

# A DEMAND-SIDE APPROACH TO SMES' CAPITAL STRUCTURE: EVIDENCE FROM ARGENTINA

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## ABSTRACT

*Corporate finance, especially capital structure theory, studies a firm's decisions from the normative perspective of maximizing shareholder value. We propose a descriptive approach to understanding how small and medium enterprises (SMEs) make their financing choices. Considering owner-firm intertwinement as a fundamental characteristic of these firms, we include behavioral features as explanatory variables of capital structure. We test the implications of our approach in a sample of small Argentine firms. The evidence partially supports our hypothesis: the owner-manager's age and previous experience with personal debt are relevant in an SME's financing choices. We believe this reflects the owner's level of aversion to risk and uncertainty.*

## INTRODUCTION

Researchers in small and medium size enterprises (SMEs), like Storey (1994), argue that differences between small and large firms are not only a matter of size; consequently, special models are required to study SMEs.

Several characteristics differentiate small firms from large firms. First, management and ownership unification leads to an owner-firm intertwinement (Ang, 1992) at economic as well as emotional levels. Second, private equity factors affect the diversification possibilities and risk position of the owner. Moreover, the lack of professional management causes business problems, such as shortsighted planning. Agency equity costs also exist in these firms, where firm control and ownership are shared among the business partners. Only a firm with a single owner-manager is free of agency costs of equity (Ang, 1991, 1992). In family firms, the inclusion of younger generations is another source of agency problems. Furthermore, information asymmetry problems between small firms and external funds providers are especially large because of the informality and scarcity of information available. Finally, small firms have shorter life expectancy, given that the firm may cease to exist if just one person (the owner) leaves, due to a lack of succession planning.

Capital structure theory has been built around Modigliani and Miller's (1958) propositions of irrelevance in a context of perfect capital markets. The acknowledgment of market imperfections such as corporate and personal taxes, transaction costs, and information asymmetries has led to refinements in capital structure theory. However, there is still no theoretical agreement on the relevance of capital structure to overall firm value, because the trade-off and pecking order theories do not agree. While the trade-off theory argues that costs and benefits of debt lead to an optimum value, the pecking order theory suggests that capital structure is just the result of "cumulative requirements for external financing" (Myers, 1984, p. 581).

Traditionally, SME studies have focused on information asymmetry problems (e.g., Berger & Udell, 1998; Petersen & Rajan, 1994). As SMEs have restricted access to capital markets, due to high costs or legal form limitations, the credit rationing effect is expected to be particularly strong for these firms.

However, Hamilton and Fox (1998) and Hutchinson, Hall, and Michaelas (1998) propose a financing hierarchy with preference for internal funds, based on the owners' desire for control and flexibility. While the original proposition of the financing hierarchy results from the undesirable signaling effect of new equity issues, this argument can be considered a demand-side explanation.

We continue this line of investigation and propose a new approach to SME financing. This approach is based on demand factors that are complementary to traditional variables such as size, growth, profitability, and taxes. The originality of this proposition lies in the consideration of personal and behavioral aspects of the capital structure decision; we focus on qualitative distinctions among financing sources instead of measuring the quantitative capital structure of the firm. We analyze a data set with information on variables not previously recorded in Argentina, such as personal costs of bankruptcy, the owner-manager's goals for the business, and experience with personal debt. This data set allows us to test the implications of the new approach under two perspectives: the use of financial liabilities for all firms, and the use of financial liabilities for firms willing to use this kind of financing. The evidence supports our hypothesis in part: the owner-manager's age and her previous experience with personal debt are relevant in SMEs' financing choices, which we expect to reflect the owner's risk and uncertainty aversion. When we exclude from the analysis those firms that never use financial debt, the behavioral variables lose relevance, and credit rationing proxies, such as firm size, are dominant. We believe this characterization of the problem could be very helpful in understanding capital structure decisions in small firms in Argentina (and other developing countries), where the history of economic crises (the most recent was from 2000-2002) has undermined public confidence in financial institutions.<sup>1</sup>

The article is organized as follows. First, we review the traditional explanations of SMEs' financing decisions and supporting international evidence. Next, we present the arguments of the managerial view and of life cycle approaches and propose the hypotheses of the new approach to explain SMEs' capital structure. Finally, we describe the methodology and provide empirical results.

## SMES' CAPITAL STRUCTURE: THEORY AND EVIDENCE

“The modern theory of capital structure began with the celebrated paper of Modigliani and Miller (1958). They (MM) pointed the direction that such theories must take by showing under what conditions capital structure is irrelevant” (Harris & Raviv, 1991, p. 297). The irrelevance holds for perfect capital markets (no frictions with perfect competition in product and securities markets, information efficiency, and perfectly rational utility-maximizing agents). The acknowledgment of imperfections that make capital structure relevant (e.g., corporate and personal taxes, transaction costs, and information asymmetries) have inspired later developments.

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<sup>1</sup> We find that 37.5% of the firms that have no financial debt at the time of the study considered macroeconomic uncertainty as the main reason to use no debt. This result has also been observed by other national level studies (Observatorio PyME, 2007).

In this section, we briefly describe three approaches: trade-off, pecking order, and credit rationing. At the end, we sum up the empirical evidence on SMEs.

### *Trade-off*

The trade-off theory predicts a target optimal structure, as a result of balancing what Copeland, Weston, and Shastri (2004) call equilibrium effects (permanent influences whose effects are industry-wide, such as taxes, bankruptcy costs, and agency problems).

Prasad, Bruton, and Merikas (1997) propose another point of view for this approach in their study of the effect of operating and financial risk on systematic risk. If investors cannot fully diversify their portfolios because of capital market imperfections, they will value the control of systematic risk in a stock, and managers will have an incentive to control systematic risk. Moreover, in an SME, the owner-manager generally has a large portion, if not all, of his or her personal wealth invested in the firm, and controlling systematic risk has a direct impact on that personal wealth. Using Mandelker and Rhee (1984)'s decomposition into financial leverage and business risk,<sup>2</sup> Prasad et al. (1997) conclude that, if the systematic risk of the firm rises beyond acceptable because of operating factors, managers should seek to balance it by reducing financial leverage.

Applying the trade-off theory to small firms raises questions. One question is how to define the optimal target, which traditionally has been to maximize firms' value or, similarly (when operating cash flows are unaffected), to minimize the cost of capital. These particular objectives are difficult to measure in small firms, and may not be the only or even the primary goals of the owner-manager. Moreover, the main advantage of debt, the tax shield, can be especially difficult to assess in small firms where business income is taxed as personal income.

### *Pecking Order*

The pecking order theory differs from the trade-off theory in its conclusion of a hierarchy in the financing choices, instead of the existence of an optimal structure. Different arguments explain this result:

- Flexibility: managers have high discretion regarding the use of these funds.
- Transaction costs: external financing creates costs that are avoided with internal financing.
- Information asymmetries: insiders (managers and owner-managers) know better than outsiders the current situation and future prospects of the firm. By using internal funds, managers avoid sharing information about expected return and investment opportunities. Myers and Majluf (1984) and Myers (1984) study the signaling effect of equity, stating that investors may see new equity as bad news and infer that equity is overpriced.

