UNIVERSIDADE CATÓLICA PORTUGUESA

Relationship Lending and Financing of SMEs in Portugal

Master final Dissertation
presented to Universidade Católica Portuguesa
to obtain the master degree of Finance

by

João Teodorico Pinto Leite Braamcamp de Figueiredo

Under the supervision of

Professor Doutor Manuel Ricardo Fontes da Cunha

Católica Porto Business School

Março de 2017

aos meus Pais que nunca desistiram de mim.

To my Parents who never gave up on me.

Acknowledgments

I would like to express my sincere gratitude for the availability and support of those who contributed for this achievement, and in a particular way to:

Professor Doutor Manuel Ricardo Fontes da Cunha, my supervisor, for his invaluable orientation and constant support during the development of this master thesis

My Parents for all the opportunities that they gave me

My siblings, Cristina, Francisco e Ana, and to Francisca for all the support, care and love. Their availability and motivation were unquestionable.

My colleagues and friends who accompanied me along the academic career and for the memorable times spent together.

To everybody thank you very much!

Resumo

Esta tese de mestrado tenta estabelecer una relação entre a banca de relação e a estrutura de capitais das pequenas e médias empresas (PMEs) Portuguesas, nos anos de 2006, 2008 e 2015. Apesar de ja existirem bastantes estudos sobre a relação entre assimetria de informação e monitorização delegada, a relação entre estes dois conceitos e a estrutura de capitais nestes últimos anos não tem sido alvo de tantos estudos. Assim sendo, com este trabalho pretendemos perceber de que modo é que a banca de relação, através de informação privada (assimetria de informação) obtida através da monitorização delegada pode influenciar as decisões de financiamento das PMEs Portuguesas. Para podermos realizar este estudo temos de tentar reponder à seguinte questão: Qual é o impacto da banca de relação na estrutura de capitais das PMEs em Portugal?

Palavras-chave: Banca de relação, Monitorização delegada, Assimetria de informação, Estrutura de capitais, Portugal.

Abstract

This master thesis examines the influence of the of relationship banking in the capital structure of Portuguese small and medium enterprises (SMEs), in the years of 2006, 2008 and 2015. Although, the relation between delegated monitoring and asymmetric information has been subject of many studies, the relation between this two concepts and the capital structure of a firm has rarely studied. Our work will be focus in understanding who does relationship lending influences financing decisions of SMEs, by exploring inside information (due to asymmetric information between financial intermediaries) that came from delegated monitoring activities. In order to do se, we try to answer the following research question: What is the impact of relationship lending in the capital structure and financing decisions on SMEs in Portugal?

Key-words: Relationship lending, Delegated monitoring, Asymmetry of information, Capital structure, Portugal.

Contents

List of Tables

List of Figures

Chapter 1

Introduction

1.1 Purpose and Research Questions

This master thesis examines the influence of relationship lending in the capital structure and the financing decisions of small and medium enterprises (SMEs) in Portugal[1]. To better understand the importance of SMEs to the European and Portuguese economy we first need to look to some statistical facts about them. In Europe SMEs represent 99.8% of all enterprises, 57.4% of value added and 66.8% of the total work force.

Since my thesis is based in Portuguese SMEs, we must understand why SMEs are important for the Portuguese economy. SMEs have a big responsibility in the development of countries, since they usually have a very high weight in the growth of the gross domestic product (GDP). In Portugal SMEs are responsible for 99.9% of all enterprises, 69.0% of value added and finally they form 78.0% of the total jobs (Muller, Devnani, Gagliardi, & Marzocchi, 2016).

With such an importance to the economy it is very useful to understand how financial decisions are made, how firms finance their investment projects and how is capital structure affected by the financing decisions made by the owner-managers. Our work will be focus in understanding who does relationship lending influences

[1]SME definition by the European commission: enterprises with less than 250 employees and a turnover smaller than EUR 50 million and/or their balance sheet total is smaller than EUR 43 million.

financing decisions of SMEs, by exploring inside information (due to asymmetric information between financial intermediaries) that came from delegated monitoring activities.

We will try to attend the following research question: What is the impact of relationship lending in the capital structure and financing decisions on SMEs in Portugal?

1.2 Document Structure

The document is divided in 5 chapters. The first chapter is the introduction, where we establish the importance of SMEs to the European economy and we also define our research question. In the "Literature Review and Proposed Model" chapter the author review the relevant literature about delegated monitoring, asymmetric information, the costs of relationship lending, relation between relationship banking and SMEs financing, determinants of capital structure in SMEs and finally the proposed model. In chapter three we present the data and the methodology used in order to test the hypothesis. On chapter four we find the empirical results of our model and finally in chapter five we find the conclusions that we may take from this study.

Chapter 2

Literature Review

This thesis focuses on the relationship lending and the financing decisions of small and medium enterprises. In order to establish a relationship between the two we first need to understand what is the role of banks in the society, mainly through delegated monitoring and second what is the importance of relationship lending in the financing of SMEs, and finally what is the impact of this relation in the capital structure of SMEs.

2.1 Delegated Monitoring:

Diamond (1984) developed a theory of financial intermediation based on the minimum cost production of information that is useful to understand and resolve incentives problems. According to Diamond (1984) a financial intermediary (a bank as an example) is delegated the task of costly monitoring loan contracts written with firms who borrow from it. Financial intermediaries have a gross cost advantage in collecting this information since the alternative is either the duplication of efforts if each lender monitors directly or a free-rider problem, in which case there is no monitoring by lenders. However, Diamond (1984) was not the first author to assign the "delegated monitoring" to banks. Schumpeter (1939) affirms that:

" *...bank must not only know what the transaction is which he is asked to finance and*

how it is likely to turn out but he must also know the costumer, his business and even his private habits, and get, by "talking things over with him", a clear picture of the situation." (Schumpeter, 1939)

Diamond theory analyses the determinants of delegation costs, and develops a model in which the intermediary has a net cost advantage relative to direct lending and borrowing. In his model Diamond argues that diversification is key to a possible net advantage of intermediation, since there is a strong similarity between the relation of an individual lender and the borrower and the relation between an intermediary and its depositors. Diamond model relates two theories. The first, is the principal agent theory, where the monitoring of additional information about the agent can solve moral hazard problems. The second theory, is the theory of financial intermediation based on imperfect information, where an ex-post information asymmetry between lenders and entrepreneurs, who need to raise capital for a risky project, may lead to an adverse selection problem.

With this in mind, Diamond (1984) assumes a world where debt is shown to be the optimal contract between lender and entrepreneur. Due to wealth constraint the entrepreneurs cannot have a negative consumption. The contract in which they enter, to raise funds, will have some cost, if there is no monitoring and lenders may observe the final outcome of the investment. In the case of a negative net present value (NPV) the entrepreneur will have a non-pecuniary bankruptcy cost. As an alternative to incurring in these costs, it is possible for lenders (who contract directly with entrepreneurs) to spend some resources in monitoring the data which the entrepreneur observes. Between these two type of costs, non-pecuniary and monitoring, the less expensive of the two will be optimal. However, there is a third type of contract, delegated monitoring. This contract appears when direct monitoring is not viable, since with too many investors monitoring can be a very expensive activity. To overcome this problem investors may delegate this activity to a third party or to one of the investors. To better understand this idea lets assume that there are m outside security holders in a firm and it costs, to each on of the holders, $K > 0$ to monitor. The total cost of monitoring will be $K \cdot m$. This will imply either

a very large expenditure on monitoring costs or a free rider problem. The solution proposed by Diamond requires that security holders should delegate the monitoring to a few security holders, or to an outsider player (a bank as an example).

Banks as providers of monitoring services

A simple model of firm borrowing and delegated monitoring by a financial intermediary: (Diamond, 1984)

The model assumes a world where there are N risk neutral entrepreneurs that are endowed with the technology for an invisible project that has stochastic returns. The projects need an investment of 1 unit, which is higher than the wealth of the entrepreneur, and will produce an output in one period where $E[r] > R$[1]. Finally, there are m lenders and each one as available a wealth of $1/m$. Since we are in the presence of a competitive capital market, if an entrepreneur project has a return higher than R (R/m for each lender) investors will make the loan.

As was previously said, if the lender has the ability to observe the outcome of the investment made by the entrepreneur we can define three type of contracts. In the first one, there is no monitoring. However, there is a non-pecuniary bankruptcy penalty (ϕ), which represents a cost in the case of the failure of the project.

The second one happens when each of the m lenders spend resources monitoring the outcome of the project. However, this type of contract will only be efficient if there is a small number of investors. If there was only one lender in the economy the cost of directly monitoring would need to be smaller than the non-pecuniary penalty without monitoring ($K \leq E_{\tilde{y}}[\phi \times (\tilde{y})]$). When we introduce many lenders monitoring is only valuable if and only if the total cost of monitoring is smaller than the value of the non-pecuniary penalty without monitoring ($m \cdot K \geq E_{\tilde{y}}[\phi \cdot (\tilde{y})]$). When m is larger this condition is unlikely because each lender's loan is smaller. Even if the condition is satisfied it implies a very large expenditure in monitoring, and in this case some sort of delegated monitoring might be desirable. Which takes

[1]Where R is the competitive interest rate of the economy, the project would be undertaken if the risk neutral entrepreneur had the available capital

us too the third one.

