USE OF BORROWING BY PORTUGUESE FAMILY FIRMS: ARE THERE LIQUIDITY CONSTRAINTS?

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Abstract

In this paper we examine the following three hypotheses about which there is some lack of research in the financial literature: i) family ownership is a relevant factor in determining firms' access to sources of debt; ii) family ownership influences differently the probability of using a given source of finance, its use being subject to approval by financial institutions; and iii) the influence of the family ownership factor on firms' access to debt differs between micro, small and medium/large firms. Using a bivariate models with partial observations to explain the probability of the firm requesting debt and the concession by the financial institutions, we find strong support for the three hypotheses. Particularly, we find that: i) the family ownership factor is an important determinant of the demand for bank debt and leasing, ii) family-owned firms are exposed to restrictions in access to bank debt. In the case of leasing, the opposite happens, and iii) family-owned micro firms are more likely to suffer restrictions in accessing bank debt.

Keywords: family firms, financial constraints, size, bivariate models with partial observations, leasing, bank.

1. Introduction

Despite the particularly active research on capital structure, since the pioneering publication by Modigliani and Miller in 1958, a limited number of studies have been published on debt structure. Examples of studies published on this topic are those by Bolton and Scharstein (1996), Bolton and Freixas (2000), Liu (2006), Rauh and Sufi (2010) and Thadden et al (2010).

Despite the evidence demonstrated by firms' financial decision practice, using debt of different types, sources and priorities, the majority of empirical studies on capital structure decision treat debt as uniform. At a time of great concern about excess debt in European

economies, it is of great interest to know the determinants of firms' debt structure. The main objective of this paper is to contribute to increasing knowledge about the financing decision, by investigating if debt structure depends on the firm's decision or if it is determined by restrictions imposed by the financial market. Just as La Rocca et. al, (2011), we believe that firms' debt structure is the result of business decisions, but that it can also be motivated by inefficiencies in the financial system. These are stronger in SMEs than in large firms and are associated with problems of information asymmetry (Berger and Udell, 1995; Scherr and Hulburt, 2001; and Ramalho and Silva, 2009), taking on greater importance in small peripheral economies such as Portugal.

The importance of SMEs and family firms for the European economy is extensively dealt with in the European Commission reports of 2003 and 2009. They account for between 70% and 80% of European firms and contribute to between 40% and 50% of employment (Mandl, 2008). In Portugal, these firms represent between 70% and 80% of the business sector, two thirds of GNP and 50% of employment (Coimbra, 2008).

Besides the economic relevance of family firms, the limited number of studies on debt structure in the international literature and, as far as we know, on family firms of different sizes and sectors of activity forms the main contribution of this paper. To meet this objective, the sample of this study is divided into family firms and non-family firms of various sizes (micro, small and medium-sized/large) and by sectors of activity (industry, construction, commerce and services). Organizing data in this way allows investigation of the effect of the type of ownership on debt structure in firms of different sizes and in different sectors of economic activity. The majority of empirical work is focused on studying small and medium-sized firms (SMEs) as a uniform group, ignoring their differences which could induce different processes in the financing decision (Ramalho and Silva, 2009). In empirical work, it is also common to consider only SMEs or large firms (e.g. Ebben and Johnson, 2006; Cassar and Holmes, 2003; Hall et al, 2000; López-Gracia and Aybar-Arias, 2000; Chittenden et al, 1996), which makes it difficult to make direct comparative analyses between firms of different sizes. In addition, studies about the financing process of small firms, particularly micro-firms, are few in the financial literature, with those by Ramalho and Silva (2009), Akyüz et al (2006), Cassar and Holmes (2003) and López-Gracia and Aybar-Arias (2000) probably being the only cases. Although family firms exist in all sectors of activity, their presence is most associated with traditional, work-intensive sectors (Mandl, 2008). Villalonga and Amit (2010) state that whole sectors of activity are dominated by family firms. However, there is still limited knowledge of family firms' involvement and

performance in each sector (Chen and Nowland, 2010), namely the relationship between these attributes and access to debt.

The second contribution of this paper arises from studying the probable existence of restrictions in firms' access to financial debt and what factors determine this limitation. This aspect is particularly relevant for the financial literature at a time when several papers such as those by Petersen and Rajan (1994), Brounen et al. (2005), Strebulaev and Yang (2007), Kurshev and Strebulaev (2007) and Ramalho and Silva (2009) showed that a substantial number of firms follow a zero leverage policy. It is therefore important to investigate whether zero or low rates of debt ratio are the result of the firm's internal decision not to resort to debt or if they are due to external restrictions. In particular, we intend to investigate whether the firm's family ownership, size and sector of activity influence its access to different sources of finance. Researching the possible existence of restrictions in access to debt and their limiting factors is another contribution of the paper. In particular, we investigate whether family ownership has an influence on firms' access to the main sources of financial debt used by Portuguese firms, i.e., bank loans and leasing[1]. Indeed, it is important to check if the existence of zero or low debt ratios is the result of a decision by those in charge of firms not to turn to debt, or due to external restrictions in accessing these sources of finance. Access to capital is a critical factor in the formation and growth of these firms, and so it is relevant to investigate how family ownership influences this process.

The third contribution is of an econometric nature, resulting from application of the most suitable methodology to study the process of firms' financing decision[2]. In certain

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[1] *Eisfeldt and Rampini (2009) mention that leasing is essentially ignored in the financial literature. However, for most firms, leasing represents a significant proportion of total debt (Chu et al, 2008). The financial literature provides mixed results in explaining the decision to use leasing and/or bank loans. On one hand, the financial literature suggests that leasing and traditional financing (for example, through banks) are substitute sources (growth of one source diminishes the other), but on the other says they are complementary sources (high levels of one source concur with high levels of the other). Nevertheless, the decision to resort to leasing or other sources of finance remains an empirical question (Callimaci et al, 2011).*

[2] The econometric aspect is one of the gaps pointed out in previous studies. The majority of researchers studying the financing practices of family firms only focus on the mere influence of the family aspect, failing to formally propose econometric models (López-Gracia and Sánchez-Andújar, 2007).

samples, a significant number of observations were seen to have a value of zero in the variables representing the result of the financing decision, reflecting the fact that many firms do not use debt or did not access this type of financing. In the study of restrictions in access to the financial market, the bivariate model with partial observations was used, allowing inclusion of both sides of the financing decision, that of supply and demand. So at a first stage, firms decide to use, or not to use, a given source of debt; and at a second stage, if the decision is to use it, financial institutions decide whether to grant these funds. In fact, the sample data only present the situation where firms seek debt and this is granted, with no observation of other possible scenarios of this process. The point is that these data do not include information about cases where the request for debt is turned down. Due to this lack of data and empirical studies on the topic, based on the bivariate model the intention is to deal with this matter. Only Heino (2006) applied this methodology in studying the financing decision of Mexican micro-firms.

This study is structured in five more sections after this introduction. The following section presents the financial literature's contributions on the relationship between family ownership and access to debt. Section 3 characterizes the sample and identifies the variables used in the econometric study. Section 4 specifies the econometric methodology and presents the results obtained with the econometric models. Finally, the study ends with the conclusion.

2. Classic Determinants of the Financing Decision

The first section presents a summary of the theories of capital structure, agency costs, pecking order and trade-off, and how these can be adapted to studying the debt structure of family firms. The second section presents the main hypotheses tested in the empirical part.

