UNIVERSIDADE CATÓLICA PORTUGUESA

Debt Maturity Structure Determinants for Listed Iberian Firms

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May 2021

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Final work under the Dissertation modality presented to Católica Porto Business School towards obtaining the master's degree in Finance.

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May 2021

Acknowledgment

I would like to acknowledge everyone who played a role in this academic accomplishment as due to the pandemic at hand, the world changed its *modus operandi* a long with all of us.

To my supervisor Luis Pedro Krug Pacheco for the guidance, availability, and the numerous comments and suggestions that guided me throughout this endeavour.

To my family, my friends for their patience and support, and my colleagues who were in the same situation and whose discussions were a plus in this effort.

Sumário Executivo

Este trabalho tem como objetivo examinar as determinantes da estrutura da maturidade da divida de empresas portuguesas e espanholas listadas e a sua evolução temporal no espaço dos últimos 20 anos utilizando uma amostra de 53 empresas com comparação da relevância das teorias literárias entre os períodos de 2000 até 2009 e 2010 até 2019.

Considerando a literatura corrente, este trabalho testa determinantes a nível das empresas (tamanho, peso da divida, taxa de imposto efetiva, correspondência de maturidade, rendibilidade, spread médio da yield, performance anual do preço das ações) e variáveis macroeconómicas (prémio de risco e taxa de inflação).

Os resultados obtidos atrás do modelo de regressão OLS, modelo de efeitos aleatórios e modelo de efeitos fixos mostram que a literatura corrente mantém a sua relevância em ambos os índices ibéricos. Quando analisados os índices individualmente, algumas variáveis não apresentaram os resultados esperados com a sua evolução temporal a demonstrar uma ligeira perda de relevância no PSI20 e no IBEX35 quando comparando os resultados obtidos da análise às décadas individualmente. Estas variáveis anteriormente indicadas incluem o tamanho, a performance anual do preço das ações e a taxa de inflação. Os resultados das restantes variáveis mantem a sua relevância teórica com as relações esperadas a serem mantidas nos períodos observados.

Palavras-chave: Maturidade da Divida, Estrutura de Capital, Dados em Painel, Evolução Temporal.

Abstract

This empirical paper aims to examine the determinants of the corporate debt maturity structure of listed Portuguese and Spanish firms, with an overlook of their timely evolution by comparing a sample of 53 firms from 2000 to 2019 and comparing the relevancy of these determinants during the period of 2000 till 2009 and from 2010 to 2019.

Considering the current literature, this paper tests firm-level (firm size, debt weight, effective tax rate, maturity matching, profitability, average yield spread, 52-week share price performance) and country-level variables (term premium and inflation rate).

The results provided by the OLS Regression Model, Random Effects Model and Fixed Effects Model, show that the current literature still holds mostly true for both Iberian indexes, when looking inside the individual indexes over the entire timespan, some variables do not show the expected results and their time evolution show that some theories are losing momentum on the PSI20 and IBEX35 indexes when comparing the first and second half of the timespan. These include firm size, 52-week share price performance and inflation. The remaining ones resume their theoretical relevance as the expected relation maintains over the course of the entire period.

Keywords: Debt Maturity, Capital Structure, Panel Data, Time Evolution.

Index

Acknowledgment I

Sumário Executivo II

Abstract III

1. Introduction 1

2. Literature Review 4

   2.1. Classical Approach 4

   2.2. Perfect Market Modelling 5

   2.3. Trade-Off Model 6

   2.4. Bankruptcy Costs 8

   2.5. Signalling & Information Asymmetry 9

   2.6. Agency Costs 13

   2.7. Macroeconomic View & Spreads 14

   2.8. Timing & Window of Opportunity Models 16

3. Theoretical Hypothesis: 18

4. Variables 21

   4.1. Dependent Variable: 21

   4.2. Independent Variables: 21

5. Sample 28

6. Descriptive Statistics 29

7. Hypothesis Testing 34

8. Methodology 37

9. Results 39

10. Conclusion: 47

Bibliography 52

Appendixes 56

Appendix A: PSI20 & IBEX35 Descriptive Statistics 56

Appendix B: PSI20 Descriptive Statistics 57

Appendix C: IBEX35 Descriptive Statistics 58

Appendix D: (2000-2009) Descriptive Statistics 59

Appendix E: (2010-2019) Descriptive Statistics 60

Appendix F: Hypothesis test 61

Appendix G: Determinants of Debt Maturity 62

Appendix H: Correlations PSI20 & IBEX35 (2000-2019) 63

Appendix I: Correlations PSI20 - (2000-2019) 64

Appendix J: Correlations IBEX35 - (2000-2019) 65

Appendix K: Correlations PSI20 & IBEX35 (2000-2009) 66

Appendix L: Correlations PSI20 & IBEX35 (2010-2019) 67

Table Index

Table 1: Variables, Proxies and Formulation 25

Table 2 - PSI20 and IBEX35 Descriptive Statistics 29

Table 3 - PSI20 Descriptive Statistics 30

Table 4 - IBEX35 Descriptive Statistics 30

Table 5 - (2000-2009) Descriptive Statistics 31

Table 6 - (2009-2019) Descriptive Statistics 31

Table 7: Heteroskedasticity Tests 37

1. Introduction

The preference between capital sources and structure is a major one as companies need to properly adjust between debt and equity as their performance is dependent on this choice. And as firms finance themselves through debt or equity (either by internal funds or stock), when struck by the first respective option, they need to select its averagely weighted maturity as the inappropriate choice might impact its market value and even endanger its market position.

Debt structure choice theory has evolved from the idea introduced by Modigliani and Miller (1958) that, in a "perfect world" without taxes or transaction costs, capital structure choice is irrelevant. Prior to this, several theories arose concentrated on this choice, expanding into different perspectives and focusing on the costs and benefits of each, as these new perspectives included taxes, bankruptcy costs, market imperfections, agency costs, and several others.

In these concepts that emerged after 1958, a couple of theories stood out on capital structure decisions, namely the Static Trade-off theory and the Pecking Order. The Static Trade-off theory (Myers and Robichek, 1965) defends that there is a trade-off when choosing the debt structure as while the more debt a firm uses the tax benefits increase, but the bankruptcy costs increase as well, and vice-versa, as such, there is an optimal capital ratio that maximizes firm value. The Pecking Order (Myers, 1984), on the other hand, defends that firms refrain from searching for an optimal capital structure when information asymmetry is present, instead they follow a strict order of financing. Starting with internal funds, then debt issuance and convertible bonds, lastly, stock issuance, prompting that more profitable firms use less leverage.

Afterward, the theory regarding agency costs was formalized by Jensen and Meckling (1976) over the costs over conflicts of interest, and Myers (1977) shows how debt structure can mitigate them and the several problems it brings forward, such as underinvestment and asset substitution issues, that can be remediated by lowering the average debt maturity, complemented by the theory of maturity matching, suggested by Hart and Moore (1994), with the focus on matching asset and leverage to prevent agency costs. The theory of signalling also made a debut with Flannery (1986) as it shows that firms use debt maturity to signal the market of their financial health by using short-term debt. Taxes were as well, a big factor of academic research as Brick and Ravid (1985) suggested that long-term debt benefits the companies with their consequential benefits. Rollover risk also plays a big role in these determinants as the theory behind this states that firms with higher yield spreads will refrain from issuing long-term debt (Gopalan et al., 2014). Regarding debt weight, Leland and Toft (1996) showed that as a firm's leverage increases, its maturity tends to accompany in an upward direction.

Much like the previous firm-based determinants, the country-level determinants were put to trial, as macroeconomic variables took the stage alongside the financial and legal system. Inflation was one of these as Wang et al. (2010) suggested that as inflation rates increase, firms will tend to use short-term debt as the benefits are maximized in the shorter term. The term premium theory put by Jun and Jen (2003) suggest that as the yield curve steepens upwards, firms will push towards short-term debt and vice-versa, to prevent higher yields and vice-versa when the term premium shows a lowering tendency.

Even though several theories emerged, and the statistical relevance of further determinants was proven, no unified theory emerged (Terra, 2011), as the empirical results are not consensual, with the expected results not showing such linear tendencies as expected, with most of these theories being tested in the United States of America and few papers focusing on European countries and

even fewer on Asia, Africa or Oceania, with only China appearing more on evaluation grounds for these theories. Furthermore, the time appreciation of these tests is mostly on periods prior to the 2008 financial crisis and does not focus on the changes undertaken by the international landscape (Correia et al., 2014).

This paper explores the determinants of debt maturity structure of the listed Iberian firms, as the indexes in the used sample consist of the PSI20 and the IBEX35 which include 18 firms from PSI20 (Portuguese index) and 35 firms from IBEX35 (Spanish index), with the sample containing observations with the time range beginning in 2000 until 2019, also testing each index individually towards determining the difference of the debt structure determinants for these 2 similar countries and an additional test which divides this time frame from 2000 to 2009 and 2010 to 2019, in order to determine the time evolution of these determinants in two decades.

To test the debt structure determinants, this paper uses OLS linear regression models with panel data, whereas the dependent variable is the debt maturity, in other words, the ratio of debt with a maturity date above or equal to 3 years following Barclay and Smith (1995) and a set of firm-level and country-level explanatory variables, including firm size, debt weight, effective tax rate, maturity matching, profitability, average yield spread, and 52-week share price performance on a firm-level basis and in a country-level basis term premium and inflation rate.

2. Literature Review

"How do firms choose their capital structures?" (Myers, 1984) This question has been the basis of the baffling topic of capital structure, as several scholars attempt to answer which are the firm's determinants concerning the financing decisions. Companies have in their arsenal 3 financing sources, including internal funds, debt, and equity, whereas each one of them has an implied cost attached to them and due management is necessary towards maximizing the value of the firm at hand. As such, several theories arose from this development with the notion of capital structure as the proportion of debt on the company's asset value, with these notions prompting a discussion of behavioural finance versus mathematical models on the weight of the corporate leverage. The theories vary from the maximum handling of interest tax shields versus bankruptcy costs to the order of financing sources by the embedded costs of each one.

Although these theories are, mostly, put to the test on the central European and American markets, this paper will handle an overview on these theories and test the formers on the Portuguese and Spanish indexes over a period of 2 decades, contributing towards a further insight on the Iberian companies inside both indexes.

2.1. Classical Approach

Durand (1952) established the basis for a new approach to valuating cashflows, contrary to the valuation method used before which incorporated the maximization of income, whereas Durand demonstrated the importance of

maximizing wealth instead of income. As such, all capital sources have an implied cost, and the managers should manage these in order to maximize the value of the company. Durand provided the concept of different discount methods on different capital bases, improving the notion of the drawbacks such as opportunity costs in deploying retained earnings towards investment opportunities against delivering dividends to its shareholders. With the additional notion that a firms' cost of capital maintains its level until a point where the amount of debt causes the cost of capital to increase because of the inherent risk.

2.2. Perfect Market Modelling

Modigliani & Miller (1958) developed one of the most important bases of capital structure theory whereas profit maximization loses its priority in investment and financing decisions. Although this criterion still bears its weight on the firms' decisions, the authors expose the major importance of the comparison between the return and the marginal cost of capital on a firms' financial decisions, all with the main objective of maximizing market value, while viewing a "perfect market" (neglecting taxes and transaction costs).

