



UNIVERSIDADE CATÓLICA PORTUGUESA

Debt Maturity Structure

A comparison between PSI-20 and IBEX 35
non-financial firms and large non-listed firms
from Portugal and Spain

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Católica Porto Business School
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by

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Abstract

Financing decisions are fundamental to firms' daily activity and debt maturity plays a crucial role. In this context, the aim of this paper is to identify the most significant differences in debt maturity between Portuguese and Spanish firms and understand the main determinants that affect the corporate decisions of debt maturity.

In this study, firms that belong to the stock indexes PSI-20 and IBEX 35 are compared with large non-listed companies from both countries, Portugal, and Spain, individually for 2010 to 2019. The paper follows the methodology of the principal mentors of debt maturity structure of firms, such as Stohs and Mauer (1996), Barclay and Smith (1995), or Ozkan (2002). Using two types of regressions, OLS and Fixed Effects, we tested and compared four sets of companies. The variables are Growth, Profitability, Asset Tangibility, Maturity Matching, and the Debt-to-Equity ratio. Previously during the theory, we explore the pecking order theory, the tradeoff model, the information asymmetries, and agency costs that impact the choice of debts' maturity.

The work's main conclusions are that the companies take tax advantages, as the tradeoff theory reports; listed firms prefer more long-term debt than the unlisted firms; unlisted firms use more debt than the listed. Some signs do not comply with the theory, and the variable that better explains the dependent variable, Debt Maturity, is Maturity Matching. The conclusions allow us to understand better the financing decisions made by these firms, especially the determinants of the debt maturity. A comparison like this has never been made before, bringing new information on the subject and to financing literature.

Keywords: Debt Maturity; Taxes; Financing Decisions; Asymmetric Information; Financing Costs; Size.

Resumo

As decisões de financiamento são fundamentais para a atividade das empresas e a maturidade da dívida desempenha um papel crucial. Neste contexto, o objetivo da presente dissertação é identificar as diferenças mais significativas na maturidade da dívida e suas determinantes entre empresas portuguesas e espanholas, e compreender os principais determinantes que afetam as decisões das empresas relativamente à maturidade da dívida.

Neste estudo, as empresas pertencentes aos índices de ações PSI-20 e IBEX 35 são comparadas com grandes empresas não cotadas de ambos os países, Portugal e Espanha, individualmente, para o período de 2010 a 2019. A metodologia utilizada no presente estudo segue os fundamentos dos principais mentores da estrutura de maturidade do endividamento de empresas, como Stohs e Mauer (1996), Barclay e Smith (1995) ou Ozkan (2002). Com recurso a dois tipos de regressão, OLS e Efeitos Fixos, testamos e comparamos os quatro conjuntos de empresas. As variáveis são *Growth*, *Profitability*, *Asset Tangibility*, *Maturity Matching*, e o rácio *Debt-to-Equity*. Na revisão de literatura, exploramos a teoria *pecking order*, o modelo de *tradeoff*, as assimetrias de informação e os custos de agência que afetam a tomada de decisão no que respeita a maturidade da dívida.

Os resultados deste trabalho permitem concluir que as empresas usufruem de vantagens fiscais, conforme relata a teoria do *tradeoff*; as empresas listadas preferem dívida de longo prazo do que as empresas não listadas, as empresas não listadas demonstram usar mais dívida do que as cotadas. Alguns sinais não estão de acordo com a teoria, e a variável que melhor explica a variável dependente, a Maturidade da Dívida, é a variável *Maturity Matching*. As conclusões permitem compreender melhor as decisões de financiamento tomadas por essas empresas, principalmente os determinantes do prazo de

vencimento da dívida. Uma comparação desta natureza é pioneira no que concerne as empresas em análise, trazendo novas informações sobre o tema e para a literatura de financiamento.

Palavras-chave: Maturidade do Endividamento; Impostos; Decisões de Financiamento; Assimetria de Informação; Custos de Financiamento; Dimensão.

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Chapter 1

Introduction

Corporate finance is very much related with financing decisions, it is a discretion that we must have in mind. Many firms choose debt as the primary tool to obtain external financing, but a question that is always in our mind is: "for what duration should we borrow?". This decision must follow specific criteria to achieve the "optimal" maturity and the trade-off between debt and equity to maximize its value.

The main theories and models that compose the literature about Debt Maturity are the Bankruptcy Costs with seminal works from Guedes and Opler (1996) or Leland-Toft (1996), among others; Agency Costs with solid contributions from Barclay and Smith (1995) and Stohs and Mauer (1996); Information Asymmetry with works from Myers (1984) and Myers-Majluf (1984); furthermore, and probably the most important model for this approach, the Trade-off model, especially the papers from Hovakimian (2001 and 2004) and Antoniou (2006).

This thesis aims to prove for some of the previous answers and findings, and others that will be on the literature review throughout a comparison between listed firms, non-financial firms belonging to the PSI-20, and IBEX-35 stock indexes and high dimension unlisted firms from Portugal and Spain. The sample and the approach used were never employed to study this matter and with this purpose. It is also essential to compare countries with a similar market and belong to the same economic region. This comparison is essential because if we

compare Portuguese companies with USA companies, the comparison would require a more careful approach due to the different standards used and the different sizes of companies and markets.

Most of the empirical literature used Panel OLS or Fixed Effects, models. In this study, both panel models will be employed to achieve the best comparison possible because some sets of companies presented better results under OLS models and others with Fixed Effects. The models will be analyzed separately by type. The analysis range is between 2010 and 2019, and the variables used are from the principal authors of this subject. The PSI-20 companies will be the basis for the entire study.

This thesis's primary conclusions led us to determine or not upon the main findings of the literature. It was possible to observe that the firms analyzed do take the tax advantages of debt and the listed firms prefer more long-term debt than non-listed. However, future research can be made, with some improvements, such as the sample size to increase the quality of the results, robustness, and assertiveness relative to the literature. The limitations were many, but the result still allows us to take a few conclusions and state differences between the firms analyzed, which is the study's primary objective.

This thesis's structure will include the following chapters—first, the Literature Review with the main models and theories of the Debt Maturity studies. Secondly, there will be the "Methodology", "Variables", and the "Data" with the respective descriptions. Third, the "Results" with an appreciation of the models' results and various tests made to the variables. The last chapter contains the main conclusions of this study.

Chapter 2

Literature Review

2.1. Debt Maturity Structure: Introduction

Financing Decisions are a crucial action that financial managers must take. Jointly with Debt Maturity, they are fundamental principles to the capital structure of firms. Financing Decisions usually rely on two sources, Debt or Equity, and as firms act on their interest, they take these to create value for the firm. Accordingly, to Fama and French (1998) literature, many factors, including taxes, bankruptcy costs, agency costs, proxy effects, size, and asymmetric information, play a role in the relation between firm value and financing decisions. Many authors discussed this subject (Bennett and Donnelly, 1993; Lasfer, 1995; Bevan and Danbolt, 1998; Ozkan, 2001; and Bevan and Danbolt, 2004). It still is a much-debated topic and, sometimes, difficult to decipher. All these factors will be approached during the literature. Together with the importance of financing decisions comes the Debt Maturity, because empirically and not only at a theoretical, authors like Fan et al. (2012) or Frank and Goyal (2009) showed that this is a fundamental matter. As said before, at a level of value creation, financial policies, or measures to be taken and the accessibility to the different financial resources, more long-term or more short-term.

Modigliani and Miller (1958) propose that the firm's value depends on its profitability and not on its capital structure. They argue that a company's option or combination of options does not affect its real market value. Accordingly, their argument was based on Glickman (1996), on an argument about the neutrality of money, particularly the case of the money-contract relationship represented by corporate gearing. The author invokes that, and using a general macroeconomic case, in a monetary production economy operating under conditions of intractable uncertainty and in which firms and households constitute categorically distinct functional entities, money, and money contracts have a unique and positive role. The first theory from Modigliani and Miller received many critics because it assumes perfectly efficient markets, in which the companies do not pay taxes, while there are no bankruptcy costs or asymmetric information. Many authors criticized the theory, and the reasons for this criticism were obvious. Imperfections must be accounted for in this subject-matter. These criticisms made Modigliani and Miller reinvent their study and correct these assumptions in a new study in 1963. The corrections performed somewhat increased the tax advantages of debt financing under the model used and reduced leverage effects. However, despite the existence of tax advantages of debt financing, this does not necessarily mean that corporations should seek the maximum amount of debt in their capital structures. After this study, a compilation of new theories about firms' capital structure and, specifically, about the debt maturity structure emerged.

The first theory approached is the agency theory and the costs that come from the control, monitoring, information, incentives, and others required to firms finance themselves. The agency costs that come from equity and separate dominant shareholders from the other shareholders are considered favorable costs, and the agency costs that result from the use of debt, which separates investors with different rights, are taken as unfavorable costs. One of the main

predictions of the literature is that agency costs of debt financing result in an optimal debt maturity structure (Myers, 1977; Barnea et al., 1980). Asymmetry of information is another crucial factor when deciding to finance using debt due mainly to moral hazard and adverse selection. Inside this theory, we will also focus on liquidity risk and the signaling theory, as well as in the pecking order theory. For example, Barclay and Smith (1995) show that the term to maturity of a firm's debt rises with credit quality and size and falls with growth opportunities. The last topic that will be important for the analysis of this thesis will be the trade-off theory, where we are going to look at the advantages and disadvantages of financing with short- or long-term debt maturity. In this theory, we will also consider the tax effect of debt and the possible bankruptcy costs. If we investigate Leland and Thoft's (1996) research, debt maturity is determined by a trade-off between tax advantages and leverage-related costs. At the end of this literature review, other vital theories within debt maturity will be mentioned at the end of the literature review but will not be approached during the study.

2.2. Agency Theory

The agency theory attempts to explain and resolve disputes over priorities between principals and their agents. Jensen & Meckling (1976) state this same definition in their study, relying upon the separation of ownership and control between the agents. To solve these kinds of problems, a delegation of duties must exist, and, on this topic, corporate governance plays a very important role. Bencivenga and Smith (1993) show that financial intermediaries that improve corporate governance by economizing on monitoring costs will reduce credit rationing and thereby boost productivity, capital accumulation, and growth.

We can consider three types of agency theory. The first type is between the principal and agents, which arises due to the information asymmetry and variances in risk-sharing attitudes (Jensen & Meckling, 1976; Ross, 1973). The second type of conflict occurs between the major and minor shareholders (Gilson & Gordon, 2003; Shleifer & Vishny, 1997), and it arises because major owners take decisions for their benefit at the expense of the minor shareholders. The third type of agency problem happens between the owners and creditors. This conflict awakes when the owners take more risky investment decisions against the will of the creditors.

Berle & Means (1932) found that agency between owners and managers in the organizations exists due to the separation of ownership from the control found since the birth of large corporations. The owners assign the task to the managers to manage the firm with the hope that managers will work for the owners' benefit. However, managers are more interested in their compensation maximization. A different problem arises when there is a conflict of interest between the major and the minor owners, if the ownership is concentrated in the hands of a few persons or with the family owners, then the minority shareholders find it difficult to protect their interests or wealth (Demsetz & Lehn, 1985). The agency problem may also arise when there are disagreements between owners and creditors due to the projects undertaken and the shareholders' financing decisions (Damodaran, 1997). Eisenhardt (1989) suggests two remedies to solve the agency conflict through proper governance. The first relies on an outcome-based contract, where the action of the agents' can be checked. In the second place, the principal needs to form a strong information structure, where the principal is aware of all the information about the agents' actions and cannot misrepresent the principals.

Heading back to Jensen & Meckling's (1976) research and the concept of agency cost. For the authors, the agency costs are one of the internal costs

attached with the agents that occur due to the misalignment of the interest between the agent and principal. According to their findings, the agency cost is the sum of the monitoring cost, bonding cost, and the residual loss, which is basically the cost incurred to monitoring and assessing the agent's performance of the firm and operate according to the defined system of the firm and the conflict of interest between managers and owners, respectively. Firm size and business risk can also be considered as factors of retaining agency problems. Because smaller firms with higher business risk are also more likely to experience rating downgrades, they are also more subject to the agency costs of debt (Yi, 2005).