2.1. Classic Theories of Capital Structure

Some authors, such as Ang et al (2000) and Ampengerger et al. (2009) argue that family firms have lower agency costs because creditors see family ownership as the business model that best protects their interests. In the first place because it is easier to align the interests of the owners (family) with those of the managers (family members). In addition, the main interests of the shareholding family are defending the family reputation and the desire to pass on ownership to the next generations, i.e., they are more concerned with maximizing the firm's value than maximizing wealth. Therefore, they tend to make decisions more oriented towards long-term objectives and towards reducing the risk of failing to meet obligations,

which can contribute to reducing monitoring costs and to alignment with creditors' interests. Taken together, creditors' recognition of this behaviour allows the granting of more favourable terms of credit, as shown by James (1999) and Anderson, Andersen et al (2003) who identified a lower cost of debt in family firms. From another perspective, we can expect family firms to have higher agency costs of debt, due to the concentration of ownership and management in family members, the greater ease of changing the composition of assets and greater capacity to use bonuses and gratuities. These characteristics represent a greater conflict of interests between the shareholding family and creditors and imply higher monitoring costs. In these circumstances, family firms face more restrictive terms of bank credit and higher interest rates, with financing through leasing emerging as an alternative. This source of finance can be seen as a means to control the agency costs of debt related to asset substitution and underinvestment (Sharpe and Neguyen, 1995; Barclay and Smith 1995). These costs can be reduced by increasing the proportion of leasing in the debt structure. Given the limited number of empirical studies on this subject, in line with the perspective of Chua et al. (2011), we can accept as inconclusive the effect of family involvement on agency costs and on firms' capital structure.

Trade-off theory defends the existence of an optimal capital structure allowing maximization of company value. This maximization occurs with setting the tax benefits (tax effect aspect) against the costs of debt (insolvency costs aspect). The benefits arise from reducing tax, allowed by deduction of interest on the debt (MM, 1963) and other costs such as amortization and provisions. The costs are originated by the potential costs of insolvency (Kraus and Litzenberger, 1973). Increased debt increases the firm's exposure to possible difficulties in meeting its obligations, i.e., it raises the expected bankruptcy costs. From this perspective, firms face a trade-off between the tax advantages and the increased costs arising from debt. Therefore, issuing additional debt has two effects on company value. On one hand, it increases the value through tax savings and on the other, diminishes it due to the reduced likelihood of survival. Depending on which of these conflicting influences predominates, company value can rise or fall with increased debt (Brennan and Schwartz, 1978). These aspects are even more important in family firms, where the literature suggests they use resources more efficiently (Anderson and Reeb, 2003; Lee, 2006; Maury, 2006; Chu, 2009). Then, despite managers and owners' greater aversion to risk, they need to invest and issue debt to take advantage of tax benefits. As an alternative they can take out leasing contracts which allow increased tax savings through the mechanism of accelerated amortization of assets included in rents. In this way, leasing allows increased tax savings compared to other

sources of finance such as bank loans. If family firms are more efficient, they make more profit, and so financing through leasing allows a reduction in the value of the tax paid on income. This source of finance allows diminished likelihood of insolvency and transfer of the risk from the firm to the leasing company. Given the importance of this risk for shareholding families, which can mean loss of control to creditors, we can expect to find a higher proportion of leasing in the debt structure of family firms. The greater tax savings from leasing and the higher insolvency costs borne by family firms mean these firms will have an optimal capital structure that is different from other firms and a different way to reach it.

According to the pecking order theory of Donaldson (1961) and Myers and Majluf (1984), firms tend to choose sources of finance according to the following hierarchy: first they use internally generated funds, and when these are insufficient they issue bonds. In the latter case, first of all they choose increased debt, and only as a last resort after exhausting their capacity for debt do they issue new shares. This behaviour is explained by information asymmetry and by the informative character of financing decisions, which are interpreted by market agents as signs of company value. In the case of family firms, where their property is often confused with that of the family and where the managers are owners, financing decisions are mainly affected by the desire to avoid intrusion in business and ensure ownership will be transferred to future generations. These characteristics mean managers have a great capacity to change firms' asset portfolio, to consume benefits and channel funds to themselves or to the family. Together, these characteristics do not favour the external investor. These factors determine that to avoid interference in business, family firms first of all use internal funds and, wanting to keep control of the business, prefer debt to equity financing, which represents the behaviour forecast by pecking order theory. Given the characteristic of greater opacity in family firms, leading to higher costs of information asymmetry, leasing emerges as a preferred source of finance, and a prioritized source of finance in the pecking order of external finance.

2.2. Empirical Hypotheses

Since the literature on family firms and the three classical theories of capital structure do not clarify the decision process on debt structure or justify possible differences between family and non-family firms of varying sizes and sectors of activity, in this section we present some hypotheses to study the proposed aspects.

Although most empirical studies on capital structure treat debt as uniform, some authors such as Diamond (1991 and 1993), Park (2000), DeMarzo and Fishman (2007), Hackbarth et al (2008) and Rauh and Sufi (2010) demonstrated that firms use various types of debt simultaneously. In line with the initial work by Rajan (1992), Dewatripont and Maskin (1995) and Bolton and Scharfstein (1996) who studied optimal debt structure, López-Gracia and Mestre-Barbera (2010), Yuetang et al (2010) and Luo (2011) analyzed the influence of tax on optimal debt structure.

Various authors such as Petersen and Rajan, 1994; Cosh and Hughes, 1994; Berger and Udell, 1998) and Cressy (2007) confirmed that bank loans are small firms' main source of external finance. Sharpe and Neguyen (1995) demonstrated that leasing is a good financing alternative for firms close to their maximum debt capacity and Drury and Braund (1990) and Beattie et al. (2000) confirmed this is a good alternative for firms facing liquidity problems.

The financial literature speaks of the reluctance of those in charge of family firms to use debt. Nevertheless, some studies have pointed out similar behaviour in family-owned firms and other firms concerning how they resort to finance through debt. Therefore, the aim is to study the determinant factors, firstly, of the use of debt by this type of firm, and secondly, of the granting of funds by financial institutions. So the following hypothesis is formulated:

Hypothesis 1: Family ownership is a relevant factor in determining firms' access to sources of debt.

Analysis of Table 2 and 3 show that 34% of family firms and 37,4% of non-family firms have no bank debt and 32,8% and 42,9% present no financing through leasing. When we observe the use of these financing sources over a longer period, the number of firms not using either is seen to almost double. Various studies such as those by Faulkender and Petersen (2006), Strebulaev and Yang (2007), Byoun et al (2008), Ramalho and Silva (2009), Dang (2011), Bessler et al. (2012) and Strebulaev and Yang (2007) observed that a high number of firms in their samples had no debt in their capital structure. Considering these data, it seems relevant to find out the reasons why so many firms do not use debt to finance their operations or why they do not use certain sources of debt in their debt structure.

Like Kurshev and Strebulaev (2007) and Ramalho and Silva (2009), we believe that the explanation can be found in the financing decision process, which develops in two stages. The first stage consists of the firm's decision to use a certain source of finance. But the final result, the second stage, depends on financial institutions' approval of the request for finance. From this perspective, firms' debt structure depends on the choice in terms of source of finance and on the decision on the supply side.

Although the decision process is common to both types of firm, both the type of option for a given source of finance and the financing source's decision can be affected by the type of firm ownership structure. Family firms tend to favour control of capital and avoid interference in the business, which suggests the preference for financing through leasing. But the greater security offered to creditors by these firms' interest in lowering risk suggests that creditors will tend to facilitate financing through bank loans.

According to Smith and Wakeman (1985), holding assets via traditional financing makes it more difficult for firm owners to reduce risk through diversification and the use of leasing can mitigate this problem. Indeed, the owners of closed firms can diminish risk through leasing due to this being shared to a certain extent by the leasing compnay. Adams and Hardwick (1998) also concluded that closed firms tend to use more leasing than firms with more disperse capital ownership.

Depending on the factors affecting each phase of the decision process, we can expect to find differences between the debt structure of family firms and that of non-family ones, and so we will analyze the results of the following hypothesis:

Hypothesis 2: Family ownership influences differently the probability of using a given source of finance, its use being subject to approval by financial institutions.