This is proven by the authors in an economy characterized by the fact that all debt commodities are perfect substitutes of each other in a scale factor, in other words, the author assumes that firms are divided by return classes in which firms are organized by their respective returns on their own shares. As such, considering that the market value of a firm is the sum of its value of debt and its equity market value, then "…the market value of any firm is independent of its capital structure…" and if the average cost of capital is the ratio between the expected returns to the market ratio of all its securities, then "... the average cost

of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class" (Modigliani & Miller, 1958). Additionally, comparing firms with and without debt, the expected yield of a stock is equal to the pure equity steam in the respective class plus a risk premium equal to the D/E ratio times the spread between the capitalization rate and the rate of return and the firm will not invest if the rate of return is lower than the capitalization rate independently of the instrument used.

2.3. Trade-Off Model

Modigliani & Miller (1963) proceeded to rectify their previous paper regarding Perfect Market Modelling, with emphasis on the deduction of interest on the computation of corporate income. As such, while the previous work disregarded the level of leverage on the expected return of a firm, the correction is made by an example of how, in the case of two firms with the same risk class, if one firm has the double of the actual return than the other, the distribution of returns after taxes will not be proportional to each other.

The authors corrected their views on the importance of interest tax shields, proving the fact that the higher is the rate of return and degree of leverage, the volatility of after-tax returns is lower. Additionally, the authors display an equilibrium between the unlevered value of a firm and the value of a leveraged firm plus the rate of market capitalization times the permanent level of debt, stating how the value of unleveraged firms cannot exceed the value of the leveraged firm minus the rate of market capitalization times the value of debt, as such, if the equilibrium is broken, the investors would sell their shares of the unleveraged firm and only buy the leveraged firms' stock. With the introduction of the WACC (weighted average cost of capital) as the appropriate cost of capital

for investment decisions, the trade-off model is presented as the equilibrium of the existence of tax shields on debt financing and the financial flexibility of a firms' borrowing power.

Miller (1977) added new insights, as the trade-off model does not only consist of the equilibrium between interest tax-shields advantages and bankruptcy costs disadvantages, with the companies structuring their capital structure in order to achieve the optimal equilibrium and maximization of its value but also the personal taxation factor, as investors with capital gains have to deal with personal taxes and the potential consequences on the trade-off equilibrium, especially if the firms pay the full rate for its entire (or almost entire) gain, therefore, eliminating the relevancy of firms' leverage. DeAngelo-Masulis (1980) continues from "Debt and Taxes" (Miller, 1977) with new insights derived from the original theorem by introducing non-debt tax shields, in other words, realistic tax code modifications, such as accounting depreciation deductions and investment tax credits. As such, the paper concluded that the trade-off model must include these factors in order to permit a more inclusive view on the financing decision.

Myers (1984) introduced the notion of costs of adjustment and lags resulting from current events that affect the equilibrium ratio and the time needed to recalibrate the optimal debt ratio of the specific firm, requesting further development of models as the debt ratios vary widely across similar firms. As such the author advised the need to update the model with the introduction of adjustment costs, especially resulting from agency costs and information asymmetry.

2.4. Bankruptcy Costs

Several literature pieces support the trade-off theory such as Kraus-Lintzenberger (1973) whose deduction proceeded to develop a more interactive model regarding tax shields and insolvency costs with the main conclusions pointing towards an increased level of firms leverage when bankruptcies penalties are relatively lower.

Relatively to the structure of the debt's maturity, several points, such as, firms whose value is derived from large investment opportunities, have more incentives to borrow short-term debt and players with riskier investment opportunities tend to use longer-term debt in order to avoid inefficient liquidation, with firms hedging against liquidity risk by matching the maturity of its debt with the asset's life span, although the usage of short-term debt translates to more uncertainty of interest payments, and when the acquisition of these short term items is possible to sequence, there is a possibility to hedge against net income volatility by using long-term debt (Morris, 1976) and with the interest rates affecting significantly a firms' net income, in periods of economic regressions, firms will tend towards short-term debt and vice-versa, with the addition of the notion of firms with higher leverage levels using long-term debt in order to minimize refinancing issues and liquidity risk (Morris, 1992).

Firms with shorter debt terms tend to have a lower optimal leverage ratio and the tendency of issuing more short-term debt to minimize agency costs even though long-term debt generates higher firm value. As such, "the choice of debt maturity, therefore, represents a trade-off between tax advantages, bankruptcy costs and agency costs" (Leland-Toft, 1996). Guedes-Opler (1996) continued with the claim of riskier firms' tendency to issue more long-term debt to avoid

inefficient liquidation risk and firms with more growth options tending to issue short-term debt.

Datta et all (2005) findings suggest that managers with stock ownership have a clearer incentive to proceed with stakeholders' goals of increased self-monitoring, using more short-term debt rather than using the normal tactic of entrenching in long-term debt, as this last one brings higher agency costs. However, these claims go further as it is noticed that managers with lower stock ownership tend to use more long-term debt even if liquidation risk is low, as longer maturity usage requires less external attention to manage.

2.5. Signalling & Information Asymmetry

According to Myers (1977), firms can use investment opportunities like options as these are dependent of the company of exercising them at the optimal debt ratio point as the benefits that come from these investments are ultimately divided by the shareholders and the debtholders. But as these benefits have a priority towards debtholders over shareholders, the firm's management might reject these as the shareholders might not reap the benefits due to losing priority over them, possibly rejecting positive-NPV projects. With this issue being appropriately entitled the underinvestment problem. Myers also provides several ways of correcting this, such as by shortening the debt maturity to the point of this debt maturing before the investment option is exercised, yet this is not an easy method as the costs of monitoring might increase in the process as these costs are tolerated by the stockholders and they might reject this and obstruct the company from shortening the debt maturity. Another way is to restrict the dividends, but this only creates pressure to invest in something and with an NPV higher than the dividend value itself in order to further maximize

the firm value. But this pressure, might make managers "jump the gun" and invest in negative-NPV projects.

Myers(1984) in "Capital Structure Puzzle", emphasized the cost of external financing, as this cost does not only integrate the normal underwriting and administrative costs, but the information asymmetry might prevent the firm to not issue debt even on a positive NPV opportunity due to the inside information being favourable and the managers preferring cover the investment with internal revenues rather than external financing since the firms' shares are overvalued, in other words, the firm will only issue new shares if the value of the opportunity surpasses or equals the number of shares issued even if the project's NPV is positive and the old shareholders are compensated in the process, as the value of the firm might be reduced. As such, the strategy demonstrated bases itself on issuing equity if the firms' shares are overpriced and issuing debt if the shares are undervalued, but by using it, the market will notice the pattern and only buy equity when the debt channels are completely exhausted. The "Modified pecking order" supported by Myers bases itself on several points. Firms prefer to use retained earnings or debt over equity issues as this might prevent firms from using positive NPV opportunities or issuing stocks at a low rate. Relatively to dividends, there is evidence that firms set target pay-out ratios to not disrupt the equilibrium between rates of equity investment and internal funds. While the pecking order model demonstrates a preference for retained earnings, firms prefer to fund projects with a mix of retained earnings and low-risk debt to maintain some sort of "Reserve borrowing power". Finally, the author points out another point relevant to benchmarking towards debt ratios, as different industries have different asset risk, type, and capital requirements, but long-run industry ratios tend to be meaningless to individual firms as a target.

With regards to debt maturity, Ross (1977) holds the claim that companies signal the market through their financial structure about their good performance

by issuing short-term debt, demonstrating robustness towards new information in the short run. Supported by Flannery (1986) privileging how transaction costs restrict lower performance firms from issuing short-term debt, as this type of debt tends to have higher transaction costs than the longer type, therefore, firms only choose short-term debt if justified towards transaction costs.

Firms' choice of debt maturity is proven to be a demonstration of not only their performance but their strategy, as the maturity is mostly derived from the arrival of cash flows. Diamond (1991) divides the type of short-term borrowers into two types, the firms that have lower credit ratings and have no choice in the matter, and the highly rated firms that use short-term debt as a buffer to be able to refinance at lower rates as new information unfolds, while mid rating borrowers use long-term debt to finance their investment projects. The information effect is very much present in this decision as lower-rated firms choose short-term debt as their liquidity risk is more present than the information effect while the higher-rated firms use this choice not focused on liquidity risk but on the possibility of refinancing at better rates on the short-term.

Stohls & Mauer (1996) examined the debt maturity structure determinants on multiple industrial firms in the United States with the main conclusion pointing towards theories of information asymmetry pursuing Diamond's (1991) theory of high and low credit rating firms' tendency of issuing short-term debt and the intermediate ones issuing long-term debt, emphasizing the relevance of asset maturity and the widely legitimized notion of debt and asset maturity matching, while not proving the due relevance of tax shields on debt choice.

Barclay & Smith's (1995) findings support Myers on the issue of short-term debt on firms with more growth options with the added notion of increased usage of long-term debt on regulated firms as these firms' discretion towards policy is decreased and the underinvestment policy is narrowed. Additionally, greater firms tend to use long-term debt while smaller firms use short-term debt

as their only options of financing is based on bank loans, as this concept is justified by firm's access to capital markets as larger firms have better contact with debt markets while smaller firms have more difficulties in justifying the higher monitorization costs and debt backing imposed in long-term leveraging (Whited, 1992).

Diamond (1991) defies this notion by modelling the existence of long-term debt in small firms when the interest rate term structure increases. Furthermore, Diamond demonstrates how debt maturity varies negatively towards credit rating, as such, firms with better credit ratings tend to use short-term debt to refinance themselves at better rates on information arrival, while firms with lower credit ratings use long-term debt to insure lower debt costs, with the very low credit rating companies using short-term debt to finance themselves as long-term debt isn't viable and therefore, leaves them with no choice at par with Titman (1992) with the claim as firms with low credit ratings that are expecting a rating improvement, prefer to issue short-term debt to potentially refinance at better rates and swap a floating rate to a fixed rate as they might expect some deterioration of their credit in the near future and therefore lock-in their future obligations. Gul and Goodwin (2010) show the relation between short-term maturity debt and credit rating as firms with lower credit ratings tend towards short-term debt, as lower-rated firms have more private leverage and the monitoring costs are higher, as such, weaker control over debt governance show the increased cost on debt.

Asset maturity matching still proves to be a major influence in debt maturity choice as also indicated by Stohs and Mauer (1996) whereas the mismatching of asset and debt maturity reduces risks of profit appropriation by debt issuers and is seen as a moderate tendency on smaller firms. Scherr and Hulburt (2001) findings match Diamond's (1991) theory of firms with lower average debt maturity having a higher default risk and lower credit ratings, with Ozkan (2000)

demonstrating a positive correlation between debt maturity and size of firms and asset maturity while negatively correlated with growth options and tax rate, as such, at par with the current theories, justified by the increased chance of information asymmetry issues in smaller and less regulated firms.

2.6. Agency Costs

The concept of agency costs was initially formalized by Jensen and Meckling (1976), based on the notion of conflicting interests inside an organization, especially between shareholders and managers or between stockholders and creditors, as these befall with the existence of conflicting interests between two parts. This occurrence brings extra costs, such as monitorization and incentive charges towards aligning views and objectives when dealing with agents inside the organization, or when between stockholders and creditors with the usage of contracts protecting each firm's interests of over usage of debt. Myers (1977) contributes towards this notion with firms not investing in positive NPV projects due to these conflicts with creditors as these agents can capture the profits incoming from the projects and block the viability of opportunities and therefore incurring underinvestment issues. Although this conundrum can harm various firms, Myers provides a solution to these by mismatching leverage maturity by issuing shorter-term debt, as this proves to be more present on firms with more investment opportunities. Therefore, this strategy of maturity matching between corporate debt and assets can help mitigate the underinvestment issue as the debt repayment is targeted to be repaid as the asset's value starts to decline. As such, firms with long-term assets will possess long-term debt, and this type of maturity length of assets do not significantly increase the agency costs (Guedes and Opler, 1996).