In this type of contract lenders will delegate the monitoring to some monitoring agents (in our case financial intermediaries). Diamond (1984) assumes that the actions taken by the monitor can not be directly observed by the lender. This means that lenders need to provide incentives to the delegated monitor to monitor and enforce the contract. With this type of contract the total cost of delegated monitoring is equal to the cost of monitoring, k, plus the expected cost of providing incentives to the monitor, which we call the cost of delegation and denote the cost per project by D. With this in mind the lender will only choose to delegate monitoring if and only if the total cost of monitoring is inferior too the cost of the other two contracts ($K + D \leq \min(m \cdot K; E_{\tilde{y}}[\phi \times (\tilde{y})])$).

With his paper we conclude that financial intermediaries allow a better contracts to be used and allow pareto superior allocations. This provides a positive role for financial intermediaries.

2.2 Asymmetric Information, Bank Lending and Implicit Contracts

Sharpe (1990) argues that customer relationship is a consequence of asymmetric information. However, in Sharpe's argument asymmetric information arises in the same side of the market and not between sides. In other words, asymmetric information arises between lenders or borrowers and not between lenders and borrowers. By exploit the presumptions made by Kane and Malkiel (1965) and Fama (1985), that when a bank lends to a firm learns more about that borrower's characteristics than other banks, Sharpe (1990) was able to argue that the asymmetric evolution of information will lead to a potential ex-post monopoly power. A monopoly power has undesirable effects on the allocation of capital, since it is relatively costly for banks and firms to write multiple periods contingent contracts. Even though banks earn a zero expected profit over the lifespan of the average costumer relationship, they are not disciplined by the market to offer better performing customers "com-

petitive" rates and can expect to earn economic profit on those costumers. Due to competition, rents are washed away via lower interest rates on loans offered to all firms in their initial period, precisely when banks know the least about the firm. As a result low quality firms employ a greater proportion of capital than in a standard symmetric information system. Sharpe (1990) suggests that firms stay with the same bank not because they are treated particularly well, but because high quality firms are "informationally capture". Their bank makes the best offer, but this only happens due to the difficulty that firms have to convince other banks about their superior performance. Adverse selection makes it difficult for one bank to draw a customer from another bank without attracting the less desirable.

Sharpe (1990) concludes that a bank charges prices that exceed its marginal cost of funds, even though there is no asymmetric information concerning its product. Rather than moral hazard, it is the potential for taking advantage of captive customers, by altering the terms of trade, that gives rise to a reputation equilibrium where competitors earn rents over time.

The Model:

A. Firms

Sharpe (1990) assumes that there are M risk-neutral entrepreneurs seeking funding for their projects. It is assumed that they will carry out the investment for a two periods. For a given firm, the one-period gross return is identical and independent distributed (i.i.d). In other words, assumes that returns only depend on the quality of the firm, meaning that the returns vary across firms. Another important assumption is that the returns follow a binary distribution, meaning that the success of the project is independent from the size of the investment. A firm of type q, that invests I units of capital, earns a gross return of:

$$\begin{gathered} g(I) \cdot I \text{ with probability } p_q, \\ 0 \text{ with probability } 1 - p_q. \end{gathered} \tag{2.1}$$

Equations (2.1) are the gross return of the investment project of firm q. Although the results can be generalised to a market with many types, for simplification it is assumed that $q \in \{H; L\}$, with $P_H > P_L$. Thus, there are two types of firms, high (H) and low (L) quality, where the quality is directly related with the probability of success. Let θ be the fraction of firms that are high quality, $\theta \cdot M$ is the aggregate measure of high quality firms. In contrast with the majority of asymmetric information literature Sharpe (1990) assumes that firms only know the distribution of types and not their own. While this assumption seems to be in conflict with the standard assumption of information asymmetry, the difference can really be seen as one emphasis. It is surely the case that, in the process of running a firm, an entrepreneur (and perhaps the financial intermediary) garners new information about his ability to carry out projects.

Entrepreneurs are assumed to immediately consume any net profit earned on first-period projects. Thus, they generate no additional collateral for subsequent operations. While unrealistic, the purpose of this assumption is straightforward. Sharpe developed a simple model in which a firm's cost of capital varies over time according with the information available, arising from the firms past performance, to the financial intermediary.

B. Loan Supply and the Information Structure

Sharpe (1990) assumes a world where firms own no capital and are only able to raise funds by borrowing from one of the M banks of the economy in a "competitive" bank loan market. It is also assumed that each bank as access to an unlimited amount of capital at a cost $\tilde{r}$ [2]per period.

Like firms, banks are unable to observe firm's quality and at the beginning of the first period, they only know θ, the proportion of high quality firms in the economy. It is also assumed that, when a bank lends capital to a firm, it has the ability to observe if the project is successful or not. Let $\gamma(f) \in \{\tilde{S}, \tilde{F}\}$ be the perfect signal of the outcome of firm's f's project in period one, where $\gamma = S$ if the project is success

[2]More generally $\tilde{r}$ could be interpreted as the competitive interest rate of the economy. If the project, had an $E[r] \geq \tilde{r}$,the firm would undertaken the project if it had the available capital

and $\gamma = F$ if the project fails. Banks that did not lend to firm f in the first period can only observe a noisy signal of the outcome , $\tilde{\gamma}(f) \in \{\tilde{S}, \tilde{F}\}$. This information may be observe by the actual lender. Its conditional distribution is given by:

$$\begin{aligned} \text{prob}(\tilde{\gamma} = \tilde{S}|S) = \text{prob}(\tilde{\gamma} = \tilde{F}|F) = (1+\phi)/2, \\ \text{prob}(\tilde{\gamma} = \tilde{S}|F) = \text{prob}(\tilde{\gamma} = \tilde{F}|S) = (1+\phi)/2, \end{aligned} \tag{2.2}$$

where $\phi \in [0,1]$. Finally it is also assumed that the signal $\tilde{\gamma}$ is fixed for any particular firm. All the outside banks observe the same signal from the firm and they do it without cost. Thus, in one extreme, if $\phi = 0$, outside banks learn nothing about the firm's past performance and, at the other extreme, if $\phi = 1$, outside banks learn the same as the inside bank. Implicit in the assumption of asymmetric outcome observability is the idea that the lender must expend some minimum level of resources to make sure that the borrower is doing what it has promised, i.e, that it is not taking unnecessary risk or wasting capital via (Diamond, 1984). In the process of monitoring lenders learn more about the success of the firm's operation than do outside banks. As a result, the original lender should be in a better position to evaluate the firm future performance. Furthermore, banks do not unveil information concerning profitability of their commercial clients. Clearly such information sharing would help competing banks to bid away their best customers.

Equilibrium Loan Contracts

We now examine the temporal pattern of equilibrium loan rates faced by firms in each of the two regimes. In one, two period contingent contracts are assumed to be enforced; in the other, pre-commitments on the terms of the second-period contract are assumed to be unenforceable. In either regime, was assume that contract offers are built from standard single-period debt contracts. A single-period debt contract consists of an interest rate offer, $r_j(f)$, and a corresponding repayment schedule,

$$I \cdot [1 + r_j(f)] \text{ if } \gamma(f) = S.$$
$$0 \text{ if } \gamma(f) = F. \tag{2.3}$$

where I is the size of the loan chosen by the firm. A two-period contract will consist in the interest rate of the one-period loan plus a commitment on the terms of the two-period loan, that commitment being contingent on the firm performance in the first period.

A firm facing an interest rate of r in a given period chooses the investment level which solves

$$\max_I = [g(I) - (1 + r)]I \cdot p^e(f) \tag{2.4}$$

where $p^e(f)$ represents the expected probability of success of a certain firm. The first-order condition that yields the implicit investment level is:

$$I^* = -[g(I^*) - (1 + r)]/g'(I^*) \tag{2.5}$$

Given our assumption in (2.1), it can easily be verify that the second order condition holds and that both, investment and profit, are decreasing functions of the interest rate. On the other hand, the investment level is independent of the firm's expected probability of success.

The first thing to do before describing the equilibrium is to determine the break-even interest rate of the banks. To do so, a bank must have at least the same rate of return, upon the probability of success, that it would have if it invested in a competitive market, $\tilde{r}$:

$$(1 + \tilde{r}) = p^e \cdot (1 + r)$$

solving the equation in order to r we get that: (2.6)

$$r = \frac{\tilde{r}+1-p^e}{{p^e}^3}$$

Let r_p denotes the break-even loan rate for a loan made to a randomly selected firm in the first period. In this case, $p_e = p = [\theta \cdot p_h + (1-\theta) \cdot p_l]$, is the unconditional probability of success. However banks are more concerned in determining the conditional break-even interest rate upon the success of the firm in the first period, r_s. This interest rate, r_s, is given by equation (2.6) for:

$$p^e = p(S) = p_h \cdot prob(H|S) + p_l \cdot (1 - prob(H|S)) \tag{2.7}$$

and,

$$prob(H|S) = \frac{\theta \cdot p_h}{p} \tag{2.8}$$

In the case of a firm that has failed in the first-period we have that the interest rate that break-even the loan made by the bank is given by equation (2.6) but, instead of replacing p^e by $p(S)$ we replace by $p(F)$ (the conditional probability of success in the second period conditional on failure in the first period). These interest rates (r_p, r_S, r_F) are called the "standard competitive rates" since these rates would prevail if all the banks could observe all projects outcomes.