The size factor has been pointed out in the literature as an important determinant of firms' access to different forms of finance. Various authors such as Petersen and Rajan, 1994; Cosh and Hughes, 1994; Berger and Udell, 1998) and Cressy (2007) confirmed that bank loans are the main source of external finance for small firms. Firms of different sizes can therefore be expected to behave differently when turning to the financial market and receive different responses.

Ramalho and Silva (2009) demonstrated what the literature has increasingly recognized, that the financial behaviour of micro and small firms differs from that of medium-sized and large firms. The fact is that small companies are not a smaller version of large ones (Scherr and Hulburt, 2001). These authors, just as Ang (1992), Berger and Udell (1998) and Sogorb-Mira (2005), found that small firms differ from large ones in various aspects such as taxation, expected life-cycle, access to the financial market, flexibility, scale economies and information asymmetry.

Although many studies characterize the differences between SMEs and large firms, to our knowledge, the literature on family firms has not yet managed to separate suitably the effects of size from the effects of ownership on the choice of capital structure. Lasfer and Levis (1998) mention studies where greater use of leasing was confirmed in firms with a high

proportion of owners in management (Mehran et al (1999) and in small firms (Barclay and Smith, 1995, Sharpe and Nguyen, 1995) but the question of size's influence on this decision process is complex. According to the authors, the determinants of leasing are influenced by company size. SMEs bear greater financing costs than large firms (Kundid and Ercegovac, 2011). In this study, based on a sample of micro, small and medium/large firms, we intend to contribute to clarifying the differences caused by family ownership in the debt structure decision of firms of various sizes through testing the following hypothesis:

Hypothesis 3: The influence of the family ownership factor on firms' access to debt differs between micro, small and medium/large firms.

According to contributions in the financial literature, micro and small firms are expected to present greater restrictions in accessing debt due to their characteristics (levels of risk and problems of information asymmetry), whether or not they are family-owned firms. Quality, efficiency and sustainable management of the credit risk in commercial banks incorporates a process of credit rationing. SMEs are significantly dependent on bank finance, with access to finance being a priority for this type of firm. However, these firms suffer greater financing restrictions than large ones for various reasons, among them their closed nature which increases problems of information asymmetry (Kundid and Ercegovac, 2011). Funding through leasing can be an effective means of solving the financing problems of SMEs (Hongyu and Meiyue, 2012).

According to Eisfeldt and Rampini (2009), the greatest benefit for the leaser is the possibility to recuperate the asset. This possibility allows the leaser to grant more credit than do financial creditors whose rights are guaranteed by the same asset. In this way, financing through leasing allows a greater capacity for debt compared to financing through guaranteed debt. This aspect makes the former source of finance more valuable for financially restricted firms. However, leasing presents agency costs related to the separation of ownership and control of the asset originating a trade-off between the benefits and costs associated with this source. The benefits will compensate for the costs in firms that are more restricted financially, whereas less restricted firms will prefer to own the assets. Lasfer and Levis (1998) also refer to this dichotomy of benefits and costs between the two sources.

One of the big advantages of leasing is forcing, unconditionally, the leaser to meet his contracted financial obligations while the contract lasts. This aspect leads leasers to play a significant part in financing firms' investment, compared to bank loans, due to requiring a low initial payment, or none at all. This allows the leaseholder to keep his banking provisions and lines of credit for needs to finance the exploration cycle. In addition, leasing is more

flexible in terms of periodic payments which may be adapted to firms' needs and possibilities. This form of finance presents higher rates of financing approval than finance from banks (Canadian Finance & Leasing Association CFLA, 2004).

According to the CFLA (2004), the interest rates for leasing are typically higher than bank finance, but on the other hand, transaction costs are lower. With bank finance these costs can be significant, particularly for small and medium-sized firms, since they are fixed and not dependent on the level of financing. This difference between the benefits and costs of both sources of finance may mean that each serves different market niches. Around 60% of leasing clients are small and medium-sized firms.

Lasfer and Levis (1998) suggest that finance through leasing contributes to forming fixed capital and that this source can present lower financing costs.

3. Descriptive Data Analysis

This section describes the sample and the variables used in this study, and presents a preliminary analysis of the effect of family ownership, size and sector of activity on the debt structure of family firms and non-family firms.

3.1 Sample

The data used in this study were extracted from the SABI database, which provided balance sheets, income statements, concentration of capital, division of debt into the different sources of finance and other characteristics of Portuguese companies in 2007. To build the sample, two selection criteria were used. Firstly, firms could not be in a situation of technical bankruptcy, which according to article 35 of the Commercial Company Code corresponds to having negative equity. Secondly, firms should possess operational gains, EBITDA[3] and positive turnover in order to consider in the sample only firms that are operating and not at a final stage of their life-cycle or at too early a stage.

The lack of consensus in the literature on the definition of a family firm, classified by Astrachan et al. (2002) and Klein et al. (2005) as the "family business definition dilemma", is well characterized in the paper by Mazzi (2011), which presents a long list of definitions used, where criteria related to ownership predominate. Considering this aspect and the information available on the SABI, we follow the concept of López-Gracia and Sánchez-Andujar (2007) and classify as family firms those where an individual or a family owns more

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[3] Earnings before interest, taxes, depreciation and amortization .

than 50% the capital. Applying this definition we obtained a sample of 21 420 family firms and 4 401 non-family firms.

Besides the family ownership factor, this study aims to clarify the effect of the size factor on the financing decision. The sample was therefore divided in three groups: micro, small and medium/large firms. Considering the conclusions of the study by Ramalho and Silva (2009), it was decided to join medium-sized and large firms in a single group, which showed great similarity in the financing decision process and its determinant factors. The process of classification by size adopted was the one recommended by the European Commission (European Commission Recommendation of 6 May, number 203/361/CE). The number of collaborators was used as the main criterion, complemented by the financial criterion of total assets or turnover. Application of the criteria described above gave the sample division shown in Table 1:

Table 1 – Sample

	Non-Family		Family		Total	
	Number	**%**	**Number**	**%**	**Number**	**%**
Micro	1 095	24.9	13 081	61.1	14 176	54.9
Small	1 659	37.7	7 085	33.1	8 744	33.9
Medium / Large	1 647	37.4	1 254	5.9	2 901	11.2
Total / Global Weight	**4 401**	**17.0**	**21 420**	**83.0**	**25 821**	**100.0**

Table 1 presents the sample distribution by size and ownership. The data presented reveal that family firms tend to be smaller. However, more than 43,2% of medium/large firms are family-owned and 12% of micro and small firms are non-family-owned. These data show the sample is sufficiently diversified to allow analysis of the effects of family ownership and size on debt structure decisions.

3.2 Impact of Family Ownership and Size on Debt Structure

The Portuguese financial system makes various types of debt available to firms, with different periods, costs and guarantees. Among them, we highlight bank loans, bond loans, leasing and credit from suppliers. Firms' debt structure results from the decision on the type of debt contracted, which added to the initial situation determines future debt structure. This study uses the debt structure ratio proposed by Rauh and Sufi (2010), which relates the type

of debt to total assets as the measure of financing decisions through debt. This measure was chosen because we are interested in analyzing debt composition, so as to find out if the choice of a certain source of finance is the result of a company decision or if it is imposed by the financial system. Since the sample is made up mainly of unquoted firms, we use book values extracted from financial statements.

The above analysis of the sample data showed that a high number of firms do not use medium and long-term debt, particularly debt from financial institutions such as banks and leasing companies (similarly to the studies by Faulkender and Petersen, 2006; Kurshev and Strebulaev, 2007; Strebulaev and Yang, 2007; and Ramalho and Silva, 2009). Table 2 presents the proportion and effect of zero ratios for the case of bank debt. This table shows that around 37% and 34% of family and non-family firms respectively do not resort to bank debt. In the case of long-term bank debt, these figures reach 75% and 66%, remaining at 47% and 40% for short-term debt. These results reveal a greater frequency of zero ratios in the case of family firms. However, the weight of family micro-firms in the sample once again clearly determines these results. In fact, in terms of the frequency of zero ratios, both types of micro firms present similar figures, but in the other two dimensions, there is a clearly greater frequency of using bank debt in family firms.

