, our exercises on the effect of access to financing on SMEs performances (measured by the growth rates of sales or number of employees), have failed to show a significant results. Taking into account that methodologically it is a difficult task, further robustness checks and new performance indicators will be explored in our future research.

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VII.   Appendix

Table 1: Sources of Investment Financing. In percentages.

	Internal resources	From banks	From suppliers	From clients	From public programs	Other sources
Year						
2006 (n=944)	73.2	15.5	6.9	1.3	2.1	0.9
2007 (n=746)	66.5	20.6	7.5	2	2.1	1.2
2008 (n=1,031)	58.1	27.7	9.5	1.8	1.5	1.4
2009 (n=1,013)	60	23.7	9.6	0.6	4.5	1.7
Total (n=3,734)	64.7	21.7	8.3	1.4	2.5	1.3
Number of Employees						
1 to 11 employees (n=704)	70.8	15.6	8.4	2.1	0.9	2.2
12 to 20 employees (n=1,009)	72.2	15	6	2.3	2.1	2.2
21 to 41 employees (n=955)	66.6	21	6.6	1.5	2.7	1.6
More than 42 employees (n=1,058)	63.1	22.9	9.1	1.3	2.6	1.1
Total (n=3,726)	64.7	21.7	8.3	1.4	2.5	1.3

Source: Observatorio
Pyme.

Table 2: Percentage of firms requesting credit and percentage being granted

	Current Account Overdrawn		Bank Loans		Leasing	
	Request %	Granted %	Request %	Granted %	Request %	Granted %
Year						
2005, n=1110	34.8	86.3	34.8	86.3	-	-
2006, n=865	34.1	89.2	23.9	82.8	15.4	77.2
2007, n=728	40.7	89.9	28.1	83.0	19.0	79.4
2008, n=1016	39.3	85.5	28.9	77.6	19.1	77.5
2009, n=1002	41.8	86.9	31.7	78.5	15.5	79.7
Total, n=4721	38.0	87.3	29.8	81.7	17.2	78.4
Number of employees						
1 to 11, n=1098	28.6	69.5	19.9	54.8	6.3	54.8
12 to 20, n=1470	33.3	84.6	23.6	74.9	11.6	67.3
21 to 41, n=1356	43.7	82.6	37.5	75.8	17.1	81.0
More than 42, n=1278	53.3	86.3	46.7	80.1	31.1	85.1
Total, n=5202	39.9	82.5	31.9	74.3	17.2	78.4
Main Activity						
Manufactures, n=5310	39.6	82.7	31.8	75.1	17.3	78.5
Machinery repair, n=116	39.5	84.4	32.7	62.2	13.6	88.9
Resale, services, or other activities, n=106	50.5	73.6	37.5	51.3	13.3	75.0
Total, n=5536	39.9	82.5	31.9	74.3	17.2	78.4

Source: Observatorio Pyme.

Table 3: Has Stopped a Project because
Lack of Financing- Needs Financing Proxy

	%
Year	
2004, n=596	34.06
2005, n=1178	32.26
2006, n=923	31.20
2007, n=739	30.72
2008, n=1022	29.75
2009, n=998	31.86
Age	
Less than 8 years, n=2371	31.93
9-18 years, n=940	34.04
More 19 years, n=2145	29.98
Number of employees	
1 to 11, n=1121	31.04
12 to 20, n=1509	28.96
21 to 41, n=1394	33.79
More 42, n=1310	32.75
Main Activity	
Manufactures, n= 5234	31.58
Machinery repair, n=114	31.58
Resale, Services, other, n= 105	26.67
Total	32.97

Source: Observatorio Pyme.

Figure 1: Percentage of firms that reported each category as one of the main 3 problems that the firm have to face (2004-2006)
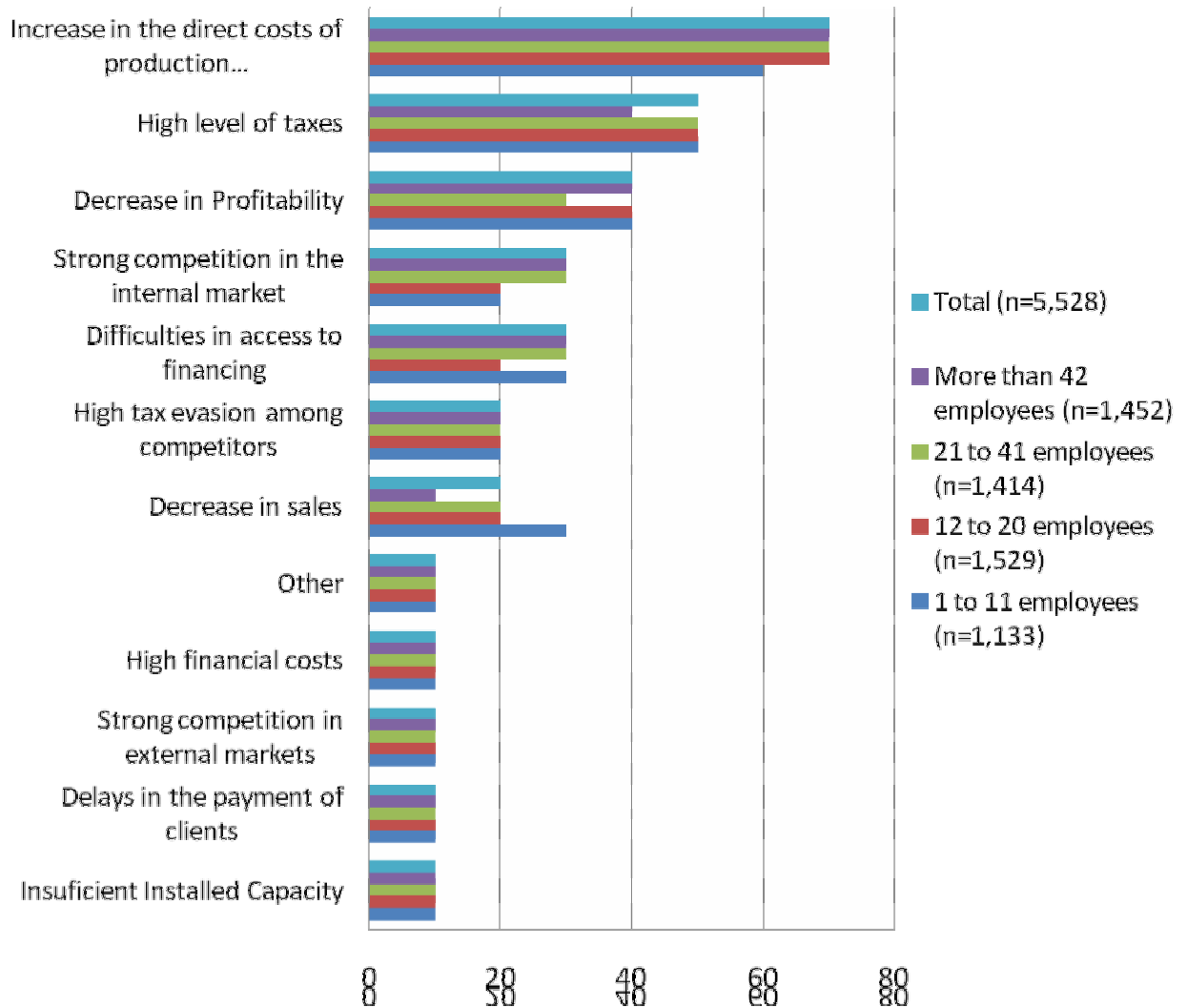
Source: Observatorio Pyme.