Smith and Warner (1979) push the notion that major firms are less exposed to these agency costs as the potential conflicts of interest are of lesser extent than smaller firms, as well as Barnea, Haugen and Senbet (1985) arguing these firms can also attend to these issues by lowering their debt maturity and, therefore, prevent conflicts of interest between bondholders and shareholders.

2.7. Macroeconomic View & Spreads

Debt choices vary over time and the macroeconomic landscape is a major factor towards this decision of structure strategy, as such, Wang et al. (2010) demonstrated how the GDP growth rate and micro-tax burden are positively correlated with a firm's debt maturity while the inflation rate and money supply are negatively correlated with a firm's debt maturity. As such, as the GDP growth rate increases, the economic background provides more investment opportunities and as risks decrease with this optimistic outlook, firms tend to issue long-term debt, at par with the micro-tax burden, as the taxes increase, firms' investment choices are limited, with it the choice of debt also tends towards the longer term as the need for shorter-term is diminished with the lesser choice of investment options. Inversely, with inflation rates growing, the notion of the real value of the debt return is blurred and as this risk increases, the usage of short-term debt is used.

Zhang and Sorge's (2010) macroeconomic findings show the existence of a higher ratio of long-term debt in countries with higher GDP growth and lower inflation rates, while Fan et al. (2012) demonstrates the usage of higher leverage levels in countries where the tax gain related to interest tax shields is greater, and the uncertainty of firms regarding the legal environment tend to tilt the decision of debt structure towards the short-term period, with a macroeconomic view

related to the positive relation between inflation levels and debt maturity, whereas the increased volatility of inflation levels tend towards shorter-term debt.

Baker et al. (2003) state that as firms refer to issue debt at the lowest cost possible, firms tend to use long-term debt when predicted bond returnability is relatively low, as this is linked to the inflation, bond returns and spreads, with these variables being negatively correlated to the leverage maturity of firms.

As the focus of public debt floods literature, private debt is also a key driver towards debt maturity structure choices as this type of debt has a very relevant role in leverage choice. Wang et al. (2017), explored how debt maturity affects the cost of bank loans, focusing on rollover risk. Their findings suggest banks charge a higher loan rate for firms with shorter-term debt and long-term debt while intermediate maturity debt has a shorter interest loan rate, with bank spreads being more noticeable in firms with higher dependency on bank financing and on firms with higher growth options and Chen et al. (2020) claiming that firms with shorter-term debt face a higher spread justified by the higher risk of repayment risks although there is increased debt readjustment, added by the notion that highly levered firms occur higher risk and therefore higher credit spreads. Kim et al. (1995) takes on the rollover risk with a model that shows that a long-term debt maturity strategy can maximize tax-timing option value making firms increase their debt maturity as the term structure and interest rate volatility surges, while Stohs and Mauer (1996) find the opposite as firms shorten their debt maturity as the yield curve steepens in the long term and try to avoid term premium in those interest rates.

2.8. Timing & Window of Opportunity Models

Graham-Harvey (2001) throughout an extended survey describing the current practices of corporate finance and usage of the previously described models on capital structure, it was understood that firms try to time several factors that influence their corporate structure and their choices of funding projects and other investments. There was evidence of firms timing interest rates in order to issue debt when felt that the rates were low, additionally, there is more likeliness to borrow short-term debt when the short-time rates are relatively lower compared with longer rates or when it is expected to longer rates to decline. Baker-Wurgler (2002) further analysed this aspect of timing, pointing towards the evidence of how firms tend to prefer issue equity when the market value is relatively high and then repurchase it when the market value is low, especially during the brief period of over-enthusiasm of investors prior to earnings forecast. Just as firms issue equity when the cost is low and then repurchase it when the cost bounces back. The results demonstrated how leverage is negatively related to market valuations, as such, low leveraged firms tended to raise funds when the market valuation was high, such as, but not restricted to, high market-to-book ratios, and vice-versa.

Several works demonstrated the existence of "windows of opportunity" for equity issuance, whereas these so called "windows" are periods where information costs are low for all firms. The announcement effect developed by Myers-Majluf (1984) based on how firms only issue equity when debt financing is not an option and the market value of the stock is too high, but as the investor knows this rationale, the market value will decrease. Hansen (1986) demonstrated the advantage of issuing equity in periods of increased market volume versus times of low market volume. Bayless-Chaplinsky (1996) added by proving the existence of these periods based on the favourable prices for firms'

equity issuing with the realization that the market volume is not the main causing factor of this variation leading to the periods of opportunity, but time trend and with an added insight on the future perspective of managers of making market timing a more integral part of this decision.

3. Theoretical Hypothesis:

Using the existing relevant literature as a starting base, the expected positive or negative relations are firstly investigated using the hypothesis testing. The debt structure determinants put to the test are as follows:

H1: Debt maturity directly varies with a firm's size.

Titman and Wessels (1988) claim that firms with a relatively higher dimension, the access to long-term debt markets is positively correlated such as smaller firms only have access to short-term debt markets as long-term debt markets usually have an above-average cost for that firm segment.

H2: Debt maturity is positively correlated with the debt weight.

Leland and Toft (1996) show that as firms increase their leverage, the usual choice of debt maturity is relatively higher than firms with low levels of leverage that tend to have a somewhat lower debt maturity structure.

H3: Debt maturity is negatively correlated with effective tax rates.

Stohs and Mauer's (1996) results show, although modest, support for the inverse correlation between the effective tax rate endorsed by the tested firms and their debt structure as a firm's debt maturity structure increases, so do the tax shield advantages.

H4: Debt maturity is positively correlated with its asset's maturity.

Myers (1977) demonstrates the maturity matching principle whereas the matching of asset's maturity with its respective debt maturity, controls agency costs between its stakeholders, as the repayment of its leverage is in sync with the asset's cashflows.

H5: Debt maturity is negatively correlated with its profitability.

At par with Myers and Majluf (1984), the pecking order states that firms use a particular order to fund their projects, firstly using their internal funds (as it is their cheapest source of financing as the information asymmetry is at its lowest value), the next source is debt financing and, in the end, equity funding (where the information asymmetries are of the most concern and, as such, the costliest). Hence, profitable firms will tend to use less long-term debt.

H6: Debt maturity is negatively correlated with the average yield spread of bonds recently issued.

To evaluate the effects of the rollover risk of enterprises, Gopalan et al. (2014) test the theory that as firms struggle to refinance their debt, the ability to repay their dues in the future is increasingly diminished, as such, firms face an increased long-term debt cost. Therefore, as the yield spread increases, firms will stay away from increased maturity in their leverage.

H7: Debt maturity is positively correlated with past share price performance.

Lucas and McDonald's (1990) model show that firms will usually wait for positive news (new information that translates into positive stock price variations) to issue new debt, while not letting bad news arrive before issuing as well. As such, it expected a rise in equity prices before issuing a long-term debt instrument. Therefore, past equity price performances will be positively correlated with the firm's debt maturity.

H8: Debt maturity is negatively correlated with the term premium.

Jun and Jen (2003) indicate that firms with relatively healthy books will take advantage of short-term rates as the yield curve shows a tendency to increase in the long term. As such, firms will use more long-term debt if the term premium is lower and vice-versa, concluding the negative correlation.

H9: Debt maturity is negatively correlated with the country's inflation rate.

Wang et al. (2010) show that as the agents believe that short-term inflation can be predicted while long-term inflation cannot, the notion that the participants will focus more on short-term debt contracts. As such, the inflation rate is negatively related to the debt structure.

4. Variables

4.1. Dependent Variable:

i. Debt Maturity (DM)

The notion of long-term debt is still a debatable point between scholars, such as Scherr and Hulburt (2001) whose measurement of long-term debt is a maturity of one year to Schiantrelli and Sembenelli (1997) and Ozkan (2002) whose extent reach five years. As such the chosen degree of long-term debt maturity is posed to reach 3 years mimicking the choice of Barclay and Smith (1995), with the DM variable as the ratio between the total long-term debt lasting longer than three years until payment and the value of each firm's overall debt value.

4.2. Independent Variables:

i. Firm Size (FS)

Whited (1992) brought the notion of how larger firms tend to use long-term debt while smaller firms use short-term debt as monitorization costs and leverage backing brings higher costs to the table rending this option unserviceable towards an organization's strategy of leverage. This is justified by the information asymmetry and the barriers in accessing long-term debt markets.

Therefore, in order to measure the firm's overall size in the chosen sample, the method used resembles Antoniou et al. (2006) and Fan et al. (2012) whose measuring is based on the natural logarithm of the total asset value of each

organization. With an expected positive relation between FS and the DM variable.

i. Debt Weight (DW)

Morris (1992) and Stohs and Mauer (1996) clear the fact that organizations tend to use more long-term debt as the debt ratio of each firm rises in order to hedge against and even delay exposure to credit risk.

The measurement of debt ratio will impersonate the method used by Scherr and Hulburt (2001), Antoniou et al (2006), and Stephan et al. (2011) based on the ratio between the total value of liabilities and the total value of assets. The model predicts a positive correlation between the DR and DM variables.

ii. Effective Tax Rate (Efftx)

As Modigliani and Miller (1963) initially proposed, firms may benefit from interest tax shields as the companies further increase their leveraged positions and their debt maturity rises further, with Stohls and Mauer (1985) also demonstrating a negative relation between debt maturity and the effective tax rate. Therefore, in order to fool proof this idea, the method used will be based on Ozkan (2002) and Antoniou et al. (2006) with a ratio of tax paid to taxable income.

iii. Maturity matching (MM)

As stated by Morris (1976) and Myers (1977), the strategy of asset maturity matching with liabilities can be effective towards mitigating risks regarding the firm's liquidity, while Stohs and Mauer (1996) supported the notion that the mismatching can better protect against profit appropriation.

As such, the way to approach this will consist of using the overall ratio between the firms' current assets and their total assets.

iv. Profitability (Prof)

Myers and Majluf (1984) demonstrated how companies tend to follow a pecking order, whereas they prioritize the usage of internal funds, which is considered by the authors as the cheapest form of financing due to the low amount of asymmetry in information, followed by a firm's debt then, in last place, equity. As such, it is implied that firms with better profitability will use less leverage.

This will be measured by Alcock et al. (2012) by using the ratio between the EBITDA of each subject and its total book asset value.

v. Average Yield Spread (AvrgYldSprd)

In order to show firm's exposure to rollover risk, Gopalan et al. (2014) examined the relationship between this risk and the cost of long-term debt as bondholders demand a premium from the rollover risk, in other words, the risk associated with the bond refinancing must be compensated as the maturity of the debt structure increases, therefore firms with a higher yield spread will refrain from long-term borrowing.

Gopalan et al. (2014) used the variation of yield spreads between December of the current sampled year minus the yield spread of the year former to the previous one also in December. This paper will perform a similar method in order to check the theory previously described, by using the average yield spread of the corporate bonds issued in the 5 years prior to 2019, using as the benchmark

the comparable Deutsche Bunds available, otherwise performing the Bootstrapping method when directly comparable Bunds are not available.

vi. Share price performance (SPP)

The signalling hypothesis initially stated by Myers (1984) about how firms use short-term debt to signal their financial well-being and undervaluation and Flannery's (1986) theory of firms with better financial prospects using short-term debt to better position themselves when new information arrives while firms with less financial health base themselves more on locking in their leverage by using long-term debt.