Table 2 – Influence of Zero Ratios of Bank Debt

Total bank debt = total bank debt / total assets, MLT bank debt = MLT bank debt/ total assets, ST bank debt = ST bank debt / total assets. Level of significance: *** - 1%, ** - 5% e * - 10%.

		All			Micro			Small			Medium / Large		
		TOTAL	MLT	ST	TOTAL	MLT	ST	TOTAL	MLT	ST	TOTAL	MLT	ST
Bank With Zeros	Non-Family	0.142	0.061	0.081	0.108	0.040	0.068	0.149	0.062	0.087	0.158	0.074	0.084
	Family	0.125	0.045	0.079	0.098	0.032	0.066	0.161	0.064	0.097	0.205	0.085	0.119
	T Test	6.55***	8.50***	0.90	2.11**	2.77***	0.497	-2.62***	-0.58	-2.80***	-7.41***	-2.42***	-7.83***
	MW Test	5.74***	12.46***	4.95***	0.07	1.19	-0.68	-4.88***	-1.15	-3.72***	-9.40***	-4.77***	-8.62***
Number	Non-Family	1 495	2 889	1 773	538	906	625	523	1 098	634	434	885	514
	%	34.0	65.6	40.3	49.1	82.7	57.1	31.5	66.2	38.2	26.4	53.7	31.2
	Family	8 012	16 114	9 989	6 248	10 967	7 330	1 605	4 587	2 396	159	560	263
	%	37.4	75.2	46.6	47.8	83.8	56.0	22.7	64.7	33.8	12.7	44.7	21.0
	Total	9 507	19 003	11 762	6 786	11 873	7 955	2 128	5 685	3 030	593	1 445	777
	%	36.8	73.6	45.6	47.9	83.8	56.1	24.3	65.0	34.7	20.4	49.8	26.8
Bank Without Zeros	Non-Family	0.216	0.178	0.097	0.212	0.233	0.158	0.218	0.183	0.142	0.215	0.160	0.122
	Family	0.199	0.183	0.071	0.187	0.196	0.150	0.208	0.181	0.147	0.234	0.154	0.151
	T Test	54.87***	-1.24*	8.69***	3.52***	2.99***	1.13	1.86**	0.30	-1.19	-2.92***	0.88	-5.40***

MW Test	3.90***	-2.46**	12.79***	2.21***	2.34***	-0.16	1.25	-0.33	-1.64	-4.25***	-0.75	-6.03***

The data also suggest a positive relationship between size and use of bank debt. Micro firms are clearly the ones using least bank debt, followed by small firms. Medium/large firms show a greater frequency of using this source of finances. The data suggest that the size factor is determinant for the use of this source and that large firms can have easier access or those in charge of them are more likely to resort to this source of finance.

The effect of observations with zero values on the debt ratios of firms in the sample is also analyzed in Table 3 which includes the ratios of firms with debt. Small-size categories show a greater proportion of bank debt when zero ratios are excluded. Therefore, small firms use less bank debt, but when they use this source they do so in a greater proportion than large firms. Ramalho and Silva (2009) obtained this type of evidence in their study of long-term debt in Portuguese companies.

Considering only firms without zero-leverage values, similarities are observed between small family and non-family firms. The differences between micro-firms are amplified and family micro-firms are confirmed as showing the smallest proportion of bank debt of all sample firms. The differences between medium/large firms of the two types diminish but family firms continue to show a greater proportion of bank debt. These results reveal that introduction of the size and family ownership factors in analysis of the financing decision contributes to greater understanding of this process. Introducing the issue of zero debt values in the study promotes an additional and relevant clarification.

Table 4 presents the proportion and effect of zero leasing ratios. The results also reveal a negative relationship between size and the existence of zero leasing ratios and a greater frequency of family firms not turning to this source when analyzing the total samples. Similarly to what happened with bank debt (Table 3), also here these results are determined by the weight of family micro-firms in the sample. Considering size, the length of leasing is seen to become relevant in determining the firm type, family or non-family, showing less use of this source. Analysis of the leasing ratios without firms with zero values confirms the following aspects: a great similarity between micro-firms of both types and a greater proportion of leasing in small and medium/large family firms than in non-family firms.

Table 4 – Influence of Zero Leasing Ratios

Total leasing = total leasing / total assets, MLT Leasing = MLT leasing/ total assets, ST Leasing = ST leasing / total assets. Level of significance: *** - 1%, ** - 5% e * - 10%.

		All			Micro			Small			Medium / Large		
		TOTAL	MLT	ST	TOTAL	MLT	ST	TOTAL	MLT	ST	TOTAL	MLT	ST
Leasing With Zeros	**Non-Family**	0.043	0.022	0.021	0.040	0.015	0.025	0.047	0.025	0.022	0.041	0.023	0.018
	Family	0.053	0.020	0.034	0.048	0.014	0.033	0.061	0.026	0.035	0.063	0.038	0.026
	T Test	-6.15***	2.07**	-10.03***	-2.36***	0.48	-3.27***	-5.36***	-0.51	-7.05***	-6.88***	-5.57***	-4.93***
	MW Test	2.38**	16.08**	5.11**	-4.23***	1.62	-3.54***	-6.91***	3.022***	-4.09***	-7.67***	-5.17***	-4.22***
Number	**Non-Family**	1 442	3 055	1 650	656	958	702	493	1 118	586	293	979	362
	%	32.8	69.4	37.5	59.9	87.5	64.1	29.7	67.4	35.3	17.8	59.4	22.0
	Family	9 186	17 470	10 813	7 066	11 664	7 859	1 943	5 141	2 677	177	665	277
	%	42.9	81.6	50.5	54.0	89.2	60.1	27.4	72.6	37.8	14.1	53.0	22.1
	Total	10 628	20 525	12 463	7 722	12 622	8 561	2 436	6 259	3 263	470	1 644	639
	%	41.2	79.5	48.3	54.5	89.0	60.4	27.9	71.6	37.3	16.2	56.7	22.0
Leasing Without Zeros	**Non-Family**	0.064	0.071	0.034	0.100	0.121	0.070	0.067	0.077	0.034	0.050	0.056	0.023
	Family	0.093	0.106	0.068	0.104	0.131	0.084	0.084	0.096	0.056	0.074	0.080	0.033
	T Test	-12.30***	-9.45***	-16.97***	-0.55	-0.82	-2.38***	-5.08***	-3.51***	-8.25***	-6.40***	-4.44***	-5.15***
	MW Test	-17.44***	-12.70***	-21.95***	-2.17**	-1.15	-3.80***	-8.86***	-5.52***	-11.03***	-7.76***	-5.95***	-6.17***

When analyzing firms with access to medium and long-term debt, small firms are found to use a greater proportion of long-term debt than large firms. In the case of micro firms, around 82% of total debt is medium/long term. In small firms, that figure is 66% and 72% in non-family and family firms respectively. Medium/large firms present a greater distribution of debt over the two lengths, with medium and long-term debt corresponding to about 59% of total debt.

4. Econometric Analysis

The results described in the previous section indicate that the decisions of family firms, according to size, differ significantly from those of non-family firms in most cases. However, these differences can be at least partially due to other factors determining debt structure. Based on regression techniques, we attempt to find out, once these factors mentioned in the literature are controlled for, if the influence of family ownership is still important in explaining both the probability of a firm obtaining a given source of finance, subject to the previous decision, and the option for the type of debt to use.