Chittenden, Hall, and Hutchinson (1996) state that issuing external equity may be particularly costly for SMEs because of the relatively fixed costs of initial public offerings, the small firm effect on the cost of equity, and the potential loss of control by the original owner-managers.

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<sup>2</sup> *Business risk* is generally defined as the risk of the firm without financial leverage. Business risk depends both on the sensitivity of the firm's revenues to the business cycle and on the firm's operating leverage (Ross, Westerfield, & Jaffe, 2003).

Zoppa and McMahon (2002) describe an SME pecking order where the first choice is internal equity, including the additional time the owner-manager spends in the firm for a salary below standard market remuneration. Additionally, the firm uses short-term debt, including trade credit and personal loans. Then, long-term debt is included, possibly beginning with loans from the owners, family, and friends. New equity comes last, first through the original owners or relatives, and finally through new partners.

Berger and Udell (1998) explain the small firm financial structure using a *financial growth cycle* “in which financial needs and options change as the business grows, gains further experience, and becomes less informationally opaque” (p. 622). Firms face higher information asymmetries during the infant stage (first two years), when the main sources of funds are the entrepreneur, friends and relatives, trade credit, and angel investors. Credit from financial institutions, first short-term and later long-term, becomes available when the firm reaches a size and age large enough to have historical accounting records that should show a certain level of tangible assets. If the firm continues to grow, it may gain access to the capital markets. Access to financial institutions can be granted in the earlier stages through personal guarantees by the owners. This sequence can be seen as a dynamic view of the pecking order, where the strength of information asymmetries decreases as the firm gains experience.

Fama and French (2002) point out that under pecking order hypotheses, firms have no incentive to issue debt if they still have internal funds to finance their investments. This behavior is inapplicable to some firms, especially smaller ones. Moreover, it assumes that firms will use debt if some attractive investment opportunities remain open. A special case among SMEs, those that do not use debt even if they pass up attractive investments, remains unexplained.

### *Credit Rationing*

Stiglitz and Weiss (1981) demonstrate that information asymmetries may affect the supply of bank credit, causing credit rationing. When a bank grants credit, both interest rate and credit risk matter. If information asymmetries exist, the interest rate a bank charges affects credit risk in two ways: first, an adverse selection effect, sorting potential debtors, and second, an incentive effect, influencing debtors' actions. The bank determines the interest rate that maximizes its loan portfolio's expected return. If at that rate there is excess demand, the bank rations credit instead of increasing the interest rate, because increasing the interest rate would attract riskier borrowers (negatively affecting the expected return). In addition, a higher interest rate would provide firms with an incentive to take riskier projects, leading to an asset substitution problem.

In the context of credit rationing, Petersen and Rajan (1994) point out that changes in the firm leverage may be caused by effects on the demand and supply of funds. If financial institutions limit the amount of credit they give, firms will have to resort to more expensive sources of funds once the cheaper sources have been exhausted, given that the return on investment exceeds the cost of these funds. In this case, an under-investment problem may arise. In Petersen and Rajan (1994)'s model, the expensive substitute of bank debt is trade credit. They consider that variables such as firm age and size, duration of the longest relation with creditors, and the concentration of creditors may capture the characteristics of lending relationships. All these variables should be positively related to debt, as the lending relationship reduces the information asymmetries.

Because SMEs have restricted access to capital markets, due to high costs or legal form limitations, the credit rationing effect is expected to be particularly strong for these firms.

**Table 1. Traditional Determinants of SME's Capital Structure and Their Evidence**

Determinant	Debt Ratio			
	TO	PO	CR	Observed
<b>General economy characteristics</b>				
Corporate tax rate	+ / 0			-
Non-debt tax shields	-			-
<b>Firm characteristics</b>				
Firm size	+	+	+	+
Firm age	+	**	+	-
Profitability	+	-		-
Growth	-	+		+
Tangibility of assets	+			*
Singularity of assets	-			*
Lending relationship	+	+		+

TO: Trade-off. PO: Pecking order. CR: Credit rationing.

\*: Contradictory or not statistically significant.

\*\* : Mature firms are expected to have less financial need (because of stable or no growth) on one hand, and to become less informationally opaque on the other hand.

### *International Evidence*

We analyzed the empirical results of 19 papers from different countries.<sup>3</sup> In Table 1, we classify the variables into two groups—general economy and firm characteristics—and show the traditional determinants of SMEs' (quantitative) financial structure and their empirical evidence. The strongest support is for a negative association of profitability, firm age, corporate taxes, and non-debt tax shields with the debt ratio, while firm size and growth have a positive effect. The results on profitability and growth seem to align well with the pecking order. Nevertheless, this cannot be seen as a straightforward support of the pecking order over the trade-off, as adjustment costs in the dynamic formulation of the latter can also act as an explanation of this result. Moreover, the detailed results in Table 8 show that evidence is not conclusive.

### **CONSIDERING BEHAVIORAL VARIABLES: THE MANAGERIAL VIEW AND LIFE CYCLE APPROACHES**

The traditional corporate finance paradigm, in which the previous theories belong, is based on the assumption that agents are perfectly rational and pursue utility maximization. In particular, this means that rational players update their beliefs following Bayes' law and behave maximizing Savage's notion of subjective expected utility. Behavioral finance "analyses what happens when we relax one, or both, of the two tenets that underlie individual rationality" (Barberis & Thaler, 2003, p. 1053).

In this research, we are specifically interested in the contributions of cognitive psychology to the recognition of biases in people's beliefs and preferences. Some outstanding characteristics of

<sup>3</sup> In Tables 7 and 8 in the Appendix we show the list of authors and places of origin, as well as the individual results for each paper.

how people form beliefs are overconfidence, belief perseverance, and optimism. When dealing with the subject of preferences, we highlight the qualities of loss and uncertainty aversion.<sup>4</sup>

Research in behavioral corporate finance can be classified in two distinct approaches: irrational managers and irrational investors. Optimistic managers would implement a pecking order, because they would avoid issuing what they consider to be under-valued equity (Baker, Ruback, & Wurgler, 2004). These behavioral costs are internal to the firm and are caused by managers' cognitive imperfections and vulnerability to emotional influence (Shefrin, 2001). A solution proposed in the literature in order to achieve value maximization is to align (irrational) managers' incentives with (rational) investors' interests.

Small firms have received little attention from behavioral finance theorists. However, we believe this is a potentially rich field given the owner-firm intertwinement characteristic of these firms. Special models are required, however, as shareholders and managers most frequently are the same people.

We believe that behavioral factors should be considered among the variables that affect small firms' financing decisions. Optimism and overconfidence can be translated into a manager's under-estimation of the firm's risk, which would result in under-estimating the cost of equity. This implies a pecking order; 26.7% of the firms in our sample believe that reinvested gains are the cheapest form of financing.