Sharpe (1990) similarly characterised the break-even rates based in the observation of the signal that firms gave to the outsiders banks in the first period of investment. For a randomly selected firm with $\tilde{\gamma}(f) = \tilde{S}$ the condition probability of and the break-even loan rate are define as $p(\tilde{S})$ and $r_{\tilde{S}}$, where:

$$p(\tilde{S}) = p_H \cdot prob(H|\tilde{S}) + p_L \cdot (1 - prob(H|\tilde{S})) \tag{2.9}$$

and,

$$prob(H|\tilde{S}) = \frac{\theta[p_H(1+\phi)+(1-p_H)(1-\phi)]}{\theta[p_H(1+\phi)+(1-p_H)(1-\phi)]+(1-\theta)[p_L(1+\phi)+(1-p_L)(1-\phi)]} \tag{2.10}$$

Finally, for a randomly selected firm with $\tilde{\gamma}(f) = \tilde{F}$ the conditional probability of success and the break-even loan rate, upon the bad signal that the firm gave to outsiders banks, is define as $p(\tilde{F})$ and $r_{\tilde{F}}$.

[3]where p^e is the bank expected probability of success of the firm

It is easy to verify and intuitive that $p(S) > p(\tilde{S}) > p > p(\tilde{F}) > p(F)$, and consequently that, $r_S < r_{\tilde{S}} < r < r_{\tilde{F}} < r_F$. Furthermore, as ϕ converges to one, this means that the signal is becoming more accurate, $r_{\tilde{S}}$ and $r_{\tilde{F}}$ converge to r_S and r_F, respectively. (Sharpe, 1990)

According with the main theoretical thought, banks reduce the agency costs of lending to small and medium growth firms in various ways. However, in practice, many of the these firms try to diversify their financing even if banks are willing to lend more. Rajan (1992) argues that while the benefits of bank financing are well understood the costs are not. While informed banks make flexible financing decisions, that prevents firms to take bad projects, the costs associated with this role are the bigger bargaining power of banks over the projects profit, once the project begun. Thus, the firm's choice of borrowing sources, and the choice of priority for its debts claims, attempt to optimally circumscribe the powers of banks. With his model Rajan (1992) justifies the coexistence of banks and financial markets. Rajan (1992) argues that the ex post allocation of property rights will determine some ex ante incentives. However, he divides this property rights in two separated types, the surplus and the control rights. Since both of them are aspects of the bank's information-based implicit property rights, they tend to vary similarly with a lot of factors.

Sharpe (1990) and Rajan (1992) are very similar papers, however they have many and important differences. While Sharpe (1990) restricts his analysis to examine the costs of the inside bank, Rajan (1992) explores the benefits of the inside bank's control. Rajan (1992) shows that changes in the allocation of priority, in general, do not alter the inside bank's rents. Nevertheless, changes in the priority may alter the bank's control and indirectly affect the owner's incentives to exert effort. Sharpe (1990) also analyses the role of implicit contracts in reducing the bank's incentives to extract rents, while Rajan (1992) the amount of borrowing from different sources and the allocation of priority as factors that changes the ability of banks to extract rents as well as their ability to control the firm.

Rajan (1992) has two contributions to the theory. The first one is to highlights the

cost of bank's finance that stems endogenously from the monitoring and controlling functions that the bank performs. The second contribution is that, maturity, source and priority affect both the benefits and costs of bank debt.

THE MODEL:

Rajan (1992) developed a model that is divided in four parts (the firm/project, the financiers, information and finally the contracts). Those parts define the characteristics of the model. With respect to the project Rajan (1992) describes an economy with a single owner-managed firm, with a project idea, the project lives for two periods. In the initial date 0 the project requires an initial investment of I. The owner then expends a personal effort β at a unit cost of 1. This personal effort (β) along side with an exogenous quality parameter (θ) will affect the probability ($q(\beta;\theta)$) of the good state (G) to occur. At date 1, there are two possibilities, the good state, G, with probability $q(\beta;\theta)$ and the bad state, B, with probability $(1-q(\beta;\theta))$. In this date the assets purchased at date 0 can be liquidated for a value L where $L \leq I$. At date 2, in the good state the projects pays out X with probability 1. While in the bad state the project will pay out X with probability p_B and zero with probability $(1-p_B)$, and the assets are depreciate to zero. Rajan (1992) also assumes that $X > I \geq L > p_b X$ and that $q(\beta;\theta)$ as the following properties:

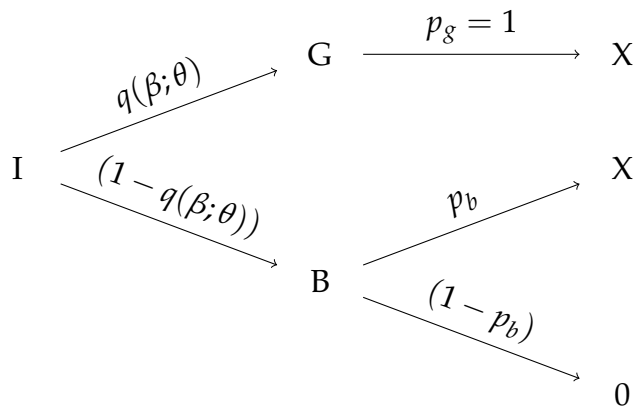
$$q_1(\beta;\theta) > 0, q_1 1(\beta;\theta) < 0, q_2(\beta;\theta) > 0 \tag{A1}$$

$$q_1(0;\beta) = 1/\epsilon, q_1(x;\theta) = 0 \tag{A2}$$

$$q_{12}(\beta;\theta) = 0 \tag{A3}$$

Assumption (A1) state that the probability of the good state being realized is increasing and concave in the effort of the owner, β, and is increasing in the quality, θ. Assumption (A2) states that the marginal benefit of the effort decreases to zero from a large number. Assumption (A3) is a separability assumption.

In summary, if the owner invests at date 0:



Regarding financiers Rajan (1992) assumes that we are in a risk-neutral world and the risk-less interest rate is zero. The owner has no money of their own and must borrow it to finance the project. There are two type of lenders (banks and financial markets) in a competitive credit market. As we are interest in finding what is the impact of relationship lending in the finance of small and medium enterprises we will only take into account the banking type of debt, since SMEs usually do not have access to financial markets. In this world banks enter the market at each date to acquire information and make loans. If a bank makes a loan to a firm at date 0, it gains the access to the internal records of the firm. During this period, the bank monitors the firm's boks and the accounts that the firm maintains with the bank. Much of the information acquired in this way is "soft" in nature. This means that it is not credible to communicate to the outsiders even if the firm wants to do so. Therefore banks acquire information only by lending, which is consistent with the empirical evidence in Lummer and McConnell (1989). Rajan (1992) assumes, for simplicity that monitoring costs are negligible (Rajan, 1992).

Rajan (1992), as well as Sharpe (1990), assumes that everyone knowns the quality, θ, at date 0. Once the project begins only the owner knows the effort, β, made and also knows the state at date 1 before deciding whether to continue or to stop de project. The inside bank learns the effort provided and the state at the same time as the owner. Regarding the contracts Rajan (1992) assumes that they can not be contingent on the liquidation decision, effort or the state. He also does not allow contracts in which the required payment under any circumstance is less than the amount borrowed; $D_{i,j} < A_i$.

The Basic Trade-Off

The borrower decides (i) what type of lender to approach to borrow; (ii) what effort level, β to exert and after contracting (iii) whether to liquidate or to continue the project after seeing the state at date 1. The lender decides (i) the contract terms offered at date 0 and (ii) whether to renegotiate, cut off credit, continue with the old contract or offer a new contract at date 1.

First-Best Solution

If the entrepreneur manges to raise capital to invest in the project, at date 1 the owner should liquidate the project in the bad state and he should continue the project in the good state. Thus having an expect surplus of:

$$E_{[\text{Surplus}]} = q(\beta;\theta)(X-I) - (1-q(\beta;\theta))(I-L) - \beta \tag{2.11}$$

In equation (2.11) the first term is the surplus in the good state, the second terms is the depreciation of the assets in the bad state and finally the third term is the cost of effort. The project will only be financed if the surplus is positive for some effort of level. Since the effort is the only variable that can be changed and that may influence the probability of the good state to occur, the owner will choose an effort level that maximize the expected value of the surplus. The effort β_{FB}, which maximises this surplus is obtain by solving the first-order condition (FOC):

$$\begin{aligned} &\tfrac{\partial E_{[\text{Surplus}]}}{\partial \beta} = 0 \\ &q'(\beta;\theta)(X-I) + q'(\beta;\theta)(I-L) - 1 = 0 \\ &q'(\beta;\theta)(X-I+I-L) = 1 \\ &q_1(\beta;\theta) = \tfrac{1}{X-L} \text{ for } \beta = \beta^*_{FB} \end{aligned} \tag{2.12}$$

Assumptions A1 and A2 ensure the existence and uniqueness of the solution.

A contract that approaches first-best has to follow two features: First, the owner must have an incentive to liquidate the project in a bad state scenario. Second, the owner should obtain all the surplus in the good state and face all the losses in the bad state. However it is impossible for a contract to have both this objectives.
Rajan throughout his paper repeatedly uses the following ideas:

1. Given limited liability, the owner will never liquidate in the bad state unless refused credit or bribed;

2. The competitive date 0 market for credit and lenders individual rationality together imply that loans are zero NPV projects.