4.1 Explanatory Variables

The main objective of this study is to characterize the influence of family ownership on debt structure decisions. To show this aspect, in the following regression analysis we present a dummy variable, family ownership, which is equal to one if the firm is classified as family-owned and equal to zero otherwise. The preliminary analysis carried out in the previous section suggests that the influence of the family ownership factor on debt structure may depend on size. To test this aspect, the models to be estimated include two dummy variables, Micro and Small Firms (which is equal to one if the firm is classified as micro or small and zero otherwise) and two interaction variables, which combine these two dummies with family ownership. In addition, the vast number of empirical studies on capital structure produced a long list of factors that also influence debt decisions. Some of these factors, which are described in Table 5, are used in this study as control variables. Joined to these variables is classification of firms in four sectors of economic activity: industry, construction, commerce and services.

Table 5 – Test Variables of the Hypotheses

Independent Variables	Definition	Non-Family		Family		Tests	
		μ	σ	μ	σ	T Test	Mann-Whitney Test
Size	*Natural Logarithm of Sales*	*14.998*	*2.004*	*13.094*	*1.531*	*70.941****	*58.276****
Profitability	*EBIT over Turnover*	*0.044*	*1.900*	*0.094*	*3.368*	*-0.961*	*4.229****
Tangibility of Assets	*Fixed Assets over Total Assets*	*0.246*	*0.231*	*0.234*	*0.212*	*3.179****	*0.557*
Growth Rate	*Total Assets in year n over Total Assets in year n-1*	*0.119*	*0.448*	*0.105*	*0.361*	*2.371****	*2.418****
Age	*Number of Years since Founding*	*22.070*	*15.698*	*17.764*	*11.718*	*20.834****	*16.609****
Liquidity	*Availability over Assets*	*0.104*	*0.163*	*0.164*	*0.206*	*-18.091****	*-24.761****
Risk	*Altman Z Coefficient– Unquoted Firms*	*4.022*	*72.229*	*3.342*	*38.717*	*0.889*	*-2.204***

Table 5 presents the descriptive analysis of the explanatory variables for the sample of family-owned and non-family-owned firms, as well as the results of the T and Mann-Whitney tests of differences in means, between the two types of firm. This analysis reveals greater size, maturity, growth rate, level

of tangible assets and risk in non-family firms. On the other hand, family firms show greater profitability and liquidity levels.

4.2 Econometric Methodology

We consider that $y_1 = 1$ for cases where the creditor decides to grant the debt (with $y_1 = 0$ corresponding to non-concession of finance) and y_2 the result of the firm's decision to seek debt ($y_2 = 1$ if the firm decided to request finance and $y_2 = 0$ otherwise). In the sample, we only observe situation $y_1 = y_2 = 1$. In addition, instead of x_i, y_{i1} and y_{i2}, in this model only x_i and z_i, is observed, where $z_i = y_{1i} \times y_{i2}$. Therefore, we have:

$$z_i = \begin{cases} 1 \text{ if } y_{i1} = 1 \text{ and } y_{i2} = 1 \\ 0 \end{cases} \qquad 4.1$$

Between the different variants existing in the Bivariate Probit Model of Partial Observations, as a function of the data and objective of the study, we chose to use the Poirier (1980) model and the Abowd and Farber (1982) model.

In the Poirier (1980) model, y_1 and y_2 are estimated simultaneously and the two errors (ϵ_1 and ϵ_2) are correlated:

$$\Pr(z = 1) = \Phi_2(x_1\beta_1, x_2\beta_2; \rho) \qquad 4.2$$
$$\Pr(z = 0) = 1 - \Phi_2(x_1\beta_1, x_2\beta_2; \rho) \qquad 4.3$$

where ρ represents the correlation coeficiente between ϵ_1 and ϵ_2 and Φ_2 the function of bivariate standard normal accumulated distribution. The function of maximum likelihood for this version of the bivariate probit model with partial observations is as follows:

$$lnL = \sum_{i=1}^{N} \{z_i ln\Phi_2(x_1\beta_1, x_2\beta_2; \rho) + (1 - z_i)ln[1 - \Phi_2(x_1\beta_1, x_2\beta_2; \rho)]\} \qquad 4.4$$

In the Abowd and Farber (1982) model, y_1 and y_2 are estimated sequentially and the two errors(ϵ_1 and ϵ_2) are assumed not to be correlated:

$$\Pr(z = 1) = \Phi(x_1\beta_1)\Phi(x_2\beta_2) \qquad 4.5$$

$$\Pr(z = 0) = 1 - \left[\Phi(x_1\beta_1)\Phi(x_2\beta_2) \right] \qquad 4.6$$

In this case, the function of maximum likelihood is as follows:

$$lnL = \sum_{i=1}^{N} \left\{ z_i ln\Phi(x_{i1}\beta_1)\Phi(x_{i2}\beta_2) + (1 - z_i)\ln\left[1 - \left[\Phi(x_{i1}\beta_1)\Phi(x_{i2}\beta_2)\right]\right]\right\} \qquad 4.7$$

In order to assess the suitability of the models to studying the determinant factors of firms' access to debt, the results obtained will be analyzed in two aspects:

- Sign and statistical significance of the coefficients estimated:

  o Wald test - Z Statistic: $\hat{\beta}_j / \hat{\sigma}(\hat{\beta}_j) \overset{a}{\sim} N(0,1)$ $\qquad H_0 : \beta_j = 0$

- LR test – according to the process adopted by Heywood and Mohanty (1993).

The methodology adopted, with introduction of the supply and demand side in the decision process and the importance of studying financing sources, determined the definition of variables in this approach to the process of financing family-owned firms. The methodology and the characteristics of the data motivate use of a binary variable. Therefore, two binary variables were used, originating the same set of models:

- Total Bank Debt with the following values:

  1 if Total Bank Debt / Total Assets > 0
  0 if Total Bank Debt / Total Assets = 0

- Total leasing with the following values:

  1 if Total Leasing / Total Assets > 0
  0 if Total Leasing / Total Assets = 0

The choice of these variables was determined by analysis of the financial structure of sample companies. These two variables are considered the two most relevant sources of funds coming from financial institutions. In these sources of finance, a relevant number of zero values was observed in the respective debt ratios. It is therefore important to assess if these zero values are due to the option of those in charge of firms or due to restrictions in accessing these sources of funds imposed by the financial markets.

4.3 Empirical Results

This section attempts to assess the existence of possible restrictions in access to bank debt and leasing. Given the characteristics of the matter studied and the available data, the

following approach was chosen to study the problem of firms' access to the financial market: introduction of the two sides involved in the decision, i.e., the demand side and the supply side. The process of accessing funds in the financial market begins with firms' disposition to seek this source of finance, i.e., they request funds from banking institutions and leasing companies. If firms request this form of finance, the second phase arises, which is financial institutions' decision whether or not to grant debt. The methodology of the Bivariate Probit Model of Partial Observations developed by Poirier (1980) emerges as specifically suitable for the characteristics of the problem under study. Specifically, we have a situation where the value of 1 corresponds to the request for and concession of bank debt or leasing. Among the different variants of the Bivariate Probit Model of Partial Observations, the Poirier (1980) and Abowd and Farber (1982) models were used in order to check if both models allow us to obtain consistent results. These two variants were estimated in the scope of total bank debt and total leasing. The estimation process of the Bivariate Probit Model of Partial Observations requires the existence of at least one different explanatory variable in determining y_{i1} and y_{i2}. Therefore, the variables of asset tangibility and risk were used in the concession component and the liquidity variable in the demand component. These options are due to having considered that the firm's asset collateral value and risk rating determine the decision to grant more significantly than the decision to request. And in the case of liquidity, the situation is inversed.