Figure 2: Average score of firms to the main problems they have to face. 1-not relevant, 10 very relevant. (2007-2009)
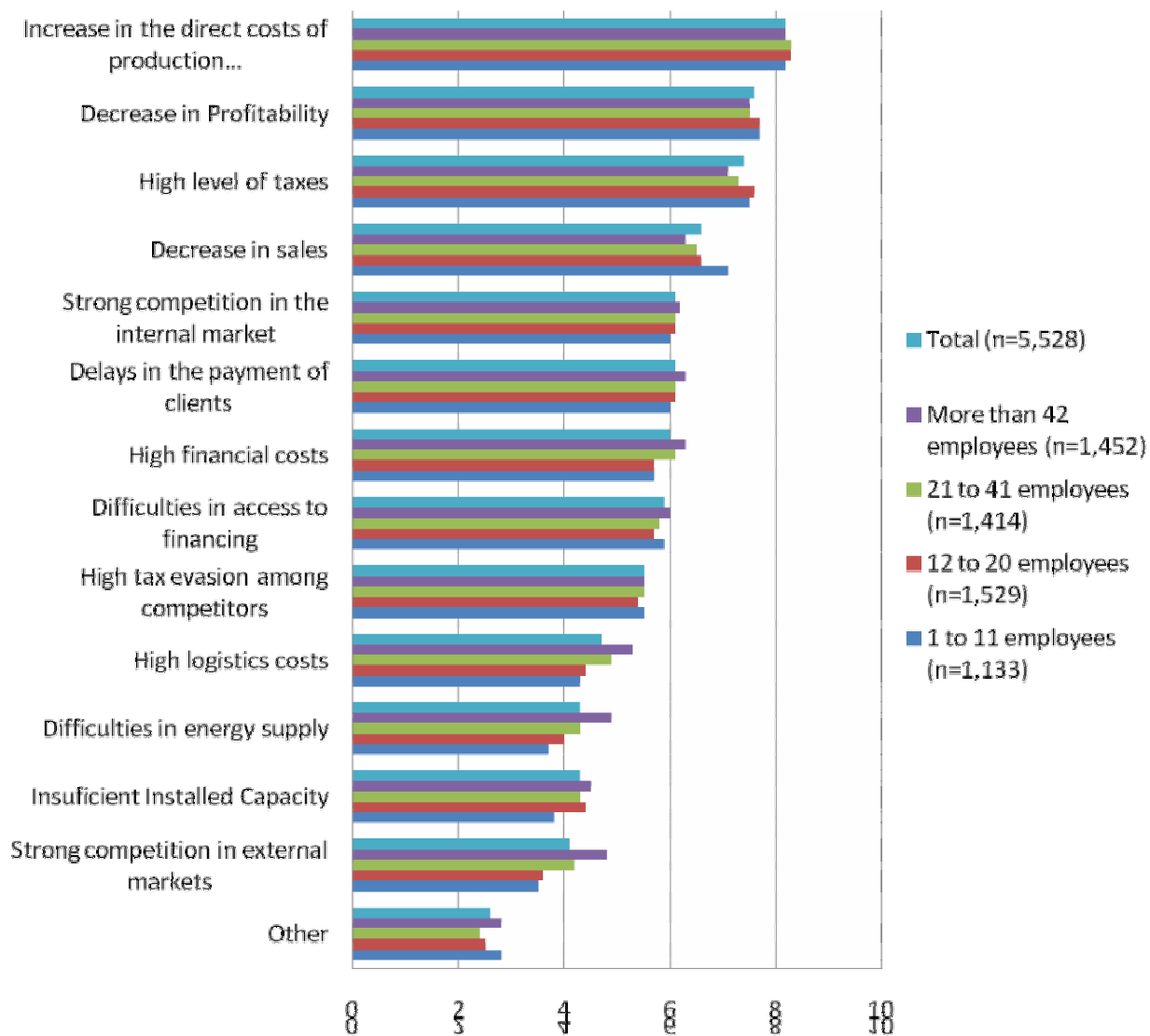
Source: Observatorio Pyme.

Table 4: Panel Database Description

Region	Observations (1)	%	Firms (2)	%	Average Obs. per firms (1)/(2)
AMBA	2212	40	986	41.2	2.24
CENTRO	1497	27	676	28.2	2.21
CUYO	932	17	363	15.2	2.57
NEA	349	6.3	143	6	2.44
NOA	292	5.2	136	5.7	2.15
SUR	254	4.5	91	3.8	2.79
Age					
After 2002	2402	43.4	1666	48.5	1.44
1992-2001	1051	19.0	607	17.7	1.73
Until 1991	2083	37.6	1163	33.8	1.79
Number of employees					
1to11	1133	21	668	22.9	1.70
12to20	1529	28.3	845	29	1.81
21to41	1414	26.2	774	26.5	1.83
More 42	1330	24.6	631	21.6	2.11
Legal Form					
Unipersonal	298	13.5	264	14.5	1.13
Sociedad de hecho	116	5.2	99	5.4	1.17
Sociedad Anónima	999	45.2	801	43.9	1.25
SRL	715	32.4	584	32	1.22
Sociedad Cooperativa	23	1	23	1.3	1.00
Otra	59	2.7	53	2.9	1.11
Total*	5536	100	2395	100	2.31

*Note: The sums of the numbers in the corresponding categories might not equal exactly the general total because of rounding or missing observations.