Debt maturity can play an important role in resolving the problem. Guedes-Opler (1996) says that firms attempt to control the agency costs of debt by altering their borrowings' maturity. This can be achieved by issuing short-term debt, which matures before any opportunity to exercise the growth options. The empirical prediction is that firms with more growth options will employ shorter-term debt in their capital structure and contracting costs (Myers 1977). Jointly with the type of debt, another critical factor that was already mentioned and must be accounted for is the firms' size. It has been suggested by a considerable number of authors, and it is a fact, that larger firms have lower agency costs. Smaller firms are more likely to face a potential conflict of interest between the firm's shareholders and bondholders, such as risk shifting and claim dilution (Smith & Warner, 1979). Barnea et al. (1980) say that these problems can be resolved with the same solution by issuing more short-term debt. At the same time, larger firms have much easier access to the capital markets (Titman & Wessels, 1988), which smooths their job when solving possible agency conflicts. Whited (1992) also argues that small firms are generally precluded from accessing long-term debt markets since the proportion of their collateralizable assets to future investment opportunities is relatively small. Relatively to the risk,

Leland & Thoft's (1996) results suggest that, in the presence of agency costs, riskier firms should issue short-term debt in addition to using less debt. Issuing short-term debt leads to a smaller incentive to raise firm risk after the issue. The agency-related costs decline since short-term debtholders do not have to protect themselves from misincentives by demanding higher coupon rates. In the same vein, Barnea, Haugen, and Senbet (1980) believe that short-term debt reduces the incentive for risky asset substitution because short-term bond prices are relatively insensitive to shifts in risk of the underlying assets. Another valid argument comes from Myers (1977), which affirms that firms schedule debt repayments to match the decline in value of assets to lower the agency costs of debt. Thus, firms with more long-term assets in place can support more long-term debt. Maturity matching allows firms to extend debt maturity without significantly increasing the agency costs of debt.

The issue of long-term debt is a possibility that most of the authors do not implement in their studies, but it can solve this kind of problem. Barnea et al. (1980) say that the combination of shortening the maturity of debt and issuing long-term debt with a call provision performs identical tasks in eliminating these agency problems discussed above. This happens because the call date and maturity dates are equal. For example, adding a call feature (with an exercise price less than the face value) is tantamount to merely reducing the amount (rather than the maturity) of debt in the capital structure, which is an unacceptable solution to the asymmetry problem. Because the agency cost resulting from informational asymmetry is permanent if the entrepreneur resorts to long-term financing. Both Bodie-Taggart (1978) and Myers (1977) recognize that shortening the debt's maturity can overcome the incentive problem associated with future investment opportunities. However, they conjecture that firms issue long-term debt to avoid costs associated with short-term debt

issuance. The implication of the solutions previously mentioned is that firms prefer long-term debt to short-term debt.

The last matter that might be worth mentioning is the decision made when deciding about the payment of dividends or if they should retain earnings to finance the firm's activity. This is an issue that will be properly addressed further in the literature, but for now, it is important to refer that the payment of dividends might expose companies to the necessity of raising external funds in the capital markets. This allows outside investors to exercise some control over the insiders at that time (Easterbrook, 1984). A contrary opinion comes from La Porta (2000) that utter that dividends are better than retained earnings because the latter might never materialize as future dividends. As said, this a discussion that may become clearer ahead.

2.3. Information Asymmetry

During periods of high uncertainty, the issue of asymmetric information between lenders and borrowers is more severe, leading to more volatile future cash flows that can negatively affect borrowers' ability to repay debt (Pan, Wang, & Yang, 2019). Goswami et al. (1995) show that long-term debt will be the preferred financing instrument chosen when, across time, the degree of asymmetric information increases. Contrary to Goswami et al., Yi (2005) states that when there is asymmetric information regarding the quality of assets, a firm may signal the asset quality using short-term debt, which minimizes the adverse selection problem related to issuing new debt. The key insight of adverse selection models is that asymmetric information induces a bias toward short-term debt. This bias arises because borrowers with favorable inside information avoid locking in their financing costs with long-term debt since they expect to be able to borrow under more favorable terms later.

As we just saw, many authors show different perspectives and methods of solving or, at least, attenuate the issue of asymmetric information. For Flannery (1986), the insider of a relatively good-quality firm will consider all the market's required default premia to be excessive, which is most unreasonable on long-term debt due to the outsider's perception of a higher probability of credit quality deterioration than the insiders. Myers (1984) argues that if managers know more than the rest of the market about their firm's value, the market penalizes securities' issuance (like equity) whose expected payoffs are crucially related to the assessment of such. Based on these expectations, we can say that, as Myers and Majluf (1984) argue, asymmetric information problems drive the capital structure of firms. For example, firms seeking outside finance naturally face an adverse selection and hence mispricing problem. To avoid mispricing, firms finance investments internally if they can, and if they cannot, the argument is that firms prefer debt to equity since it is argued that debt is less sensitive to the lack of knowledge of outside investors about the value of firms' investment projects (Myers (1984) and Myers and Majluf (1984)).

The pecking order theory of the capital structure of Myers (1984); and Myers and Majluf (1984) predict that firms prefer debt over equity because of information asymmetry between well-informed managers and less-informed investors. When investment needs exceed internal funds, they are met primarily with debt, while equity is used as a residual financing source. On information asymmetries that lead to liquidity risk and signaling, Fama (1990) suggests that the debt maturity structure reflects the incentive to provide information, monitoring, and bonding relevant for contracts. So, it is essential that the agents, particularly firms, find financial intermediaries that reduce informational asymmetries may ease external financing constraints and facilitate better resource allocation (Levine, 2002).

2.3.1. Liquidity Risk

The studies previously presented, within this topic, find that adverse selection is an important determinant of market liquidity. Liquidity risk is the risk that an illiquid borrower, although viable, cannot obtain refinancing (Diamond, 1991). Liquidity risk from short-term debt arises from the borrower's loss of control rents if lenders are unwilling to refinance when bad news arrive. Diamond also says that short-term debt matures before the cash flows arrive from a firm's investments and must be refinanced at terms that depend on its future credit rating. Long-term debt, in contrast, has maturity matching the timing of the cash flows. This brings the relevance of liquidity when the borrowers must choose between short-term and long-term debt because short-term debt needs to be issued systematically to maintain the investments' cash flows. Short-term debt can still cause a loss of project rents if it must be refinanced at an overly high-interest rate because of credit market imperfections (Froot, Scharfstein, and Stein (1993)). As an alternative, for firms with risky growth opportunities, there is an incentive to finance themselves with long-term debt because, with it, they can avoid the threat of inefficient liquidation.

Based on credit rating, Diamond enforces that some very low-rated borrowers have no choice but to use short-term debt despite the control that it gives to lenders. The high rated who use short-term debt to their borrowing to take advantage of the arrival of information. Borrowers with ratings in between these rely more heavily on long-term debt. Liquidity risk arises from debt that is of shorter maturity than assets. As said before, short-maturity debt creates liquidity risk because sometimes the borrower is unable to refinance, and the lenders liquidate when the borrower would not choose to if he or she were the sole owner of the firm. Diamond concludes his theory about the liquidity risk stating that a borrower with a sufficiently good credit rating, this liquidity risk is outweighed by the effect of expecting future news to be favorable. For borrowers with lower

ratings, the liquidity risk outweighs the information effect. While liquidity risk gives some firms an incentive to borrow long-term, they may not be able to do so because the rate of return required to compensate investors for bearing long-term credit risk can induce substitution into risky low-quality projects (Diamond (1991) Stiglitz and Weiss (1981)).

The last concept regarding the liquidity risk will be its effect on leverage. A firm determines its leverage according to growth opportunities in its core business segment, and the capital structure is weakly exogenous to investment in its non-core business segment. If the capital structure has no impact on investment, we should not observe a strong relationship between leverage and investment in the firm's non-core segment (Lang et al., 1996). Liquidity risk effects on leverage should be more critical for lower credit quality firms and firms that cannot lengthen their debt maturity (Johnson, 2003).

Carey et al. (1993) claim that, on average, firms with unrated debt are likely of lower credit quality than rated firms and likely find it more challenging to lengthen maturity because they borrow primarily from banks and non-bank private lenders at shorter average maturities than public debt. So, Johnson (2003) concludes that the effect of liquidity risk on leverage is significantly larger in unrated firms than for rated firms. One crucial characteristic of private equity investments, which distinguishes them from investments in public companies, is their higher leverage (Axelson, Stromberg, and Weisbach, 2009). The fact that these loans need to be refinanced or renegotiated (e.g., following a breach of covenants) makes private equity investments sensitive to the availability of capital of the debt providers (Axelson et al., 2010, Kaplan and Stromberg, 2009). At times of low liquidity, private equity houses may find it difficult to refinance their companies and may be forced to liquidate the investments or accept higher financing costs (throughout the issue of new short-term debt). This argument relates the returns of private equity companies to funding liquidity. Funding

liquidity is an important source of liquidity risk in private equity. Thus, while short debt maturity can reduce the cost of underinvestment problems and thereby increase optimal leverage, it can also increase liquidity risk and reduce optimal leverage. Given these two effects, Johnson (2003) says that firms would trade off the cost of underinvestment problems against the cost of increased liquidity risk when choosing short debt maturity.

2.3.2. Pecking Order Theory

Myers (1984) and Myers, Majluf (1984) present in their studies the pecking-order theory where firms have not a defined capital structure. In this context, the firms' capital structure results from hierarchical financing decisions over time (Shyam-Sunder, Myers 1999). Myers (2001) emphasizes that the pecking order theory is a conditional theory of firms' capital structure, relating information differences to financing choices. As such, we should expect the pecking order theory to provide a relatively (more) accurate description of firms' financing behavior only when adverse selection costs associated with the issuance of information-sensitive securities are "large(r)." According to the theory, firms have financial constraints due to information asymmetries existing between the agents involved. So, this problem will make the borrowers choose between their financing options. In the first place, firms will go for internal financing resulting from retained profits; secondly, to use debt with low risk, which is basically short-term debt; and, the last option, firms end up choosing external equity. Donaldson (1961) observes that managers prefer to fund new investments with retained earnings rather than debt but prefer debt to equity financing. Myers-Majluf (1984) states that firms seem to favor debt over equity issues, not the reverse. Then we must try to figure which option is the best or if both are good but for a different kind of borrower. If firms opt to follow the pecking order, they

will finance with internal resources to the extent possible. If internal funds are not an adequate solution, firms will opt to finance externally.

Retained earnings have no adverse selection problem. Debt has only a small adverse selection problem, and equity is subject to serious adverse selection problems. From an outside investor's point of view, equity is strictly riskier than debt. Both have an adverse selection risk premium, but that premium is significant on equity. Therefore, an outside investor will demand a higher rate of return on equity than on debt. From the firm perspective, retained earnings are a better source of funds, but debt is a better deal than equity financing. Accordingly, the firm will choose to fund all projects using retained earnings if possible. If there is an inadequate amount of retained earnings, then debt financing will be used. Equity will be avoided to escape from the higher premium. The adverse selection cost for risky debt is not as significant as equity; hence firms choose risky debt over equity. Myers (1984) suggests that risky debt is between pure self-financing and equity finance and constitutes the second tier of the pecking order hierarchy.

When firms have the capacity to retain earnings and use them in further investments or financing decisions, they will have a lower leverage position when they are profitable and a higher leverage position if they have less profit when accumulating more debt. Hovakimian et al. (2001), during the discussion of debt versus equity choice, has found that the probability of issuing debt vis-a-vis issuing equity declines with the firm's market-to-book ratio. The tendency to issue debt when operating performance is high is tempered by the firms' preference and the availability of internally generated funds (Hovakimian 2003). Many authors state the managers avoid external finance because they want to avoid the subjection of capital markets' discipline. However, at the same time, it is generally better to issue safe securities than risky ones. So, firms should go to

bond markets for external capital but raise equity by retention if possible. That is, external financing using debt is better than financing by equity.

Looking into these financing options, Fama and French (2005) refer that firms' profitability and growth characteristics are central to their financing decisions since valuable growth opportunities indicate how much investment a firm may need. Profitability reflects to what extent these investment needs can be funded internally. Firms issue equity only under duress, or when needs are so much more than what internal resources could provide, financing with debt will produce excessive leverage. Berger and Udell (1998) find that firms rely more on debt financing as firms grow from "infancy" to "adolescence" but use less debt as firms become "middle-aged" and "old." Myers (2015) emphasizes that pecking order should apply to mature firms and not to growth firms since it is mostly managers inside information about assets in place that blocks equity issues and investment. While it is true that mature firms often have relatively more assets in place than growth opportunities, it is unclear if information asymmetries overall are more significant for mature firms. More information has accumulated about the assets in place for mature firms. Small, young firms are more likely to have greater information asymmetries about all their assets because of their short history. On average, Berger and Udell also report that "smaller" firms have more equity, most of which comes from principal owners, and "larger" firms have more debt through bank loans and trade credit.