Tables 5.1 and 5.2 present the results obtained from estimation of the Abowd and Farber (1982) and Poirier (1980) models respectively for total bank debt. The models confirm the statistical relevance of the family ownership factor as an important determinant of firms seeking bank debt. All show a positive relationship between this factor and demand for debt. Therefore, among firms with the same control characteristics, family-owned firms are more likely to seek bank debt. However, the models seem to confirm the existence of restrictions in these firms' access to debt, principally in the case of small firms. Most models reveal a negative relationship (statistically significant only in the Abowd and Farber, 1982 models) between family ownership and concession of credit.

Table 5.1 – Bivariate Models – Total Bank Debt – Abowd and Farber (1982)

Dependent Variable: Dummy = 1 if total bank debt > 0. Independent Variables: Family ownership = 1 if the firm is family owned, Size = natural logarithm of sales, Profitability= EBIT over turnover, Asset tangibility = fixed assets over total assets, Growth rate = total assets in year n over total assets in year n-1, Age = number of years since founding, Liquidity = availability over total assets, Risk = Altman Z coefficient for unquoted firms, Size category and sector of activity dummies. Level of significance: *** -1%, ** - 5% and * - 10%.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Request	Concession	Request	Concession	Request	Concession	Request	Concession	Request	Concession

	Request	Concession	Request	Concession	Request	Concession	Request	Concession	Request	Concession
Family Ownership	0.612	-0.280	0.622	-0.257	0.622	0.799	0.553	-0.28	0.369	0.047
	15.41***	-2.19**	14.81***	-2.11**	7.71***	2.29**	14.29***	-2.18**	2.55**	0.138
Size	0.058	0.634	0.032	0.633	0.032	0.661	0.055	0.659	0.056	0.664
	4.42***	27.87***	1.95*	25.82***	1.75*	25.09***	4.13***	26.28***	4.27***	26.08***
Profitability	0.002	0.099	0.002	0.092	0.003	0.094	0.001	0.142	0.002	0.133
	0.06	1.03	0.06	1.17	0.07	1.14	0.05	1.13	0.06	1.02
Asset Tangibility		0.164		0.142		0.198		0.259		0.255
		2.32***		2.07**		2.77***		3.15***		3.09***
Growth Rate	0.432	-0.204	0.452	-0.204	0.439	-0.207	0.427	-0.222	0.425	-0.222
	8.31***	-6.75***	8.46***	-6.65***	8.09***	-6.54***	8.40***	-7.06***	8.38***	-6.91***
Age	-0.113	0.002	0.000	-0.012	-0.120	0.002	-0.110	0.002	-0.113	0.002
	-5.46***	0.20	0.49	-7.94****	-5.70***	0.18	-5.39***	0.18	-5.55***	0.19
Liquidity	-2.638		-2.690		-2.633		-2.517		-2.508	
	-33.01***		-31.47***		-30.96***		-33.02***		-33.07***	
Risk		-0.006		-0.006		-0.006		-0.006		-0.006
		-19.90***		-20.35***		-18.14***		-19.16***		-14.85***
Micro			-0.028	-0.016	-0.171	1.34				
			-0.42	-0.07	-1.86*	4.54***				
Small			-0.005	-0.031	-0.025	0.726				
			-0.11	-0.13	-0.34	2.41**				
Family Micro					-0.010	-1.213				
					-0.10	-3.16***				
Family Small					-0.090	-0.647				
					-0.93	-1.63*				
Industry							0.060	-0.038	-0.066	0.063
							0.81	-0.40	-0.52	0.16
Construction							0.296	-0.011	0.461	-0.079
							3.47***	-0.11	2.93***	-0.19
Trade							0.002	0.071	-0.133	0.660
							0.031	0.77	-1.06	1.54
Services							-0.207	0.214	-0.339	0.498
							-2.81***	2.20**	-2.66***	1.23
Family Industry									0.234	-0.202
									1.50	-0.50
Family Construction									-0.195	0.051
									-1.05	0.12
Family Trade									0.224	-0.684
									1.48	-1.55
Family Services									0.237	-0.385
									1.53	-0.92
Constant	0.994	1.831	0.496	-2.391	1.127	0.671	0.607	-2.730	0.706	-3.000
	13.76***	12.13***	2.989***	-7.75***	10.86***	2.60***	4.07***	-14.09***	3.96***	-8.64***
LR Test	533.876***		460.714***		392.204***		534.534***		527.116	
McFadden Pseudo R²	19.44%		19.54%		19.49%		19.70%		19.75%	

In the models where interaction dummies of family ownership with size (models 3) were introduced, a positive relationship was obtained between concession of bank debt and firms' family ownership, showing that the negative relationship found in the other models was essentially due to most family firms being micro-firms. Therefore, these results appear to confirm the existence of restrictions to small family firms' obtaining debt, compared to their non-family equivalents, the same values being found for the control attributes.

Table 5.2 – Bivariate Models – Total Bank Debt – Poirier (1980)

Dependent Variable: Dummy = 1 if total bank debt > 0. Independent Variables: Family ownership = 1 if the firm is family owned, Size = natural logarithm of sales, Profitability = EBIT over turnover, Asset tangibility = fixed assets over total assets, Growth rate = total assets in year n over total assets in year n-1, Age = number of years since founding, Liquidity = availability over total assets, Risk = Altman Z coefficient for unquoted firms, Size category and sector of activity dummies. Level of significance: *** -1%, ** - 5% and * - 10%.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Request	Concession	Request	Concession	Request	Concession	Request	Concession	Request	Concession
Family Ownership	0.604	-0.088	0.607	-0.086	0.586	0.784	0.553	-0.109	0.508	-0.152
	15.73***	-0.86	15.61***	-0.85	7.78***	2.53***	14.53***	-1.04	3.31***	-0.47
Size	0.017	0.645	0.005	0.649	-0.008	0.654	0.017	0.659	0.054	0.621
	1.05	34.22***	0.26	27.77***	-0.40	27.16***	1.09	30.00***	4.40***	30.47***

Profitability	0.002	0.091	0.002	0.090	0.002	0.084	0.001	0.112	0.006	0.447
	0.25	2.08**	0.27	2.07**	0.29	2.14**	0.17	1.67*	0.47	2.29**
Asset Tangibility		0.176		0.176		0.192		0.264		-0.233
		2.53**		2.51**		2.75***		3.34***		-2.61***
Growth Rate	0.408	-0.168	0.413	-0.168	0.417	-0.165	0.404	-0.175	0.265	-0.151
	6.42****	-5.39***	6.37***	-5.38***	6.26***	-5.26***	6.49***	-5.43***	5.30***	-4.40***
Age	-0.017	-0.176	-0.022	-0.171	-0.030	-0.160	-0.024	-0.171	-0.002	-0.008
	-0.60	-5.73***	-0.77	-5.58***	-0.99	-5.13***	-0.84	-5.36***	-1.96*	-4.93***
Liquidity	-2.924		-2.935		-2.951		-2.805		-2.633	
	-33.18***		-31.16***		-30.10***		-31.34***		-32.10***	
Risk		-0.006		-0.006		-0.006		-0.006		-0.057
		-5.79***		-5.78***		-5.87***		-5.80***		-15.34***
Micro			-0.070	0.073	-0.182	0.981				
			-1.00	0.36	-1.91*	3.75***				
Small			-0.060	0.070	-0.055	0.550				
			-1.21	0.36	-0.80	2.15**				
Family Micro					0.074	-1.025				
					0.66	-3.06***				
Family Small					-0.050	-0.585				
					-0.54	-1.70*				
Industry							0.003	0.057	-0.060	0.049
							0.04	0.68	-0.50	0.12
Construction							0.279	0.060	0.511	-0.173
							2.91***	0.67	3.32***	-0.46
Trade							-0.044	0.132	-0.091	0.277
							-0.53	1.66*	-0.75	0.73
Services							-0.224	0.177	-0.375	50.188
							-2.64***	2.16**	-3.11***	0.78
Family Industry									0.138	-0.053
									0.85	-0.13
Family Construction									-0.301	0.232
									-1.56	0.60
Family Trade									0.110	-0.219
									0.69	-0.57
Family Services									0.184	-50.010
									1.15	-0.78
Constant	0.828	1.937	0.901	1.856	0.987	1.071	0.873	1.855	0.075	-6.719
	9.56***	13.07***	8.54***	7.41***	8.29***	4.21***	7.55***	10.44***	0.34	-16.98***
LR Test	674.242***		569.144***		528.448***		666.032***		834.182***	
McFadden Pseudo R²	18.72%		18.46%		18.30%		18.60%		19.04%	

The results seem to reveal that the sector of activity is a probable determinant of the request for, and granting of bank debt in specific cases. Namely, firms in the construction sector tend to seek more bank debt, whereas the opposite happens in firms in the service sector. Nevertheless, the latter sector seems to present fewer restrictions in obtaining this type of funding. The interaction of family ownership with sector of activity was not shown to be a significant determinant influencing the demand for, and the concession of bank credit.