Belief perseverance can play an important role in uncertain and changing environments like the Argentine economy. For many leveraged firms that suffered the 2000-2002 crisis, taking on new debt is not an option to consider, although macroeconomic conditions during 2006 (the year of the survey) were exceptionally favorable. We also expect that information asymmetries may have a demand effect beyond adverse selection. In Briozzo and Vigier (2007), firms are classified in three groups: 1) firms whose financing decisions respond to trade-off predictions,<sup>5</sup> 2) firms whose financing decisions respond to pecking order predictions, and 3) firms that never use debt. Firms from group 2, less willing to use financial debt than those from group 1, could be reflecting the previous experience of the owner in the financial markets where they find credit rationing or higher-than-expected interest rates. This would be a case of belief perseverance.

In pursuit of a more complete understanding of the small firm financing decision, we propose a new approach, taking into consideration a fundamental characteristic of these firms: owner-firm intertwinement. This approach is complementary to and not a substitute for traditional theories. Our idea is to integrate some diverse contributions by other authors and to propose some new factors that we expect to be related to the firm's financial structure. We classify the arguments into two groups: the managerial view, which takes into consideration the impact of the personal characteristics of the owner-managers and the way they run their organizations, and life cycle approaches, where the focus lies on the evolution of the firm and its owner-managers.

The *managerial view* includes the following variables:

- *Business goals* of the owner, which can vary from traditional financial objectives. These goals can be to increase the value of the firm or increase sales growth, or they can be more family-oriented goals such as providing the family with business careers, passing the business on to the next generation, or improving the family's lifestyle. Carland,

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<sup>4</sup> According to Ellsberg (1961), there is uncertainty aversion if the decision maker prefers to bet on an urn of known composition rather than on an urn of unknown composition. That is, people tend to prefer bets with known probabilities to bets with unknown ones.

<sup>5</sup> These would be firms that choose to use debt even when internal funds are available.



Carland, Carland, & Pearce (1995) suggest there may be differences in risk propensities of founders who primarily focus on profit and growth compared with owners of small businesses who focus on goals that are more personal or family income.

- *Attitude toward debt financing and previous debt experiences* (both personal and for the firm). Frequently there are no clear limits between the owner's and the firm's finances. We expect that experience with personal debt will reduce uncertainty aversion (a demand effect). We are specifically interested in uncertainty aversion because we believe we have an acceptable proxy for it: previous experience with debt at the personal level. Imagine two firms that are equal in every aspect except that A's owner has used personal debt, and B's has not. Regarding the traditional framework for capital structure, the financial leverage decision should be the same for both firms. However, we expect that A would have a higher probability of using debt in the future. Our hypothesis is that A's owner is more familiar with financial leverage (which means a reduction in uncertainty aversion), and this is the reason for the different decision. In addition, this experience can soften the information asymmetries, thus improving access to debt (supply effect). We also believe that uncertainty aversion is present in what could be called "own firm bias," which is the propensity of small firms owners to invest all (or almost all) of their capital in their own firm. In the fashion of the known "home country bias,"<sup>6</sup> this "own firm bias" may mean a preference for familiar companies or, in this case, the most familiar company: one's own.

Both variables are proposed by Romano, Tanewski, and Smyrniotis (2000) for family firms. Here we extend this concept to small firms in general, as well as relate previous debt experiences with changes in uncertainty aversion and information asymmetries. The following variables are an original contribution of this paper:

- *Professionalization of management*, particularly in the field of economic sciences, which we expect to be related to the diversification of financing sources. Numerous non-traditional sources are often unknown to SMEs because of lack of information, or perhaps absence of interest. We also include here the use of formal planning methods,<sup>7</sup> which are expected to reduce informational opacity.<sup>8</sup>
- *Personal costs of bankruptcy* are a consequence of the usual owner-firm intertwinement present in SMEs. These costs include the socio-economic and emotional consequences that the firm's bankruptcy implies for the owner, even with limited liability. We consider them to be a result of the lack of diversification of the owner's human capital and the emotional bond that the owner has with the firm, especially in family businesses. For partnerships with no limited liability, or the case of sole proprietorship, the legal consequences are larger, and can lead to bankruptcy at the personal level. In Argentina, we usually observe that small firm owners have a strong emotional bond with their firm, which means much more to them than a source of income; it also means social respect and self-fulfillment. Considering the firm figuratively as "one of their children" is quite common, and losing the firm means for its owner not only a monetary but also a personal

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<sup>6</sup> The propensity of investors to invest more than an optimal fraction of their portfolio in securities of the country where they live. For example, Grinblatt and Keloharju (2001) find this effect significant for the Finnish market.

<sup>7</sup> This variable is included in Romano et al. (2000).

<sup>8</sup> This could bring an endogeneity problem, as formal planning may be a consequence of using debt.

loss, which can lead to depression and affect the owner's personal life. We call these effects the "emotional costs of bankruptcy."

On the other hand, we propose two life cycle approaches, which describe the changing features of firms and their owner-managers through time. The *life cycle of the owner-manager* approach argues that the owner-manager's risk and uncertainty aversion and goals will evolve during his or her lifetime as objectives change from pursuing profit and growth to focusing on more personal goals and family income. As Ang (1992) points out, small firms have shorter expected lifespans, which largely depend on the founders' permanency in the firm, and succession plans. When the owner is preparing for his or her succession, long-term planning may be neglected, affecting the term choice in financing decisions. Specifically, we expect that uncertainty aversion will increase with age, an idea which is present in related literature. Previous papers studying cognitive life-cycle patterns find that analytic performance is negatively correlated with age in adult populations (Salthouse, 2005) and that personal financing choices change with age (Agarwal, Driscoll, Gabaix, & Laibson, 2007).

The financial growth cycle of the firm (described by Berger & Udell, 1998) and the life cycle of the owner-manager are expected to be connected with each other, sometimes with opposite effects. For example, as the firm and its owner grow older, information asymmetries decrease, granting easier access to debt (a supply-side effect), while the owner's risk aversion and personal costs of bankruptcy increase with age, and thus he or she desires to use less leverage (demand-side effect).

Finally, we believe that the *life cycle of the family firm* may also affect the financing choice. Similar to Gallo (1998), we recognize three distinctive stages in the family firm: the founder-owner, the second generation (brothers and sisters as partners), and the third generation (cousins and relatives as stockholders). The first generation owners are expected to be entrepreneurial and prone to risk taking (Ang, 1991), characteristics not necessarily transferable to successive generations. As new people join the ownership of the firm, agency costs of equity and personal costs of bankruptcy increase.<sup>9</sup> Family businesses may use less debt than non-family businesses because of aversion to financial risk and the owner's fear of losing freedom to dictate business policies (Gallo, Tàpies, & Cappuyns, 2004).

The life cycle approaches we propose can be seen as a dynamic view of the managerial variables. To illustrate this idea, imagine the following demand function for external funds (financial liabilities) for an individual firm:

$$D(t, E, C_b, O_b, I, F, R, X) \quad (1)$$

Where:

t: Owner-manager' age

E: Previous personal debt experiences (experience ranges from null to a high degree)

C(.): Emotional costs of bankruptcy (ranges from null to a high degree), which varies with the owner's age, as well as with other non-observable factors.