2.4. Trade-Off Model

A firm's optimal debt ratio is usually viewed as determined by a trade-off of the costs and benefits of borrowing, holding the firm's assets and investment plans constant (Myers,1984). According to the Trade-Off model of Kraus & Lintzenberger (1973), Scott (1977), and Kim (1978), firms should reach the level

of debt that maximizes the advantages of debt tax-shields and minimizes the possibility of bankruptcy. So, firms need to manage an equilibrium level of debt that makes them benefit from the tax advantages of debt financing and, at the same time, avoid the costs of financial distress and the probability of bankruptcy. A firm is supposed to substitute debt for equity or equity for debt until the firm's value is maximized. Stohs and Mauer (1996) add that firms trade off the benefits and costs of alternative debt maturity structures by considering the underinvestment costs of debt, the signaling effects of debt, liquidity risk, asset maturity structure, and tax status.

If there were no adjustment costs and the static trade-off theory is correct, then each firm's observed debt-to-value ratio should be its optimal ratio (Myers, 1984). High adjustment costs could explain the observed wide variation in debt ratios since firms would be forced to depart from their optimal ratios. Debt is a valuable device for signaling by firms. Leverage increases the firm's value because enhancing leverage coincides with the market's realization of value (Ross, 1977). According to Goldstein, Ju, and Leland (2001) and Jun and Jen (2003) show that if firms can increase debt in the future, they will opt for lower leverage initially. Debt may as well reduce the agency cost of management, which brings some discipline to the management. Miller (1977) denoted an equilibrium of aggregate supply and demand for corporate debt, in which personal income taxes paid by the marginal investor in corporate debt only offsets the corporate tax saving.

Higher profitability decreases the expected costs of distress and allows firms to increase their tax benefits by increasing leverage. (Strebulaev 2007). Hovakimian (2001) highlights the importance of past profits in predicting observed debt ratios because firms often make financing and repurchase decisions that offset these earnings-driven changes in their capital. With a periodic adjustment, an increase in profitability lowers leverage by increasing future profitability and its value. Fischer et al. (1989) and Leland (1994)

developed dynamic trade-off models in which firms let their leverage fluctuate over time, reflecting accumulated earnings and losses and not adjusting it toward the target if the adjustment costs exceed the value lost due to suboptimal capital structure.

Nevertheless, firms that follow a dynamic trade-off strategy will choose the amounts of new debt and equity so that the deviation from the target induced by accumulation of earnings and losses is offset and the resulting debt ratio is close to the target (Hovakimian, 2003). If the firm value rises, the debt-to-value ratio falls, and firms ought to issue debt, not equity, to rebalance their capital structures. Hovakimian, in his first study, also refers that the tendency of firms to make financial choices that move them toward target debt ratio appears to be more important when they choose between equity repurchases and debt retirements than when they choose between equity and debt issuances.

Generally, companies with the strategy of having high market-to-book firms have low target debt ratios and, therefore, the probability of these firms to issue equity are higher than to issue debt. These firms may also have good growth opportunities. Guedes and Opler (1996) say that firms with more substantial growth opportunities, as measured by the market-to-book ratio, tend to issue shorter maturity debt. Barclay and Smith (1995) find that firms with more short-term debt also have higher market-to-book ratios. Stohs and Mauer (1996) find that, along with the size and the riskiness of companies, long-term debt is most likely to be used by larger, less risky firms with relatively poor growth opportunities. Hovakimian (2003) introduced profitability and achieved that it does not affect target leverage. Unprofitable firms issue equity to offset the excess leverage due to accumulated losses. As a resume, Stulz (1990) claimed that high-growth (high market-to-book) firms have low target debt ratios, while low-growth firms have high target debt ratios. Myers (1984) reports that people feel

comfortable with the static trade-off story because it sounds plausible and yields an interior optimum debt ratio. It rationalizes "moderate" borrowing.

2.4.1. Importance of Taxes

Modigliani and Miller (1963) changed their approach in this, let us say, "reformulation" of their initial theory. They took taxation under consideration and proposed that the firms should employ as much debt as possible. Companies have an advantage when using debt rather than using internal capital to benefit from debt tax shields. This tax shield allows firms to pay lower taxes than they should when using debt capital instead of using only their capital. They do not distinguish between internal and external financing. All finance needs to be external so firms may maximize their tax shields and, consequently, the firm's total value. They concluded that firms should be 100% debt-financed to exploit the tax advantage fully. However, if there is a debt capacity limit somewhere below 100%, the firm might first completely use it to issue debt. However, if that does not raise enough money, then equity will be used as a last financing resource. A pecking order might quickly emerge in such a model.

Brick and Ravid (1985) show how different time patterns of interest payments affect the combined taxes paid by borrowers and lenders. They argue that borrowers seek to accelerate interest payments to maximize the present value of interest tax shields, while lenders seek to slow down interest payments to minimize the present value of their tax liabilities. The main point here is that a maturity strategy that accelerates interest payments is more costly on a before-tax basis. The reverse, which is a strategy that slows down interest payments, since a premium must be paid to lenders to induce them to accept a larger tax bill. One implication of the Brick and Ravid model is that borrowers prefer long-term debt because the term structure of interests is upward sloping since the present value of tax shields being at the highest level. Long-term debt is attractive

when interest rates are volatile, and the firm expects a stream of taxable earnings. Issuing long-term debt reduces the firm's expected tax liability, increasing the firm's current market value. The firm selects its leverage before the maturity of debt is decided.

Larger firms with more tangible assets are less sensitive to their capital structures because these firms are generally more prepared to face adverse shocks. This means that these firms can probably increase their debt ratios and take advantage of the tax shields without increasing their probability of bankruptcy. Under the Jensen and Meckling (1976) framework, Diamond (1991) argues that, unlike long-term debt, shorter-term debt mitigates these conflicts because it requires frequent renegotiations and banks' monitoring. Stulz (2000) and Rajan & Winton (1995) consider this a powerful tool to monitor managers' minimum shareholder effort. Myers (1977) also suggests that short-term debt mitigates the underinvestment problem because it matures before the growth opportunities are exercised.

Kane et al. (1985) show that optimal debt maturity increases as the tax advantage of debt decrease, as the flotation cost increases, and as the volatility of firm value decreases. Scholes and Wolfson (1992) propose a tax clientele hypothesis to predict the relationship between debt maturity and taxes. They argue that companies will prefer to issue long-term debt obligations rather than a sequence of short-term debt instruments to mitigate the transaction costs. However, not all firms can afford to issue long-term debt and avoid more expensive short-term debt securities. Firms may have higher long-term debt, not only because they have less short-term debt but also because they prefer long-term debt to equity financing of their long-term assets.

Conversely, their maturity structure may be short-term if their preference is more towards equity than debt. If firms are in countries with more favorable dividend tax environments, it is expected that these firms will prefer to use equity

instead of long-term debt to finance themselves. Pour & Lasfer (2013) expect managers to use more long-term debt to maximize firm value and to minimize their investors' after-tax returns when they operate in strong protection countries and the classical tax system.

2.4.2. Bankruptcy Costs

Bankruptcy is merely the transfer of ownership from one security holder to another. A safe assumption is that bondholders are no less rational than stockholders. Any costs associated with the bankruptcy event must be limited to costs associated with an informal reorganization of the capital structure in the capital market before default (Haugen & Senbet, 1988). If this does not happen and bondholders control the firm, the firm is more likely to disappear because customers and suppliers will lose trust in the firm. Following Fama's (1978) findings, the firm will be disciplined by the capital market to maximize the combined values of debt and equity and avoid other agency costs, such as those associated with risk-shifting. Jensen and Meckling (1976) identify such agency costs as bankruptcy costs associated with managerial consumption of perquisites (perks) and costs associated with managerial incentive to undertake suboptimal risky projects which transfer wealth from bondholders to stockholders. Risky firms are the ones that should borrow less. Also, firms that have their assets in place will borrow more than firms that hold intangible assets and valuable growth opportunities. Castanias (1983) finds that firms with high probabilities of bankruptcy employ smaller amounts of debt. He concludes that this is consistent with significant ex-ante costs associated with bankruptcy.

It has been argued that, while there are potential impediments to pure market solutions to bankruptcy problems, these impediments are easily overcome through the inclusion of simple provisions in corporate charters and bond indentures. If capital markets are competitive and well-functioning, these

provisions are nearly costless. (Haugen & Senbet, 1988). A usual method that lenders use to facilitate the monitoring and, most importantly, avoid that borrowers enter solvency is debt covenants, which limit or add possible actions that borrowers may take. Rajan and Winton (1995) advance the argument that covenants and collateral as contractual devices increase a lender's incentive to monitor. Therefore, it is generally expected that lenders extend short-maturity debt when the costs of designing and monitoring debt contracts are prohibitively high. There are at least two arguments regarding a creditor's preference for shorter maturity over covenants (collateral). The first argument is that, in some situations, covenants that try to control the risk-shifting of firms may not be effective. The second argument for a creditor's preference for short maturity leads to higher costs, mainly because contracts need to be designed and adjust several times when contracts need to be renewed. To offset the high cost of monitoring, it should provide better information than what is publicly available. Flannery (1994) argues that creditors likely regard shorter debt maturity as more valuable than covenant protection because short debt maturity allows creditors to incorporate new information about a borrower's riskiness into the contract terms without imposing restrictions the selection of investment projects. Short-term loans give the bank unlimited power to act, but long-term loans with covenants allow the bank to act only if a covenant has been violated. Moreover, covenants contain verifiable information only, but monitoring may reveal unverifiable information and imperfectly correlated with covenant terms; therefore, short debt maturity gives lenders more flexibility in pricing new information.

2.5. Other Theories

Some other models and theories consider the maturity structure of debt and influence firms' capital structures. Some of them are not eligible to be approached in this study, not because they are not crucial to this matter but due to the theories' extension. The timing is a very important theory in what concerns Debt Maturity. Graham and Harvey (2001) evidence that managers' active effort to time the debt market to evaluate the liquidity provision or to try to understand somehow or guess the temporal structure of the interest rates (Berlin, 2006). Another approach is brought by Fan et al. (2012) that explores the volatility of the inflation rate and the uncertainty of the economic cycle, and they conclude that managers opt for short-term debt. Wang et al. (2019) state that companies choose long-term debt if the conjuncture is more favorable because they are more available to finance with longer maturities. The opposite works with short-term debt. Another theory that could take our attention would be related to the financial and legal systems. Demirgüç Kunt-Maksimovic (2004) finds that bank concentration increases financing obstacles, with a more substantial effect for small and medium firms than large firms. Their results also underline the importance of controlling for the economic, institutional, and regulatory environment when assessing the effect of market competitiveness. These are essential theories on what concerns the firm's debt maturity structure, but the approach requires a lot of attention and time to both subjects, which is a limited resource during this thesis. It could be interesting to consider these factors in a comparative work like this.

The literature may help us understand what is coming next. It is important to consider that the size, the assets, the location, the industry, and other specifications of the firms are the most determinant factors for the model used to find differences between Portuguese and Spanish firms. Furthermore, we will try

to find which of the mentioned financing choices is more by a specific type of firm or by the firm's location.

Chapter 3

Data and Methodology

3.1. Data

This study will focus on the Portuguese non-financial firms that compose the PSI-20 index, large unlisted Portuguese firms, large Spanish unlisted companies, and, at last, IBEX 35 non-financial companies. The period for this analysis will be the date interval between 2010 and 2019. The annual data, in euros, was retrieved from the databases DATASTREAM, for the listed firms, and SABI, for the unlisted firms by their book values. The chosen sample differentiates from previous research and may allow us to understand if there are significant differences between listed and non-listed firms within these two countries.

3.2. Variables and Hypothesis

To achieve what may explain this study's key variable, the debt maturity structure of a given firm. The paper will focus on comparing the debt maturity structure between the different sets of companies mentioned above. In the "Methodology" will be explained the approach that enables this comparison. On the rest of this topic, the paper shows the variables that will compose this hypothesis and guide us to an answer to the research question. To develop this hypothesis, we will follow the main findings of theoretical debt maturity models closely. The proxies of the variables will be like the ones used by the prominent

authors of this theory, in particular, Stohs and Mauer (1996), Barclay and Smith (1995), Ozkan (2000), Guedes and Opler (1996), and others.