Bank Contracts

Short-Term Bank Contracts

The owner borrows I at date 0. At date 1, if we are in the bad state the bank demand the liquidation of the project and will receive L. Otherwise, if we are in the good state the contract, that was stablished at date 0, does not oblige the bank to lend. Instead, the bank can use his discretion to hold up the owner and demand a share of the surplus in exchange for the funds needed to continue the project. Let μ ($\mu \in [0;1]$) be the share of unallocated surplus that the owner gets after bargaining. The expected surplus of the owner will be

$$E_{[\text{SURPLUS}]} = q(\beta;\theta)\mu(X-I) - (1-q(\beta;\theta))\mu(I-L) - \beta \tag{2.13}$$

The owner will choose an effort level, β that maximises the expected value of the surplus. The effort β_{sb}, which maximises this surplus is obtain by solving the first-

order condition (FOC):

$$\begin{aligned} &\frac{\partial E_{[\text{Surplus}]}}{\partial \beta} = 0 \\ &q'(\beta;\theta)\mu(X-I) + q'(\beta;\theta)\mu(I-L) - 1 = 0 \\ &q'(\beta;\theta)\mu(X-I+I-L) = 1 \\ &q_1(\beta;\theta) = \tfrac{1}{\mu(X-L)} \end{aligned} \tag{2.14}$$

for $\beta = \beta^*_{sb}$, provided it is individually rational for the bank to lend:

$$[1 - \tfrac{I-L}{q^*_{sb}(X-L)}] - \mu \geq 0 \tag{2.15}$$

This condition only states that the bank makes a nonnegative profit from lending. If μ is very high, close to 1, the bank will not be able to recover the depreciation losses. However, if μ is very low, close to 0, the owner will not have the proper incentives to exert much effort. In either of these two extreme cases it will not be rational for the bank to lend the money. In this scenario the firm could be better with a arm's length debt contract. However, for intermediate values of μ the bank will lend. But, comparing equation (2.14) and (2.12), and using the monotonicity and concavity of q, there will be an insufficient level of effort compared with the first-best solution.

The short-term contract described by Rajan (1992) requires a payment at date 1. This condition works well in the case of a bad state. Since the bank may cut off credit, receiving L. However, in the case of a good state, where the bank should continue to lend, the contract has to be renegotiated with resulting distortions to the firm's incentives for effort[4].

Long-Term Bank Contracts

The bank lends I in a long-term contract, so that at date 1 the loan is renewed automatically and at date 2 the required repayment is D_{02b}. In the good state

[4]The first best solution may be achievable if we constrain the bargaining sufficiently by means of an external non renegotiable mechanism

scenario the optimal decision is to continue the project. Since, the surplus of the project is fully allocated by the initial contract there is no renegotiation. Otherwise, if we are in the bad state, it would be efficient to close down the project. As the bank can not unilaterally do so, the contracts needs to be renegotiated. The surplus that they get if the owner chooses the efficient way is $L - p_B X$. The owner gets $p_B(X - D_{02b}) + \mu(L - p_B X)$ while the lender gets $p_B D_{02b} + (1 - \mu)(L - p_B X)$ in the bad state. The first term in both of the equations is the amount allocated by the initial contract we required that:

$$X \geq \frac{I-(1-q^*_{Lb})(1-\mu)(L-p_B X)}{q^*_{Lb}+(1-q^*_{Lb})P_B} = D_{02b} \tag{2.16}$$

The left side of the equality is the face value of the loan in order to break-even. The inequality requires that the project return be enough to meet in the good state. The face value increases with the bargaining power of the owner for two reasons. The first one states that the bank gets less surplus in the bad state and the second one shows that, an increase of the owner's share in the bad state will reduce the incentive to exert effort to avoid the state, thereby reducing q^*_{Lb}.

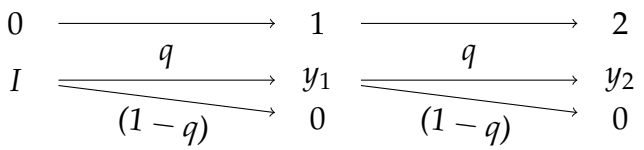
2.3 The Costs of Relationship Lending

Relationship lending brings two major problems, the soft-budget constrain and the hold-up problem (Boot, 2000). Regarding the soft-budget constrain the main issue is to understand if a bank can credibly deny additional credit to a firm when problems arise. In other words, the soft-budget constrain problem rises when a borrower in the edge of defaulting, due to financial problems, will try to rise funds near his bank in an attempt to forestall default. If the firm attempts to rise funds in new financial institution the firm will not be able to rise the capital. However, if the bank has already loaned money to the firm may well decide to extend further credit in order to recover its previous loan. The main problem with this situation is that borrowers realise that they can renegotiate their contracts *ex post*. This may have perverse incentives in the effort level made by the firm. This means that, if the renegotiation of loans is too easy, a borrower may exert insufficient effort in preventing a bad outcome from happening.

The next issue is the hold-up problem, possibly another dark side of relationship lending. This problem is related with the information monopoly that banks gain while monitoring the firms which they lend money. In this way, banks could charge (*ex post*) high loan interest rates (Sharpe, 1990; Rajan, 1992).

For a better understanding we now present a model to illustrate the effects of the hold-up costs. In this model we will consider an economy with two periods and a zero interest rate. Firms have an investment opportunity that requires one unit of investment at the beginning of each period and returns y_1 and y_2 at the end of each period. This project can be successful with probability q and unsuccessful with probability $(1-q)$. In this economy there are also financial intermediaries that are willing to provide the unit of capital that firms need to invest. However they have some market power, so they only borrow the capital if the gross expected return $\rho > 1$ ($\rho = 1$ corresponds to competitive case). In the first interaction with the firm banks will need to expend an one time monitoring cost (M). If the firm takes a second loan in the same bank there is no need for the bank to occur in the duplication of this cost. However, if the firm in the second period chooses another bank there will be a duplications of costs since, the second bank will expend the monitoring costs again. This implies that the first bank will have an information advantage regarding the remains. The firm will repay R_1 in the first period and R_2 in the second period. The bank will invest $(1+M)$ in the first period and if the firm is successful the bank will invest another unit of capital in the firm. Otherwise the bank will not finance the project in the second period.

In summary:



The bank expected outlay is $((1 + M) + q)$. *Ex ante* competition implies that all banks obtain the same return of their ρ funds; that is:

$$\begin{aligned} \rho(1 + M + q) &= (qR_1 + (1 - q)0) + q(qR_2 + (1 - q)0) \\ \rho(1 + M + q) &= qR_1 + q(qR_2) \\ \rho(1 + M + q) &= qR_1 + q^2R_2 \end{aligned} \tag{2.17}$$

If we assume competition at date 1, i.e. if the firm can switch to another bank, it will have to repay

$$\begin{aligned} qR_2 &= \rho(1 + M) \\ R_2 &= \tfrac{\rho(1+M)}{q} \end{aligned} \tag{2.18}$$

Equation (2.18) is also the optimal solution to the incumbent bank.
If we replace R_2 in equation (2.17) we get that:

$$\begin{aligned} \rho(1 + M + q) &= qR_1 + q^2R_2 \\ \rho(1 + M + q) &= qR_1 + q^2(\tfrac{\rho(1+M)}{q}) \\ \rho(1 + M + q) &= qR_1 + q(\rho(1 + M)) \\ qR_1 &= \rho[(1 + M + q) - q(1 + M)] \\ qR_1 &= \rho[1 + M + q - q - qM] \\ qR_1 &= \rho[1 + M(1 - q)] \\ R_1 &= \tfrac{\rho[1+M(1-q)]}{q} \end{aligned} \tag{2.19}$$

Consequently we have

$$R_1 = \tfrac{\rho[1+M(1-q)]}{q} < R_2 = \tfrac{\rho(1+M)}{q} \tag{2.20}$$

This result shows that the bank uses its monopoly power during the second period, while competition between banks decreases the rates in the initial stage of the relationship. In general the holdup situation generates a cost for the firm, but it also implies in this context that banks will finance more risky firms because they will ask for a lower first repayment at the initial stage of the project (Rajan, 1992).

Alternatively firms may opt for multiple bank relationships since, with several bank relationships a firms might reduce the holdup problem, but worsen the availability of credit. One explanation is that multiple relations may reduce the value

of information since, no bank has an information monopoly regarding the others. The reduce value of information may cause to much *ex post* competition which may discourage the lending to "young" firms. Von Thadden (1995) shows that a long-term line of credit with a termination clause can balance the costs and benefits of the hold-up problems and the effects of *ex post* competition. However, Von Thadden specifies that the credit will only continue with *prespecified* terms. The existence of theses clauses gives the lender a limited bargaining power. In this way, the severity of the hold-up problem may be optimally managed and multiple bank relationships may not be needed (Boot, 2000).

2.4 Relationship Lending and SMEs Financing

It is important to state that for the majority of small firms the external finance is strictly limited to the private debt and equity markets.

The financing of projects in small and medium enterprises (SMEs) is a very sensitive issue. Small firms with opportunities to invest in positive net present value projects may be blocked because potential providers of external finance can not see if the firm has access to a quality project (adverse selection problem) or ensure that the funds will not be diverted to fund alternative project (moral hazard problem). This problem rises because SMEs are very often informationally opaque. To overcome this problem, finance providers may use relationship lending technologies to reduce the information asymmetry and also to reduce moral hazard and adverse selection problems (Berger & Udell, 2002). Under this technique banks acquire information over time through contact with the firm stakeholders and use this information in their decisions about the availability and terms of credit to the firm.