O(.): Pursuing business objectives (profits, sales, or value maximization) as opposed to personal goals (to provide family with business careers, to pass something on to the next generation, or to improve lifestyle). The emphasis on business objectives ranges from

<sup>9</sup> If the income of the whole family depends on the firm, its bankruptcy implies losing the means of subsistence, reputation, and lifestyle for all the family members.



null to a high degree. This variable also varies with the owner's age, and with other non-observable factors.

I: Interest rate for the particular firm.

F: Net cash flow deficit; it represents the requirements for external financing. This depends on firm profitability and age, dividend policy, size, growth, and business risk.

R: Other characteristics, like present capital structure, legal form, and taxes.

X: Variables that are external to the firm, such as the term structure of interest rates, and expected inflation.

This demand function can be described through the following derivatives:

$\frac{\partial D}{\partial C} < 0$ , when the emotional costs of bankruptcy rise, the demand for financing would decrease.

$\frac{\partial D}{\partial O} > 0$ , because following a business goal more intensively would lead to increasing needs for financing.

$\frac{dD}{dt} < 0$ , here a direct effect and two distinct indirect effects are acting. First, the direct effect of higher risk and uncertainty aversion increases with age. Second, age raises the emotional costs of bankruptcy:  $\frac{\partial C}{\partial t} > 0$ . Finally, younger owners would tend to follow business goals, while older

owners would rather focus on family and succession:  $\frac{\partial O}{\partial t} < 0$ . Mathematically:

$$\frac{dD}{dt} = \underbrace{\frac{\partial D}{\partial t}}_{<0} + \underbrace{\frac{\partial D}{\partial C}}_{<0} \cdot \underbrace{\frac{\partial C}{\partial t}}_{>0} + \underbrace{\frac{\partial D}{\partial O}}_{>0} \cdot \underbrace{\frac{\partial O}{\partial t}}_{<0} < 0 \quad (2)$$

$\frac{\partial D}{\partial E} > 0$ , given that higher personal debt experience would increase the demand for financing.

$\frac{\partial D}{\partial I} < 0$ , because if the interest rate rises, the demand decreases.

$\frac{\partial D}{\partial F} > 0$ , because higher deficit increases the demand.

Under this new approach, we recognize multiple goals, not only shareholder value maximization. This implies that the *trade-off* proposition can be seen as complementary to other theories, and not as a universal explanation.

Moreover, in our formulation, the net cash flow deficit does not directly equal the demand for external funds; other variables also play a role. We explain this using a dynamic system: suppose a firm has a deficit of \$100, and given the interest rates, age of the owner, and emotional and other costs, the firm would demand \$60 of external financial funds. The difference could be

covered by the owner's funds, or if not, the dividend and investment policies could be reformulated until equilibrium is reached.

The managerial view and life cycle approaches propose a demand-side explanation for SMEs financing decisions. Under this view, firms with similar "objective" features, like size, age, asset structure, and access to financial debt, could have different financing choices if their "subjective" characteristics differ.

The financing decision is generally studied through its observable result: capital structure. However, Brealey and Myers (1984) point out that how financial decisions are made is a question that still remains unanswered. Taking into consideration the demand-side motivations of financing decisions, we identify two typical cases among SME owner-managers: those willing to use financial debt (under certain supply and demand conditions), and those who will not take on debt even if by doing so they pass up an attractive investment. With this distinction we intend to recognize the differential forces of supply and demand that underlie the capital structure choice. We expect that behavioral variables could explain this particular case of firms that exclude themselves from debt demand.

## METHODOLOGY

We analyzed the effect of the proposed variables on the probability of using financial liabilities<sup>10</sup> using a Probit model. We focused on the use of debt rather than on the quantitative financial structure for two main reasons:

1. The difficulty in measuring the capital structure as a proportion of the firm assets, given that data on invested capital are scarcely available in firms without financial statements. Moreover, the application of personal debt to the firm, which is frequent in SMEs, is not registered in the firm's financial statements.
2. The relatively scant use of financial debt: nearly half of the firms in the sample do not use this kind of debt.

Consequently, our hypotheses are:

**H<sub>1</sub>:** *Being a family firm negatively affects the probability of using financial liabilities.*

**H<sub>1b</sub>:** *The incorporation of new generations to the family firm positively affects the probability of using financial liabilities.*<sup>11</sup>

**H<sub>2</sub>:** *Higher professionalization of management positively affects the probability of using financial liabilities.*

**H<sub>3</sub>:** *The age of the small firm owner negatively affects the probability of using financial liabilities.*

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<sup>10</sup> A financial liability results from a bank credit, a bond issue, or other relation with financial institutions. Trade credit, tax debts, and other operating liabilities are excluded from this concept. We also exclude overdraft fees, but include personal debt of the owner incurred because of the firm.

<sup>11</sup> We controlled for emotional costs of bankruptcy, and our expectation was that agency costs of equity would exceed the change in risk aversion.

**H<sub>4</sub>:** *Business-oriented goals, such as sales growth or value maximization, positively affect the probability of using financial liabilities.*

**H<sub>5</sub>:** *Emotional costs of bankruptcy (linked to the personal costs of bankruptcy) negatively affect the probability of using financial liabilities.*

**H<sub>6</sub>:** *Previous experience of the owner with credit for personal purposes positively affects the probability of using financial liabilities.*

Besides the explanatory variables mentioned previously, we also included some control variables from traditional theories: firm age and size, growth, sector, reinvested gains, days payable outstanding, and limited liability. The operational definitions of the variables, and their expected effect, are shown in the Appendix.

To collect the data we designed a questionnaire to be completed through personal interview. The list of firms for the empirical study was provided by *Subdirección Estadística de la Municipalidad de Bahía Blanca* (Department of Statistics of Bahia Blanca Municipality).<sup>12</sup> From the 265 firms contacted between July and October 2006, we obtained a 54% response rate. The data set of completed questionnaires ranges from 111 to 129 firms for the whole sample, and 98 to 114 firms for the sub-sample.<sup>13</sup> For this study, we collected a data set of SMEs with information on variables with no previous records in Argentina, such as personal costs of bankruptcy, owner-manager goals for the business, and experience with personal debt. We believe the resulting database is unique to Argentina, and it includes qualitative data that it is not frequently present in studies undertaken in developing countries.

The binary Probit model is estimated by equation 3:

$$P(y = 1 | x) = G(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k) \quad (3)$$

Where G is the normal cumulative density function  $G(z) = \Phi(z) = \int_{-\infty}^z \phi(v)dv$  and  $\phi(z)$  is the normal probability density function.