3.2.1. Dependent Variable

Debt Maturity has seen two main approaches: the long-term debt, debt that matures in more than one year, percentage on the firm's total debt (Barclay and Smith, 1995), and the weighted average debt maturity. It is composed of each type of debt of the firm's balance sheet times the maturity in months (Stohs and Mauer, 1996). This study makes more sense to use the first approach due to the lack of data for the non-listed firms since they do not disclose specific types of debt issued and the respective maturity. The long-term debt considered matures more than three years, as Barclay and Smith considered in their study.

3.2.2. Independent Variables

Growth

As Scherr and Hulburt (2001) did in their study, the proxy of growth will be the past growth sales. The logic of this is that past growth is an indicator of future growth. Many authors use market-to-book as a proxy for growth, but since we analyze non-listed firms, there is no market value for this type of firm. Another interpretation for this proxy is the agency problems of debt. As we have seen in the literature, the implication is that high sales growth is associated with less leverage, less long-term debt, and more short-term debt to finance the current activity.

Size

The firm's size is an essential factor because, usually, the smaller the firm's size, the higher the agency costs when borrowing debt when comparing with larger firms. These firms often look for solutions to reduce agency costs, such as

issuing short-term debt (Barnea et al., 1980). On the other side, larger firms have easier access to the capital markets, as we have seen in the Literature Review. The proxy used is the size of firms measured by the natural logarithm of the firm's sales, as Ozkan (2002) used in his findings. Usually, size has a more negligible or negative relation with short-term debt and a positive long-term debt effect.

Current Asset Maturity

The proxy for asset maturity is measured by the ratio between the sum of the property, plant, and equipment, and tangible assets with the annual depreciation. This measure is used by Ozkan (2000) during his findings of the maturity structure of firms. Previously, Guedes and Opler (1996) considered only the property, plant, and equipment disregarding the calculation's tangible assets. Stohs and Mauer (1996) use the proxy of the current asset maturity that is obtained by the ratio of the current assets to the cost of goods sold. Typically, the bigger the firm's asset maturity, the bigger the debt maturity (positive relation).

Maturity Matching

Maturity matching underlies that each asset should be financed with a financial instrument with almost the same maturity. Firms usually use a combination of short-term and long-term debt. This proxy variable's measurement is the ratio of current to total assets (Hol and Wijst, 2008). For maturity matching, it is expected that the higher the value of the ratio, the higher will be the short-term debt, a positive relation, and the opposite with long-term debt.

Operating Debt

Accordingly, to Scherr and Hulburt (2001) is an essential component of small firms' total debt. Here we will try to understand if it is also important for larger firms. The ratio measures sales to liabilities, both by their book values.

Term Premium

The term premium's proxy is the difference between the month yield of a 10-year government bond and the bond yield of a 6-month government bond. The term premium is an element used in Barclay and Smith (1995); they test whether the yield curve's steepness influences the maturity of new debt issues. It is expected that there is a positive relation between debt maturity and an expected increase in the interest rates if we are in the presence of an upward-sloping term structure of the interest rates.

Impact of Taxes

As we have seen in the Literature Review, the trade-off model consists of a trade-off between the per-period between tax-advantage of debt and bankruptcy and debt issue flotation costs. So, it is essential to include a proxy of the tax rate in our model to achieve their influence on the dynamic of debt maturity. Ozkan (2002) computed in his study the tax effect throughout the ratio of taxes to EBIT. The expected relationship between the taxes and the debt maturity is negative. This means that if debt maturity increases, the taxes paid decrease.

Asset Tangibility

The level of intangibles is captured by the ratio of depreciation to total assets. The asset tangibility is measured by the ratio of fixed assets (property, plant, and equipment) to total assets. It is expected a positive relationship between asset tangibility and debt maturity.

Profitability

Profitability is used to test the pecking order theory (Wald, 1999). Profits are also an essential factor for the firms that want to benefit from tax shields of debt. The profitability is measured by the ratio of EBIT to total assets. EBIT will be used, instead of the Net Income, to avoid small values for the variable. It is also an expected positive relation between profit and debt. The main reason is that debt is often used as a disciplinary instrument at a high free cash flow level (Jensen's, 1986).

Leverage

The leverage is calculated through the ratio of Debt to Equity. This ratio is an essential metric in corporate finance, and it is used to evaluate a company's financial leverage. It allows us to measure the degree to which a company is financing its operations through debt versus funds owned by the firm. Barclay and Smith (1995) find a positive correlation between leverage and debt maturity. Stohs and Mauer (1996) argue an automatic correlation between variables since a high long-term debt inevitably leads to a higher ratio of debt.

3.3. Methodology

As mentioned before, the first set of data was retrieved from DATASTREAM in euros. The same has been done with the data downloaded from the SABI database. The industry classification of the data sets was based on the industries of the PSI-20 firms (excluding the financial firms). The term premium for Portugal and Spain was obtained on the Investing.com website using historical data for the past ten years (2010-2019). Before the construction of the variables, the data had missing values that required some treatment. To do the cleaning of the databases, Excel's VBA coding was the first tool used to obtain a clean sample

of many variables. After the cleaning, the computation of the variables was the next step.

A resume of the computation of the variables will be described in Table 1, based on the proxies mentioned in the previous section:

Variable	Computation
Debt Maturity	Long-term Debt/Total Assets
Growth	Past sales growth
Size	ln(Sales)
Term Premium	Month yield 10-year gov. bond - Month yield 6-month gov. bond
Operating Debt	Sales/Liabilities
Taxes	Taxes/EBIT
Profitability	EBIT/Total Assets
Asset Tangibility	Property, plant and equipment/Total Assets
Maturity Matching	Current Assets/Total Assets
Current Asset Maturity	Current Assets/Cost of Goods Sold
Leverage	Debt/Equity

Table 1. Variables Computation

- Debt Maturity had both items available, long-term debt and total debt/liabilities, to a direct computation, so we just applied the ratio for this proxy and achieved the value for the variables.

- Growth was computed with the past growth sales. Due to the lack of data, the year 2010 is empty for all companies of the sample. For the non-listed firms' samples, values, where the ratio was above 10, were deleted from the data.

- Size is measured by the natural logarithm of sales.

- Current Asset Maturity is computed through the ratio of current assets to the cost of goods sold. Both lines were displayed, so it was not required additional calculations. For non-rated firms from Spain, it was necessary to delete some data. Values between 0 and 40 were deleted from the sample.

- Maturity Matching computation is achieved with the current assets divided by the total assets of a firm.

- Operating Debt, to calculate this variable, the sign needed to be changed from the value presented by the databases. So, the ratio of sales to liabilities has the opposite value. Some values were exaggerated for the purpose of this study. The values above 20 were deleted from the sample.

- Term Premium computation involves monthly data of government bond yield with 6-month and 10-year maturity. The difference between these two yields (10-year – 6-month) makes us achieve the term premium's desired result. Each type of bond's annual yield corresponds to each year's annual average yield was computed for both countries.

- The impact of Taxes is computed by the ratio of the taxes paid by the firms in a year to the EBIT of that year. This variable also presented values that were not adequate for analysis, so this ratio's values were limited to the amounts between -10 and 10.

- Asset Tangibility was computed through the ratio of items Property, plant, and equipment to total assets.

- Profitability is the ratio of EBIT to total assets.

- Leverage is the ratio of Debt to Equity. Debt assumes the value of total liabilities in the balance sheet and not only the firm's debt. The value of Leverage was limited to the interval between -100 and 100.

After the first cleaning of the data, the computations created new missing values and values that were not fit for the analysis, so the missing values were restricted from the sample, and the restrictions mentioned above for each variable were implemented. The models and the cleaning just mentioned were executed using GRETl codes.

Many of the authors in the bibliography used two different types of models. Guedes and Opler (1996), Stohs and Mauer (1996), and Barclay and Smith (1995) used "pooled OLS" models in their research. The last two also did Panel Fixed

Effects to study the Debt Maturity of listed firms. Hol and Wijst (2008) also use the Fixed Effects model to study non-listed firms and Fan et al. (2010) to compare debt maturity choices and capital structures at an international level. Another important factor is that many of these authors use robust standard errors in their analysis. Considering all the references and methods mentioned above, the thesis's analysis will run models using Fixed Effects and OLS, using robust standard errors in both models.

Considering the four sets of data, PSI-20, IBEX 35, non-listed firms for Portugal and Spain, there will be two comparisons: companies from Portugal and another with companies from Spain. This research aims to find if the chosen variables do comply with the literature and with results achieved by the authors mentioned that were mentioned.

However, the main objective is to make conclusions about debt maturity and its determinants by comparing listed and non-listed firms and Portuguese and Spanish firms. In the first place, this will be done for Portugal and Spain separately. Each set of firms has four models, two "Pooled OLS" and two Fixed-Effects. The difference between the two models is the number of variables used in each. The first model contains all the independent variables. The second only contain variables that showed statistical significance in the first two models that contained all the independent variables of the PSI-20 firms. Before discussing the results of the referred models, there will be a comparison between the main statistics of the four sets of data and the correlation between the different variables of the models. The univariate analysis will be performed, with univariate tests and t-tests to evaluate the statistical analysis. The comparison between the listed and unlisted firms began with the OLS regressions and followed by the Fixed Effects, comparing both countries separately, at first, and pointing some comparisons between Portugal and Spain during the analysis.

Chapter 4

Results

4.1. Comparative Statistics

The summary statistics are presented for all variables for the four sets of data, the set of PSI-20, IBEX 35, Portuguese non-listed firms, and Spanish non-listed firms shows information for 16, 28, 71, and 79 companies, respectively. The timeline is between 2010 and 2019, the last ten available years. This information is for both dependent and independent variables. The tables below contain the summary of descriptive statistics:

Portugal

Summary statistics PSI-20 Firms

	N	Mean	Median	Std. Dev.	Perc. 5%	Perc. 95%
Debt Maturity	497	0,206	0,104	0,235	0,003	0,710
Growth	497	0,046	0,031	0,170	-0,145	0,309
Size	497	19,430	19,230	0,931	18,333	21,262
Operating Debt	497	4,074	3,224	3,188	0,488	10,143
Taxes	497	0,210	0,236	0,737	-0,094	0,536
Profitability	497	0,058	0,049	0,081	-0,024	0,205
Asset Tangibility	497	0,200	0,127	0,216	0,001	0,665
Maturity Matching	497	0,636	0,691	0,286	0,117	0,991
Current Asset Maturity	497	1,313	0,353	3,530	0,109	6,105
Debt/Equity	497	5,567	2,296	9,640	0,271	27,307
Term Premium	497	0,036	0,032	0,019	0,011	0,082

The table presents the variables descriptive statistics. "N" represents the number of observations, "Std. Dev." represents the standard deviations, "Perc. 5%" and "Perc. 95%" represent the fifth and ninetieth five percentile, respectively.

Table A.1. Summary Statistics Table PSI-20 firms

Summary statistics for Non-listed Portuguese Firms

	N	Mean	Median	Std. Dev.	Perc. 5%	Perc. 95%
Debt Maturity	497	0,206	0,104	0,235	0,003	0,710
Growth	497	0,046	0,031	0,170	-0,145	0,309
Size	497	19,430	19,230	0,931	18,333	21,262
Operating Debt	497	4,074	3,224	3,188	0,488	10,143
Taxes	497	0,210	0,236	0,737	-0,094	0,536
Profitability	497	0,058	0,049	0,081	-0,024	0,205
Asset Tangibility	497	0,200	0,127	0,216	0,001	0,665
Maturity Matching	497	0,636	0,691	0,286	0,117	0,991
Current Asset Maturity	497	1,313	0,353	3,530	0,109	6,105
Debt/Equity	497	5,567	2,296	9,640	0,271	27,307
Term Premium	497	0,036	0,032	0,019	0,011	0,082

The table presents the variables descriptive statistics. "N" represents the number of observations, "Std. Dev." represents the standard deviations, "Perc. 5%" and "Perc. 95%" represent the fifth and ninetieth five percentile, respectively.