Source: Observatorio Pyme.

Figure 3.a: Percentage of firms that obtained or have been rejected a Bank Loan Request in the current year (2005-2009) and the EPPI
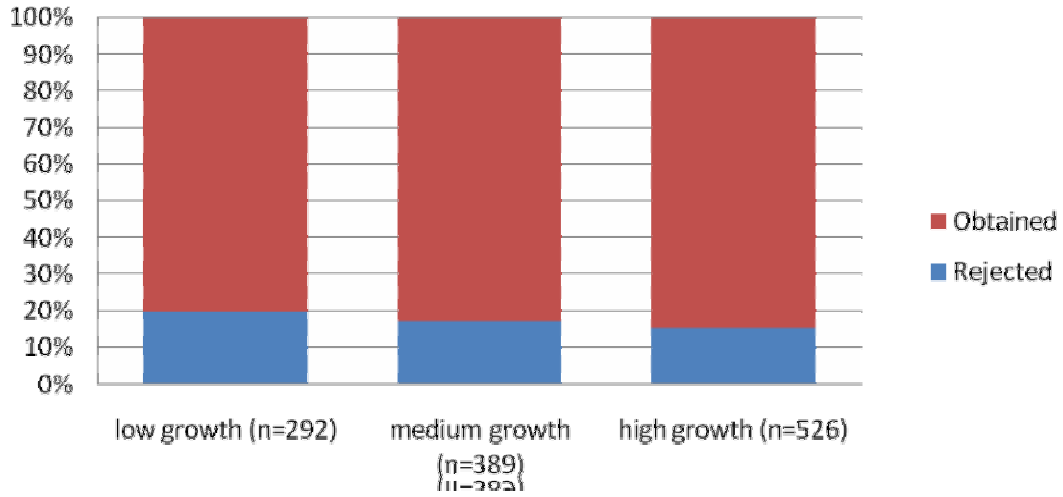
Figure 3.b: Percentage of firms that obtained or have been rejected a Bank Loan Request in the current year (2005-2009) and EPPI component variables
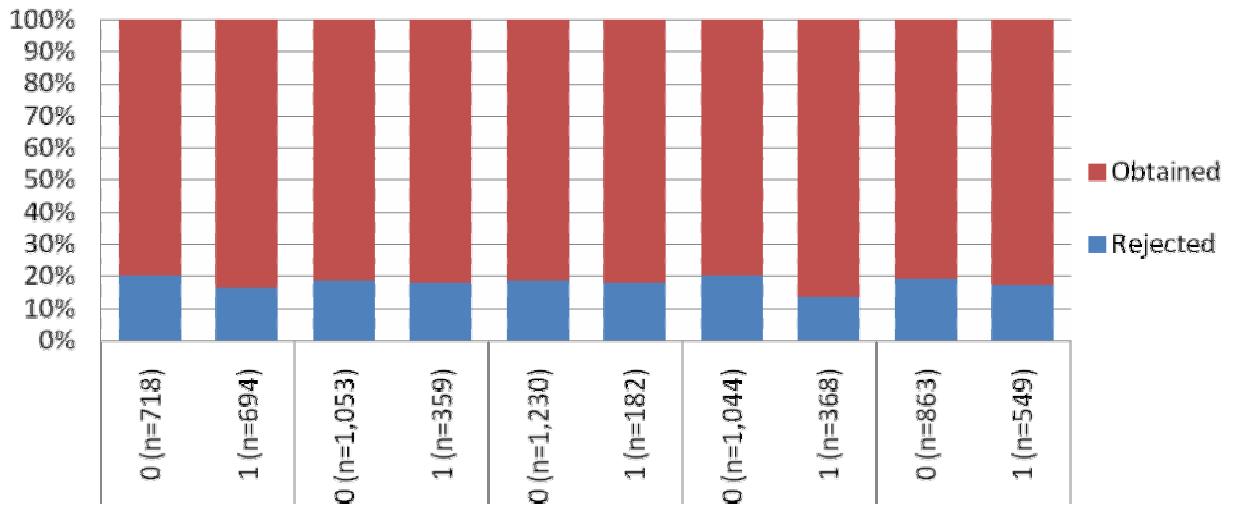
Figure 3.c: Percentage of firms that obtained or have been rejected a Bank Loan Request in the current year (2005-2009) and the *Average Weather* Indicator
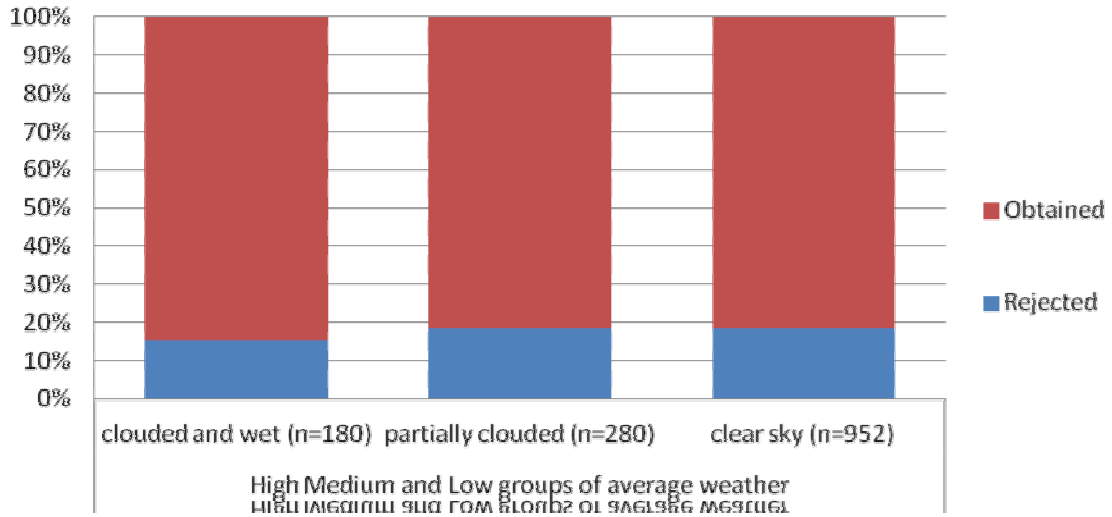
Figure 4.a: Request Status and Desirability of Credit: Has a Project Stopped Because Lack of Financing