In this section, the specification test of the bivariate model with partial observations adopted by Heywood and Mohanty (1993) was used, namely the test of maximum likelihood ratio (LR test) between the probit model and the bivariate model. Rejection of the null hypothesis in all the models of bank debt indicates greater suitability of the model considering the existence of the demand and concession component compared to the model that only considers use, or non-use, of debt. Concerning robustness, this can be said to be significant when analyzing the results estimated within each methodology (Poirier, 1980 or Abowd and Farber, 1982) and a high number of significant variables and constant coefficient signs are observed.

Tables 5.3 and 5.4 present the results obtained from estimation of the Abowd and Farber (1982) and Poirier (1980) models respectively, for total leasing. The results show the family ownership factor as an important determinant of the demand for leasing, observing in all models a positive relationship between this variable and the demand for leasing as a source of finance. The models estimated reveal the non-existence of restrictions in family firms' access to this source. The great majority of models present a positive and statistically significant relationship between this variable and the granting of finance.

Similarly to what occurred for bank debt, the results of the leasing models show less demand for leasing in micro-firms. The preliminary analysis of data in Section 3.2 showed these firms use this source of finance less frequently. In addition, family ownership reduces the probability of small firms seeking this source of finance. However, neither size nor the interaction of this factor with family ownership were revealed to be significant in determining the concession of finance through leasing.

The results of the models show a greater tendency in the sectors of activity considered in this study to seek leasing as a source of finance than the other sectors. Model results show a higher propensity of sectors of activity considered in this study to look for more leasing as a source of funding than other sectors. However, the results do not indicate any relevance of the sector of activity and its interaction with family ownership in determining the concession of finance through this source.

Concerning analysis of the test variables of the standard hypotheses, all the models suggest a greater demand for bank debt in small firms. This factor is also statistically significant in determining the concession of bank debt in all models. Therefore, large firms will be more likely to have the requested finance granted. This result confirms the arguments in the financial literature about small firms' difficulty in accessing the financial market. In the case of leasing, large firms are found to show a significantly greater demand with fewer restrictions of access to this source of finance.

Table 5.3 – Bivariate Models - Total Leasing – Abowd and Farber (1982)

Dependent Variable: Dummy = 1 if total leasing > 0. Independent Variables: Family ownership = 1 if the firm is family owned, Size = natural logarithm of sales, Profitability = EBIT over turnover, Asset tangibility = fixed assets over total assets, Growth rate = total assets in year n over total assets in year n-1, Age = number of years since founding, Liquidity = availability over total assets, Risk = Altman Z coefficient for unquoted firms, Size category and sector of activity dummies. Level of significance: *** -1%, ** - 5% and * - 10%.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Request	Concession	Request	Concession	Request	Concession	Request	Concession	Request	Concession
Family	0.233	0.298	0.226	0.307	0.333	0.285	0.240	0.270	0.323	0.718
Ownership	7.44***	4.11***	7.02***	4.10***	5.01***	1.35	7.54***	3.62***	3.35***	1.24
Size	0.317	0.208	0.264	0.210	0.281	0.203	0.315	0.202	0.316	0.202
	43.23***	12.17***	27.63***	9.68***	29.24***	9.24***	41.65***	11.56***	41.53***	11.53***
Profitability	-0.009	0.014	-0.007	0.013	-0.007	0.014	-0.010	0.013	-0.010	0.015
	-0.95	0.45	-0.78	0.44	-0.77	0.43	-1.12	0.46	-1.12	0.52

	Model 1 Request	Model 1 Concession	Model 2 Request	Model 2 Concession	Model 3 Request	Model 3 Concession	Model 4 Request	Model 4 Concession	Model 5 Request	Model 5 Concession
Asset Tangibility		26.455 (20.30***)		24.842 (19.50***)		26.499 (19.51***)		26.124 (20.14***)		25.699 (20.24***)
Growth Rate	0.243 (8.80***)	-0.157 (-3.64***)	0.294 (11.08***)	-0.171 (-4.03***)	0.249 (9.00***)	-0.162 (-3.76***)	0.243 (8.73***)	-0.150 (-3.52***)	0.243 (8.72***)	-0.150 (-3.55***)
Age	-0.271 (-15.92***)	0.003 (0.06)	-0.004 (-25.89***)	-0.009 (-5.00***)	-0.281 (-16.38***)	0.003 (0.06)	-0.264 (-15.36***)	0.003 (0.06)	-0.266 (-15.50***)	0.002 (0.06)
Liquidity	-0.653 (-12.36***)		-0.693 (-13.10***)		-0.649 (-12.26***)		-0.639 (-11.91***)		-0.638 (-11.84***)	
Risk		-0.022 (-6.34***)		-0.024 (-7.08***)		-0.022 (-6.14***)		-0.023 (-6.93***)		-0.024 (-6.96***)
Micro			-0.103 (-2.10**)	-0.082 (-0.64)	-0.126 (1.72*)	-0.064 (-0.40)				
Small			0.044 (1.04)	0.032 (0.29)	0.124 (1.99**)	0.025 (0.18)				
Family Micro					-0.091 (-1.10)	0.046 (0.19)				
Family Small					-0.174 (-2.19)	0.042 (0.18)				
Industry							0.228 (5.58***)	0.095 (0.43)	0.290 (2.94***)	0.367 (0.67)
Construction							0.253 (5.22***)	0.078 (0.37)	0.439 (3.36***)	0.788 (1.43)
Trade							0.120 (3.06***)	0.025 (0.12)	0.232 (2.31**)	0.255 (0.48)
Services							0.229 (5.53***)	-0.033 (-0.16)	0.283 (2.77***)	0.383 (0.71)
Family Industry									-0.072 (-0.67)	-0.298 (-0.49)
Family Construction									-0.203 (-1.45)	-0.829 (-1.39)
Family Trade									-0.130 (-1.20)	-0.249 (-0.43)
Family Services									-0.060 (-0.54)	-0.488 (-0.83)
Constant	1.226 (22.53***)	-0.544 (-4.10***)	-1.232 (-12.37***)	-1.740 (-7.19***)	1.271 (17.90***)	-0.523 (-2.97***)	-1.148 (-14.31***)	-1.943 (-7.38***)	-1.220 (--11.06***)	-2.321 (-4.21***)
LR Test	1 209.948***		963.616***		1 103.170***		1 164.376***		1 170.322***	
McFadden Pseudo R²	18.79%		18.41%		18.97%		18.97%		17.49%	

Table 5.4 – Bivariate Models - Total Leasing – Poirier (1980)

Dependent Variable: Dummy = 1 if total leasing > 0. Independent Variables: Family ownership = 1 if the firm is family owned, Size = natural logarithm of sales, Profitability = EBIT over turnover, Asset tangibility = fixed assets over total assets, Growth rate = total assets in year n over total assets in year n-1, Age = number of years since founding, Liquidity = availability over total assets, Risk = Altman Z coefficient for unquoted firms, Size category and sector of activity dummies. Level of significance: *** -1%, ** - 5% and * - 10%.