In literature, it is generally left unspecific whether it is the bank firm relationship or the loan officer firm's owner relationship who acquires and stores the relationship information and how this information may be disseminated within the bank. The information collected by this technic is often 'soft' data, such as the information about character and reliability of the firm's owner and may be difficult to quantify, verify and communicate through the normal transmission channels of a banking or-

ganisation. Under relationship lending, the lender bases his decisions in substantial part on proprietary information about the firm's owner gather through a variety of contacts over time (Petersen & Rajan, 1994; Berger & Udell, 1995; Bhattacharya & Chiesa, 1995). The property information is collected via loans, deposits and other financial products. Additional information is gathered with the help of the remain stakeholders (eg, suppliers and customers) who may give some information about the business environment in which they operate. This information will help the financial intermediary to deal with information opacity problems provided by SMEs (Berger & Udell, 2002; Petersen & Rajan, 1994; Berger & Udell, 1995).

Empirical research shows that the strength of the relationship may affect the pricing and the availability of credit. In more traditional empirical research the strength of the relationship is measured in terms of its temporal length, that is, the amount of time banks have provided some kind of service (eg, loans, deposits or other type of service). However in more recent literature the strength of the relationship may be measure in terms of the bank providing multiple services, getting the exclusivity of the relationship, this implies being the only provider of bank loans to the firm and finally the degree of mutual trust between the firm and the bank (Berger & Udell, 2002; Petersen & Rajan, 1994; Berger & Udell, 1995). Empirical studies have showed that stronger relationships are associated with lower interest rates, reduced collateral requirements, increased credit availability and a lower dependence on trade debt, which gives protection against the interest rate cycle (Berger & Udell, 2002; Petersen & Rajan, 1994; Berger & Udell, 1995). According with the mainstream literature SMEs that have stronger relations (i.e, long relation, working with fewer banks) with their financial intermediaries experience better credit conditions than those who have weaker relations (Petersen & Rajan, 1994; Hernández-Cánovas & Martínez-Solano, 2010). With respect to the costs, there is very different evidence regarding the US and European small firms. In the US case, SMEs with a stronger relationship tend to have a lower interest rate than those who have a less concentrated relationship with banks (Berger & Udell, 1995; Petersen & Rajan, 1994; Hernández-Cánovas & Martínez-Solano, 2010). In the case of the European SMEs, empirical evidence showed that firms with a stronger relationship may have higher interest

rates than firms with weaker relationships. We may conclude that the empirical evidence suggests that firms in the continental European financial system that reduce the number of relations or that increase the duration of the relation might confer to the bank a monopoly power and the ability to extract rents from the company. However, if the companies try to weaken the relation in order to reduce the banks monopoly, the empirical evidence suggests that grating loans is less attractive to the bank (Hernández-Cánovas & Martínez-Solano, 2010).

In summary, relationship lending is an information-intensive type of debt financing which can affect the cost and the availability of credit in a particular way. It is based in the idea of inter temporal implicit contract which is facilitated by a certain degree of (ex post) bargaining power of the lender (Elsas & Krahnen, 1998).

2.5 Determinants of capital structure and financing decisions of SMEs

Capital structure represents a permanent source of financing in the form of retained earnings, long-term debt and equity. The perusal of the literature related to capital structure reveals many implicit and explicit facts about the financing decisions made by firms in general. According with Kumar (2015) the determinants of capital structure are either qualitative and quantitative. However, the problem accessing finance can not be explained based on determinants of capital structure alone. It requires an assessment of existing and target capital structure. Existing capital structure reflects the present choice of financing decisions of a firm, and target capital structure represents all the available financing source in the market. If the existing and preferable capital structure are the same the firm has overcome the problem associated with inadequate and timely supply of financing. However, the main literature has showed that there is a significant gap between the existing capital structure and the preferable one in SMEs (Kumar & Rao, 2015).

Modigliani and Miller (1958) paper provides the basic foundation of capital structure theories. Their paper shows that under perfect market conditions, capital structure does not affect the value of a firm. This unrealistic assumption compel

researchers to rethink on the importance of financing decisions with respect to firm's value. This gave rise to the development of alternative theories of capital structure. Two of the most important new theories are the Trade-off, the Pecking order and the agency cost theory (Serrasqueiro, Matias, & Salsa, 2016).

The trade-off theory assumes that firms have a target debt level which will correspond to a optimal capital structure that maximises the advantages of debt tax-shields and minimises bankruptcy costs, if this where the cases companies with a higher debt to value ratio should have a higher debt than firms with a lower debt to value ratio. In other words, it is supposed to firms to substitute equity for debt and debt for equity until they maximise the value of the firm. According with Myers (2001) the trade-off theory explains only moderated debt ratios, the theory defends that a a company will continue to borrow where the marginal value of tax shields on additional debt offsets the increase of the current market value of the firm (Myers, 2001). When analysing the trade-off theory many authors notice that this theory is in trouble in the tax front. This problem occurs because the theory rules out conservative debt ratios by taxpaying firm. In other words, the theory cannot explain why the most valuable companies in the world are also the ones with the lowest debt ratios, Microsoft as an example. This idea is strongly supported by the literature and the empirical evidence, once, according with Myers (1984) the most profitable firms in a given industry tend to borrow the least (Myers, 1984, 2001; Rajan & Zingales, 1995).

According to the pecking order theory, firms chose to finance their investment project according with the financing costs. This means that a first firms will choose to finance their projects with the lower cost of capital possible, in second with the second lower cost of capital and sow one. In other words, a company first will finance an investment project with their own internal funds, second they will adjust the dividends payout ration to their investment opportunities, third a firm will adjust their marketable securities. If all this measures are not enough firms must turn to external financing. Regarding this type of financing first managers will choose the safest type of security and if it is not enough they will move risky securities. However, this theory can be quickly reject if we require it to explain everything. However, recent

work based on asymmetry of information gives predictions roughly in line with the pecking order theory. Myers and Majluf (1984) argue that, based on asymmetric information and management acting in the interest of older stockholders may explain several aspects of corporate behaviour. Including the order of preferences in which a firm chooses to get their funds to finance an investment project. Since we are in the presence of asymmetric information, the firm will follow a financial hierarchy of information knowledge while financing investments.

Myers and Majluf (1984) explain the pecking order theory with asymmetric information with resource to the following model. They assume that a a firms issues stocks that a are with N, however managers know that they ar worth N_1, where N_1 is the value of the firm when, everything else constant, investors adquire the manager special knowledge. Manager work to maximize the true value of the company. Lets define δN as the amount that a the shares are over or undervalued, where

$$\Delta N = N_1 - N$$

The manager will issue and invest if

$$y \geq \Delta N$$

Where y represents the NPV of the investment project. If in one hand the manager's issued unfavourable information, ΔN is negative and the firm will alway issue (zero NPV project). On the other hand, if the manager issues favourable information the firm ay pass a positive NPV investment opportunity rather than issuing undervalued shares. If manager act according with the two previous condition the decision to issue will signal bad news for shareholders. Now lets define V as the market value of the company and V' as the value of the company with the new issue shares. If the manager acts according with the inequity we must conclude that

$$V = E(x \mid \text{No issue}) = E(x \mid y \leq \Delta N)$$

where x is the value of the firm if the investment project is passed by,

$$V' = E(x + y + N|\text{issue}) = E(x + y + N|y \geq \Delta N)$$

The total amount is fixed by assumption. But, the number of new shares is not. Thus, ΔN is endogenous, it depends on V'. For example, is the firm issues, the fraction of all shares held by new stockholders is N/V'. The manager sees the true value of their claims as :

$$N_1 = \frac{N}{V'}(x + y + N)$$

Thus, given N, x and y and given the stocks is issued, the greater the price *per share*, the less value is given to new shareholder, and the less ΔN is. With the previous model Myers and Majluf (1984) gave two implications of their model. The first one is that, due to asymmetric information there is a possibility for manager to not issue equity and pass up a positive NPV investment project. This cost can be avoided if the firm retain enough internal cash-flow to cover the project. The second implication is that if a firm chooses to seek external funding is better off issuing debt than equity. This model assumes that new shares or risky debt would be underpriced. This mean that, if the risky security is overpriced equity or other risky security seems to be better than debt. However, if investors knows that managers will only issue equity when its overpriced investors will only buy it when the firm has already exhausted its debt capacity, that is, unless the firm has issued so much debt already that it would face substancial additional costs in issuing more. Thus investors would effectively force the firm to follow the pecking order (Myers, 1984; Myers & Majluf, 1984; Jensen & Meckling, 1976; Kumar & Rao, 2015).

2.6 Theoretical Model

Hypothesis and Proposed Model

According with Myers and Majluf (1984) on the existence of asymmetric information between shareholder and managers, there are two main factors that affects the capital structure of a firm. The first one is that firms prefer to pass by god investment opportunities instead of issuing undervalued shares. The second effect is that managers will only issue stocks when they are overvalued. However, if managers act according to the previous idea, shareholders will only buy shares when the firm has already exhausted its debt capacity (Myers, 1984; Myers & Majluf, 1984; Jensen & Meckling, 1976).