Table A.2. Summary statistics Portuguese Non-listed firms

The number of observations is most significant for the non-listed firms (497 against 138). For the PSI-20 and non-listed firms' statistics, the mean and median are similar in both cases. Debt Maturity values are highest for the listed firms, which means that they present higher values of long-term debt when compared with the non-rated. This also proves what we have seen in the literature. A particular difference is noted in the variable Taxes, where we can see that for the listed firms, the mean is negative and positive for the non-listed. This may be related to the advantages of tax shields. Another important reference goes to the variable Size. As expected, most of the listed firms are greater than the non-listed firms. The difference is not significant because the non-listed firms are the largest non-rated firms from Portugal. Maturity Matching shows that the current assets have a higher presence in non-rated firms. The Profitability is, as expected, better in the PSI-20 firms. Since these are considered the leading Portuguese companies. At last, the most significant difference goes to the Debt-to-Equity ratio. This ratio discloses that non-listed firms have more debt (liabilities) than equity in their balance sheets, which shows us higher values for this ratio.

Spain

Summary statistics IBEX35

	N	Mean	Median	Std. Dev.	Perc. 5%	Perc. 95%
Debt Maturity	194	0,272	0,270	0,141	0,005	0,494
Growth	194	0,048	0,040	0,164	-0,121	0,216
Size	194	22,880	22,750	1,471	20,435	24,909
Operating Debt	194	1,338	0,985	1,080	0,253	4,016
Taxes	194	-0,107	-0,029	1,061	-0,793	0,606
Profitability	194	0,113	0,102	0,078	0,008	0,273
Asset Tangibility	194	0,406	0,458	0,238	0,032	0,782
Maturity Matching	194	0,336	0,310	0,163	0,124	0,674
Current Asset Maturity	194	1,925	0,886	3,290	0,397	9,556
Debt/Equity	194	2,121	1,929	1,377	0,416	5,170
Term Premium	194	0,023	0,019	0,009	0,011	0,037

The table presents the variables descriptive statistics. "N" represents the number of observations, "Std. Dev." represents the standard deviations, "Perc. 5%" and "Perc. 95%" represent the fifth and ninetieth five percentile, respectively.

Table A.3. Summary statistics IBEX-35 firms

Summary statistics for Non-listed Spanish Firms

	N	Mean	Median	Std. Dev.	Perc. 5%	Perc. 95%
Debt Maturity	391	0,152	0,109	0,147	0,003	0,469
Growth	391	0,049	0,015	0,321	-0,236	0,394
Size	391	21,240	21,014	0,917	20,100	23,026
Operating Debt	391	3,134	2,510	2,504	0,451	7,642
Taxes	391	-0,178	-0,041	1,143	-0,971	0,497
Profitability	391	0,061	0,047	0,095	-0,050	0,255
Asset Tangibility	391	0,093	0,033	0,134	0,000	0,422
Maturity Matching	391	0,539	0,517	0,229	0,173	0,949
Current Asset Maturity	391	0,996	0,474	2,104	0,117	3,100
Debt/Equity	391	3,495	1,945	5,415	0,439	10,561
Term Premium	391	0,022	0,019	0,009	0,011	0,037

The table presents the variables descriptive statistics. "N" represents the number of observations, "Std. Dev." represents the standard deviations, "Perc. 5%" and "Perc. 95%" represent the fifth and ninetieth five percentile, respectively.

Table A.4. Summary statistics Spanish Non-listed firms

The comparison for the Spanish firms is like the Portuguese. The number of observations is 194 (listed) against 391 (non-listed). The main differences to the previous comparison are that Taxes have the same sign in both listed and unlisted firms, the Debt-to-Equity ratios have a less significant difference, and the Debt Maturity values. The Size values are closer than the previous also because the non-listed firms presented are also the largest, from Spain. The level of Profitability is higher in the rated firms. The growth is similar in both comparisons. The last note goes for the Current Asset Maturity. In Portugal, this variable shows relative values in both sets of firms, but the value has a significant difference in Spain. It is higher for the rated firms, which means that the current assets are also higher or the cost of goods sold smaller in this type of firm when compared with the unlisted companies.

4.2. Correlations

To analyze the correlation between the variables, the same procedure of descriptive statistics will be used. The correlation matrixes are present in Appendix (B):

Portugal (Appendix B.1. and Appendix B.2.)

Correlations	Debt Maturity	t-stat	p-value	
Growth	-0,051	0,590	55,64%	
Size	0,243	2,915	0,42%	***
Operating Debt	-0,197	2,341	2,07%	**
Taxes	0,295	3,605	0,04%	***
Profitability	0,038	0,439	66,15%	
Asset Tangibility	0,361	4,510	0,00%	***
Maturity Matching	-0,581	8,314	0,00%	***
Current Asset Maturity	0,127	1,490	13,87%	
Debt/Equity	0,129	1,521	13,07%	
Term Premium	-0,013	0,154	87,79%	

The table describes the correlation between the dependent and independent variables. For each coefficient is attributed "****", "***", and "**" if the significance level is under 1%, 5%, and 10%, respectively, with the correspondent p-value.

Table B.1. Correlations Table PSI-20 firms

Correlations	Debt Maturity	t-stat	p-value	
Growth	-0,117	2,614	0,92%	***
Size	0,159	3,583	0,04%	***
Operating Debt	-0,509	13,142	0,00%	***
Taxes	0,021	0,456	64,85%	
Profitability	-0,109	2,435	1,52%	**
Asset Tangibility	0,219	4,996	0,00%	***
Maturity Matching	-0,547	14,541	0,00%	***
Current Asset Maturity	0,262	6,048	0,00%	***
Debt/Equity	0,145	3,249	0,12%	***
Term Premium	0,077	1,712	8,76%	*

The table describes the correlation between the dependent and independent variables. For each coefficient is attributed "****", "***", and "**" if the significance level is under 1%, 5%, and 10%, respectively, with the correspondent p-value.

Table B.2. Correlations Table Portuguese Non-listed firms

The dependent variable has a correlation of at least 0,05 for all the variables, except with Profitability and the Term Premium in the listed firms' case. For the unlisted firms, the exception is the variable Taxes. In both matrixes, the Term Premium is the variable that shows the lowest values of correlation between the remaining variables. The variables Maturity Matching and Current Asset

Maturity for the listed firms present negative signs with most other variables. On the unlisted firms' side, the correlation has fewer negative values for both variables. The variable Taxes shows lower values of correlation for non-rated firms when compared with the results of the PSI-20 firms. In terms of statistical significance for the listed firms, the correlations between Debt Maturity and Growth, Profitability, Current Asset Maturity, Debt-to-Equity, and Term Premium do not present statistical significance. On the unlisted firms' case, only the correlation with Taxes does not present any statistical significance.

To finish this comparison, it is relevant to highlight the results that show a higher correlation level. Beginning with the listed firms, the correlation of the variables Current Asset Maturity and "Debt/Equity" with Operating Debt present a negative correlation of over 50% in both variables, with the result being -0,5808 and -0,5275, respectively. Another negative value of this magnitude is the correlation of Maturity Matching with Asset Tangibility (-0,5576). The variables that have a higher positive correlation with the dependent variable are the Taxes (0,2953) and the Asset Tangibility (0,3607), a negative correlation is the variable Maturity Matching (-,5805). Relatively to the unlisted firms, the higher correlation values are all related to the dependent variable. With positive correlation are Current Asset Maturity (0,2623) and Asset Tangibility (0,2191), with negative correlation are Operating Debt (-0,5086) and Maturity Matching (-0,5471).

Spain (Appendix B.3. and Appendix B.4.)

Correlations	Debt Maturity	t-stat	p-value	
Growth	-0,111	1,549	12%	
Size	0,089	1,234	22%	
Operating Debt	-0,709	13,911	0%	***
Taxes	0,146	2,042	4%	**
Profitability	-0,329	4,821	0%	***
Asset Tangibility	0,167	2,347	2%	**
Maturity Matching	-0,464	7,250	0%	***
Current Asset Maturity	0,420	6,415	0%	***
Debt/Equity	0,358	5,308	0%	***
Term Premium	0,023	0,320	75%	

The table describes the correlation between the dependent and independent variables. For each coefficient is attributed "****", "***", and "**" if the significance level is under 1%, 5%, and 10%, respectively, with the correspondent p-value.

Table B.3. Correlations Table IBEX-35 firms

Correlations	Debt Maturity	t-stat	p-value	
Growth	-0,119	2,368	2%	**
Size	0,156	3,121	0%	***
Operating Debt	-0,422	9,183	0%	***
Taxes	0,059	1,172	24%	
Profitability	-0,189	3,794	0%	***
Asset Tangibility	-0,001	0,022	98%	
Maturity Matching	-0,502	11,457	0%	***
Current Asset Maturity	0,165	3,289	0%	***
Debt/Equity	-0,002	0,045	96%	
Term Premium	-0,031	0,604	55%	

The table describes the correlation between the dependent and independent variables. For each coefficient is attributed "****", "***", and "**" if the significance level is under 1%, 5%, and 10%, respectively, with the correspondent p-value.

Table B.4. Correlations Table Spanish Non-listed firms

The higher positive correlation for the listed companies Current Asset Maturity and the dependent variable (0,4201) and negative correlation is between Operating Debt and the dependent variable (-0,7085) in the rated firms. For the unrated firms, Maturity Matching with the dependent variable presents the most

significant negative correlation value (-0,5023) and Asset Tangibility with Operating Debt (0,2937) the positive. In a more generic and strict comparison with Portugal, Spain does not show the same correlation results for the variable Taxes. The behavior of this variable is much more similar in both listed and unlisted firms. In the case of the Spanish firms, the tendency of Term Premium having the lower correlations maintains. This may be explained by the fact that this variable is calculated with interest rates used with government bonds and not information provided by the firm's financial statements. In terms of statistical significance for the listed firms, the correlation between the dependent variable with Growth, Size, and Term Premium present a p-value above 10%, the same occurs with Taxes, Asset Tangibility, Debt-to-Equity ratio, and Term Premium for the unlisted firms.

4.3. Univariate and T-Tests

4.3.1. Univariate Tests

On the following tables are presented the results for the t-statistics, significance and r-squared for all the variables of the four models.

Portugal

Univariate Tests

Variable	Debt Maturity			
	Coef.	t-stat	p-value	R ²
Growth	1,262	2,378	2,65%	0,061
Size	5,413	12,800	0,00%	0,812
Operating Debt	1,460	17,450	0,00%	0,788
Taxes	1,304	6,405	0,00%	0,520
Profitability	0,655	6,678	0,00%	0,585
Asset Tangibility	0,033	19,990	0,00%	0,918
Maturity Matching	-0,061	-0,541	59,39%	0,006
Current Asset Maturity	0,346	5,864	0,00%	0,533
Debt/Equity	0,398	6,617	0,00%	0,554
Term Premium	14,676	14,880	0,00%	0,706

The table reports the values from univariate OLS Regressions. The data treatment and construction are reported in the Methodology. For each factor is reported the coefficient (Coef), the t-statistics (t-stat), the p-value (sign) and the r-squared (R²).

Table C.1. Univariate Regressions PSI-20 firms

Univariate Tests

Variable	Debt Maturity			
	Coef.	t-stat	p-value	R ²
Growth	0,154	1,636	10,63%	0,008
Size	0,994	4,100	0,01%	0,100
Operating Debt	0,602	6,015	0,00%	0,323
Taxes	0,193	7,323	0,00%	0,186
Profitability	0,012	4,928	0,00%	0,179
Asset Tangibility	0,011	8,948	0,00%	0,439
Maturity Matching	0,079	2,365	2,08%	0,038
Current Asset Maturity	0,017	5,468	0,00%	0,080
Debt/Equity	0,034	5,127	0,00%	0,172
Term Premium	4,621	8,514	0,00%	0,367

The table reports the values from univariate OLS Regressions. The data treatment and construction are reported in the Methodology. For each factor is reported the coefficient (Coef), the t-statistics (t-stat), the p-value (sign) and the r-squared (R²).

Table C.2. Univariate Regressions Portuguese Non-listed firms

In the Portuguese listed companies, the sign of the variables Growth, Operating Debt, Taxes, Maturity Matching, and Term Premium does not meet the expectations from the correlation obtained with Debt Maturity. The variables that do not meet the Portuguese unlisted firms' sign expectations are Growth, Operating Debt, Profitability, and Maturity Matching. The only variables that do not show any statistical significance are Growth, only by a few decimal cases, in the non-rated firms and Taxes in the sample of rated firms. The remaining variables show statistical significance for a level of at least 5%. The explanatory level and the coefficients are higher for the PSI-20 firms when compared with the unlisted firms, except with the variable Taxes where the coefficient is negative for the listed firms and the explanatory power is lower (0.005501 against 0.038071). At last, in the t-stats, the tendency of higher value maintains for the rated firms' side, except in the variables Maturity Matching, Taxes and Operating Debt where the t-stat results are larger for the non-rated firms.