As such, this hypothesis will be tested by mimicking Antoniou et al. (2006) and Guedes and Opler (1996) via the yearly 52-week share price performance of each firm.

vii. Term Premium (TP)

The choice of debt maturity is backed by several theories, from agency costs to signalling theories. But one key aspect is interest saving, as firms can profit from higher savings with short-term debt, as firms with this type of debt maturity can benefit from the flexibility towards debt refinancing as the interest due is only paid on the capital needed instead over a major amount. And as short-term debt interest is usually lower than long-term nominal rates, firms can benefit more from it than over long-term debt (Jun and Jen, 2003), in other words, as the yield curve is steeper, firms benefit plus from short-term rates rather than long-term ones.

The method used by Jun and Jen (2003) was based on the difference between the month-end yield on ten-year government bonds and three-month

government treasury bills, then in order to mimic this, the method will consist of the difference between Portuguese and Spanish ten-year bond yields and three-month treasury bills.

viii. Inflation (Inf)

Zhang and Sorge (2010) demonstrate how the inflation rate influence the choice of debt structure, with countries with lower inflation rates showing a tendency towards choosing long-term debt and Fan et al. (2012) claiming the positive relationship between inflation rates and long-term debt and as more uncertainty shifts strategies towards shorter-term debt.

The method used will therefore assume Zhang and Sorge's (2010) paper by using the annual indices of consumer price inflation as a proxy towards this goal. Therefore, to better visualize the variables and their correspondent computation, a resumé of these will be described in Table 1:

Table 1: Variables, Proxies and Formulation

Variable	Formula
Debt Maturity DM	Long-term Debt / Total Debt
Firm Size FS	Log(Total Assets)
Debt Weight DW	Total Debt / Total Debt
Effective Tax Rate Efftx	Total Tax / EBIT
Maturity Matching MM	Current Assets / Total Assets
Profitability Prof	EBITDA / Total Assets
Av. Yield Spread AvrgYldSprd	Firm Bond Month Yield - Deutsche Bund Govr. Yield
Share Price Perf. Yearspp	[Year Share Price (t) - Year Share Price (t-1)] / Year Share Price (t)
Term Premium TP	Month Yield 10-year Govr. Bond - Month Yield 6-month Govr. Bond
Inflation Rate Inflt	Yearly National Consumer Price Index

The table describes each variable used on the model estimation, their proxies, and/or their respective formulation.

When observing these variables and their formulation, several points stand out. Firstly, the Debt Maturity variable was computed using Barclay and Smith's (1995) method as the long-term debt is the total leverage maturing in 3 or plus years, with some observations being omitted due to this ratio being beyond 100%. The Debt Weight variable also endured several excluded observations as the formula delivered several observations with a debt weight above 100%, therefore these observations were promptly excluded.

The Firm Size variable was performed using the method used by Antoniou et al. (2006), although the alternative method used by Ozkan (2002) which consisted of using the natural logarithm of sales was also a clear possibility. The Effective Tax Rate variable provided with several observations with an effective rate of above 100% and below 0%, as such, these values were excluded to enable a more accurate model.

The maturity matching variable also provided several variables with a value above 200 years, as this value shows the average years of maturity left on each firm's assets. Even though there are numerous assets with maturity above 100 years, the observations with assets above 200 years were barred. The profitability was computed using the ratio consisting of the EBITDA divided by its total assets as used by Alcock et al. (2012).

The Average Yield Spread shows a similar method used by Gopalan et al. (2014), but due to limitations on the information available, the method used was based on the average yield spread of bonds issued by these listed firms on both indexes in the past 6 years. The spread was calculated using the benchmark bonds available, with the bonds used being the Deutsche Bunds. When no directly comparable bond was available, the method of bootstrapping was utilized to provide more faithful results.

The Term Premium for each firm was calculated using the sovereign bonds of their respective countries, with the yield of each surveyed bond using as a benchmark for their spread the Deutsche Bunds.

The Share Price Performance consisted of the variation of each listed firm's share price yearly variation and the Inflation Rate, also known as the Consumer Price Index, was targeted towards each firm depending on their listed index, as such, the PSI20 model only used the Portuguese inflation rate, while the IBEX35 listed firms only used their respective inflation rate as well.

5. Sample

In order to achieve the objective of testing the formerly indicated independent variables towards demonstrating their impact on the structure of maturity of debt, the sample consists of the firms included in PSI20 and IBEX35 indexes, in other words, the determinants of the debt maturity structure are tested in 53 companies based in Portugal (18 firms) and Spain (35 firms) in the timeline between the year 2000 and 2019. This sample was chosen to provide a better overlook of the Iberian companies inside both indexes and provide a measure of comparison between both countries and both decades inside the time spectrum.

The data compiled in this sample was provided by Refinitiv, in December 2020. From the entirety of the data pool collected, several observations were excluded in order to provide a clear and unbiased look at the statistically relevant variables on the models at hand. These exclusions comprise the missing variables in each firm and year, the Debt Maturity and Debt Weight below or equal to 100%, the Effective Tax Rate between 0% and 100%, and finally, the Maturity Matching demonstrating an average maturity of assets above 200 years were equally excluded.

6. Descriptive Statistics

In order to provide an improved and comparable investigation between the two Iberian countries between the timeline of 20 years, the following analysis consists of a comparative examination between the aforementioned countries altogether, the two apart and the difference in total between the first and second decade of the sample.

Table 2 - PSI20 and IBEX35 Descriptive Statistics

PSI20 & IBEX35 - Descriptive Summary						
	Average	Median	Minimum	Maximum	Std. Deviation	N
Debt Maturity DM	0,76288	0,81334	0,01326	1	0,18141	331
Firm Size FS	23,199	23,089	17,774	25,88	1,4248	331
Debt Weight DW	0,3804	0,39608	0,01807	0,65527	0,13122	331
Effective Tax Rate Efftx	0,24677	0,25004	0,0048414	0,6126	0,098927	331
Maturity Matching MM	21,217	19,975	0,0053256	117,92	14,493	331
Profitability Prof	0,10796	0,10252	0,0050189	0,23548	0,045647	331
Av. Yield Spread AvrgYldSprd	0,019169	0,016875	0,0078734	0,052402	0,011387	331
52w Share Price Perf. Yearspp	0,1042	0,093937	-0,9145	1,9022	0,31871	331
Term Premium TP	0,034058	0,036075	0,007032	0,083778	0,01471	331
Inflation Rate Inflt	0,019466	0,02375	-0,00825	0,04375	0,014607	331

The table presents the descriptive statistics of the PSI20 and IBEX35 index from 2000 to 2019. "N" indicates the number of observations, "Std. Deviation" represents the standard deviation.

Table 3 - PSI20 Descriptive Statistics

PSI20 - Descriptive Summary						
	Average	Median	Minimum	Maximum	Std. Deviation	N
Debt Maturity DM	0,73804	0,78924	0,01326	0,98585	0,16984	113
Firm Size FS	22,505	22,29	20,61	24,781	1,044	113
Debt Weight DW	0,40631	0,39622	0,14803	0,65527	0,1013	113
Effective Tax Rate Efftx	0,25455	0,25644	0,0067746	0,6126	0,11638	113
Maturity Matching MM	20,496	21,108	0,0053256	64,83	12,621	113
Profitability Prof	0,11566	0,10266	0,044127	0,23548	0,041724	113
Av. Yield Spread AvrgYldSprd	0,019754	0,009961	0,0078734	0,052402	0,016664	113
52w Share Price Perf. Yearspp	0,11642	0,083807	-0,59322	1,9022	0,39635	113
Term Premium TP	0,040659	0,041	0,010395	0,083778	0,015421	113
Inflation Rate Inflt	0,017761	0,02275	-0,00825	0,04375	0,013988	113

The table presents the descriptive statistics of the PSI20 index. "N" indicates the number of observations, "Std. Deviation" represents the standard deviation.

Table 4 - IBEX35 Descriptive Statistics

IBEX35 - Descriptive Summary						
	Average	Median	Minimum	Maximum	Std. Deviation	N
Debt Maturity DM	0,77576	0,82962	0,15809	1	0,1862	218
Firm Size FS	23,559	23,637	17,774	25,88	1,4642	218
Debt Weight DW	0,36698	0,39186	0,01807	0,64876	0,14268	218
Effective Tax Rate Efftx	0,24274	0,24884	0,0048414	0,48433	0,08857	218
Maturity Matching MM	21,591	19,712	0,53333	117,92	15,389	218
Profitability Prof	0,10397	0,10212	0,0050189	0,22663	0,047151	218
Av. Yield Spread AvrgYldSprd	0,018866	0,017438	0,0096625	0,036972	0,0073203	218
52w Share Price Perf. Yearspp	0,097873	0,094867	-0,9145	0,80504	0,27069	218
Term Premium TP	0,030637	0,0332	0,007032	0,0532	0,01311	218
Inflation Rate Inflt	0,02035	0,0245	-0,005	0,04092	0,014872	218

The table presents the descriptive statistics of the IBEX35 index. "N" indicates the number of observations, "Std. Deviation" represents the standard deviation.

Table 5 - (2000-2009) Descriptive Statistics

(2000-2009) - Descriptive Summary						
	Average	Median	Minimum	Maximum	Std. Deviation	N
Debt Maturity DM	0,74744	0,79328	0,01326	0,99998	0,20161	163
Firm Size FS	22,896	22,673	17,774	25,765	1,5162	163
Debt Weight DW	0,35869	0,38915	0,01807	0,65527	0,14449	163
Effective Tax Rate Efftx	0,26412	0,26222	0,026692	0,59856	0,084578	163
Maturity Matching MM	22,806	20,506	0,024126	110,24	14,608	163
Profitability Prof	0,11693	0,11019	0,013696	0,23548	0,049508	163
Av. Yield Spread AvrgYldSprd	0,019535	0,017395	0,0078734	0,052402	0,011431	163
52w Share Price Perf. Yearspp	0,1206	0,13223	-0,9145	1,7707	0,33466	163
Term Premium TP	0,038254	0,040061	0,007032	0,053308	0,01215	163
Inflation Rate Inflt	0,027622	0,03067	-0,00825	0,04375	0,012808	163

The table presents the descriptive statistics of the PSI20 and IBEX35 index during the period of 2000 to 2009. "N" indicates the number of observations, "Std. Deviation" represents the standard deviation.

Table 6 - (2009-2019) Descriptive Statistics

(2010-2019) - Descriptive Summary						
	Average	Median	Minimum	Maximum	Std. Deviation	N
Debt Maturity DM	0,77787	0,82261	0,20716	1	0,15856	168
Firm Size FS	23,493	23,296	21,122	25,88	1,2667	168
Debt Weight DW	0,40147	0,41091	0,11254	0,64964	0,11343	168
Effective Tax Rate Efftx	0,22994	0,23071	0,0048414	0,6126	0,10872	168
Maturity Matching MM	19,676	18,481	0,0053256	117,92	14,255	168
Profitability Prof	0,099258	0,096698	0,0050189	0,19707	0,039811	168
Av. Yield Spread AvrgYldSprd	0,018813	0,016875	0,0078734	0,052402	0,011367	168
52w Share Price Perf. Yearspp	0,088297	0,065884	-0,58364	1,9022	0,30259	168
Term Premium TP	0,029988	0,025266	0,0099721	0,083778	0,015828	168
Inflation Rate Inflt	0,011553	0,01375	-0,005	0,0365	0,0116	168

The table presents the descriptive statistics of the PSI20 and IBEX35 index from 2000 to 2009. "N" indicates the number of observations, "Std. Deviation" represents the standard deviation.