Legend: Requested, Did Not Request

X-axis: Does not have a stopped Project 0 (n=3,234), Has a stopped Project 1 (n=1,464)
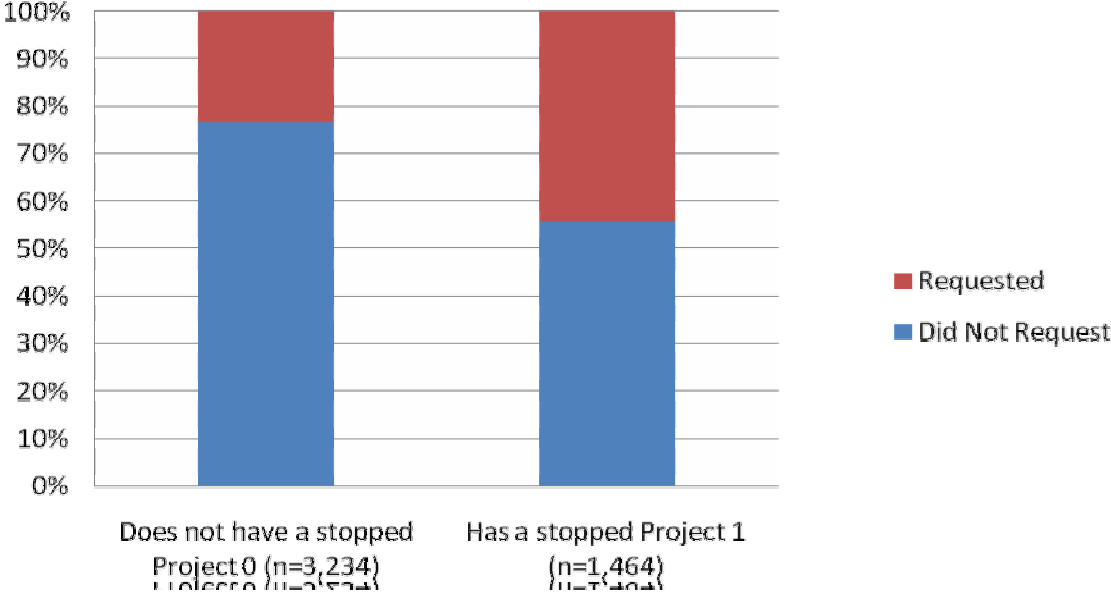
Figure 4.b: Request Status and Desirability of Credit: Obtaining Financing is a Severe Problem

Legend: Requested, Did Not Request

X-axis: The Difficulty in Obtaining Financing is not a Severe Problem0 (n=3,731), The Difficulty in Obtaining Financing is a Severe Problem 1 (n=1,007)
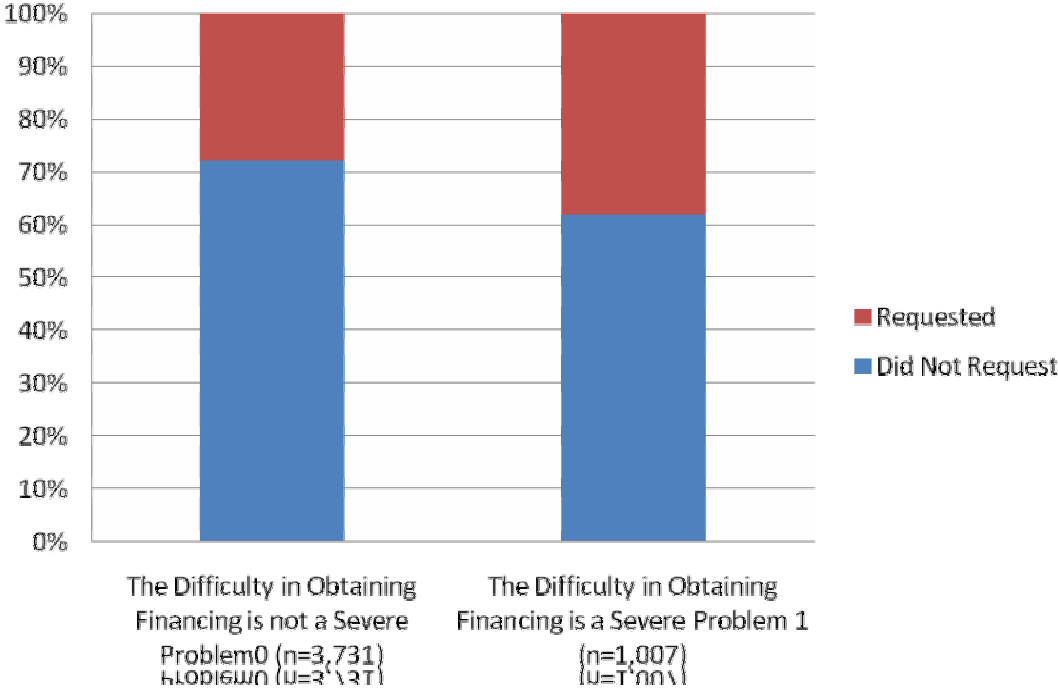
Figure 5.a: Financing Needs and EPPI (only those that did not apply)
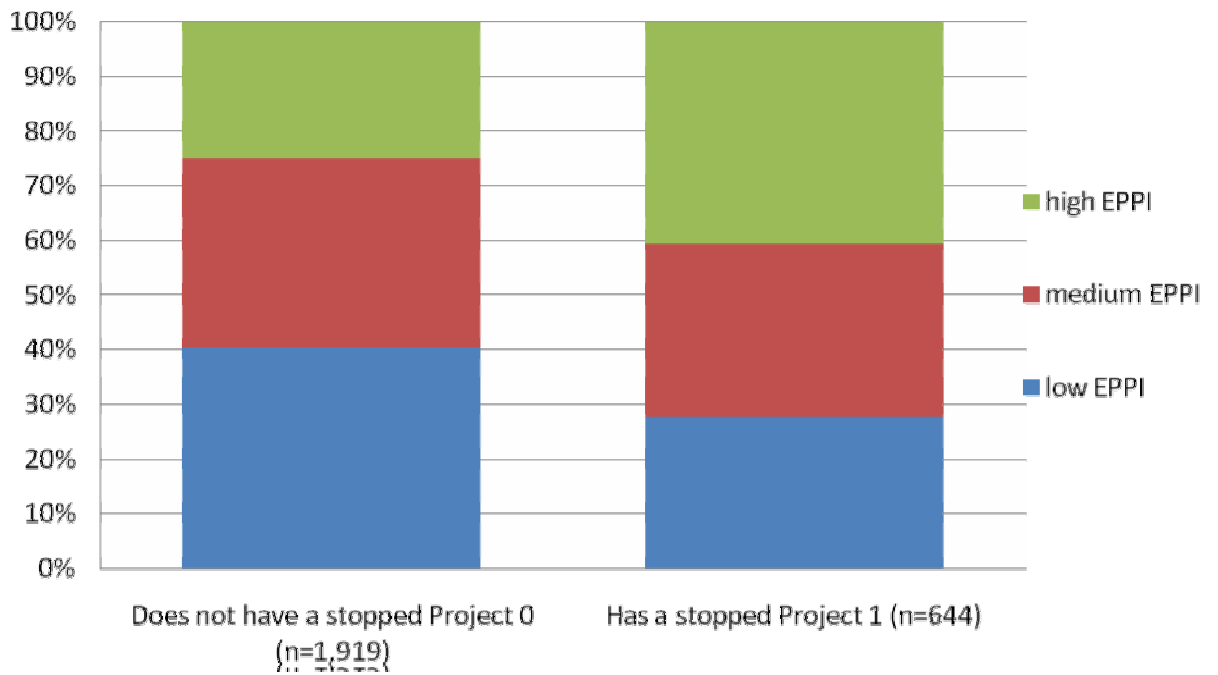
Figure 5.b: Financing Needs and EPPI (only those that did not apply)
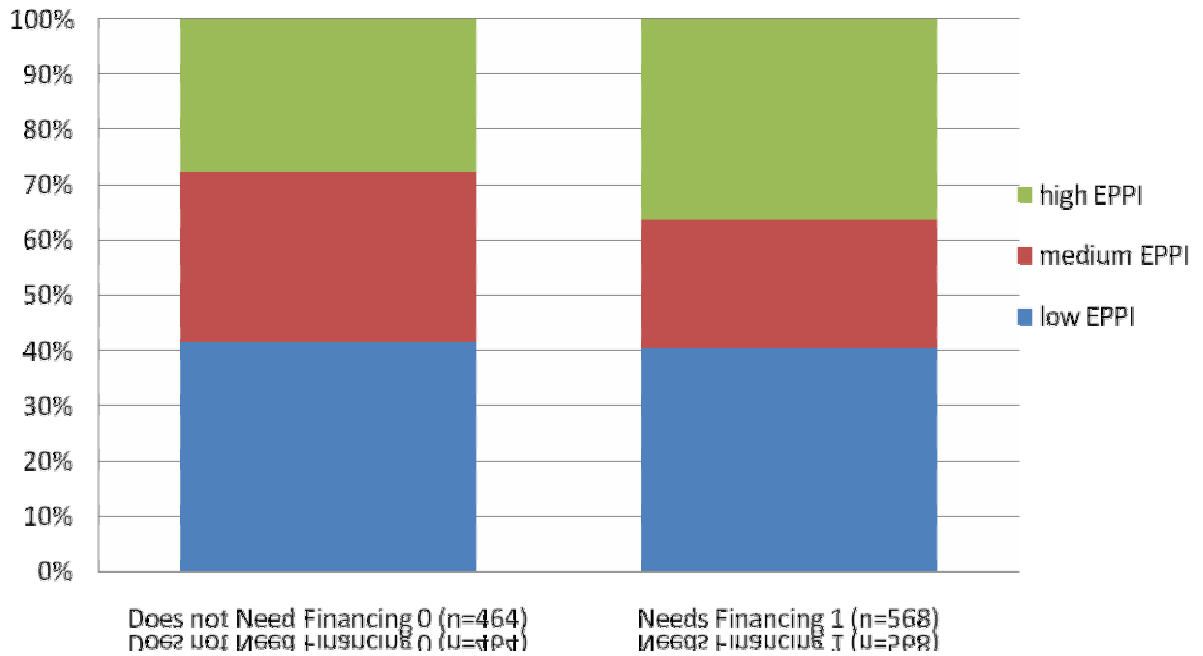
Figure 5.c: Financing Needs and EPPI (only those that did not apply)