Spain

Univariate Tests

Variable	Debt Maturity			
	Coef.	t-stat	p-value	R ²
Growth	0,364	52,630	1,2%	0,041
Size	1,450	1025,000	0,1%	0,420
Operating Debt	0,524	15,230	4,2%	0,648
Taxes	0,579	4,537	13,8%	0,499
Profitability	0,101	5,574	11,3%	0,697
Asset Tangibility	0,012	20,670	3,1%	0,791
Maturity Matching	-0,007	-0,452	73,0%	0,001
Current Asset Maturity	0,087	12,900	4,9%	0,238
Debt/Equity	0,050	3,405	18,2%	0,379
Term Premium	10,364	96,430	0,7%	0,691

The table reports the values from univariate OLS Regressions. The data treatment and construction are reported in the Methodology. For each factor is reported the coefficient (Coef), the t-statistics (t-stat), the p-value (sign) and the r-squared (R²).

Table C.3.Univariate Regressions IBEX-35 firms

Univariate Tests

Variable	Debt Maturity			
	Coef.	t-stat	p-value	R ²
Growth	0,018	1,317	20,14%	0,001
Size	0,526	3,775	0,10%	0,078
Operating Debt	0,533	4,428	0,02%	0,168
Taxes	0,191	7,222	0,00%	0,279
Profitability	0,013	2,687	1,35%	0,152
Asset Tangibility	0,007	10,750	0,00%	0,526
Maturity Matching	-0,013	-0,952	35,12%	0,005
Current Asset Maturity	0,020	4,660	0,01%	0,145
Debt/Equity	0,037	1,995	5,86%	0,170
Term Premium	5,960	10,750	0,00%	0,441

The table reports the values from univariate OLS Regressions. The data treatment and construction are reported in the Methodology. For each factor is reported the coefficient (Coef), the t-statistics (t-stat), the p-value (sign) and the r-squared (R²).

Table C.4.Univariate Regressions Spanish Non-listed firms

Relatively to the Spanish companies, the signs for the IBEX 35 corporations that do not meet the expectations obtained in the correlations with the dependent variable are Growth, Operating Debt, Taxes, Profitability, and Maturity Matching. The same is observed with the non-rated companies where we can add Asset Tangibility to the list of variables that do not meet the signs expectations. This can be related to the small samples used in this study for both countries. The variables that do not show any statistical significance are Maturity Matching, Taxes and Current Asset Maturity for the IBEX 35 companies, and Growth and Taxes for the unlisted. The remaining variables show a significance level of at least 10%. The coefficients are higher in the set of the listed companies, except with the variable Asset Tangibility. It is also worth mentioning that, in the case of Spain, the variable Taxes do present the same sign on the coefficient, which does not happen in the case of Portugal. The variable Taxes presents a lower explanatory power in the listed firms, which contraries the remaining variables' tendency where the explanatory power is higher in the rated companies. To conclude, the t-stats keep the same behavior registered in Portugal, with the values of the IBEX 35 being larger than the statistics of the unrated firms.

4.3.2. T-Tests

t-tests

Variable	Debt Maturity			
	N	t test	p-value	H0 (p<0,05)
Growth	138	30,149	0,00%	Reject
Size	138	-172,717	0,00%	Reject
Operating Debt	138	-6,614	0,00%	Reject
Taxes	138	11,027	0,00%	Reject
Profitability	138	31,063	0,00%	Reject
Asset Tangibility	138	11,873	0,00%	Reject
Maturity Matching	138	13,679	0,00%	Reject
Current Asset Maturity	138	-4,210	0,00%	Reject
Debt/Equity	138	0,742	22,94%	Accept
Term Premium	138	35,680	0,00%	Reject

The table presents the t-tests between the dependent variable and each independent variable. The table contains "N" as the number of observations, the value of the "t-test", the respective p-value, and the acceptance or rejection of the null hypothesis (H0).

Table D.1. T-tests PSI-20 firms

t-tests

Variable	Debt Maturity			
	N	t test	p-value	H0 (p<0,05)
Growth	497	12,194	0,00%	Reject
Size	497	-446,391	0,00%	Reject
Operating Debt	497	-26,987	0,00%	Reject
Taxes	497	-0,144	44,26%	Accept
Profitability	497	13,184	0,00%	Reject
Asset Tangibility	497	0,347	36,42%	Accept
Maturity Matching	497	-25,963	0,00%	Reject
Current Asset Maturity	497	-6,986	0,00%	Reject
Debt/Equity	497	-12,398	0,00%	Reject
Term Premium	497	15,974	0,00%	Reject

The table presents the t-tests between the dependent variable and each independent variable. The table contains "N" as the number of observations, the value of the "t-test", the respective p-value, and the acceptance or rejection of the null hypothesis (H0).

Table D.2. T-tests Portuguese Non-listed firms

t-tests

Variable	Debt Maturity			
	N	t test	p-value	H0 (p<0,05)
Growth	194	14,455	0,0000%	Reject
Size	194	-213,075	0,0000%	Reject
Operating Debt	194	-13,628	0,0000%	Reject
Taxes	194	4,933	0,0001%	Reject
Profitability	194	13,787	0,0000%	Reject
Asset Tangibility	194	-6,712	0,0000%	Reject
Maturity Matching	194	-4,112	0,0024%	Reject
Current Asset Maturity	194	-6,991	0,0000%	Reject
Debt/Equity	194	-18,606	0,0000%	Reject
Term Premium	194	24,592	0,0000%	Reject

The table presents the t-tests between the dependent variable and each independent variable. The table contains "N" as the number of observations, the value of the "t-test", the respective p-value, and the acceptance or rejection of the null hypothesis (H0).

Table D.3. T-tests IBEX-35 firms

t-tests

Variable	Debt Maturity			
	N	t test	p-value	H0 (p<0,05)
Growth	391	5,781	0,000%	Reject
Size	391	-448,861	0,000%	Reject
Operating Debt	391	-23,505	0,000%	Reject
Taxes	391	5,670	0,000%	Reject
Profitability	391	10,374	0,000%	Reject
Asset Tangibility	391	5,945	0,000%	Reject
Maturity Matching	391	-28,101	0,000%	Reject
Current Asset Maturity	391	-7,913	0,000%	Reject
Debt/Equity	391	-12,202	0,000%	Reject
Term Premium	391	17,563	0,000%	Reject

The table presents the t-tests between the dependent variable and each independent variable. The table contains "N" as the number of observations, the value of the "t-test", the respective p-value, and the acceptance or rejection of the null hypothesis (H0).

Table D.4. T-tests Spanish Non-listed firms

The t-tests to the four data samples show that most of the variables reject the null hypothesis (H0 with a p-value < 0,05). In the Spanish firms' case, all the

variables of the two sets of firms, listed and unlisted, reject the null hypothesis of the averages being equal. Relatively to Portugal, some variables are accepted in this test. The listed firms of PSI-20 show that the null hypothesis should be accepted for the Debt-to-Equity ratio. On the unlisted firms' side, the variables that show that the null hypothesis should be accepted are the Taxes and the Asset Tangibility.

4.4. Debt Maturity Models

The readings made in previous sections will be tested with econometric models, where the checking of these theories will be done. To do this, we will perform four models with two different approaches. Two of these models will be "Pooled OLS" models, with the difference between them being the number of variables used, one with all the variables and another with fewer variables. The other two models with Panel Fixed-Effects have the same strategy. For one of the models, all variables will be used. For the other, only the ones that presented some significance in the models included all the variables (more specifically in the PSI-20 firms' models, to allow more comparisons). The first step will include a detailed analysis for Portugal and Spain, comparing listed firms with non-listed firms, and comparing the main results for Portugal and Spain.

Portugal

Models for PSI-20 Firms

	"Pooled OLS" (1)	"Pooled OLS" (2)	Fixed- Effects (1)	Fixed- Effects (2)
(Constant)	0,586 (0,405)	0,893*** (0,084)	0,924*** (0,295)	0,673*** (0,071)
Growth	-0,261* (0,141)	-0,261** (0,114)	-0,187* (0,105)	-0,178 (0,105)
Profitability	0,464 (0,715)	0,169 (0,665)	1,336** (0,505)	1,086** (0,433)
Asset Tangibility	0,044 (0,046)	0,040 (0,076)	0,351*** (0,096)	0,345*** (0,108)
Maturity Matching	-0,589*** (0,132)	-0,612*** (0,130)	-0,604*** (0,079)	-0,528*** (0,113)
Debt/Equity	-0,057 (0,045)	-0,026 (0,038)	-0,038 (0,024)	-0,075* (0,037)
Size	0,014 (0,018)		-0,015 (0,016)	
Taxes	-0,013 (0,049)		-0,028 (0,020)	
Operating Debt	-0,037 (0,046)		0,039 (0,037)	
Current Asset Maturity	0,001 (0,015)		-0,021 (0,017)	
Term Premium	0,678 (0,792)		0,123 (0,577)	
R ²	0,384	0,366	0,450	0,428
N	138	138	138	138

The table contains the OLS and Fixed Effects Regressions. The table presents the value of the coefficients and the respective standard error, in parenthesis, for each variable. The variables that show "***", or "**", or "*" show statistical significance at the level of 1%, 5%, and 10%, respectively. It is also shown the R² of each model and the number of observations.

Table E.1. Regressions Table

Models for Non-listed Portuguese Firms

	"Pooled OLS" (1)	"Pooled OLS" (2)	Fixed-Effects (1)	Fixed-Effects (2)
(Constant)	0,226 (0,400)	0,609*** (0,089)	0,145 (0,845)	0,582*** (0,127)
Growth	-0,030 (0,039)	-0,055 (0,046)	-0,027 (0,037)	-0,025 (0,053)
Profitability	-0,016 (0,136)	0,024 (0,126)	-0,212 (0,168)	-0,287 (0,225)
Asset Tangibility	-0,244** (0,108)	-0,262** (0,129)	-0,252* (0,148)	-0,262 (0,191533)
Maturity Matching	-0,482*** (0,075)	-0,594*** (0,092)	-0,399*** (0,108)	-0,521*** (0,151)
Debt/Equity	0,003* (0,001)	0,005*** (0,002)	0,003* (0,001)	0,004** (0,002)
Size	0,020 (0,019)		0,022 (0,042)	
Taxes	0,002 (0,008)		0,003 (0,007)	
Operating Debt	-0,026*** (0,006)		-0,023*** (0,008)	
Current Asset Maturity	0,007*** (0,002)		0,009*** (0,003)	
Term Premium	0,539 (0,479)		0,277 (0,396)	
R ²	0,511	0,374	0,434	0,277
N	497	497	497	497

The table contains the OLS and Fixed Effects Regressions. The table presents the value of the coefficients and the respective standard error, in parenthesis, for each variable. The variables that show "****", or "***", or "**" show statistical significance at the level of 1%, 5%, and 10%, respectively. It is also shown the R² of each model and the number of observations.

Table E.2. Regressions Table

The previous tables present the models' results elaborated to the PSI-20 firms and the non-listed Portuguese firms. The OLS models' explanatory power is better on the non-rated firms (51,08%, in the first model, and 37,43%, in the second) compared with the listed firms (38,44%, model 1, and 36,62%, model 2).

The sample size may be an essential factor for this result, but both models are still significant because at least one of the independent variables is statistically significant. It is also relevant to say that the explanatory power (R^2) decreases when the number of variables is reduced, that is, when we compare the first model with the second for each set of firms. Relatively to the Fixed Effects, R^2 , the listed firms now show a higher explanatory power than the unlisted. The quality of the models changes and benefits the rated firms. This indicates that the Fixed Effects model may be adequate when we are analyzing rated firms. The tendency of the R^2 decreasing from the first model to the second is also observed in these models.