Overlooking both countries during the entirety of the sample timeline, the Iberian firms resort to more long-term debt (debt with a maturity equal or superior to 3 years) in their debt structure (0.76288) than short-term debt, although ES firms (0.77576) resort to more to long-term debt than PT firms (0.73804), with a tendency of increased usage of LTD shown by the data of the 2nd decade (0.77787) relatively to the 1st decade (0.74744). Regarding firm size (FS), IBEX35 listed firms (23.559) demonstrate a larger amount of assets comparatively with PSI20 listed companies (22,505) with a visible tendency of growth in the overall Iberian index listed firms.

The Debt Weight (DW) of the PT firms (0.40631) is relatively higher than ES firms (0.36698) with an overall decreasing ratio of debt usage over the two decades. Spanish firms (0.24274) also benefit from lower effective tax rates (Efftx) versus Portuguese that suffer from higher effective tax rates (0.25455) with an overall decrease tendency towards the entirety of Iberian firms in the timespan collected. Interestingly, the Maturity Matching (MM) variable shows how the PT firms (20,496) tend to possess assets with reduced maturities comparatively with their counterpart firms (21,591) with a common tendency of reducing their average maturity.

Profitability (Prof) also proves to be a valuable variable demonstrating the higher profitability index of PT firms (0.11566) versus the ES firms (0.10397) with a global leaning towards the Iberian firms declining the ratio value throughout the span. The Average Yield Spread of the listed firms with issued bonds, using Deutsche Bunds as the benchmark, shows the lower average spread in Spanish firms (0,018866) and an average higher spread in Portuguese firms (0,019754) in the latest issuances. The 52-week Share Price Performance (Yearspp) in Portuguese firms (0,11642) slightly higher than Spanish firms (0,097873) with a positive evolution of average index performance throughout the period.

When overlooking the macroeconomic factors, we see that Portugal's term premium between 10-year and 3-month bond yields (0.040659) proves to be higher than Spain's TP (0.030637), showing an average positive yield curve throughout both index's government bonds with a tendency towards a less steep curve in the 2nd decade. The inflation rate between both countries also shows a diminished average evolution with Spain's inflation rate average evolution being more pronounced than Portugal's.

These tables can also be visualized using Appendix A through E in the Appendixes section further down the dissertation document.

7. Hypothesis Testing

Firstly, we must conduct a descriptive analysis, using a hypothesis test to test the significance of the independent variables on the dependent variable, which in this case, translates into the debt maturity of the sample firms.

This initial significance test (the t-test) will permit us to understand if the formerly indicated variables have any type of weight on the debt maturity structure by testing if the beta coefficient is statistically different from zero as it is used to determine if there is a relevant difference between the means of 2 samples. Two steps must be taken, the first step consists of analysing each independent variable to see if they are statistically significant by comparing the t-value with the critical value of each level of significance at hand. The second step bases itself on comparing the p-value with the level of significance to understand if the null hypothesis (which determines if each beta can be zero) can be rejected.

In order to perform the hypothesis test of the chosen variables, in other words, the t-test, which tests if there is a significant difference between two data sets, whereas the hypothesis tested rests on the null hypothesis where the difference equals to zero. If the case of the null hypothesis confirms to be zero, there is not any statistical relevance between both averages, in the case, this does not add up to zero, we consider that the null hypothesis is rejected, signifying there is indeed statistical significance in the model at hand. Analytically, this test is performed by comparing the t-ratio value with the critical value of the chosen significance level, whereas if the absolute value of the t-ratio is higher than the critical value, then the model or constant is statistically significant, with the next step resting on the comparison between the absolute value of the p-value against the level of

significance, with the case of the p-value being lower than the percentage of the tail, than we can reject the null hypothesis.

The Firm Size (FS) variable, when tested, shows a t-ratio inside the statistical insignificance (0.3344) span and a p-value higher than the required alpha, proving unable to reject the null hypothesis. The Debt Weight, on the other hand, shows it is statistically significant (4.404) and the null hypothesis is rejected (1.45e-05) at a 1% significance level. The Effective Tax Rate (Efftx) also proves itself relevant (-1.885) but with the null hypothesis being rejected at a 10% significance level, with the Maturity Matching (MM) variable showing relevance (3.037) and the null hypothesis being rejected at a 1% significance level. The Profitability (Prof) also proves to be relevant (-2.462) and the null hypothesis was rejected (0.0143) at a 5% significance level.

The variables ranging from the 52-week Share Price Performance (Yearspp), Term Premium (TP), and Inflation Rate (Inflt), much like the Firm Size, are not statistically relevant and the null hypothesis for each variable proving to be impossible to reject with a p-value on the three cases being higher than the 10% level of significance. And finally, the Average Yield Spread (AvrgYldSprd) of the most recent bonds issued by the listed firms, show statistical relevancy (-2.269) and with the null hypothesis being rejected (0.0239) at a 5% level.

When performing the t-test in each index, most of Portugal's variables do not have statistical significance, except the Maturity Matching (MM) variable with a t-ratio (3.218) above the required level and a p-value (0.0017) inside the parameters needed to reject the null hypothesis, and the Average Yield Spread (AvrgYldSprd) variable also proving to be relevant (-3.039) and the null hypothesis being excluded (0.003), with both null hypotheses being rejected at a 1% level of significance. Spain's variables, however, demonstrate a higher level of relevancy, with the Debt Weight (DW) rejecting the null hypothesis (3.10e-09) at a 1% level, the Effective Tax Rate (Efftx) also rejecting the null hypothesis

(0.0987) at a 10% level, the Prof and AvrgYldSprd variables also reject at a 10% level. The remaining variables do not pass the requirements towards statistical relevancy.

Regarding the comparison of the two decades and its evolution inside the time span, while the range from the year 2000-2009, three variables can prove its statistical relevancy, with them being the Firm Size (FS), Debt Weight (DW), and Maturity Matching (MM), with both the FS (0.0219) and DW (0.0307) rejecting the null hypothesis at a 5% level of significance and the MM variable (0.0029) rejecting at a 1% level. In the 2nd range, more variables gain relevancy and reject the null hypothesis with the inclusion of the FS (0.0256), DW (0.0004), and MM (0.0372) variable much like the former range, even though the FS and MM variables reject the null hypothesis at a 5% level and DW at a 1% level. The Prof (0.0033) and AvrgYldSprd (7.10e-05) variables both reject the null hypothesis at a 1% level.

The previously mentioned t-tests are on display in Appendix F available in the appendixes section.

8. Methodology

In order to test using panel data, with a timeline between 2000 and 2019 and with the several variables in 58 firms, Hsiao (2007) showed that by testing using panel data, the probability of heterogeneity issues occurring is further faded and enables to pinpoint the effects of specific actions and policies. As such, the method of testing the chosen independent variables towards the dependent variable DM (Debt Maturity), will consist of a panel analysis throughout a time span of 19 years with the usage of the statistical software Gretl to provide the OLS pooled model at par with Antoniou et al. (2006).

After carrying out the model, the White Test is performed to see if the model is inaccurate by heteroskedasticity, in other words, if the values of the independent variables are not constant towards the predicted standard deviations of the dependent variable. Afterwards, the models undertake the F-Statistic test to see if the Pooled OLS or the Fixed Effects Model (FEM) and the Breusch-Pagan test if the most suited test is the Pooled OLS or the Random Effects Model (REM). In case of a tie between FEM and REM, the Hausman test is performed to see which of the REM or FEM is the most consistent and accurate.

Table 7: Heteroskedasticity Tests

	PSI20 & IBEX35	PSI20	IBEX35	(2000-2009)	(2010-2019)
White Test P-value	0,006495	0,118556	0,00386	0,025019	0,000084
F-Statistic Test P-value	2,05E-20	0,0210197	6,34E-15	2,50E-06	1,83E-24
Breusch-Pagan Test P-value	2,15E-13	-	0,000111463	0,000932678	2,33E-19
Hausman Test P-value	0,0545402	-	0,0123384	0,00164829	0,495745

This table shows the results of the p-value of the White Test, the F-Statistic Test, the Breusch-Pagan Test, and the Hausman Test conducted on the entirety of the estimated models.

After performing the F-Statistic test, the White Test, the Breusch Pagan test and the Hausman test, it is realized that when overlooking the entire timespan and the two Iberian indexes, the OLS model does not suffer from heteroskedasticity and the most efficient model to use is the Random Effects Model. The R^2, whose purpose is to measure the variation of the dependent variable (DM) towards the independent variables, is 17,75%, meaning that this model explains only a relatively small percentage of the variation of DM while the remaining is explained by other variables not included in the model at hand.

Regarding each index, after evaluating both indexes, it is observed that both models do not suffer from heteroskedasticity and the advised model to pursue the Fixed Effects Model in the PSI20 and the Random Effects Model in the IBEX35 index. Concerning both decades, neither timelines show the same issue tested with the White Test, while the most accurate model falls into Fixed Effects Model when overviewing the first part of the timeline (2000-2009) and the Random Effects Model when testing the remaining of the timeline (2010-2019). The Pooled OLS and the Random Effects Model were concluded with the entire portfolio of variables, whereas the Fixed Effects Model was composed without the Average Yield Spread due to collinearity. Altogether, the models whose variables explain the variance at its highest are the models aimed at the individual indexes and the 2nd half of the timeline on the available data.

9. Results

When comparing the r-squared between the OLS models and the Fixed or Random Effects Models conducted for each sample, we can observe that while the Fixed Effects Models, by themselves, explains more of the DM variation on the PSI20 and the 2000-2009 sample than the OLS models. These results can be seen in Appendix G alongside with the Correlation tables in appendixes H through L in the Appendixes section.

Firm Size (FS): As put by Whited (1992), the correlation between company size and debt maturity is a positive one, as larger enterprises have access to long-term debt markets. This positive relation is also explained by Smith and Warner's (1979) argument that as smaller firms suffer from higher agency costs, the need for short-term debt is higher in order to resolve these conflicts, as higher debt can create incentive problems to stakeholders and shareholders and if the debt of the firm is considered risky, then it might pass on positive NPV opportunities (with this issue being labelled as underinvestment issues), as such, short-term debt is more present on relatively smaller firms to clear the way and when these opportunities arise, the probability of this underinvestment problem arise is lower (Myers, 1977). When overlooking both indexes, the expected correlation is validated in the Iberian throughout the entire timeline as to when diving in each index, we see the same positive correlation, with a positive marginal result in Spanish firms consistent with Whited (1992) as larger firms have more access to long-term debt markets, opposed to smaller firms and their constraints entering the same market much like the Portuguese firms as the PSI20 index that demonstrate a negative marginal value with Portuguese firms tending to be

smaller than Spanish firms, but when overlooking the Fixed Effects Model, the expected positive relation appears. When overviewing the two decades, it is seen a positive relation with the OLS model in the first half, but the Fixed Effects Model shows a negative correlation mush like the negative correlation in the second half (2010-2019), even though the Iberian showing a general increase of the size of their assets. Therefore, this notion seems to be losing its strength throughout the years with these time-sensitive results showing a 5% level of confidence.

When comparing with the existing literature, the positive relation is shown by the OLS model on both indexes, the IBEX35 alone and the first half, is at par with Barclay and Smith (1995), as the notion of bigger and international firms possess less long-term debt to protect against foreign exchange rates, especially when its leverage is a foreign currency. Stohs and Mauer (1996), Ozkan (2000), and Fan et al. (2012) also show a similar stance with this relation. Yet, the PSI20 results and the second half show the opposite relation, at par with Guedes and Opler (1996) and Scherr and Hulburt (2001) that show a negative relation with larger firms pursuing more short-term debt to provide refinancing options in the short term with the additional idea that larger firms show this negative relation as smaller firms have a higher default risk and, therefore, will only aim towards long-term debt.