The dependent variable Y is binary, defined as follows:

$$Y = \begin{cases} 1 & \text{if firm has financial liabilities} \\ 0 & \text{if not} \end{cases} \quad \text{at the time of the survey}$$

We run the model on two different samples. First, we consider the whole sample. Then we exclude those firms that would never use debt, even if they pass up attractive investments as a consequence. This is a special feature we can measure through our *ad hoc* questionnaire, and we

<sup>12</sup> We limited our empirical study to the city of Bahía Blanca due to budgeting and methodological reasons, as a representative sample of SME on a national level should include at least 1,000 firms (to be interviewed in person, as mailing or telephone surveys of this kind in Argentina have very low expected response rates). Moreover, firms located in different regions of the country could represent different underlying populations, so aggregate analysis of the data would be inappropriate. There are no previous databases in Argentina with the information we required for the analysis.

<sup>13</sup> The smaller samples correspond to family firms only.

find this behavior in 11.7% of the firms in our sample. Although aversion to debt in small firms has been described in other countries (e.g., Norton, 1990), we do not have evidence that this extreme case—that of willingly passing up attractive investments—has been previously documented.

This extreme aversion to debt can be better understood with some background on recent Argentine history. From 2000 to 2002, Argentina suffered a severe economic, political, social, and financial crisis, of which the most recognized features on a global scale were the resignation of President Fernando De La Rúa, the default of public debt, the *corralito*,<sup>14</sup> and the end of the convertibility regime. At the enterprise level, the number of bankruptcies increased 57.8% from 2001 to 2002 (Cincodias.com, 2002) leading to the temporary suspension of all judicial executions of debtors' property, while annual interest rates in banks reached levels above 60%. The second most recent Argentine crisis dates from the end of the 1980s, and was characterized by hyperinflation; inflation reached up to 200% a month. This history of economic crises has undermined people's confidence in financial institutions; for example, in a recent survey, it was found that 83.2% of Argentine people do not trust banks (Clarín, 2008).

With the distinction we propose between estimations we intend to examine the differential forces of supply and demand that underlie the capital structure choice. We expect personal and behavioral variables to have stronger effects when we include firms not willing to use debt in the analysis, while credit-rationing effects would be stronger in the opposite case.

## RESULTS

In Table 2 we show the descriptive statistics of the data for the global mean values and per each case of the dependent variable ( $F=1$  means the firm has financial liabilities at the time of the survey). For binary variables (marked with \*), the value shown is the percentage of the subsample with that characteristic. In all of our tables, the boldface variables have statistically significant differences among group means ( $t$ -tests for quantitative variables, Pearson chi-square for categorical ones).

Table 2 shows that some variables behave as expected. For the whole sample, owner's age is significantly higher for firms with no financial liabilities, while personal debt and formal planning are significantly higher in firms that use these outside funding sources. For control variables, we observe that firms with no financial liabilities are significantly smaller, have lower participation of limited liability legal forms, and reinvest a lower percentage of their gains. When we exclude firms that never use financial liabilities, only micro-sized firms, limited liability, and reinvested gains have statistically significant differences.

The variable "other investments" reflects whether the owner has some degree of diversification in his or her portfolio (this is a dummy variable, where a positive answer equals one). This variable is not included in the Probit regression, as we do not expect it to have an effect on the probability of using financial liabilities. We expect, however, that firms that do not use financial liabilities have owners less prone to diversifying their portfolios (because of the "own firm effect"). Although we observe that firms with financial liabilities have a larger proportion of owners with other investments (49% vs. 39%), we do not find this difference to be statistically significant.

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<sup>14</sup> This is the informal name given to a set of economic measures that almost completely froze bank accounts. Later most deposits were exchanged for a series of compulsory bonds.

For the Probit model, we estimate different specifications for the whole sample (Table 3) and the sub-sample, excluding firms unwilling to use financial liabilities (Table 4).<sup>15</sup> Both tables show the marginal effect (other variables at their mean values) for the estimated models.<sup>16</sup> For dummy variables the change is from D=0 to D=1. We discuss hypothesis testing and goodness of fit in the Appendix.

**Table 2. Descriptive Statistics**

<i>Variables</i>	<b>Whole Sample</b>			<b>Sub-sample**</b>	
	<b>F=1 (51.2%)</b>	<b>F=0 (42.8%)</b>	<b>Global mean</b>	<b>F=0</b>	<b>Global mean</b>
<b>Owner's age</b>	<b>47 years</b>	<b>49.5 years</b>	48.2 years	48.1 years	47.5
<b>Personal debt*</b>	<b>29.2%</b>	<b>13.4%</b>	21.6%	17.6%	24.4%
Family firm*	90%	82%	86.3%	80.4%	86.2%
Generation of the family firm* (a)	31.1%	42.4%	36.6%	40%	35%
Business goal*	59%	45.5%	52.6%	43.6%	53%
Owner has M. or E. degree*	14%	12%	13%	11.8%	13%
<b>Formal planning *</b>	<b>62.5%</b>	<b>47.8%</b>	55.4%	53%	58.5%
Employees have M. or E. degree*	25%	21%	23%	25.6%	25.2%
<b>Emotional costs*</b>	31%	29%	30%	26%	29%
<b>Size: Micro*</b>	<b>20%</b>	<b>41%</b>	29.7%	<b>38%</b>	27%
Size: Small*	59.7%	48.5%	54.3%	50%	55.7%
Size: Medium*	<b>20.1%</b>	<b>10%</b>	15.2%	10%	16.4%
Firm age	26.2 years	25.9 years	26.1 years	24.9 years	25.7 years
<b>Limited liability*</b>	<b>72.2%</b>	<b>47.8%</b>	60.4%	<b>53%</b>	64.2%
Sector: Services*	18%	25.3%	21.6%	27.4%	22%
Sector: Commerce*	52.8%	53.7%	53.2%	47%	50.4%
Sector: Other*	5.5%	7.4%	6.4%	9.8%	7.3%
Sector: Industry*	23.6%	13%	18.7%	15.7%	20.3%
Expected growth	14.6%	13.6%	14%	13.6%	14.2%
Historical growth	23%	19.6%	21.3%	19.8%	21.8%
Days payable outstanding	30.7 days	33.9 days	32.2 days	37.8 days	33.5 days
Sales margin	15.9%	14.8%	15%	15.9%	15.9%
Other investments	49%	39%	44.8%	40.4%	44.8%
<b>Reinvested gains</b>	<b>64.7%</b>	<b>51.4%</b>	58.7%	<b>53.6%</b>	60.4%

\*\*Sub-sample excluding firms that never use financial liabilities. The group that uses financial liabilities (F=1) is equal to the group F=1 for the whole sample. (a): Only for family firms.

<sup>15</sup> We show two-tailed *p*-values.

<sup>16</sup> We use the Huber/White/sandwich variance estimators. Robust variances give accurate assessments of the sample-to-sample variability of the parameter estimates even when the model is misspecified.