Legend:
- high EPPI
- medium EPPI
- low EPPI

The Difficulty in Obtaining Financing is not a Severe Problem 0 (n=2,131)

The Difficulty in Obtaining Financing is a Severe Problem 1 (n=451)
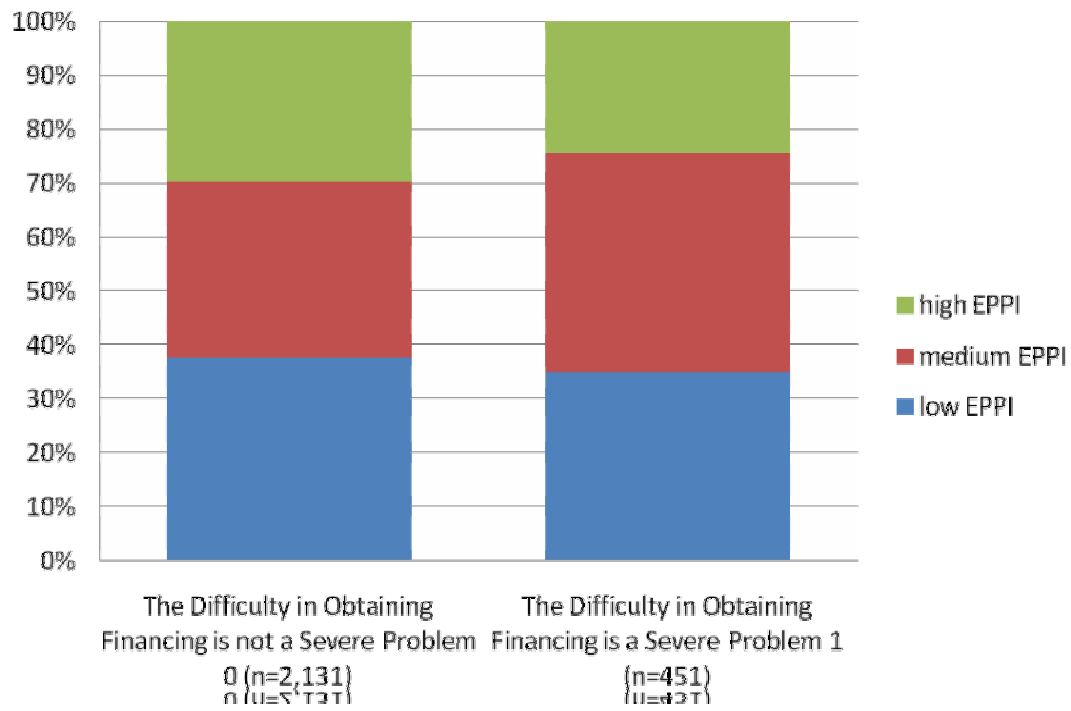
Table 5: Percentage of Respondents Presenting Balance Sheet Information