Debt Weight: Titman and Wessels (1988) at par with Morris (1992) and Stohs and Mauer (1996) argue that firms with a larger debt weight on their books tend to ramp up the length of the overall maturity to hedge against default risk, with this argument being supported by the higher costs included in short-term debt contraction aggravated by the already relatively higher default risk in more leveraged firms. Scherr and Hulburt (2001) also support this relation as, independently of the size of firms, the results show the higher usage of long-term

debt on firms with a higher leverage presence on their balance sheet. Across the board, it is seen that the expected positive relation is confirming in the overall view of both indexes combined at a 1% level of significance, while the individually tested indexes' results, showing that the PSI 20 cannot be explained at that value whatsoever, only the IBEX35 maintains that 1% level. Concerning the time evolution, it is observed that this notion tends to gain more momentum as it becomes more relevant in the 2nd decade, with the first-time segment results being explained at a 5% level of confidence and the rest at a 1% significance level, demonstrating an increased notion of the debt weight influencing leverage maturity choice. As such, these results are at par with Stohs and Mauer (1996), Antoniou et al. (2006), with this relation being justified by the idea that highly leveraged firms use more long-term debt as a hedge against default risk.

Effective Tax Rate: As the trade-off model bases itself on interest tax shields, the doctrine dictates that firms sell long-term debt as opposed to short-term debt to maximize the tax benefits, as such, when a firm has a lower effective tax rate, the tax benefits are lower, and to maximize them, they increase their debt maturity. As such, the expected value of the Debt Maturity is inversely correlated with the Effective Tax Rate, showing the same results as Ozkan (2000), Antoniou et al. (2006), and Cai et al. (2008). Generally, the expected value of correlation between the Debt Maturity and Effective Tax Rate is seen all together in the models aimed at the Iberian companies, and in the IBEX35, with both showing a 10% level of significance. Yet it appears that the PSI20 does not comply with this idea as the expected relation does not check the result of the model, showing a positive effect. But even though this notion is not seen in the Portuguese index, it is understood that its time evolution of the relationship is positive, but when using the Fixed Effects Model, the expected relation emerges, so when comparing

the OLS models and the Fixed Effects Model, the notion tends to keep fading against the multiple other variables in the model at hand.

The relation demonstrated on all the OLS models, except the PSI20 index alone when using the OLS model, go hand at hand with the results from Stohs and Mauer (1996) and Cai et al. (2008) as the main concept of the "trade-off" theory that firms will try to balance interest tax advantages and bankruptcy costs alongside with debt issue flotation costs. As the firms' debt maturity increases, so do the flotation costs, yet the tax advantages decrease, and the volatility of firm value goes down as well. Therefore, the companies increase debt maturity as flotation costs increase to dilute refinancing costs over a longer period. So, if the tax advantages decrease then the firm uses more short-term debt to maximize the tax shield's value over the flotation costs (Wiggins, 1990). However, the PSI20 showing a positive relation, goes towards the results of Antoniou et al. (2006) that firms with a higher tax rate are better suited to issue long-term debt.

Maturity Matching: Myers (1977) claims that if the maturity of a company's assets matches with its debt, the agency costs are related to conflicts between bondholders and stakeholders when claiming the cashflows. Stohs and Mauer (1996) also press the matching of the maturity of a firm's assets, with the notion that if the debt maturity exceeds the asset maturity, the asset's cashflows are diminished, inversely, if the asset's maturity exceeds the debt maturity, then the risk of defaulting on the principal payment may be higher. As such, the results are at par with the theory defended by these authors. With the complete overlook and the PSI20 showing a positive relation explained at a 1% level and the IBEX35 index showing the expected correlation without a relevant level of confidence. In our time lapse, regarding both indexes, it is observed that this matching principle is slowly fading, with the first half explaining this strategy at a 1% confidence level and the second half at a 5% level. The OLS model results are at par with

Antoniou et al. (2006), Cai et al. (2008), and Fan et al. (2012) as the direct relation shows that the concept of enterprises matching the maturity of their assets and debt to hedge against defaulting on their obligations as, otherwise, if the asset maturity is higher than their debt obligations, it might not generate sufficient cash flows to pay the debt, just like if the debt has a higher maturity, then the debt has to be repaid even after the assets are no longer profitable. As such, this concept is still very much present in the Iberian firms.

Profitability: As Modigliani and Miller (1963) stated that firms prefer debt issuance over equity issuance as interest payments are tax-deductible, then firms with higher profitability ratios would try to benefit as much as possible from this advantage. Flannery (1986) also demonstrates that firms with the objective of signalling to the market their financial well-being, issuing shorter-term debt to achieve this, while worst-performing firms sell long-term debt. As such, it was expected a negative correlation between DM and Profitability, and both indexes combined show it, with the combination of both indexes and the IBEX35 alone explaining the value at a 5% level. Much like the previous results, the time development unambiguously showing a step towards this notion as the first decade complied with the expected relation and the second decade showing the expected results with a 1% significance level, as such, this notion seems to have a growing tendency in the Iberian indexes. The results shown across the board go at par with Alcock et al. (2012), using Myers and Majluf's (1984) concept of the pecking order as firms will tend to prioritize internal fund usage, then debt, then equity issuance as the cost increases over the options respectively, due to information asymmetry.

Average Yield Spread: Merton (1974) and Campbell and Taksler (2003) show that as the rollover risk of a firm increases, the risk of default in the long-term increases. As such, bondholders require a higher risk premium on longer maturity bonds, increasing the cost of issuing long-term debt. Therefore, as long-term debt cost increases and the yield spread rises, the firms' debt structure tends to decrease (Gopalan et al., 2014), additionally, if firms possess a higher rollover risk, the pressure of selling their assets is highly increased if any losses occur as these firms will have a harder time to fulfil their obligations. The tested models show that on the entire spectrum of indexes, the expected tendency holds with both indexes at a 5% level and the PSI20 index explaining the debt maturity variation with a 1% level of significance, while in the Spanish index this does not hold, as there is a straight relation at a 5% level just like in the first half of the timeline tested, although the tendency shows that the firms altogether are getting more aware of this expanding cost on their leverage.

Share Price Performance: Signalling plays a big part in this result, as corporations signal their financial security and stock undervaluation by issuing short-term debt over long-term debt, with Lucas and McDonald's (1990) verdicts suggesting that, due to information asymmetry, overvalued firms would be more likely to issue long-term debt as it is more difficult to estimate the cost of debt and the firm would take advantage of this mispricing and under-valued firms would do the opposite. As such, it is predicted that the two variables would have a positive correlation. With this happening across the board, only the time evolution of this notion proves to be at odds in the second decade, where the relation is negative when average stock price performance is higher than the previous decade, as such, demonstrating that firms attend to the signalling hypothesis in the first half, while in the second half, the tendency towards this notion seems to decrease slightly.

Term Premium: Brick and Ravid (1985) state that as firms observe an upwards yield curve, the tendency is to issue long-term debt to maximize the advantage of the present value of interest tax shields in the long term while resolving several agency costs issues. However, Guedes and Opler's (1996) findings show an inverse relationship between the term premium and debt maturity structure, alleging there was no previously intended strategy. As such, it was expected a positive correlation between the debt maturity variable and the term premium. When examining the results, it is seen that in the overall indexes, the argument that no such strategy, gains drive as the relations are mostly negative, with exception of IBEX35 firms. Now, if the Spanish firms have this strategy in mind or this is just a random fluke, with the data at hand, it is very hard to decipher, but in the time spectrum, the evolution of the results show that this notion is becoming more of a reality, but the statistical weight is not relevant.

Inflation Rate: When overlooking the macroeconomic side of the equation, the notion of when the inflation rate is positive and prices keep rising and money value depreciates, it is believed that as this rate is expected to increase, the future value of the investments in the debt market is depreciated on a more pressing level than in the short-term. As such, as inflation rates increase, the tendency towards short-term debt obligations simultaneously increase, therefore, there is a negative correlation between the inflation rate and debt maturity (Wang et al., 2010). This matter appears to be monotone in the entirety of the findings, with the results showing a negative correlation between the Debt Maturity and Inflation Rates, as such, it is relatively fair to assume this notion is correct to the Iberian firms, even though the second half of the timeline shows a positive correlation. The results shown on the PSI20 and IBEX35 indexes combined and alone, alongside with the first half of the timespan, go at hand with Wang et al.

(2010) and Sorge and Zhang (2010), but the time evolution show a positive relation after 2010, beginning to edge closer to the results of Fan et al. (2012).

10. Conclusion:

Contrary to most of the present literature regarding debt structure determinants, this paper focused on expanding the existing literature by testing several determinants of debt maturity structure on the Iberian listed firms, which includes the PSI20 and the IBEX35 indexes. To test this, the method used based itself on panel data collected on the 2 indexes that form the Iberian overview (PSI20 and IBEX35) on a range of 19 years (2000-2019), with the panel data providing a more realistic model, justified by the greater number of observations and estimators.

To perform this endeavour, following the current literature relevant to the subject at hand, several determinants were chosen and tested in order to provide a clear view of the 2 indexes and their evolution over the 2 decades. With the inclusion of firm size, debt weight, effective tax rate, maturity matching, profitability, average yield spread, share price performance, term premium, and inflation rate.

The results show us that the Iberian indexes mostly comply with the current theories of signalling, bankruptcy costs, information asymmetry, maturity matching, taxes, rollover risk, and the macroeconomic theories. The results show that the agency costs theory continues to be, mostly, at par with the current literature, with the results showing the expected correlation when overlooking both indexes and the IBEX35 alone, while the PSI20 does not show this and the time test also showing a departure of this theory though the second part of the time segment examined. With the average size of Portuguese firms being smaller than the Spanish listed firms, the notion of larger firms using more long-term debt is supported by this model much like the notion of Whited (1992) and

Barclay and Smith (1995). Yet the average time evolution shows an average increase in firm's size overall, but the results show that the notion is not supported in the second half of the time segment, much like the results of Guedes and Opler (1996).

Additionally, the notion of only medium-sized firms using long-term debt while smaller and larger firms using short-term debt is not observed as the correlation between size and debt maturity shows a mostly direct correlation instead of an inversed U-shaped relation where only the medium-sized firms would use long-term debt (Diamond, 1991).

The bankruptcy costs model proves to be relevant in the IBEX35 and PSI20 indexes altogether and individually as the results are consistent with Stohs & Mauer (1996) and Scherr & Hurburt (2001) as firms with a higher debt ratio push towards long-term debt over short-term leverage to hedge against default risk and the higher costs, as this is also seen with the negative correlation between average yield spreads and the amount of debt over 3 years. When viewing the time evolution, this notion appears to continue to thrive as the positive marginal effect keeps rising over the time span. The fiscal effect also proves to be of complete relevance on the test results, except the PSI20 findings as the expected correlation is the contrary of the Portuguese index's results. As lower effective tax rates reduce the tax benefits, the companies are expected to issue long-term debt over short-term debt as these shorter-term options bring forward higher transaction costs, therefore the relation between the debt maturity of the firms and the effective tax rate was expected to be negative. As the overall board shows this notion being a reality, the PSI20 index does not align with the theoretical notion pushed by Kane et al. (1985).