For the whole sample estimations (Table 3), we find statistically significant support for owner-manager's age, personal debt use, size (micro firm), limited liability, and sector (industry). When we limit the analysis to family firms (Model 4) owner-manager's age is not statistically significant.<sup>17</sup>

**Table 3. Marginal Effect Estimations for the Probit Model (Whole Sample)**

Model	1	2	3	4	5	6	7
<b>Owner's age</b>	-0.011 (0.035)	-0.01 (0.033)	-0.009 (0.092)	-0.01 (0.058)	-0.01 (0.033)	-0.01 (0.037)	-0.01 (0.021)
Business goal	0.058 (0.611)						
<b>Personal debt</b>	0.267 (0.026)	0.293 (0.008)	0.32 (0.002)	0.316 (0.008)	0.293 (0.008)	0.296 (0.007)	0.306 (0.005)
Emotional costs	0.019 (0.863)	0.034 (0.732)	0.057 (0.60)	-0.003 (0.976)	0.035 (0.725)	0.035 (0.727)	0.028 (0.778)
Firm age	0.001 (0.678)	0.0005 (0.845)	-0.0009 (0.731)	-0.0006 (0.804)	0.0004 (0.855)	0.0004 (0.874)	-0.0005 (0.84)
Formal planning	0.005 (0.959)	0.114 (0.252)	0.017 (0.865)	0.067 (0.544)	0.115 (0.248)	0.123 (0.223)	0.102 (0.315)
Family firm							0.312 (0.07)
Non-founder generation				-0.09 (0.403)			
<b>Size: Micro</b>	-0.223 (0.06)	-0.227 (0.034)	-0.162 (0.153)	-0.219 (0.059)	-0.229 (0.034)	-0.221 (0.041)	-0.25 (0.029)
<b>Limited liability</b>	0.348 (0.003)	0.303 (0.003)	0.306 (0.007)	0.301 (0.006)	0.305 (0.003)	0.304 (0.003)	0.35 (0.001)
Days payable outstanding	-0.001 (0.363)	-0.001 (0.615)	-0.003 (0.117)	-0.001 (0.568)	-0.001 (0.611)	-0.009 (0.654)	-0.005 (0.796)
<b>Sector: Industry</b>		0.31 (0.015)		0.249 (0.072)	0.309 (0.016)	0.317 (0.013)	0.31 (0.019)
Reinvested gains			0.248 (0.139)				
Historical growth					-0.023 (0.869)		
Expected growth						0.243 (0.518)	
N	109	129	119	111	129	129	129

A free cell shows that a variable is not included in the model. *P*-values are in parentheses.

<sup>17</sup> In Model 3 owner's age is not statistically significant, which can be a result of including reinvested gains as a variable or a result of the different sample. Results of other models on the sample used in Model 3 suggest that owner's age is never statistically significant. This suggests that the cause lies in the different set of firms.



When we restrict the study to the sub-sample, only size (micro firm) and limited liability remain statistically significant, while personal debt shows weaker support. However, the change in the significance of personal debt may be a result of sample size limitations. When we estimate Models 2 and 5 on the same set of firms as in Model 3, we find that personal debt results are statistically significant, while firm size is not. Model 4 restricts the analysis to family firms, and personal debt is not statistically significant. It is interesting to note that days payable outstanding receives support in Model 3, with a negative sign that could be showing a credit-rationing effect. We also observe that the global significance tests for the sub-sample Probit estimations are weaker, probably because of sample size limitations.

The effect of generation of the family firm must be analyzed in a different set of firms, only including those that qualify as family firms (Model 4 in both tables), but the results are not statistically significant.

**Table 4. Marginal Effect Estimations for the Probit Model (Sub-sample\*\*)**

Model	1	2	3	4	5	6	7
Owner's age	-0.006 (0.226)	-0.007 (0.156)	-0.004 (0.427)	-0.006 (0.817)	-0.007 (0.154)	-0.007 (0.168)	-0.007 (0.109)
Business goal	0.153 (0.161)						
<b>Personal debt</b>	0.167 (0.139)	0.203 (0.054)	0.25 (0.012)	0.219 (0.057)	0.203 (0.054)	0.207 (0.048)	0.216 (0.036)
Emotional costs	0.065 (0.542)	0.063 (0.531)	0.112 (0.281)	0.012 (0.922)	0.064 (0.527)	0.068 (0.499)	0.057 (0.566)
Firm age	0.003 (0.424)	0.0003 (0.916)	-0.0006 (0.821)	-0.0007 (0.817)	0.0002 (0.924)	0.0001 (0.957)	-0.0008 (0.756)
Formal planning	-0.061 (0.584)	0.084 (0.402)	-0.002 (0.982)	0.053 (0.643)	0.085 (0.398)	0.0988 (0.33)	0.065 (0.523)
Family firm							0.313 (0.084)
Non-founder generation				-0.057 (0.618)			
<b>Size: Micro</b>	-0.238 (0.05)	-0.23 (0.037)	-0.178 (0.126)	-0.222 (0.071)	-0.236 (0.036)	-0.231 (0.039)	-0.264 (0.028)
<b>Limited liability</b>	0.287 (0.018)	0.241 (0.024)	0.245 (0.031)	0.251 (0.032)	0.243 (0.025)	0.241 (0.024)	0.299 (0.012)
<b>Days payable outstanding</b>	-0.002 (0.213)	-0.001 (0.396)	-0.0039 (0.05)	-0.002 (0.418)	-0.002 (0.394)	-0.002 (0.43)	-0.001 (0.537)
Sector: Industry		0.229 (0.066)		0.181 (0.186)	0.228 (0.068)	0.238 (0.057)	0.23 (0.075)
Reinvested gains			0.184 (0.282)				
Historical growth					-0.022 (0.876)		
Expected growth						0.207 (0.14)	
N	94	114	106	98	114	114	114

\*\* Sub-sample excluding firms that never use financial liabilities. A free cell shows that a variable is not included in the model. *P*-values are in parentheses.

Next, we analyze the discrete change in the probability of using financial liabilities.<sup>18</sup> Owner's age ranges from 0.78 (24 years old) to 0.28 (76 years old). For size variables, we find that the probability of using financial liabilities is 0.40 for micro firms and 0.62 for larger firms. Finally, for sector variables, we find that the probability of using financial liabilities is 0.81 for the industry sector and 0.49 for other firms. In Table 5, we compare the previous estimates for the whole sample with those for the sub-sample, observing that the effects of size and limited liability are stronger for the latter group.

**Table 5. Probability of Using Financial Liabilities**

	Whole Sample	Sub-sample
Personal debt	0.78	0.78
Limited liability	0.67	0.71
Size: Micro	0.40	0.46

Finally, in Appendix Figures 1 and 2 we plot the probabilities over the range of the owner's age, for personal debt and limited liability.<sup>19</sup> They both suggest that the relationship between age and probability of using financial liabilities is approximately linear.

## CONCLUSIONS

First, we review the conclusions on the empirical results:

- *Owner-manager's age*: The evidence shows strong support for a negative effect on the probability of using financial liabilities. This result supports our hypothesis of the life cycle of the owner-manager. As we control for personal costs of bankruptcy, business goals of the owner, and firm age, this should show the effect of changes in risk and uncertainty aversion with age. As we expected, this variable loses empirical support for firms willing to use financial debt.
- *Experience with personal debt*: The evidence shows strong support for a positive effect on probability of using financial liabilities, for both sets of firms. This result also supports the existence of owner-firm intertwinement.