Since our analysis is based on Portuguese SMEs we need to have in consideration that banks are the main source of financing to most of the SMEs. Despite the lower credit requirements by banks, information asymmetry is the biggest problem associated with the financing of small firms. Due to the lack of information banks need to rely on soft information in order to finance SMEs projects. The most common type of soft information available to bank is the relationship between the bank and the manager-owner of the firm. Those two phenomenons, asymmetry of information and banking financing requires, make relationship lending a big player in the financing of SMEs, once it removes the problem of asymmetric information (Petersen & Rajan, 1994; Berger & Udell, 1995; Kumar & Rao, 2015).

Relationship lending implies the existence of specific information of the borrower only available to him and the lender. This phenomenon encourages the entrepreneur to transmit valuable strategic information and it will also encourage the bank to carry out costly monitoring work. Due to this increase of information the bank knowledge of the firm will also increase, making it less risky to lend money. A consequence of relationship lending is the increase of the availability of credit and the decrease of the costs of capital (Diamond, 1984; Bhattacharya & Chiesa, 1995; Petersen & Rajan, 1994; Boot, 2000; Hernández-Cánovas & Martínez-Solano, 2010). However, Sharpe (1990) argues that due to the asymmetric evolution of the infor-

mation between the lender and the other banks there is a reduction of the flexibility of the firm to leave the relationship and provides the bank with monopoly power, which as three main effects. The first one Sharpe argues that financial intermediaries with monopoly power will offer uncompetitive conditions hence obtained monopoly rent. Second, the firms reduced flexibility to change lenders will increase the incentives of lender to invest in monitoring. Third, the reduced competition allows banks to extract returns in the long term to offset initial losses arising from granting loans to small firms (Sharpe, 1990; Hernández-Cánovas & Martínez-Solano, 2010).

The main literature profitability, age, size, tangibility and growth as the major factors affecting the capital structure of SMEs. The effect of these factors has been analysed based on the leverage of SMEs. Most of mainstream literature states that most of the SMEs in developing countries dependent on short-term debt. Dependence on short-term debt has revealed the existence of an under-developed capital market and the absence or reluctance of financial institutions in providing finance to SMEs in developing countries. Thus, this argument also supports the problem of access to finance for SMEs. Profitability provides stability in earnings, and due to risk-aversive nature of SMEs, less preference is given to external funding. Inaccessibility of long-term debt for SMEs also indicates the lack of collateral to mortgage in lieu of long-term loans. It also justifies the positive relationship between long-term debt and asset structure. Since, SMEs are risky ventures, they have to provide collateral for taking long-term loans from banks and other financial institutions. However, short-term debt is inversely related with asset structure due to the inability of SMEs to provide valuable collateral for raising external funds. Debt overhang is a major issue encountered when financing the investment to boost growth. Growth makes pressure on earnings and pushes SMEs owner-managers to take more long-term debt. However, in order to avoid a conflict between owner-manager and lender (asymmetric information), firms prefer to finance high growth investment with their own funds instead debt (Myers & Majluf, 1984; Myers, 1984; Titman & Wessels, 1988; Myers, 2001; Kumar & Rao, 2015).

With our model the main objective is to understand how relationship lending affects the capital structure of Portuguese SMEs.

Chapter 3

Data and Methodology

Since we are interested in understanding what is the impact of relationship lending in the leverage level of a firm we will use the *truncated* regression model to determine the coefficient of the independent variables. However, our analysis will not stop here. We also want to understand how did the 2007 financial crisis affect the relation between banks and the leverage level of a firm. To do so, we collected data from Portuguese SMEs before, during and after the financial crisis.

3.1 Methodology

We will now describe the models that we use to analyse the effects of relationship banking in the capital structure of Portuguese SMEs.

The model

We will estimate two models, in both models the sample is truncated at zero, since a firm can not have a leverage[1] inferior to zero. To estimate the model we need a linear regression model that takes into account the fact that the sample is truncated in a point. In our case a left truncation at the leverage level equal to zero. With a truncated dependent variable we need to be concerned with inferring the characteristics of a full population from a sample drawn of a restricted part of the

[1]Leverage is the use of various financial instruments or borrowed capital to increase the potential return of an investment

population. The best model to estimate such regression is the *truncated*.
Our linear regression models are:

$$\text{Lev}_i = \beta_0 + \beta_1 \text{Con}_i + \beta_2 \text{Size}_i + \beta_4 \text{Age} + \beta_5 \text{Asset struct}_i + \beta_6 \text{Prof}_i + \beta_7 \text{Empl.}_i + \mu_i \tag{3.1}$$

$$\text{Lev}_i = \beta_0 + \beta_1 D_i \text{NOB}_i + \beta_2 \text{Size}_i + \beta_4 \text{Age} + \beta_5 \text{Asset struct}_i + \beta_6 \text{Prof}_i + \beta_7 \text{Empl.}_i + \varepsilon_i \tag{3.2}$$

With model 3.1 we expect to find out if a higher number of relations with banks (lower relationship banking) has a positive or a negative impact in the capital structure of SMEs, and if this impact is statistically significant. In model 3.2 our main objective is to find out if there is a statically significant difference between SMEs that work with only one bank (higher relationship banking) and SMEs that work with several banks.

Variables

In our review of literature we have find that, according with the main theories of capital structure, there are few variables that influence in the financing decisions of SMEs. The variables that we will use are define in table 3.1

Table 3.1: Variables definition

Variables	**Definition**
Leverage (Lev_i)	Total Debt / Total Assets
Concentration (Con_i)	$ln(1 + \text{Number of relations relations})$
Number of banks ($D_i NOB_i$)	Dummy variable taking value 1 when firm works with one bank and 0 otherwise
Size ($Size_i$)	$ln(Turnover)$
Age (Age_i)	$ln(1 + \text{Number of years of the firm})$
Asset structure ($A.struct_i$)	Tangible Assets / Total Assets
Profitability ($Prof_i$)	$EBIT$/Total Assets
Employees ($Empl._i$)	$ln(\text{Number of employees})$

Leverage (lev_i) will measure the capital structure of firm i and it will be our dependent variable. With regard to the independent variables we want manly to understand what is the impact of relationship lending in the financial structure of Portuguese SMEs. In order to do the analyses, the main independent variables that we will use is one that examines the effects of banking relation in the capital structure of a firm. According with the literature, we expect that if a firm increases the number of relations their information will be less valuable to the bank, making less attractive to lend money. A good proxy for relationship lending is the concentration of banks that work with a firm, which may be measure as the natural logarithm of the number of banks (NOR_i) with which the firm works $ln(NOR_i)$. We will also want to analyse what is the difference between a firm having one or more banks. In order to do so, we will use a dummy variable that takes the value 1 if the firm works with 1 bank and 0 otherwise. With respect to profitability, in one hand the trade-off theory argues that profitability is positively related to indebtedness. The most profitable firms have greater debt capacity, and take advantage of debt tax-shields. They also have another advantage, since the most profitable firms are probably more able to fulfil their responsibilities regarding to debt. On the other hand, the pecking-order theory argues that firms will invest internal funds (profits) in their own projects first. They only move to external funds if and only if the internal funding is insufficient. Additionally, they prefer debt over equity. This implies that according to the pecking-order theory profitability may be negatively related to indebtedness (Hernández-Cánovas & Martínez-Solano, 2010; Serrasqueiro et al., 2016; Pacheco & Tavares, 2015). According to the Trade-off theory there is a positive relationship between asset structure and indebtedness, where the greater the tangible asset value the greater the indebtedness level, because those act as collateral in case the firm enters a bankruptcy process. The existence of collateral reduces agency costs and the problems of information asymmetry. Pecking Order theory also predicts a positive association, because firms which have collateral make their creditors feel more comfortable financing their investments and their financial costs are also lower (Myers, 1984; Hernández-Cánovas & Martínez-Solano, 2010; Serrasqueiro et al., 2016; Pacheco & Tavares, 2015). Regarding size, the literature

argues that asymmetric information and moral hazard problems are greater in small firms due to the lack of financial disclosure and their owner-manager nature. These two problems combine with a low value of assets to grant their capacity to pay off the debt and interest and a low diversification, which will imply a higher risk for creditor, will result in a positive relation between size and indebtedness (Hernández-Cánovas & Martínez-Solano, 2010; Serrasqueiro et al., 2016; Pacheco & Tavares, 2015). With respect to age, according with Peterson and Rajan (1994) young firms tend to have a a higher leverage ratio than more mature firms. Firms that come from survival phases successfully tend to retain more earning than younger firms. Relatively to Portuguese SMEs and according with the literature there is a positive relation between age and leverage (Petersen & Rajan, 1994; Ramalho & da Silva, 2009; Matias & Serrasqueiro, 2017).

3.2 Data

In order to analyse the relationship between relationship lending and the capital structure decision of firms we collected the data from a cross-section sample containing 5,000 Portuguese SMEs with a turnover less than EUR 50 million, total assets smaller than EUR 43 million and with less than 250 employees. Regarding the data before the financial crisis the year that we choose was 2006 because it is the last year before the subprime, after cleaning our sample we end up with 3,090 observations. With respect to the data during the financial crisis we choose the year of 2008 because it is the year when *Lehman Brothers* bankrupted, after cleaning the data we end up with 3,146 observations. Finally, for the data after the financial crisis we choose the year of 2015 because it is the last year available, after cleaning our sample we end up with 3,139 observations. The data was collected from SABI database.