Looking into the variables that show statistical significance, it is noted that for the listed companies, Fixed Effects models show more quality than the OLS models, and for the unlisted companies, the opposite. The variables Growth and Maturity Matching show statistical significance in the first and the second models on the OLS models for the listed firms. The second model can also be noted that and as expected for all the other models that see a reduced number of variables, the constant gains statistical significance. Relatively to the unlisted firms, the first model finds statistically significant the variables Asset Tangibility, Maturity Matching, Debt-to-Equity ratio, Current Asset Maturity, and Operating Debt. The same can be verified in the second model for the variables that remain and where the constant with significance can be added. As expected, and noted before, the Fixed Effects models, the difference in the level of significance, are much more notorious on the listed companies relative to the unlisted. In the first model of the unlisted companies, it is possible to observe that the variables that feature significance are the same as the OLS model. Even on the second model, Asset Tangibility loses significance. Nevertheless, on the listed firms' side, the constant, Profitability, Asset Tangibility and Debt to Equity ratio (this variable

only on the second model) gain statistical significance under Fixed Effects (Growth loses significance on the model 2 of Fixed Effects).

To conclude this comparison between the two types of firms on the Portuguese side, the signal will take the attention, first with the OLS models and the Fixed Effects. Starting with the PSI-20 OLS models and with the variables that showed significance. Growth meets the sign expectations, and if the variable increases by one unit, then the Debt Maturity decreases by 0,26 in both OLS models. The opposite happens with the variable Maturity Matching, where the sign expectation does not meet. Suppose Maturity Matching changes by one unit that the dependent variable will decrease by 0,589 in the first model and 0,612 in the second. Within the remaining variables, Profitability, Asset Tangibility, Term Premium, Current Asset Maturity, and Taxes comply with the expected sign in both models. Debt to Equity and Size show a negative and positive relation, respectively, which was not expected by the literature. The OLS models for non-listed companies present different results on the sign, beyond the significance levels that were already discussed. Compared to the listed firms, Debt to Equity, Asset Tangibility, and Taxes show different signs. Debt to Equity now meets the expectations. Asset Tangibility changed to an unexpected sign, and Taxes have now a positive effect on the Debt Maturity, which goes against the expectative. The remaining variables fulfill the expectations, except Size. Profitability is the only variable that changes the sign between the first and the second model. In the first model, the variable respects the expectation. The increase of one unit in Asset Tangibility decreases Debt Maturity by 0,244 in the first model and 0,262 in the second. The increase of one unit in Maturity Matching decreases Debt Maturity by 0,482 in the first model and 0,594 in the second. The increase of one unit in the Debt-to-Equity ratio increases the dependent variable in 0,0027 in the first model and 0,0048 in the second if all the other variables remain equal.

In the Fixed Effects models, there are some divergences between listed and unlisted firms relative to the variables' sign. On the PSI-20 firms, Profitability, Asset Tangibility, Size, and Taxes show the expected sign, but they contrast with the non-rated firms' models. The same occurs when we compare the signs of the Debt-to-Equity ratio and Current Asset Maturity on the unlisted firms' side, where the sign expectations are met, but not on the PSI-20 companies. The remaining variables comply with the signs expected. Within the variables that show significance in the listed companies, the increase of one unit in Growth the dependent variable will decrease in 0,187 *ceteris paribus*, in the first model. The increase of one unit in Profitability increases Debt Maturity by 1,336 in the first model and 1,086 in the second. The increase of one unit in Asset Tangibility increases Debt Maturity by 0,351 in the first model and 0,345 in the second. The increase of one unit in Maturity Matching decreases Debt Maturity by 0,604 in the first model and 0,528 in the second. On the second model, an increase of one unit in the Debt-to-Equity ratio decreases the dependent variable by 0.075 if the rest remains equal. The unlisted companies' analysis is similar but showing the contrary effect with an increase of one unit in the ratio, increasing the dependent variable 0,003 in the first model and 0,004 in the second. The increase of one unit in Maturity Matching decreases Debt Maturity by 0,399 in the first model and 0,521 in the second. At last, Debt Maturity also changes if the Asset Tangibility increases in one unit, which leads to a decrease of 0,252 with all other things remaining equal.

Spain

Models IBEX 35

	"Pooled OLS" (1)	"Pooled OLS" (2)	Fixed- Effects (1)	Fixed- Effects (2)
(Constant)	0,654** (0,042)	0,394 (0,074)	0,635 (0,101)	0,455 (0,093)
Growth	-0,070 (0,075)	-0,053 (0,089)	-0,071 (0,078)	-0,058 (0,094)
Profitability	-0,235 (0,093)	-0,356 (0,086)	-0,231 (0,083)	-0,378 (0,063)
Asset Tangibility	-0,028 (0,100)	-0,006 (0,188)	-0,032 (0,091)	-0,054 (0,172)
Maturity Matching	-0,342 (0,183)	-0,510*** (0,001)	-0,348 (0,202)	-0,604*** (0,008)
Debt/Equity	0,028 (0,019)	0,044* (0,007)	0,028 (0,019)	0,041 (0,009)
Size	-0,012*** (0,0001)		-0,011 (0,003)	
Taxes	0,003 (0,007)		0,003 (0,007)	
Operating Debt	-0,036 (0,034)		-0,037 (0,033)	
Current Asset Maturity	0,009 (0,002)		0,009 (0,003)	
Term Premium	0,829 (0,169)		0,842* (0,116)	
R ²	0,612	0,499	0,612	0,532
N	194	194	194	194

The table contains the OLS and Fixed Effects Regressions. The table presents the value of the coefficients and the respective standard error, in parenthesis, for each variable. The variables that show "****", or "***", or "**" show statistical significance at the level of 1%, 5%, and 10%, respectively. It is also shown the R² of each model and the number of observations.

Table E.3. Regressions Table

Models Non-listed Spanish Firms

	"Pooled OLS" (1)	"Pooled OLS" (2)	Fixed- Effects (1)	Fixed- Effects (2)
(Constant)	0,301 (0,322)	0,399*** (0,039)	0,118 (0,407)	0,445*** (0,028)
Growth	0,019 (0,014)	-0,009 (0,009)	0,005 (0,018)	-0,001 (0,012)
Profitability	-0,266*** (0,093)	-0,300*** (0,089)	-0,294** (0,111)	-0,307*** (0,102)
Asset Tangibility	-0,097 (0,096)	-0,219** (0,089)	-0,352* (0,172)	-0,428*** (0,135)
Maturity Matching	-0,332*** (0,060)	-0,408*** (0,051)	-0,414*** (0,056)	-0,456*** (0,045)
Debt/Equity	0,002 (0,002)	0,003* (0,002)	0,003* (0,002)	0,003* (0,002)
Size	0,005 (0,015)		0,014 (0,018)	
Taxes	0,006 (0,007)		0,002 (0,006)	
Operating Debt	-0,016*** (0,005)		-0,004 (0,006)	
Current Asset Maturity	-0,0003 (0,002)		0,004 (0,002)	
Term Premium	-0,146 (0,799)		0,419 (0,778)	
R ²	0,41	0,359	0,448	0,437
N	391	391	391	391

The table contains the OLS and Fixed Effects Regressions. The table presents the value of the coefficients and the respective standard error, in parenthesis, for each variable. The variables that show "****", or "***", or "**" show statistical significance at the level of 1%, 5%, and 10%, respectively. It is also shown the R² of each model and the number of observations.

Table E.4. Regressions Table

Now the same exercise will be repeated with Spanish companies. Beginning with the R². It is relevant to say that despite the models for IBEX 35 do not show a significant number of variables with statistical significance (a subject that will be approached further ahead), the models present at least one variable with statistical significance. So, the models should not be discarded from the analysis

that will be performed. The OLS models that concern the listed companies show a better explanatory power than the unlisted companies' models. The Debt Maturity explanation achieved by the rated firms is 61% on the first model and 50% on the second. The non-rated firms only achieve an explanation power of 41% on the first model and 36% on the second. Relatively to the Fixed Effects models, the explanation level tends to be less divergent between the first and second models, especially on the unlisted company's side. Listed firms show an explanatory power of 61% and 53% (first and second model, respectively), and the unlisted present a result of 45% and 44%, respectively.

Addressing now the variables that present statistical significance and the R^2 that were evaluated before, the models' quality will be further appreciated. The variables that show significance on the OLS models for the IBEX 35 firms are the constant and Size, on the first model and Maturity Matching and Debt to Equity ratio, on the second. Concerning the Fixed Effects, the only variables that show statistical significance are the Term Premium, on the first model, and Maturity Matching, on the second. Relatively to the unrated firms, the models show better significance levels than the ones that were seen for the IBEX 35 firms. The OLS models present statistical significance on the variables Profitability, Maturity Matching, and Operating Debt within the first model of the non-rated companies. Profitability and Maturity Matching maintain their significance, from the first to the second model, and we can also add the constant, Asset Tangibility, and Debt to Equity ratio. As for the Fixed Effects, the variables that display statistical significance are the same as this second model. The difference between the two models is that the constant has no significance in the first. So, for the first model, Profitability, Asset Tangibility, Maturity Matching, and Debt to Equity have significance at a statistical level. For the second model, we add the constant to this list. Regarding significance level, most of the variables mentioned show a

significance at a level of 1%, with the remaining showing a level of significance of at least 10%.

To conclude the comparative analysis, the exercise of sign expectation will be repeated for the Spanish companies. First with OLS and then Fixed Effects. Beginning with the OLS models and with IBEX 35 firms, the variables that do not comply with the sign expectation are the Profitability, Asset Tangibility, and Maturity Matching that show negative signs, when the expectations were: these would have a positive relation with Debt Maturity. The variable Taxes evidence the contrary. It was expected that the variable would have a negative relation with Debt Maturity, but what can be seen does not meet this result. These results and analysis can be applied for the four models of the IBEX 35 firms since the signs presented are equal for all the variables in all four models. In the first model, if nothing else changes, the expected value of Debt Maturity will be the coefficient of the constant (0,654). Also, if the variable Size increases in one unit, the Debt Maturity is expected to decrease in 0,012 units in the first OLS model. On the second model, if the Maturity Matching increases in one unit, it decreases 0,51 in the dependent variable, with all other things remaining equal. If the Debt-to-Equity ratio increases in one unit, it increases the Debt Maturity by 0,044 units, *ceteris paribus*. Relatively to the unlisted firms OLS models, Profitability, Asset Tangibility, and Maturity Matching keep showing the same behavior as it showed in the listed companies' models, expected positive sign in theory, but a result with negative relation. It is possible to add Current Asset Maturity and Term Premium with a contrary sign towards the expectations to this list. In this set of companies, Taxes also keeps showing a positive effect on Debt Maturity, and in this model, Size demonstrates the same behavior, going against the expectation of having a negative relation with the dependent variable. If these variables, one at a time, increase one unit, Debt Maturity will decrease with Profitability (0,266 and 0,3), Maturity Matching (0,332 and 0,408), Operating Debt

(0,016), and Asset Tangibility (0,219; second model result with statistical significance) and increases with Debt to Equity (0,003, second model result with statistical significance).

As said in the OLS analysis, fixed-effects models have the same sign behavior as the OLS regressions. The difference is at the statistical significance already reported as well. For the listed firms, an increase of one unit in the Term Premium increases the Debt Maturity by 0,842 on the first model. On the second model, the increase of one unit in Maturity Matching leads to a decrease of 0,604 on Debt Maturity. At last, for the unlisted firms, the Fixed Effects model diverges from the expectations. The first model, with the negative sign, once it was expected a positive relation, is Profitability, Asset Tangibility, and Maturity Matching. The opposite is noted with the variables Growth (only on the first model), Size, and Taxes with positive signs instead of negative ones. If the variables Profitability, Asset Tangibility and Maturity Matching increase in one unit, one at a time, the Debt Maturity of the firms will decrease 0,294 and 0,307 (first and second regression); 0,352 and 0,428 (first and second regression); and 0,414 and 0,456 (first and second regression), respectively. Lastly, the increase of one unit in the Debt-to-Equity ratio will increase the dependent variable's value by 0,003 if all other things remain equal.

Essential conclusions that we can observe from the resulting models are the differences on signs and statistical significance between both countries and each type of firms. For the listed firms, Debt-to-Equity and Taxes present a negative impact on PSI-20 firms, contrasting with the positive impact on the IBEX-35 firms Debt Maturity. Asset Tangibility and Profitability show the opposite impact, positive for the Portuguese firms Debt Maturity and negative to the Spanish. Relatively to the unlisted firms, only the effect of Growth on Debt Maturity diverges between Portuguese (positive) and Spanish unlisted firms (negative). In terms of statistical significance, Growth is significant just for the PSI-20 firms and

Size for the IBEX-35. Maturity Matching and Debt-to-Equity show significance on most models. The Portuguese listed firms Fixed Effects model present better results than the Spanish listed firms.