Region	Observations	Percentage presenting Balance Sheet Information
AMBA	2212	0.45
CENTRO	1497	0.51
CUYO	932	0.56
NEA	349	0.44
NOA	292	0.53
SUR	254	0.50
Age		
After 2002	2400	0.54
1992-2001	840	0.48
Until 1991	2084	0.45
Number of employees		
1 to 11	1133	0.32
12 to 20	1529	0.42
21 to 41	1414	0.56
More than 42	1330	0.68
Total*	5406	

*Note: The sums of the numbers in the corresponding categories might not equal exactly the general total because of rounding or missing observations.

Source: Observatorio Pyme

Table 6: Econometric Results: Model of the probability of reporting balance sheet information. Marginal Effects

	(1)	(2)	(3)	(4)
employees12_20	0.086419***	0.068934***	0.117647***	
	(3.559)	(2.671)	(3.173)	
employees21_41	0.228661***	0.201887***	0.266681***	
	(10.16)	(8.582)	(8.015)	
employees42_more	0.337453***	0.301075***	0.329736***	
	(16.49)	(14.12)	(10.48)	
Number of Employees				0.003339***
				(12.64)
Age (in years)	0.001724***	0.001626***	0.001308	0.001946***
	(3.038)	(2.590)	(1.486)	(3.467)
EPPI		0.018044***		
		(2.640)		
avrg_weather			0.013137	
			(1.397)	
Main Activity Dummys	Yes	Yes	Yes	Yes
Sector Dummys	Yes	Yes	Yes	Yes
Year Dummys	Yes	Yes	Yes	Yes
Observations	3543	2796	1521	3543
Adj. R-squared	0.0674	0.0765	0.0780	0.0489
Prob(Y|X)	0.578	0.662	0.597	0.580
ll_0	-2419	-1813	-1030	-2419
ll	-2256	-1674	-950.0	-2301
df_m	21	22	20	15
chi2	325.9	277.3	160.7	236.7

z statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Explanatory Variables Descriptive Statistics

Variable	Observations	Mean	Percentile 50	Percentile 95	Standar Deviation	Minimun	Maximum
Balance Sheet Indicators							
Collateral (fixed assets ratio)	1834	0.337	0.304	0.721	0.199	0	0.936
Leverage ratio	1837	1.269	0.815	4.283	1.302	0	6.827
Cash-flow ratio	1795	0.545	0.333	2.048	0.682	-2.297	3.316
Number of employees (in logs)	1817	3.432	3.367	4.92	0.859	0.693	5.638
Age	1314	27.531	26	56	15.148	4	98
Dummy if firm exports	1837	0.391943	0	1	0.488317	0	1
Exports rate	1793	7.017698	0	43	16.52399	0	100
Growth and Bussiness Opportunities Expectations							
EPPI	163	0.139	-0.35	2.934	1.486	-1.919	7.827
Averarge_weather indicator	1332	5.931	6	8.231	1.502	0	10
Need Financing Proxies							
need_financing_problem	1796	0.338	0	1	0.473	0	1
need_stopped_project	1820	0.331	0	1	0.471	0	1

Table 8: Econometric Results : Model for the Probabilities of Being Granted (Rejected) from a Credit Request (Cont.)

Dependent Variable: Dummy 1=Received Credit, 0=Rejected.	(I)	(II)	(III)	(IV)	(V)	(VI Partial Effects)
Collateral (fixed assets ratio)	-0.399844	-0.100654	-0.062341	-0.002333	0.026673	-0.034365
	(-0.793)	(-0.317)	(-0.188)	(-0.004)	(0.076)	(-0.315)
Leverage ratio	-0.133940**	-0.120790***	-0.095354*	-0.080865	-0.079928	-0.041240***
	(-2.278)	(-2.726)	(-1.902)	(-0.960)	(-1.472)	(-2.658)
cash-flow ratio	0.116824	0.010843	-0.038361	-0.048936	-0.041362	0.003702
	(0.666)	(0.135)	(-0.451)	(-0.483)	(-0.477)	(0.135)
number of employees (in logs)	0.129889	0.350312***	0.180582*	0.161802	0.147489	0.119604***
	(1.305)	(6.091)	(1.881)	(1.574)	(1.540)	(6.736)
Age	-0.00248	-0.003669	-0.002785	-0.002303	-0.002847	-0.001253
	(-0.447)	(-1.187)	(-0.879)	(-0.751)	(-0.917)	(-1.186)
Sales (in logs)			0.155564**	0.152066**	0.141626**	
			(2.489)	(2.372)	(2.269)	
Exports (as percentage of sales)				0.006903**		
				(2.398)		
Dummy Exporter					0.266052***	
					(2.591)	
Region Dummys	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummys (2005-2009)	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.901976*	-1.379170***	-3.122047***	-3.101544***	-2.986798***	
	(1.752)	(-4.275)	(-4.265)	(-3.750)	(-4.075)	
Number of obs	433	1,159	1,104	1,088	1,104	1,159
Censored obs		743	704	695	704	743
Degrees of freedom	13	13	14	15	15	13
rho		0.971	0.975	0.984	0.981	0.971
Wald chi2	15.2	61.67	66.94	82.81	76.81	61.67
Prob>chi2	0	2.64e-08	6.88e-09	0	2.66e-10	2.64e-08
Wald test of indep. eqns. (rho = 0)		22.31	12.75	0.925	6.667	22.31
Prob>chi2 - Comparison Test		2.32e-06	0.000356	0.336	0.00982	2.32e-06

Note: Column (I) results for the probit model were self-selection has not been taken into account. Columns (II-V) results for the two stage model with correction for firm's self-selection. Column VI reports the partial effects. Robust z-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Econometric Results : Model for the Probabilities of Requesting a Credit.