	Model 1 Request	Model 1 Concession	Model 2 Request	Model 2 Concession	Model 3 Request	Model 3 Concession	Model 4 Request	Model 4 Concession	Model 5 Request	Model 5 Concession
Family Ownership	0.223 (7.03***)	0.177 (2.56***)	0.216 (6.69***)	0.201 (2.81***)	0.319 (4.65***)	0.209 (1.00)	0.230 (7.12***)	0.158 (2.27**)	0.315 (3.08***)	0.622 (1.24)
Size	0.320 (39.36***)	0.069 (2.47**)	0.285 (27.10**)	0.066 (2.07**)	0.285 (27.08***)	0.067 (2.07**)	0.317 (37.76***)	0.066 (2.39**)	0.319 (37.53***)	0.063 (2.34**)
Profitability	-0.009 (-1.17)	0.014 (1.05)	-0.007 (-1.18)	0.014 (1.05)	-0.007 (-1.18)	0.014 (1.05)	-0.010 (-1.21)	0.014 (1.05)	-0.010 (-1.21)	0.015 (1.15)
Asset Tangibility		21.310 (10.81***)		21.361 (10.54***)		21.406 (10.51***)		20.864 (10.35***)		20.162 (10.05***)
Growth Rate	0.224 (6.68***)	-0.159 (-3.76***)	0.230 (6.86***)	-0.165 (-3.87***)	0.230 (6.85***)	-0.165 (-3.88***)	0.224 (6.63***)	-0.154 (-3.63***)	0.224 (6.60***)	-0.154 (-3.64***)
Age	-0.272 (-15.30***)	0.085 (1.97*)	-0.283 (-15.81***)	0.093 (2.10**)	-0.283 (-15.81***)	0.093 (2.09**)	-0.264 (-14.70***)	0.085 (1.97*)	-0.264 (-14.63***)	0.077 (1.79*)
Liquidity	-0.543 (-9.81***)		-0,542 (-9.77***)		-0.541 (-9.75***)		-0.526 (-9.31***)		-0.520 (-9.16***)	
Risk		-0.018 (-3.93***)		-0.018 (-3.82***)		-0.017 (-3.81***)		-0.019 (-4.14***)		-0.019 (-4.20***)
Micro			-0.161 (-3.24***)	-0.041 (-0.34)	-0,131 (-1.70*)	-0.040 (-0.26)				
Small			0.015 (0.35)	-0.012 (-0.11)	0.118 (1.82*)	-0.057 (-0.43)				
Family Micro					-0.083 (-0.96)	-0.025 (-0.11)				
Family Small					-0.168 (-2.03**)	0.026 (0.11)				
Industry							0.240 (5.69***)	-0.095 (-0.46)	0.307 (2.90***)	0.198 (0.41)
Construction							0.269 (5.35***)	-0.120 (-0.60)	0.469 (3.24***)	0.563 (1.17)
Trade							0.133	-0.116	0.259	0.146

							3.29***	-0.59	2.41**	0.31
Services							0.239	-0.180	0.294	0.255
							5.64***	-0.900	2.71***	0.55
Family Industry									-0.076	-0.316
									-0.66	-0.60
Family Construction									-0.215	-0.796
									-1.4	-1.51
Family Trade									-0.144	-0.282
									-1.25	-0.55
Family Services									-0.061	-0.501
									-0.52	-0.98
Constant	1.235	-0.270	1.333	-0.258	1.283	-0.245	1.021	-0.116	0.948	-0.482
	21.29***	-1.99*	19.03***	-1.51	17.09***	-1.40	14.85***	-0.48	8.82***	-1.01
LR Test	1 260.406***		1 204.590***		1 151.522***		1 215.814***		1 223.776	
McFadden Pseudo R²	20.25%		20.03%		20.04%		20.13%		20.16%	

The profitability factor is only shown to be relevant for determining the granting of bank debt in the Poirier (1980) variant, where a positive relationship is observed. These results confirm the argument in the financial literature that financial institutions grant funds to firms that are less likely to fail to meet their obligations, due to them being able to generate cash flow. In the case of the leasing models, statistical relevance of this variable never occurs.

The results associated with asset tangibility confirm, significantly, the argument in the financial literature about its collateral value allowing access to debt on better terms from financial institutions. The difference in terms of sign between the small firm dummy and the small family firm dummy seems to confirm the conclusions of Eisfeldt and Rampini (2009) that small firms, with less funds available internally, turn more to leasing. The positive sign confirms more concession of leasing to small firms in general. But when these are family owned (possessing more internal funds as shown in the descriptive analysis) they tend to have less leasing. Growing firms show a greater probability of seeking bank debt and leasing but these are the ones suffering more restrictions in accessing these sources, since a negative relationship is observed between this variable and the concession of debt.

More mature firms with high monetary means tend to be less likely to seek debt since they have sufficient funds. Nevertheless, the most mature firms appear to show more restrictions in accessing financial debt. The opposite result would be expected given the effect of reputation. This restriction may be justified by them being at later stages of their life-cycle and closer to decline. The results also show that firms with high risk ratings will find it more difficult to obtain funding from financial institutions.

The result of the LR test between the probit model and the bivariate probit leads to rejection of the null hypothesis in all the models. Therefore, similarly to what occurred in the bank debt models, this result indicates greater suitability of the model considering the demand and concession component compared to the model that only considers use, or non-

use, of leasing. As for robustness, it can also be considered significant when analyzing the results estimated within each methodology (Poirier, 1980 or Abowd and Farber, 1982).

5. Conclusions

In carrying out this study, the aim was to understand how family ownership of capital determines the financing decision, and particularly in accessing the financial market. This investigation sought to contribute to the study of the financing decision of Portuguese family-owned firms. The first of these studies only analyzed 68 firms associated with the Portuguese Association of Family Firms, whereas the second used a sample 614 family-owned SMEs.

To meet the objectives of this research, suitable econometric methodologies for the matter studied were used. Bivariate models with partial observations allowed inclusion of both sides of the financing decision: the demand and the supply. Firms may resort to debt but always depend on a positive response from financial institutions. These models have the advantage of being appropriate for the limitations of the available data, which only present firms that requested debt and obtained a positive answer, with it not being possible to discern the other three scenarios: firms do not seek debt, firms seek debt but it is not granted, and the third, more theoretical scenario, of debt being granted but firms choosing not to use it.

Bivariate models allow analysis of how family ownership influences the decision to seek debt and its concession. The results obtained confirm the family ownership factor as an important determinant of the demand for bank debt and leasing. Indeed, the models reveal that this factor increases the probability of seeking debt in firms with the same characteristics. However, the results of the models also confirm that family-owned firms are exposed to restrictions in access to bank debt. Among firms with the same control characteristics, family owned firms are more likely to have bank finance refused. In the case of leasing, the opposite happens, as family-owned firms are more likely to have this type of financing granted.

The results obtained in the models allow confirmation of the size factor as a relevant determinant of access to debt. Among firms with the same characteristics, those classified as micro and small tend to seek less bank debt and leasing. However, micro firms are shown to face greater restrictions in access to bank debt and leasing. Introduction of the interaction variables between family ownership and size allowed confirmation that family-owned micro firms are more likely to suffer restrictions in accessing bank debt. These results confirm the arguments in the financial literature about small firms' restricted access to the financial market, and so to long-term debt.

The results of the models confirm the influence of the interaction between sector of activity and family ownership in determining the financing decision. The results revealed that among firms with the same characteristics, those belonging to the service sector and being family owned, tend to have less debt in their capital structure. Family-owned firms in the industrial, commercial and service sectors show a greater likelihood of choosing bank debt or leasing. However, the results do not show the interaction between family ownership and sector of activity as being statistically relevant in determining firms' access to the financial market.

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