4.5. Comparative Analysis

The purpose of this last topic is to summarize and to make some conclusions about Debt Maturity and its determinants for the set of companies that were used to do this research and between Portuguese and Spanish as a whole.

Debt Maturity

In what concerns the main topic of this research, the debt maturity is higher for the Portuguese PSI-20 firms in an overall comparison. Between non-listed firms the debt maturity, i.e., the set of firms that present a higher amount of long-term debt in their capital structure are the Portuguese non-listed firms.

Size

As it was somehow expected due to the known differences between Portugal and Spain, the Spanish companies present, in general, a bigger size. This can be verified in both listed and unlisted companies of both countries. It is also relevant to say that the differences in size are not very significant as other determinants because all the firms in the analysis are integrated into both countries' biggest firms.

Growth

The firms' growth is the determinant that raises more difficulties to obtain a complete and transparent analysis because it would require a case-by-case analysis that is not attainable due to the load and limitations of the work. The

main reason for this is that, as we have just seen, the firms' size is quite similar along with the four groups of firms. Since all the firms are considered "big size" firms, the differences in growth are generally lower than what would be if the comparison were made with small companies. There are more Portuguese firms showing signs of growth but the Spanish growth level is higher for the firms that grow.

Taxes

To evaluate the effect of the taxes, let us say "perfectly," the analysis required an approach to the theories mentioned already mentioned, but that is not explored in this work (topic 2.5.). The data available for taxes allows us to conclude that the Spanish firms use the tax benefits more efficiently than the Portuguese, but to be sure about this conclusion, it would be necessary to investigate both countries' tax systems. Overlooking into the models we can confirm this scenario because Taxes has positive effect on the Spanish firms Debt Maturity. Rated firms against the non-rated show that the results are similar if we compare both countries separately, with the rated firms using better the positive tax effects.

Profitability

The profitability values are very identical across the samples. The listed firms present slightly higher profitability than the unlisted firms for both Portugal and Spain. The Spanish listed firms show lower profitability than the PSI-20 firms in Portugal. As we have seen in the model's analysis, profitability negatively affects the Debt Maturity of Spanish Firms.

Maturity of the Assets and Matching of Maturities

These two determinants show contrary results. The non-rated firms use more Maturity Matching, and the rated firms present assets with higher maturity. These two factors may explain each other. If we see that the listed firms undertake assets with a longer maturity, the refinancing of these assets will be made with higher maturity. Then there is a tendency for a mismatch of maturities between the assets and the refinancing. The opposite occurs with the unlisted firms that have shorter maturities and tend to be closer with refinancing. Between the listed firms, the IBEX-35 firms show higher maturity of the assets than PSI-20 firms. The fact that the Spanish firms have a slightly higher value of tangible assets may be a reason for these differences. The unlisted firms show identical results for the maturity of assets.

Capital Structure (Debt-to-Equity)

Relatively to the firms' capital structure, the non-rated firms have more debt than equity compared with the rated firms. The IBEX-35 firms present more debt than the PSI-20 firms. Finally, between the non-rated companies, the Spanish firms maintain the tendency from the listed, presenting more debt in their capital structure. Relating this with Debt Maturity and the Maturity of the Assets may be important to take some conclusions. As we have seen, the Portuguese firms, in general, use more long-term debt but the Spanish firms present assets with longer maturity and use more debt, as we just mentioned. This may let us conclude that Spanish firms using more debt to refinance assets with longer maturity, prefer to do it using short-term debt. Portuguese firms seem to choose more long-term debt to refinance their assets and operations.

Chapter 5

Conclusion

The present study's goal was to notice the main differences and analyze the importance of debt maturity between listed and unlisted companies in this regard. The literature review allows us to identify several theories highlighting the importance of debt maturity and the importance of its determinants. According to the literature, factors like size, credit quality, tax shields, growth opportunities, and capital structure contribute to debt maturity variation through different types of firms. The agency and tradeoff theories are the ones that fit better to explain this topic due to the contingencies and benefits that firms face from obtaining external financing. The pecking order theory is also crucial to this study because firms should manage their capital structures until they maximize their value, but information asymmetries as a whole is always a crucial factor to be accounted for.

The variables were constructed following the most important empirical literature, especially Barclay and Smith (1995), Stohs and Mauer (1996), and Fan et al. (2010). Then, we measured and compared the leading statistics and the correlations of the variables that supported their application and their significance to explain our dependent variable. The main empirical conclusions from the models applied are that some signs of the variables do not comply with the theory and that some of the variables explain better the debt maturity and, most importantly, the differences between the two countries and the rated and

non-rated firms. Particularly, it shows that the variables Growth and Profitability tend to reduce Debt Maturity. Size only seems to contribute to the rise of Debt Maturity within the unlisted firms. Unexpectedly, Taxes are a positive determinant for the Spanish firms, and for the Portuguese non-rated firms, the exception is the PSI-20 firms, where Taxes show a negative effect on Debt Maturity. The same results occur with the variables Asset Tangibility and the Debt-to-Equity ratio. Maturity Matching is the variable that better explains the Debt Maturity across the four samples among all the independent variables.

Relating our empirical findings with those from the literature. Some of the signs do not match with the expectations from the bibliography. It is possible to state that for firms that present lower growth options, i.e., firms that usually have a bigger size and, at the same time, are better established in the market in both countries, which can be an excellent signal to credit quality, Debt Maturity rises as Barclay and Smith (1995) concluded. Furthermore, it is possible to observe that most of these companies take tax advantages from debt financing, using the tradeoff theory and collecting it. The Spanish firms take these advantages better than the Portuguese. Unlisted firms use more debt than the listed ones, especially the Spanish firms. The listed firms have easier access to or prefer to use more long-term debt, Portuguese firms use less debt in general. The use of long-term debt by listed and unlisted companies was something that the literature could not explain very well because smaller firms generally have more equity than debt, but in this sample, the smaller firms in terms of size have more debt, despite the differences in size are not that significant. The Portuguese firms use more long-term debt than the Spanish.

There were many limitations during the construction of this thesis. The approach required several adjustments on the methodology, samples, and methods to evaluate this comparison. Empirically, it was not easy to test some of the mentioned determinants during the literature, for example, asymmetric

information. Such as asymmetric information or business risk, variables that were on the plan to be included in the study, but difficulties in getting data to compute those, forced us to take a step back. Furthermore, as we are dealing with unlisted companies, we cannot use the market-to-book ratio, and this is a variable that many of the authors use in the models and make specific comparisons. The absence of items like amortization and depreciation prevented the implementation of new variables. Some could show relevance to the matter, for example, Asset Maturity, the Effect of Taxes, or the Level of Intangibles. An important factor that affects the models' is the small number of observations of the samples. This impacts the results of the models significantly, especially if we compare them with more robust samples for both Portugal and Spain.

The study's main conclusions and findings allowed us to understand some of the differences between the financing decisions and the different types of maturity that firms make to achieve their optimal capital structure. Moreover, confirm if the findings from the literature are observed for these companies. These were never brought into a study of this kind, so we can say that this thesis is a pioneer on what concerns the comparative analysis of Portuguese and Spanish firms' debt maturity. The financing costs were not very explored during the conclusions because there are no significant differences between firms and it would require a more exhaustive research for the costs specifically. The rated firms have access to a greater diversity of financing instruments than the non-rated. The time and tools available did not allow us to make a complete comparison to the subject, so as a suggestion to future research, it would be interesting to compare the same type of companies from the same countries or add others from Europe, for example, but what is important is to add more firms to each sample, i.e., not to limit the listed firms to the firms that belong to a stock index. Add unlisted firms to the samples could improve the results and find even more differences. Another possible suggestion is to compare and analyze across

firm size. An ideal comparison, in our opinion, would include listed firms, big non-listed firms, mid-size firms, and small firms for these two countries. These supplements could improve the research quality and find even more differences in firms' debt maturity across firm size.

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Appendices

Appendix B.1.

Correlation Matrix PSI-20 Firms

	Debt Maturity	Growth	Size	Operating Debt	Taxes	Profitability	Asset Tangibility	Maturity Matching	Current Asset Maturity	Debt/ Equity	Term Premium
Debt Maturity	1,000	-0,051	0,243	-0,197	0,295	0,038	0,361	-0,581	0,127	0,129	-0,013
Growth		1,000	0,069	0,057	0,230	0,223	0,158	-0,166	-0,195	-0,022	0,068
Size			1,000	0,269	0,219	0,081	0,335	-0,320	-0,227	-0,071	-0,024
Operating Debt				1,000	-0,108	0,252	0,058	0,271	-0,581	-0,528	-0,003
Taxes					1,000	0,182	0,532	-0,543	-0,014	0,077	0,062
Profitability						1,000	0,181	-0,067	-0,162	0,095	-0,103
Asset Tangibility							1,000	-0,558	-0,069	-0,065	-0,009
Maturity Matching								1,000	-0,116	-0,314	0,063
Current Asset Maturity									1,000	0,238	0,054
Debt/Equity										1,000	0,093
Term Premium											1,000

Appendix B.2.

Correlation Matrix for Non listed Portuguese Firms

	Current										
	Debt			Operating			Asset	Maturity	Asset	Debt/	Term
	Maturity	Growth	Size	Debt	Taxes	Profitability	Tangibility	Matching	Maturity	Equity	Premium
Debt Maturity	1,000	-0,117	0,159	-0,509	0,021	-0,109	0,219	-0,547	0,262	0,145	0,077
Growth		1,000	-0,052	0,049	0,054	0,129	-0,040	0,124	-0,062	0,010	-0,087
Size			1,000	0,068	0,100	0,040	0,125	-0,176	0,091	0,180	-0,096
Operating Debt				1,000	0,008	0,098	-0,164	0,265	-0,258	-0,158	-0,042
Taxes					1,000	0,053	-0,006	0,004	0,019	0,102	-0,043
Profitability						1,000	-0,135	0,135	0,059	-0,239	-0,022
Asset Tangibility							1,000	-0,661	-0,033	-0,090	0,001
Maturity Matching								1,000	-0,085	0,100	-0,024
Current Asset Maturity									1,000	0,013	0,068
Debt/Equity										1,000	0,024
Term Premium											1,000

Appendix B.3.

Correlation Matrix IBEX 35

	Debt		Operating			Asset		Current		Term	
	Maturity	Growth	Size	Debt	Taxes	Profitability	Tangibility	Maturity Matching	Asset Maturity	Debt/Equity	Premium
Debt Maturity	1,000	-0,111	0,089	-0,709	0,146	-0,329	0,167	-0,464	0,420	0,358	0,023
Growth		1,000	-0,042	0,029	0,058	0,092	-0,172	0,093	-0,025	0,049	0,088
Size			1,000	-0,213	-0,072	-0,210	0,068	-0,170	0,042	0,194	-0,014
Operating Debt				1,000	-0,090	0,510	-0,093	0,477	-0,330	-0,458	-0,024
Taxes					1,000	0,124	0,169	-0,291	0,094	-0,074	0,007
Profitability						1,000	-0,030	-0,078	-0,005	-0,399	-0,024
Asset Tangibility							1,000	-0,522	0,263	-0,342	0,049
Maturity Matching								1,000	-0,222	0,262	0,052
Current Asset Maturity									1,000	0,098	-0,050
Debt/Equity										1,000	0,001
Term Premium											1,000

Appendix B.4.

Correlation Matrix for Non-listed Spanish Firms

	Debt		Operating			Asset		Current		Term	
	Maturity	Growth	Size	Debt	Taxes	Profitability	Tangibility	Maturity Matching	Asset Maturity	Debt/Equity	Premium
Debt Maturity	1,000	-0,119	0,156	-0,422	0,059	-0,189	-0,001	-0,502	0,165	-0,002	-0,031
Growth		1,000	0,028	0,281	-0,003	0,079	-0,020	0,146	-0,083	0,034	-0,016
Size			1,000	0,100	-0,076	0,211	0,086	-0,397	-0,061	-0,106	-0,029
Operating Debt				1,000	-0,016	0,196	0,294	0,183	-0,335	-0,160	-0,007
Taxes					1,000	-0,007	0,028	-0,019	0,056	0,052	0,027
Profitability						1,000	0,215	-0,109	-0,078	-0,165	0,030
Asset Tangibility							1,000	-0,406	-0,201	-0,156	0,012
Maturity Matching								1,000	-0,096	0,292	0,044
Current Asset Maturity									1,000	-0,004	-0,031
Debt/Equity										1,000	0,007
Term Premium											1,000