Dependent Variable: Dummy 1=Requested Credit, 0=Did not request credit.	(I)	(II)	(III)	(IV)
Collateral (fixed assets ratio)	0.352597	0.227215	0.381724	0.244703
	(1.470)	(0.752)	(1.586)	(0.815)
Leverage ratio	-0.065330**	-0.043164	-0.054796*	-0.047308
	(-2.005)	(-1.127)	(-1.692)	(-1.224)
cash-flow ratio	0.024783	0.030765	-0.001071	0.012703
	(0.379)	(0.407)	(-0.016)	(0.170)
number of employees (in logs)	0.357682***	0.360825***	0.357808***	0.333846***
	(7.741)	(6.278)	(7.667)	(5.879)
Sales (in Logs)				
Age	-0.004737*	-0.003596	-0.004580*	-0.003983
	(-1.761)	(-1.070)	(-1.724)	(-1.207)
EPPI	0.051713**		0.013927	
	(2.153)		(0.533)	
Average Weather Indicator		0.120328*		0.111518***
		(1.941)		(3.008)
Dummy: Need financing difficulties	0.463854***	0.419160***		
	(5.927)	(3.780)		
Dummy: Need Financing stopped Project			0.643188***	0.652219***
			(6.774)	(7.535)
Region Dummys	Yes	Yes	Yes	Yes
Year Dummys (2005-2009)	Yes	Yes	Yes	Yes
Constant	-1.633294***	-2.369835***	-1.686858***	-2.271588***
	(-6.811)	(-5.185)	(-6.985)	(-6.117)
Number of obs	1,159	777	1,168	786
Censored obs	743	477	748	484
Degrees of freedom	13	12	13	12
rho	0.971	0.858	0.981	0.966
Wald chi2	61.67	21.80	60.94	30.34
Prob>chi2	2.64e-08	0.0399	3.57e-08	0.00248
Wald test of indep. eqns. (rho = 0)	2.32e-06	0.00943	1.22e-05	0.000101
Prob>chi2 - Comparison Test	22.31	6.740	19.13	15.13

Robust z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Econometric Results : Model for the Probabilities of Requesting a Credit. (Cont.)

Dependent Variable: Dummy 1=Requested Credit, 0=Did not request credit.	(V)	(VI)	(VII) Partial Effects
Collateral (fixed assets ratio)	0.313108	0.371251	0.115130
	(1.271)	(1.505)	(1.389)
Leverage ratio	-0.048304	-0.038458	-0.021563*
	(-1.426)	(-1.135)	(-1.958)
cash-flow ratio	-0.006516	-0.003736	0.001002
	(-0.093)	(-0.055)	(0.044)
number of employees (in logs)	0.260970***	0.243156***	0.118293***
	(3.325)	(3.188)	(7.785)
Sales (in Logs)	0.059869	0.052990	
	(1.127)	(1.040)	
Age	-0.004238	-0.004687*	-0.001384
	(-1.511)	(-1.701)	(-1.492)
EPPI	0.037934	0.039247	0.032979***
	(0.883)	(1.542)	(3.512)
Average Weather Indicator			
Dummy: Need financing difficulties	0.434963*	0.435812***	0.138419***
	(1.777)	(3.776)	(4.616)
Dummy: Need Financing stopped Project			
Exports (as percentage of sales)	0.008303***		
	(3.217)		
Dummy Exporter		0.278918***	
		(3.078)	
Region Dummys	Yes	Yes	Yes
Year Dummys (2005-2009)	Yes	Yes	Yes
Constant	-2.231739***	-2.166717***	
	(-3.515)	(-3.631)	
Number of obs.	1,088	1,104	1,159
Censored obs.	695	704	
Degrees of freedom	15	15	15
rho	0.984	0.981	
Wald chi2	82.81	76.81	120.7
Prob>chi2	0	2.66e-10	0
Wald test of indep. eqns. (rho = 0)	0.336	0.00982	
Prob>chi2 - Comparison Test	0.925	6.667	

Robust z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 6. Panel A: Bivariate Probability of Requesting and Being Granted a Credit, and the Number of Employees (in logs)
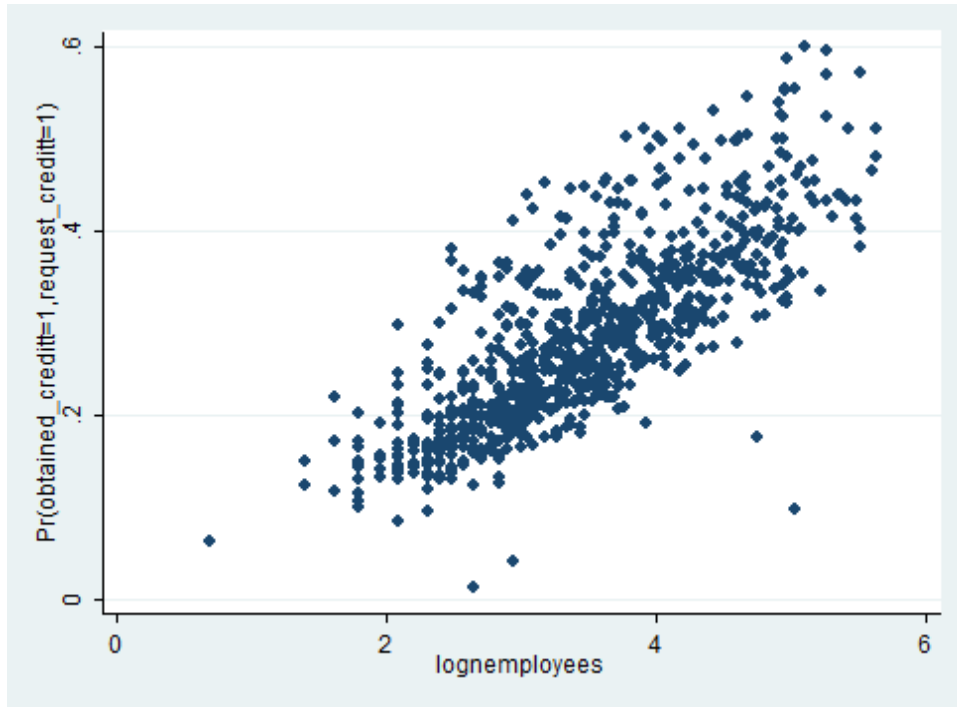