Table 3.2: Summary Statistics of the pre financial crisis data*

Variables	**Mean**	**Median**	**Stand. Dev.**	**Min.**	**Max.**
Leverage	0.1474	0.1105	0.1390	0.0000	1.7856
Concentration	1.4110	1.3863	0.3892	0.6931	2.5649
Number of Banks	0.8825	1.0000	0.3220	0.0000	1.0000
Size	8.9423	8.9852	0.8708	3.0637	10.8095
Age	2.8482	2.9115	0.7421	0.0790	4.6828
Asset Structure	0.2595	0.2213	0.1979	0.0000	0.9739
Profitability	0.0505	0.0434	0.1010	−1.7095	1.0138
Employees	63.2097	46.0000	54.3164	1.0000	250.000

* The statistics presented are computed across 3,090 observations.

Before the financial crises the median firms in the data had a leverage of 11.05%, an average of 17.38 years old, a turnover of EUR 7,983.81 thousand, 22.13% of the total assets are tangible assets, a profitability over assets of 4.34%, works with more than one bank (more specifically 3 banks) and 46 employees.

Table 3.3: Summary Statistics of the financial crisis data*

Variables	**Mean**	**Median**	**Stand. Dev.**	**Min.**	**Max.**
Leverage	0.1506	0.1160	0.1383	0.0000	1.2936
Concentration	1.3991	1.3863	0.3954	0.6931	2.5649
Number of Banks	0.8709	1.0000	0.3353	0.0000	1.0000
Size	9.0776	9.1014	0.8598	0.1287	10.8184
Age	2.9255	2.9797	0.6990	0.4422	4.7011
Asset Structure	0.2571	0.2126	0.1991	0.0000	0.9734
Profitability	0.0493	0.0458	0.0996	−1.9114	0.8413
Employees	65.2505	48.0000	55.6844	1.0000	250.000

* The statistics presented are computed across 3,146 observations.

During the financial crisis the median firms in the data had a leverage of 11.60%, an average of 18.68 years old, a turnover of EUR 8,967.73 thousand, 21.26% of the

total assets are tangible assets, a profitability over assets of 4.58%, works with more then one bank (more specifically 3 banks) and 48 employees.

Table 3.4: Summary Statistics of the post financial crisis data*

Variables	**Mean**	**Median**	**Stand. Dev.**	**Min.**	**Max.**
Leverage	0.1443	0.0973	0.2311	0.0000	8.1276
Concentration	0.7075	0.6931	0.1129	0.6931	2.1972
Number of Banks	0.0182	0.0000	0.1335	0.0000	1.0000
Size	9.2950	9.1835	0.5381	8.5962	10.8144
Age	3.2545	3.2695	0.5320	0.8437	4.7622
Asset Structure	0.2363	0.1956	0.1810	0.0000	0.9747
Profitability	0.0613	0.0486	0.1195	−3.6042	2.4346
Employees	70.3265	53.0000	54.9248	1.0000	250.000

* The statistics presented are computed across 3,139 observations.

After the crisis the median firms in the data had a leverage of 9.73%, an average of 25.30 years old, a turnover of EUR 9,734.98, 19.56% of the total assets are tangible assets, a profitability over assets is 4.86%, only works with one bank and 53 employees.

Chapter 4

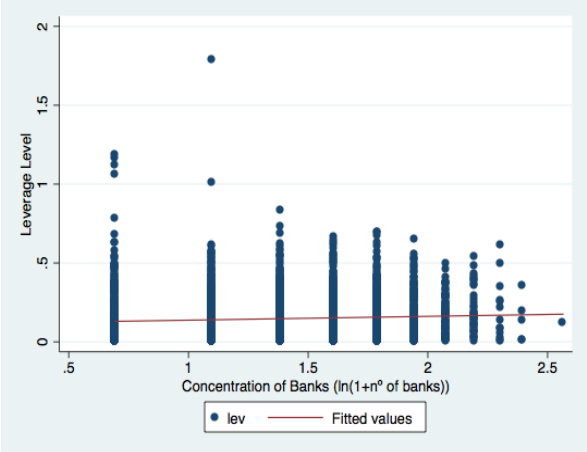
Empirical Results

4.1 Preliminary analyses

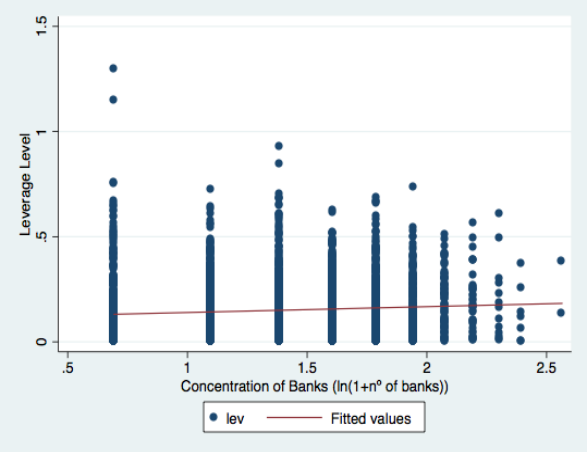
Our preliminary analysis will be focused first in the analysis of the relation between the leverage level and the concentration of banks, and secondly in figuring if working with only one bank has a significant difference in the leverage than working with more than one bank. For the first analysis, we plotted a graphic were in the vertical axis we have the leverage level of a firm and in the horizontal axis we have the concentration[1] of financial intermediaries that work with the enterprise. Regarding the second analysis our main goal is to understand if working with only one bank has any impact in the leverage level of Portuguese SMEs. In order to do the preliminary analysis of this model we will compare, in a table, the average level of leverage when a firm works with only one or with more than one bank. In both models we will look at the data in four different samples. Three of them represent the three points in time (before, during and after the crisis) the last one is the total sample.

[1] see table 3.1 for the definition of concentration

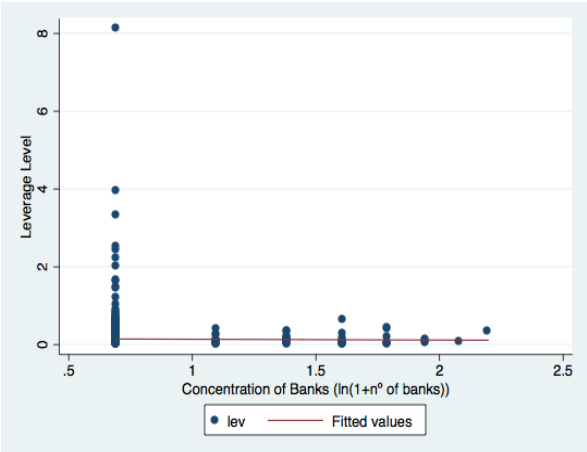
Figure 4.1: Preliminary analysis of the impact of relationship lending in the capital structure of SMEs in Portugal



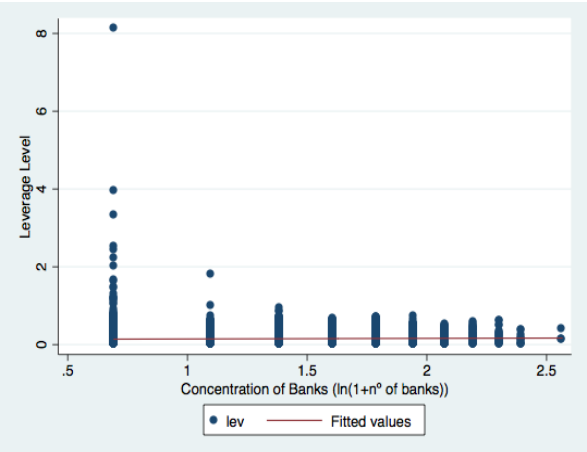
(a) Before the financial crisis



(b) During the financial crisis



(c) After the financial crisis



(d) Total Sample

In our first preliminary analysis we may conclude that before and during the financial crisis there was a positive relation between the concentration of banks and the leverage level of the firms, an evidence of a lower relationship lending. However, when we analyse the same plot for the data after the financial crisis we see that instead of a positive relation we have a slightly negative relation between the number of banks and the leverage level of a company, evidence of a higher relationship lending.

Table 4.1: Preliminary analysis of the impact of relationship lending in the capital structure of SMEs in Portugal

Number	*Before the Crisis*		*During the Crisis*		*After the Crisis*		*Total Sample*	
of Banks	**Mean**	**Frequency**	**Mean**	**Frequency**	**Mean**	**Frequency**	**Mean**	**Frequency**
One	0.1417	363	0.1454	406	0.1447	3,082	0.1445	3,851
More than One	0.1481	2,727	0.1514	2,740	0.1210	57	0.1495	5,524
Total	0.1474	3,090	0.1506	3,146	0.1443	3,139	0.1474	9,375

In our second preliminary analysis we may conclude that before and during the crisis a firm that works with more than one bank (less relationship lending) has a higher leverage level than a firm that works with only one bank. However, in table 4.1 we may conclude that, after the crisis, firms that only works with one bank (more relationship lending) have higher leverage than others firms.

4.2 Empirical Results

In this subchapter we will present the results of the estimation model of the various samples in order to better understand how does the relationship lending relate with the leverage of a company. As we have seen before, we will use a *truncated* regression model to estimate the coefficients and the marginal effects of the independent variables in the dependent one. The results of the estimation are presented in the next page.