The maturity matching principle of aligning the maturity of assets and liabilities has also proven to be present in the Iberian indexes as the results show this positive relationship in the tested observations with a fair level of

significance ranging from 1% to 5%, with the exception if the IBEX35 whose statistical value does not uphold to the other model's level, showing the positive effect on debt maturity choices of the listed firms. These results are at par with Myers (1977) and Stohs and Mauer (1996) as firms push to raise their debt maturity at an approximate pace of their asset maturity.

The signalling theory still proves to be relevant in these indexes as the test resorting to the Profitability variable is compliant with the theories at hand including Myers and Majluf's (1984) Pecking Order, as firms with higher levels of profitability use more short-term debt to signal to the market their good financial health and firms with more internal capital will follow the aforementioned order choosing more short-term debt opposed to long-term debt, with the results showing arithmetical significance when observing both indexes combined, the Spanish index and the time evolution shows the increased relevancy of this as the statistical significance increases in the second half. The rollover risk theory, which states that as the refinancing risk increases, the bond's yield spread increases over time making the long-term debt choice more costly, also proves to be a reality towards both indexes as a whole and individually as the results show the expected relation, much like the results of Gopalan et al. (2014), with considerable levels of significance within a range of 1% and 5% with attention to the time evolution as the relevancy of the notion is higher in the second half of the timeline in comparison with the first half, as a higher yield spread forces firms to tread carefully on longer-term bonds.

The information asymmetry theory was also put to the test via the Share Price Performance as firms considered overpriced on the equity market will take the opportunity to partake in issuing more long-term debt as the valuation of the debt is more difficult to pinpoint. The results showing the expected relation as per Lucas and McDonald's (1990) results, with low arithmetical relevancy and

the time evolution showing a step backward as the expected positive relation fades.

Finally, the macroeconomic theories tested with the use of the term premium and inflation rate variables as the first bases itself on the notion that firms observe the predisposition of the yield curve on a short-term basis with the case of an upwards tendency making firms issue more long-term debt to maximize tax shield advantages and minimize agency costs in the process, with the results showing the expected relation regarding the literature at hand in the overall test of both indexes and the PSI20 at par with the results from Stohs and Mauer (1996), but when observing the Spanish index, this doesn't comply with the theories derived from the used papers as the relation is opposite, much like Kim et al. (1995). Equally, the first half of the time segment is also a positive one, yet the second half starts to comply with the literature even though its statistical significance is relatively minimal. Much like the inflation rate, the notion that firms, when challenged with rising inflation rates, tend to use short-term debt to better position themselves for overall rising costs. With the results showing this tendency of choice in both indexes combined and individually much like Wang et al. (2010), but when overlooking the time evolution of these tendencies, it seems that this notion is losing power as the expected negative relation turns positive on the second half., pushing more towards the notion of Fan et al. (2012).

This dissertation was able to re-access the debt structure determinants with a special focus on the direct cost of the Iberian listed firm's leverage and the timely evolution over a period of 2 decades. The results previously discussed show that the debt structure determinants' theories are not only differently characterized over two similar countries, but also demonstrate different pressures on debt choice over time, with some variables weighing more over a decade and in the next period showing a very different weight including even losing some traction. These diversions ranged from maintaining the same

expected positive or negative relationship with the Debt Maturity dependent variable much like the literature stated but with different values attached, while other variables changed the entire predicted mathematical signs pushing towards the opposite signs as the literature predicted in a matter of years.

However, in this dissertation, there was a failed attempt to also provide this model with an impact analysis of Rating and Equity Risk Premium on the Debt Maturity Structure of the chosen indexes due to limitations on the information available. After concluding this dissertation, it is observed that the literature regarding the testing of debt structure determinants in Portugal and Spain is relatively poor when compared with Central & Nordic Europe and North America. As such, there is a vacuum of information in the Iberian Peninsula and therefore, more determinant testing is needed to determine the evolution of such in this specific geographical area of Europe, with the supplement of several variables present in the current literature, with ties to several theories extending from information asymmetry, agency costs and much more unlisted here.

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Appendixes

Appendix A: PSI20 & IBEX35 Descriptive Statistics

The table presents the descriptive statistics of the dependent variable and independent variables on the PSI20 and IBEX35 firms. DM is the ratio of total debt with a maturity date above 3 years to total debt value. FS is the natural logarithm of total assets. DW is the ratio between total book value of debt and total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

PSI20 & IBEX35 - Descriptive Summary								
	Average	Median	Minimum	Maximum	Perc. 5%	Perc. 95%	Std. Deviation	N
Debt Maturity DM	0,76288	0,81334	0,01326	1	0,36938	0,97702	0,18141	331
Firm Size FS	23,199	23,089	17,774	25,88	21,066	25,569	1,4248	331
Debt Weight DW	0,3804	0,39608	0,01807	0,65527	0,12705	0,57339	0,13122	331
Effective Tax Rate Efftx	0,24677	0,25004	0,0048414	0,6126	0,06806	0,40632	0,098927	331
Maturity Matching MM	21,217	19,975	0,0053256	117,92	3,0191	39,053	14,493	331
Profitability Prof	0,10796	0,10252	0,0050189	0,23548	0,03718	0,19576	0,045647	331
Av. Yield Spread AvrgYldSprd	0,019169	0,016875	0,0078734	0,052402	0,00855	0,052402	0,011387	331
52w Share Price Perf. Yearspp	0,1042	0,093937	-0,9145	1,9022	-0,3675	0,59214	0,31871	331
Term Premium TP	0,034058	0,036075	0,007032	0,083778	0,00997	0,054182	0,01471	331
Inflation Rate Inflt	0,019466	0,02375	-0,00825	0,04375	-0,005	0,038268	0,014607	331

Appendix B: PSI20 Descriptive Statistics

The table presents the descriptive statistics of the dependent variable and independent variables on the PSI20 listed firms. DM is the ratio of total debt with a maturity date above 3 years to total debt value. FS is the natural logarithm of total assets. DW is the ratio between total book value of debt and total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

PSI20 - Descriptive Summary								
	Average	Median	Minimum	Maximum	Perc. 5%	Perc. 95%	Std. Deviation	N
Debt Maturity DM	0,73804	0,78924	0,01326	0,98585	0,42479	0,94586	0,16984	113
Firm Size FS	22,505	22,29	20,61	24,781	20,9	24,681	1,044	113
Debt Weight DW	0,40631	0,39622	0,14803	0,65527	0,25219	0,59869	0,1013	113
Effective Tax Rate Efftx	0,25455	0,25644	0,0067746	0,6126	0,06069	0,46823	0,11638	113
Maturity Matching MM	20,496	21,108	0,0053256	64,83	0,00814	38,969	12,621	113
Profitability Prof	0,11566	0,10266	0,044127	0,23548	0,06517	0,19707	0,041724	113
Av. Yield Spread AvrgYldSprd	0,019754	0,009961	0,0078734	0,052402	0,00787	0,052402	0,016664	113
52w Share Price Perf. Yearspp	0,11642	0,083807	-0,59322	1,9022	-0,4198	0,72166	0,39635	113
Term Premium TP	0,040659	0,041	0,010395	0,083778	0,02401	0,083778	0,015421	113
Inflation Rate Inflt	0,017761	0,02275	-0,00825	0,04375	-0,0083	0,0365	0,013988	113

Appendix C: IBEX35 Descriptive Statistics

The table presents the descriptive statistics of the dependent variable and independent variables on the IBEX35 listed firms. DM is the ratio of total debt with a maturity date above 3 years to total debt value. FS is the natural logarithm of total assets. DW is the ratio between total book value of debt and total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

	Average	Median	Minimum	Maximum	Perc. 5%	Perc. 95%	Std. Deviation	N
Debt Maturity DM	0,77576	0,82962	0,15809	1	0,26659	0,98516	0,1862	218
Firm Size FS	23,559	23,637	17,774	25,88	21,088	25,645	1,4642	218
Debt Weight DW	0,36698	0,39186	0,01807	0,64876	0,06977	0,57243	0,14268	218
Effective Tax Rate Efftx	0,24274	0,24884	0,0048414	0,48433	0,06909	0,39473	0,08857	218
Maturity Matching MM	21,591	19,712	0,53333	117,92	5,7391	41,246	15,389	218
Profitability Prof	0,10397	0,10212	0,0050189	0,22663	0,03192	0,18863	0,047151	218
Av. Yield Spread AvrgYldSprd	0,018866	0,017438	0,0096625	0,036972	0,00966	0,03231	0,0073203	218
52w Share Price Perf. Yearspp	0,097873	0,094867	-0,9145	0,80504	-0,3437	0,55052	0,27069	218
Term Premium TP	0,030637	0,0332	0,007032	0,0532	0,00703	0,052638	0,01311	218
Inflation Rate Inflt	0,02035	0,0245	-0,005	0,04092	-0,005	0,04092	0,014872	218

Appendix D: (2000-2009) Descriptive Statistics

The table presents the descriptive statistics of the dependent variable and independent variables on the PSI 20 & IBEX35 listed firms during the period between 2000 and 2009. DM is the ratio of total debt with a maturity date above 3 years to total debt value. FS is the natural logarithm of total assets. DW is the ratio between the total book value of debt and the total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

(2000-2009) - Descriptive Summary								
	Average	Median	Minimum	Maximum	Perc. 5%	Perc. 95%	Std. Deviation	N
Debt Maturity DM	0,74744	0,79328	0,01326	0,99998	0,28017	0,9854	0,20161	163
Firm Size FS	22,896	22,673	17,774	25,765	20,697	25,189	1,5162	163
Debt Weight DW	0,35869	0,38915	0,01807	0,65527	0,06459	0,56246	0,14449	163
Effective Tax Rate Efftx	0,26412	0,26222	0,026692	0,59856	0,105	0,39481	0,084578	163
Maturity Matching MM	22,806	20,506	0,024126	110,24	6,7491	48,836	14,608	163
Profitability Prof	0,11693	0,11019	0,013696	0,23548	0,03976	0,20679	0,049508	163
Av. Yield Spread AvrgYldSprd	0,019535	0,017395	0,0078734	0,052402	0,00855	0,052402	0,011431	163
52w Share Price Perf. Yearspp	0,1206	0,13223	-0,9145	1,7707	-0,4075	0,65872	0,33466	163
Term Premium TP	0,038254	0,040061	0,007032	0,053308	0,65872	0,0532	0,01215	163
Inflation Rate Inflt	0,027622	0,03067	-0,00825	0,04375	-0,0029	0,04092	0,012808	163

Appendix E: (2010-2019) Descriptive Statistics

The table presents the descriptive statistics of the dependent variable and independent variables on the PSI 20 & IBEX35 listed firms during the period between 2010 and 2019. DM is the ratio of total debt with a maturity date above 3 years to total debt value. FS is the natural logarithm of total assets. DW is the ratio between the total book value of debt and the total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

(2010-2019) - Descriptive Summary								
	Average	Median	Minimum	Maximum	Perc. 5%	Perc. 95%	Std. Deviation	N
Debt Maturity DM	0,77787	0,82261	0,20716	1	0,46137	0,96209	0,15856	168
Firm Size FS	23,493	23,296	21,122	25,88	21,753	25,607	1,2667	168
Debt Weight DW	0,40147	0,41091	0,11254	0,64964	0,19644	0,57752	0,11343	168
Effective Tax Rate Efftx	0,22994	0,23071	0,0048414	0,6126	0,04777	0,42467	0,10872	168
Maturity Matching MM	19,676	18,481	0,0053256	117,92	0,02174	36,149	14,255	168
Profitability Prof	0,099258	0,096698	0,0050189	0,19707	0,02886	0,16881	0,039811	168
Av. Yield Spread AvrgYldSprd	0,018813	0,016875	0,0078734	0,052402	0,00787	0,052402	0,011367	168
52w Share Price Perf. Yearspp	0,088297	0,065884	-0,58364	1,9022	-0,3518	0,46281	0,30259	168
Term Premium TP	0,029988	0,025266	0,0099721	0,083778	0,00997	0,061282	0,015828	168
Inflation Rate Inflt	0,011553	0,01375	-0,005	0,0365	-0,005	0,03208	0,0116	168

Appendix F: Hypothesis test

The table presents the t-tests between the dependent variable Debt Maturity (DM) and the chosen independent variables. Whereas N is the number of observations considered towards the respective sample, the value of the t-test, the p-value, and the respective acceptance or rejection of the null hypothesis with a 5% level of significance.