Figure 6. Panel B: Probability of Being Granted a Credit Conditional of Having Request and the Number of Employees (in logs)
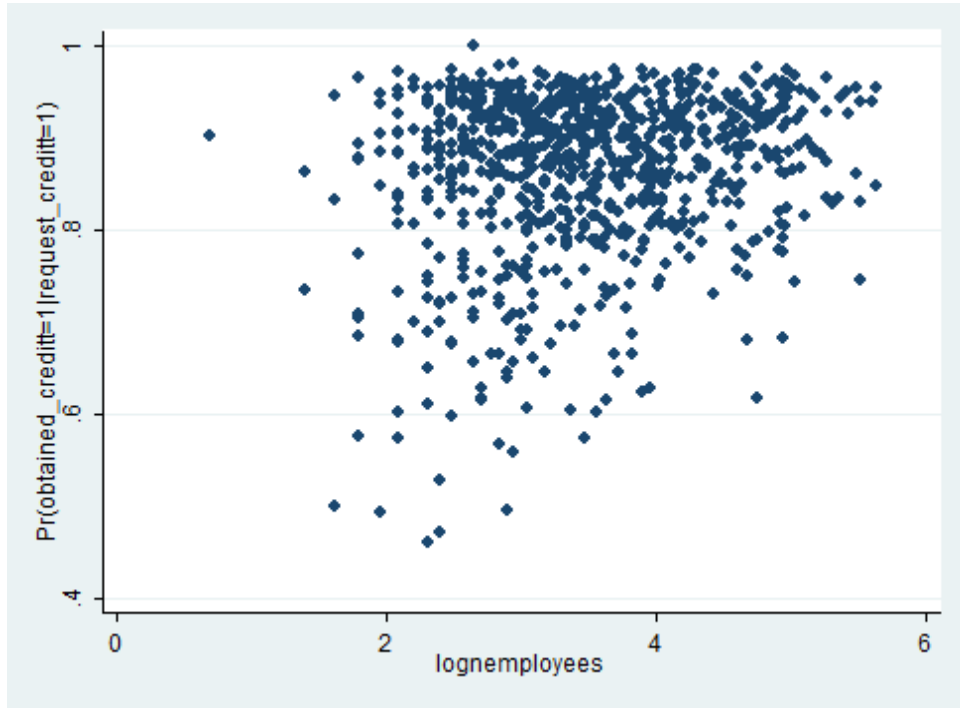
Table 10: Econometric Results. Performance and Access to Financing Model

Dependent Variable: Growth Rate in Sales	1	2	3	4	5	6	7	8
Size (number of employees)	.0298261	.0251785	.0297297	.0199929	.0258246	.0300209	.0294153	.0284382
	(.0365358)	(.0360909)	(.0364002)	(.0358037)	(.0357624)	(.0358562)	(.035631)	(.0363209
Problem: Installed Capacity	-.1153882							
	(.5497949)							
Problem: Sales fall		-1.666693***						
		(.5132727)						
Problem: Difficulties in obtaining financing			-1.027168**					
			(.4810503)					
Problem: High share of taxes on the final cost				-1.730342***				
				(.633291)				
Problem: Declining profitability					-2.015725***			
					(.6654531)			
Problem: Late payments from clients						-.7380282		
						(.5449058)		
Problem: Increase in direct production_costs							-2.343784***	
							(.8219092)	
Problem: Strong competition in the domestic market								-.1685294
								(.6080299
Constant	-5.858331	5.658125	-.4419792	6.051764	8.650108	33.99333***	48.77473***	30.99758*
	(3.581633)	(4.772919)	(4.048693)	(5.373718)	(5.754622)	(4.597497)	(7.477479)	(4.861029
Region Dummys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main Activity Dummys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	.0669001	.0723071	.0688818	.0726114	.0732242	.0700418	.0727645	.0681104
Nro de casos	2111	2111	2114	2130	2126	2120	2131	2125

* p<0.1, ** p<0.05, *** p<0.01

Table 10: Econometric Results. Performance and Access to Financing Model

Dependent Variable. Growth Rate in Sales (Cont.)	9	10	11	12	13	14	15
Size (number of employees)	.0279869	.0368473	.028344	.0342304	.01577	.0451361	.0280863
	(.0370788)	(.0359182)	(.0362182)	(.036472)	(.0658604)	(.0350221)	(.0739155)
Problem: Strong competition in international markets	-.1627518						-1.270994
	(.4734696)						(.9808269)
Problem: High financial costs		-1.398854***					-3.568255**
		(.5013367)					(1.405519)
Problem: High degree of evasion of local producers competition			-.4409596				1.29658
			(.4816567)				(1.094194)
Problem: Difficulties in the supply of energy				-.3073189			.7613319
				(.5033126)			(1.256074)
Problem: Other					-3.139011***		-3.217549***
					(.8479344)		(.9957377)
Problem: High logistics costs						-.3079167	-1.613916
						(.5177865)	(1.387014)
Constant	-5.902771*	36.07626***	32.02735***	-5.436678	64.63729***	-6.862844**	62.64163***
	(3.489619)	(4.226627)	(4.292172)	(3.361064)	(9.519609)	(3.39381)	(16.4374)
Region Dummys	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummys	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main Activity Dummys	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	.0702669	.0720635	.0674415	.0689969	.1355508	.1098017	.1520066
Nro de casos	2068	2113	2094	2117	514	1564	456

* p<0.1, ** p<0.05, *** p<0.01

Table 11: Econometric Results. Performance and Access to Financing Model

	Growth Sales - IV LIML	Growth Sales - Panel Fixed Effects	Growth Sales - Panel Fixed Effects	Growth Sales - Panel Fixed Effects	Growth Sales - Panel Fixed Effects
Problem: Difficulties in obtaining financing (1-10)	-4.123593				
	(-1.102)				
Size (number of employees)	0.030227	.1127159	1.160143*	.1143318	.4398201
	(0.865)	(.1527827)	(.6678375)	(.1510982)	(.4187348)
Dummy Has a Stopped Project because Lack of Financing- Needs Financing Proxy		-.6849976			
		(4.883781)			
Dummy any reason except dont need financing			1.832552		
			(10.04142)		
Dummy: Access to financing rated as severe (2007-09)				-7.082082	
				(6.056075)	
Dummy: Access to financing between the 3 most severe problems (2004-06)					-5.8674
				9.715978)	(9.715978)
Constant	17.283407	37.29488	-9.497011	36.62315	31.19624
	(0.815)	(25.44325)	(21.87692)	(25.28984)	(35.88039)
Observations	2114	4371	1059	4416	2236
R-squared	0.047	.0334296	.019185	.0343123	.0307216
Region Dummys	Yes	Yes	Yes	Yes	Yes
Year Dummys	Yes	Yes	Yes	Yes	Yes
Main Activity Dummys	Yes	Yes	Yes	Yes	Yes

Z statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1