The rest of the explanatory variables (family firm, generation of the family firm, professionalization of management, emotional costs, and business goals) are not statistically significant for any of the estimations. For the control variables, we find evidence for a positive effect of size—depending on sector industry (which we use as a proxy for asset tangibility)—on the probability of using financial liabilities.

Limited liability also receives strong support for a positive effect that can be caused by three different factors. First, limited liability *per se* is expected to reduce the bankruptcy costs for the owner-manager (thus positively affecting his or her attitude towards debt on one hand), and to enlarge moral hazard problems (then negatively affecting access to debt on the other hand). Second, limited liability means a fixed profits tax rate (35%) in the Argentine taxing system, while other legal forms face a progressive scheme ranging from 9% to 35%. Therefore, firms with limited liability would have incentives to use more debt because of a higher tax shield. Third

<sup>18</sup> Estimates use Model 6 from Tables 3 and 4.

<sup>19</sup> Estimates use Model 6 from Table 3.

and finally, the positive effect may reflect the level of informality, because according to regulation these firms must present financial statements, which could cause a reduction of information asymmetries.

Estimates from both sets of data differ as we expected: for those firms willing to use debt, owner's age results are not statistically significant, while this variable has a negative effect for the whole sample. This could be showing the effect of behavioral variables in the financing decisions of firms that exclude themselves from financial debt demand. Credit rationing problems would be easier to measure in the sub-sample, because of the exclusion of those firms that never face active credit rationing problems. Our results support this idea: for the sub-sample, size, limited liability, and even days payable outstanding have stronger effects.

**Table 6. Comparison of Results**

Variable	Observed in Other Studies	Our Result
Owner's age	?	-
Formal planning	+	ns
Growth-oriented goal	+	ns
Legal form	ns	+
Tax rate (firm)	-	+
Size	+	+
Firm age	-	ns
Profitability	-	ns
Growth	+	ns
Asset tangibility	?	+

ns: stands for not statistically significant.

?: stands for contradictory results

In Table 6, we compare our results with previous studies<sup>20</sup> on SMEs. Only Romano et al. (2000) and Vos, Jia-Yuh Yeh, Carter, & Tagg (2007) include the first four variables in their studies. Contrary to our results, Romano et al. (2000) do not find the owner-manager's age to be significant, while they report positive effects for formal planning and growth-oriented goals. However, when we study only family firms we find the same result regarding the owner's age. On the other hand, Vos et al. (2007) find that the owner's age has a negative effect on the diversification of financing sources, while a growth-oriented goal has a positive effect. However, the legal form results are not statistically significant.

For control variables, our results are consistent with those of other studies. The results detailed in Table 8 (in the Appendix) and the comparison in Table 6 lead us to some conclusions. First, there is no consensus about the empirical determinants of small firms' capital structure. Second, there are variables (like personal factors) and contexts (like developing countries) that have received little attention from previous research.

In this paper, we make two main contributions: we design a qualitative measure of SME capital structure and propose a new approach that includes some behavioral characteristics of these firms. Then, we test the implications of this approach on a dataset with information on variables that have not been previously studied in Argentina. Summing up the results, we find

<sup>20</sup> Summary comparisons are drawn from Table 8 in the Appendix.

evidence supporting the life cycle of the owner-manager, and the owner-firm intertwinement proposed by the managerial view. However, the familiar nature of a firm and the life cycle of the family firm are not statistically significant. Our division of firms willing to use debt from those that are not shows that demand-side variables have stronger effects for the whole population. However, our empirical results are limited by restrictions in the sample size in relation to the estimation method, and by the local nature of the studied population.

The traditional approach to SME financing focuses on information asymmetries and credit rationing problems. Our methodology shows that this feature does affect SMEs' financing decisions, but behavioral variables also matter for those firms extremely averse to debt. We believe this characterization of the problem could be very helpful in understanding capital structure decisions in small Argentine firms (and in other developing countries as well), where a history of economic crises has undermined people's confidence in financial institutions.

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## APPENDIX: EMPIRICAL EVIDENCE ON SMES' CAPITAL STRUCTURE

**Table 7. Empirical Works by Country Object of the Study**

Location	Papers
Spain	Cardone Riportella & Carzola-Papis (2001) (RP); Cardone Riportella & Casasola Martínez (2003) (RM); Aybar-Arias, Casino-Martínez, & López-Gracia (2003) (AM); Sorgob Mira (2005) (SM)
Portugal	Serrasqueiro Da Silva & Raposo Barata (2003) (SR)
France and Greece	Daskalakis & Psillaki (2005) (DP)
Poland	Klapper, Sarria-Allende, & Zaidi (2006) (KZ)
United Kingdom	Chittenden, Hall, & Hutchinson (1996) (CH); Jordan, Llowe, & Taylor (1998) (JO); Hutchison (2003) (HU)
UK & USA	Vos et al. (2007) (VO)
Ireland	Mac an Bhaird & Lucey (2006) (BL)
former Western Germany	Van der Wifst & Thurik (1993) (WT)
Eastern Europe	Klapper, Sulla, & Sarria-Allende (2002) (KS)
USA	Petersen & Rajan (1994) (PR); Gibson (2002) (GI)
Canada	Gellatly, Riding, & Thornhill (2003) (GT)
Australia	Romano et al. (2000) (focus on small family firms) (RO)
New Zealand	Hamilton & Fox (1998) (HF)

### OPERATIONAL DEFINITIONS OF THE VARIABLES

- *Owner and firm age.* Both are quantitative variables. We expect older firms to face lower information asymmetry problems.
- *Family firm.* Following Gallo (1997), we consider a business a family firm if ownership and control belong to members of a single family. This is a binary variable, and one is assigned to family firms.
- *Generation of the family firm.* This is a binary variable, and one is assigned if the second or third generation has control of the firm.
- *Professionalization of management.* This is a binary variable, and one is assigned if the firm uses formal planning methods.<sup>21</sup>
- *Experience with personal debt.* This is a binary variable, and one is assigned if the owner-manager has used debt for personal purposes (to acquire personal assets). We exclude credit card debt and personal debt incurred because of the firm.
- *Owner's objectives for the business.* This is a binary variable, and one is assigned if the owner-manager states he or she pursues sales or value maximization.
- *Personal costs of bankruptcy.* This is a binary variable, and one is assigned if the owner-manager considers that emotional costs of bankruptcy are higher than the economic costs.

<sup>21</sup> We also tried other specifications, such as owners with academic degrees, employees with academic degrees in Economics or Management sciences, and owners with academic degree in Economics or Management sciences.