Table 4.2: Estimation Results[2]

Variables	*MODEL 3.1*			*MODEL 3.2*		
	Before the Crisis	*During the Crisis*	*After the Crisis*	*Before the Crisis*	*During the Crisis*	*After the Crisis*
Con_i	0.0185^{***}	0.0230^{***}	-0.0223	-	-	-
	(0.0044)	(0.0043)	(0.0201)	-	-	-
$D_i NOB_i$	-	-	-	0.0054	0.0056	-0.0240
	-	-	-	(0.0051)	(0.0049)	(0.0171)
$Size_i$	0.0135^{***}	0.0053^{**}	0.0111^{**}	0.0095^{***}	0.0061^{***}	0.0117^{***}
	(0.0022)	(0.0022)	(0.0044)	(0.0022)	(0.0021)	(0.0044)
Age_i	-0.0034	-0.0036	-0.0155^{***}	-0.0016	-0.0011	-0.0155^{***}
	(0.0024)	(0.0025)	(0.0041)	(0.0024)	(0.0025)	(0.0041)
$A.struct_i$	-0.0467^{***}	-0.0401^{***}	0.0000	-0.0319^{***}	-0.0417^{***}	-0.0000
	(0.0086)	(0.0085)	(0.0180)	(0.0086)	(0.0085)	(0.0118)
$Prof_i$	-0.1838^{***}	-0.1237^{***}	-0.1151^{***}	-0.2823^{***}	0.1226^{***}	-0.1151^{***}
	(0.0160)	(0.0161)	(0.0180)	(0.0160)	(0.0161)	(0.0180)
$Empl_i$	-0.0097^{***}	-0.0096^{***}	-0.0050^{**}	-0.0090^{***}	-0.0086^{***}	-0.0050^{**}
	(0.0019)	(0.0019)	(0.0025)	(0.0019)	(0.0019)	(0.0025)
Log-likehood	5951.4972	4014.4458	2352.1426	3943.0822	4000.7042	2352.5073
Number of Observation	3,090	3,146	3,139	3,090	3,146	3,139

[2]Standard errors in parenthesis. *** denote p-values<0.01, and ** denote p- value<0.05 and *denote p-values<0.10

By analysing table 4.2 we conclude that in both models, before and during the crisis, there was a positive relation between the number of banks and the leverage of a firm. This phenomenon indicates that there is a negative relation between relationship lending and the leverage of a firm. However, if we analyse the period after the financial crisis we conclude that there is a negative relation between the number of banks and the leverage of a firms. This may indicate that, after the financial crisis, banks started to lend only to firms with which they already had a relation. In other words, there is evidence of a strong relation between relationship banking and the leverage of a firm.

However, the coefficients of model 3.1 after the crisis and all of the models 3.2 are not statistically significant. In other words, they may be consider equal to zero.

All of ours six models were globally significant at one per cent.
The hypothesis tested in our model is the following:

$$H_0 : Variable = 0$$

$$H_1 : Variable \neq 0$$

However, regarding model 3.1 there is some statistical evidence that relationship lending may have some impact in the leverage level of a firm. We will divide our analyse in each of the regression made (before, during and after the financial crisis). First lets interpret the results of the regression made with the data retrieve before and during the financial crisis, since they have the same signals. In these samples we may conclude that the concentration of banks has a positive impact in the leverage level of a bank, this means that when the number of banks increases (less relationship) the leverage level of a firm will also increase. With respect to the size of a firm, we conclude that there is a positive relation with the leverage of the firm, in other words, when the turnover of a firm increase the leverage level of a firm will also increase. Regarding the age there is no statistical evidence that there is no impact in the leverage of a firm. When we analyse the asset structure of a firm we find out that there is a negative relation between the asset structure of a firm and their leverage level, this means that when the number of fixed assets increase the leverage level will decrease. Regarding the profitability of a firm we find out that there is a negative

relation between the profitability of a firm and their leverage level, this means that when the number of fixed assets increase the leverage level will decrease. Finally we analyse the results of the model after the financial crisis. In this sample we may conclude that the concentration of banks has a negative impact in the leverage level of a bank. This means that when the number of banks increases (less relationship) the leverage level of a firm will decrease. However, in this sample the concentration of banks is not statistically significant. In other words, there is no relation between the two. With respect to the size of a firm we conclude that there is a positive relation with the leverage of the firm, in other words, when the turnover of a firm increase the leverage level of a firm will also increase. Regarding the age, there is a negative relation between the age of a firm and the leverage, this means that when a firms gets older the leverage level will decrease. With respect to the asset structure of a firm there is no statistical evidence that there is no impact in the leverage of a firm. Regarding the profitability of a firm we find out that there is a negative relation between the profitability of a firm and their leverage level, this means that when the number of fixed assets increase the leverage level will decrease.

If we look at model 3.2 we can conclude that the coefficients follow the same path as in model 3.1. However in this case, all the coefficients are not statistically significant. This means that the difference between working with one bank or work with more than one bank has no influence in the financing decision of a SME.
However, if we do the same test but instead of limiting our dummy variable at one bank we limited at two banks, all the models 3.2 will react in the same way as model 3.1. This means that, before and during the crises there is positive difference between working with only one bank or working with more than one, which goes according with model 3.1. However if we look at the period after the financial crisis we notice that the difference, although negative, is not statically significant.

One probable cause of the results showed in table 4.2 is that firm increase their leverage level not because they needed but because there was an excess supply of money from the financial system.

Chapter 5

Conclusion

With this master final work we where searching an answer to the following question: *What is the impact of relationship lending in financing and capital structure decisions on SMEs in Portugal?* In order to do so we have collected financial data from three different periods of time of Portuguese SMEs (before, during and after the financial crisis) and computed two regression model that may explain the impact of relationship lending i the capital structure of a firm. The first regression tries to explain the impact of the number of banks in the leverage level of a firm and the second one try to explain if there is a difference in the leverage level if a firm works with one or more banks.

From our estimations we found that before and during the financial crisis the impact of the number of banks is positive in the leverage level. However, if we look to the period after the financial crisis we can see tat although the result of the estimation is negative it is not statistically significant when firms determine their leverage level.

In conclusion, our empirical results show that, in Portugal SMEs with a stronger relationship do not have necessarily a higher availability of credit. Instead our result shows that SMEs with weaker relations have a higher leverage levels. Our results go against the main theory in relationship banking and capital structure.

References

Berger, A. N., & Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *The Journal of Business*(3), 351.

Berger, A. N., & Udell, G. F. (2002, February). Small business credit availability and relationship lending: The impotance of bank organizational structure. *The Economic Journal*(112), F32-F53.

Bhattacharya, S., & Chiesa, G. (1995). Proprietary information, financial intermediation, and research incentives. *Journal of Financial Intermediation*, *4*, 328-357.

Boot, A. W. A. (2000). Relationship banking: Waht do we know? *Journal of Financial Intermediation*(9), 7-25.

Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *Review of Economic Studies*, *51*(3), 393.

Elsas, R., & Krahnen, J. P. (1998). Is relationship lending special? evidence from credit-file data in germany. *Journal of Banking and Finance*, *22*, 1283-1316.

Hernández-Cánovas, G., & Martínez-Solano, P. (2010). Relationship lending and sme financing in the continental european bank-based system. *Small Business Economics*, *34*(4), 465-482.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305-360.

Kumar, S., & Rao, P. (2015). A conceptual framework for identifying financing preferences of smes. *Small Enterprise Research*, *22*(1), 99-112.

Matias, F., & Serrasqueiro, Z. (2017). Are there reliable determinant factors of capital structure decisions? empirical study of smes in different regions of portugal. *Research in International Business and Finance*, *40*, 19-33.

Muller, P., Devnani, S., Gagliardi, J. J. D., & Marzocchi, C. (2016, November). *Annual report on european smes* (Tech. Rep.). European Commission.

Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance*, *39*(3).

Myers, S. C. (2001). Capital structure. *The Journal of Economic Perdpective*, *15*(2), 81-102.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and invesment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187-221.

Pacheco, L., & Tavares, F. (2015). Capital structure determinants of portuguese footwear sector smes: Empirical evidence using a panel data. *TÉKHNE - Review of Applied Management Studies*, *13*, 145-157.

Petersen, M. A., & Rajan, R. G. (1994). The benefits of lending relationships: Evidence from small business data. *Journal of Finance*, *49*(1), 3-37.

Rajan, R. G. (1992). Insiders and outsiders: The choice between informed and arm's-length debt. *Journal of Finance*, *47*(4), 1367-1400.

Rajan, R. G., & Zingales, L. (1995, December). What do we know about capital structure? some evidence from international data. *The Journal of Finance*, *50*(5), 1421-1460.

Ramalho, J. J. S., & da Silva, J. V. (2009). A two-part fractional regression model for the financial leverage decisions of micro, small, medium and large firms. *Quantitative Finance*, *9*(5), 621-636.

Schumpeter, J. (1939). *Business cycle*. New York: McGraw-Hill.

Serrasqueiro, Z., Matias, F., & Salsa, L. (2016). Determinants of capital structure: New evidence from portuguese small firms. *Dos Algarves: A Multidisciplinary e-Journal*, *28*, 13 - 28.

Sharpe, S. A. (1990). Asymmetric information, bank lending and implicit contracts: A stylized model of customer relationships. *The Journal of Finance*(4), 1069.

Titman, S., & Wessels, R. (1988, March). The determinantes of capital structure choice. *The Journal of Finance*, *43*(1), 1-19.