**Table 8. Empirical Determinants of the Debt Ratio (References in Table 7)**

Debt ratio	Spain					UK					USA					General results				
	RP	RM	AM	SM	SR	DP	KZ	CH	JO	HU	VO	BL	WT	KS	PR		GI	GT	RO	HF
Profitability		-		-	-	-	-	-	ns		-		-	+	-	-		-		-
Firm size	ns	+	+	+		+	+	-	ns		+	ns	ns	+	+	+		+		+
Firm age	ns	ns	-				-	-			-	-		-	-	-		ns	ns	-
Growth		+	+	+		+	+	ns	ns	ns	+			+			+			+
Asset structure		-		+		-	+	-	+				ns	-		+				?
Singularity									ns								-	ns		?
Non-debt tax shields					-		ns						ns	-						-
Corporate taxes					-				-											-
Separation	ns											+								?
Concentration of ownership structure								-												-
Legal form											ns									ns
Lending relationship	+																			+
Formal planning																		+		+
Years as CEO	ns																			?
Owner's age											-							ns		?
Increase firm value											+							+		+
Family control importance																		-		-

ns: not statistically significant

?: contradictory or not statistically significant

- *Size*. This is a binary variable, and one is assigned to micro-sized firms. Size is measured by the standards of resolutions 675/2002 and 303/2004 of *Subsecretaría de la Pequeña y Mediana Empresa y Desarrollo Regional* [Subsecretary for the Small and Medium Enterprise and Regional Development]. We expect larger firms to face lower information asymmetry problems. Resolutions 675/2002 and 303/2004 state that a firm is considered an SME if its annual sales (without internal taxes) reach the values (in Argentine pesos) shown in Table 9.

**Table 9. Definitions of SMEs in Argentina (in Thousand Argentine Pesos)**

Size	Agriculture	Industry and Mining	Commerce	Services	Construction
Micro	\$270	\$900	\$1,800	\$450	\$400
Small	\$1,800	\$5,400	\$10,800	\$3,240	\$2,500
Medium	\$10,800	\$43,200	\$86,400	\$21,600	\$20,000

- *Sector*. This is a binary variable, and one is assigned if the firm belongs to the industrial sector. We expect that industries will have a high proportion of tangible assets that could serve as collateral.
- *Limited liability*. This is a binary variable, and one is assigned if the legal form implies limited liability. This variable may capture two further effects: the tax system, because limited liability goes with a fixed profits tax rate (35%), and the degree of informality, because according to regulations these firms must present financial statements.
- *Days payable outstanding*. Following Petersen and Rajan (1994), we use this variable to capture credit-rationing problems, as trade credit can be seen as an expensive substitute for financial liabilities. On the other hand, we also expect that firms with greater need for funds will make further use of this source.
- *Growth*. Measured as the variation rate of physical sales volume for the last two years (historical growth) and the expected variation for the next two years (expected growth). Following pecking order implications, high growth firms will need more external financing. On the other hand, these firms are expected to face higher moral hazard problems, which would lead to limitations in access to credit.
- *Reinvested gains*. The percentage of net gains that are reinvested in the firm. This reflects the use of internal funds, which is expected to rise due to financial needs (cash flow deficit). Controlling for growth, higher use of internal financing should reflect preference for this source.

## EXTENSIONS TO THE ECONOMETRIC RESULTS

We test the null hypothesis that all coefficients are zero with two tests: Likelihood ratio and Wald. The results in Tables 10 and 11 show that this hypothesis can be rejected at the 0.01 level for the whole sample, while for the sub-sample it has weaker support. We summarize the goodness of fit of the model through the adjusted  $R^2$  count. The proportion of correct guesses beyond the number that would be correctly guessed by choosing the largest marginal ( $F=1$ , in our case) varies from 0.28 to 0.45 for the whole sample. For estimations on the sub-sample, the prediction power is lower.

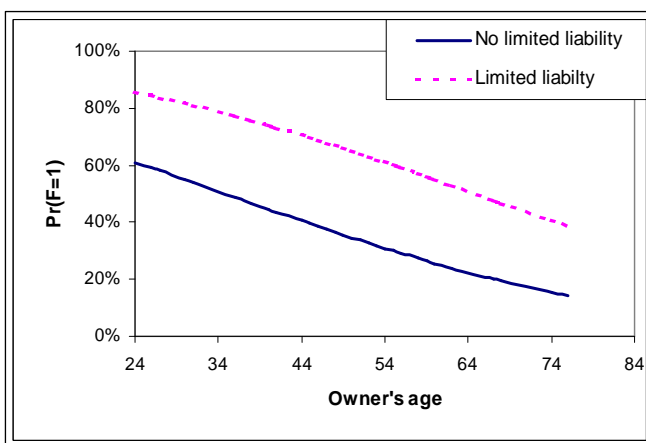
**Table 10. Joint Significance Tests (LR and Wald) and Adjusted Count R<sup>2</sup> (Whole Sample)**

Model	1	2	3	4	5	6	7
LRX <sup>2</sup> p-value	0.0020	0.0000	0.0010	0.004	0.0000	0.000	0.0000
Wald p-value	0.0027	0.0002	0.0055	0.001	0.0004	0.0002	0.0014
R <sup>2</sup> (adjusted)	0.2860	0.3730	0.3140	0.346	0.3900	0.3730	0.4580

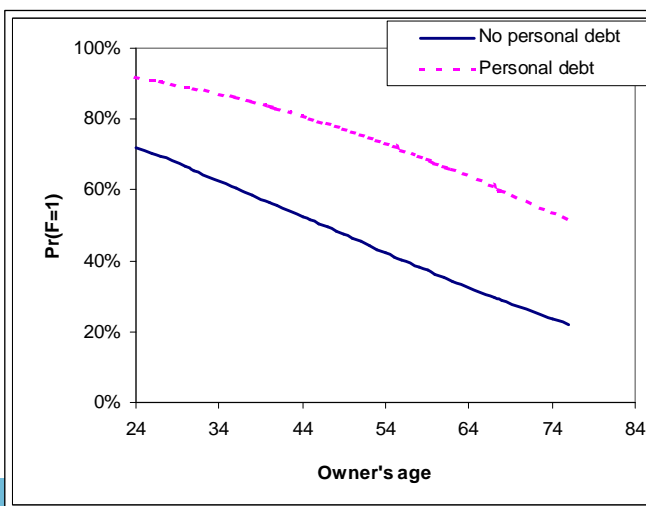
**Table 11. Joint Significance Tests (LR and Wald) and Adjusted Count R<sup>2</sup> (Sub-sample)**

Model	1	2	3	4	5	6	7
LRX <sup>2</sup> p-value	0.0280	0.022	0.0170	0.1240	0.0340	0.0270	0.0080
Wald p-value	0.0561	0.024	0.0317	0.0725	0.0398	0.0266	0.0591
R <sup>2</sup> (adjusted)	0.2350	0.250	0.1320	0.2050	0.2500	0.2270	0.3180

**Figure 1. Probability of Using Financial Liabilities by Owner's Age and Legal Form**



**Figure 2. Probability of Using Financial Liabilities by Owner's Age and Use of Personal Debt**





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