Variables	PSI20 + IBEX35			PSI20			IBEX35			(2000-2009)			(2010-2019)		
	T-test	P-Value	H0 (p<0,05)	T-test	P-Value	H0 (p<0,05)	T-test	P-Value	H0 (p<0,05)	T-test	P-Value	H0 (p<0,05)	T-test	P-Value	H0 (p<0,05)
Firm Size FS	0,3344	0,7383	Accept	−0,1939	0,0232	Reject	0,1965	0,8444	Accept	2,315	0,0219	Reject	−2,254	0,0256	Reject
Debt Weight DW	4,404	1,45E-05	Reject	−0,9100	3,65E-01	Reject	6,193	3,10E-09	Reject	2,181	3,07E-02	Reject	3,59	4,00E-04	Reject
Effective Tax Rate Efftx	−1,885	0,0603	Accept	−0,3244	0,7462	Accept	−1,659	0,0987	Accept	−0,8618	0,3901	Accept	−1,387	0,1673	Accept
Maturity Matching MM	3,037	0,0026	Reject	2,534	0,0125	Reject	1,015	0,3111	Accept	3,03	0,0029	Reject	2,101	0,0372	Reject
Profitability Prof	−2,462	0,0143	Reject	−3,060	0,0027	Reject	−2,588	0,0103	Reject	−0,7279	0,4678	Accept	−2,987	0,0033	Reject
Av. Yield Spread AvrgYldSprd	−2,269	0,0239	Reject	−3,398	0,0009	Reject	2,139	0,0336	Reject	0,4672	0,641	Accept	−4,081	7,10E-05	Reject
Share Price Perf. Yearspp	0,5487	0,5836	Accept	0,04221	0,9664	Accept	0,3165	0,7519	Accept	1,123	0,2632	Accept	−0,4887	0,6257	Accept
Term Premium TP	−0,6281	0,5304	Accept	−0,8499	0,3971	Accept	1,139	0,2561	Accept	0,9482	0,3445	Accept	−1,219	0,2247	Accept
Inflation Rate Inflt	−0,4958	0,6204	Accept	−0,04643	0,963	Accept	−0,1432	0,8862	Accept	−0,3557	0,7225	Accept	0,09387	0,9253	Accept
N	331			132			218			163			168		

Appendix G: Determinants of Debt Maturity

Regressions were estimated using panel data. DM is the ratio of total debt with a maturity date above 3 years to total debt value. FS is the natural logarithm of total assets. DW is the ratio between the total book value of debt and the total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation. T-ratios are below each coefficient value. ***, ** and * represent the significance at the 1%, 5% and 10% level, respectively.

Variables	PSI20 + IBEX35		PSI20		IBEX35		(2000-2009)		(2010-2019)		Predicted signs
	Pooled OLS	Random Effects	Pooled OLS	Fixed Effects	Pooled OLS	Random Effects	Pooled OLS	Fixed Effects	Pooled OLS	Random Effects	
Firm Size FS	0,00241392 0,7383	0,0108127 0,4088	−0,00157619 0,936	0,0103816 0,7993	0,00174161 0,8444	0,0165661 0,2912	0,0257532 ** 0,0219	−0,0209483 0,5671	−0,0223837 ** 0,0256	−0,000294613 0,1968	+
Debt Weight DW	0,331675 *** 1,45E-05	0,343207 *** 0,0002	0,185577 0,25	0,264946 0,1919	0,664516 *** 3,10E-09	0,376941 *** 0,0008	0,246141 ** 0,0307	0,317609 * 0,0541	0,37642 *** 0,0004	0,299528 ** 0,0227	+
Effective Tax Rate Efftx	−0,179473 * 0,0603	−0,00612738 0,9453	0,0700379 0,6222	0,0974016 0,4782	−0,229589 * 0,0987	−0,130668 0,3211	−0,153470 0,3901	0,0010389 0,9958	−0,143786 0,1673	0,0488768 0,542	-
Maturity Matching MM	0,00202609 *** 0,0026	0,000753253 0,2532	0,0043317 *** 0,0017	−0,00106711 0,5487	0,000843147 0,3111	0,00102055 0,1691	0,00346939 *** 0,0029	0,00259928 ** 0,0337	0,00167263 ** 0,0372	−5,80E-05 0,9336	+
Profitability Prof	−0,529648 ** 0,0143	−0,358091 0,2173	−0,720105 0,1572	−0,277526 0,6378	−0,686343 ** 0,0103	−0,376505 0,3022	−0,233811 0,4678	0,222717 0,7123	−0,955994 *** 0,0033	−0,771693 ** 0,049	-
Av. Yield Spread AvrgYldSprd	−2,03579 ** 0,0239	−1,36887 0,6319	−3,56537 *** 0,003	-	4,39732 ** 0,0336	1,87614 0,7069	0,671638 0,641	-	−4,46154 *** 7,10E-05	−2,53485 0,4727	-
Share Price Perf. Yearspp	0,0162929 0,5836	0,0087351 0,7276	0,00917938 0,8121	0,0044924 0,9006	0,0140361 0,7519	0,0174657 0,6394	0,05092 0,2632	0,0183415 0,6601	−0,0185275 0,6257	−0,0104448 0,6647	+
Term Premium TP	−0,449423 0,5304	−0,0759438 0,9062	−0,583194 0,6089	−0,737865 0,4881	1,13186 0,2561	0,715345 0,4146	1,22953 0,3445	−1,20940 0,4553	−1,12965 0,2247	−0,196784 0,752	-
Inflation Rate Inflt	−0,355377 0,6204	−0,814374 0,2038	−1,11732 0,3902	−1,36645 0,3189	−0,126947 0,8862	−0,518385 0,5031	−0,423624 0,7225	−2,16237 * 0,0658	0,113134 0,9253	−0,643831 0,4158	-
R^2	0,177522		0,212988	0,362373	0,252075		0,18997	0,487712	0,254092		
N	331		113		218		163		168		

Appendix H: Correlations PSI20 & IBEX35 (2000-2019)

The table presents the correlation matrix of the entire time spectrum regarding both indexes. DW is the ratio between the total book value of debt and the total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

Variables	Firm Size FS	Debt Weight DW	Effective Tax Rate efftx	Maturity Matching MM	Profitability Prof	Av. Yield Spread AvrgYldSprd	Share Price Perf. Yearspp	Term Premium TP	Inflation Rate Inflt
Firm Size FS	1,0000	0,2221	-0,0928	-0,034	-0,0567	-0,3983	-0,1532	-0,1903	-0,1479
Debt Weight DW		1,0000	0,0119	0,4184	0,1348	-0,5493	0,118	-0,0737	-0,1213
Effective Tax Rate Efftx			1,0000	0,1212	0,3034	-0,1276	0,1019	0,1742	0,2097
Maturity Matching MM				1,0000	-0,0657	-0,2517	0,0664	0,0468	0,0691
Profitability Prof					1,0000	-0,0176	-0,0138	0,1133	0,2094
Av. Yield Spread AvrgYldSprd						1,0000	-0,1111	-0,096	-0,0553
Share Price Perf. Yearspp							1,0000	0,2572	0,2107
Term Premium TP								1,0000	0,4514
Inflation Rate Inflt									1,0000

Appendix I: Correlations PSI20 - (2000-2019)

The table presents the correlation matrix of the entire time spectrum regarding the PSI20 index throughout the entire time spectrum. DW is the ratio between the total book value of debt and the total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

Variables	Firm Size FS	Debt Weight DW	Effective Tax Rate efftx	Maturity Matching MM	Profitability Prof	Av. Yield Spread AvrgYldSprd	Share Price Perf. Yearspp	Term Premium TP	Inflation Rate Inflt
Firm Size FS	1,0000	0,0071	-0,0743	0,1439	-0,4025	-0,3146	0,01	-0,0536	-0,1817
Debt Weight DW		1,0000	-0,0639	-0,239	-0,2189	0,0367	-0,1011	0,0159	-0,092
Effective Tax Rate Efftx			1,0000	0,3442	-0,123	0,1497	-0,0684	0,0256	0,0626
Maturity Matching MM				1,0000	0,0059	-0,0455	0,0657	0,0689	0,1559
Profitability Prof					1,0000	-0,3781	0,009	-0,0692	-0,0195
Av. Yield Spread AvrgYldSprd						1,0000	0,0662	0,009	0,0768
Share Price Perf. Yearspp							1,0000	0,0662	0,1218
Term Premium TP								1,0000	0,5144
Inflation Rate Inflt									1,0000

Appendix J: Correlations IBEX35 - (2000-2019)

The table presents the correlation matrix of the entire time spectrum regarding the IBEX35 index throughout the entire time spectrum. DW is the ratio between the total book value of debt and the total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

Variables	Firm Size FS	Debt Weight DW	Effective Tax Rate efftx	Maturity Matching MM	Profitability Prof	Av. Yield Spread AvrgYldSprd	Share Price Perf. Yearspp	Term Premium TP	Inflation Rate Inflt
Firm Size FS	1,0000	0,2221	-0,0928	-0,034	-0,0567	-0,3983	-0,1532	-0,1903	-0,1479
Debt Weight DW		1,0000	0,0119	0,4034	0,1348	-0,5493	0,118	-0,0737	-0,1213
Effective Tax Rate Efftx			1,0000	0,1212	0,3034	-0,1276	0,1019	0,1742	0,2097
Maturity Matching MM				1,0000	-0,0657	-0,2517	0,0664	0,0468	0,0691
Profitability Prof					1,0000	-0,0176	-0,0138	0,1133	0,2094
Av. Yield Spread AvrgYldSprd						1,0000	-0,1111	-0,096	-0,0553
Share Price Perf. Yearspp							1,0000	0,2572	0,2107
Term Premium TP								1,0000	0,4514
Inflation Rate Inflt									1,0000

Appendix K: Correlations PSI20 & IBEX35 (2000-2009)

The table presents the correlation matrix of the entire time spectrum regarding both indexes. DW is the ratio between the total book value of debt and the total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

Variables	Firm Size FS	Debt Weight DW	Effective Tax Rate efftx	Maturity Matching MM	Profitability Prof	Av. Yield Spread AvrgYldSprd	Share Price Perf. Yearspp	Term Premium TP	Inflation Rate Inflt
Firm Size FS	1,0000	0,1608	-0,1108	0,0072	-0,0596	-0,3247	-0,1008	-0,2598	-0,0685
Debt Weight DW		1,0000	0,994	0,3431	-0,0321	-0,1953	0,0266	0,0533	-0,0813
Effective Tax Rate Efftx			1,0000	-0,0178	~0,0906	0,0004	0,0437	0,0387	0,1196
Maturity Matching MM				1,0000	-0,25	-0,1715	0,0247	-0,0373	0,0457
Profitability Prof					1,0000	-0,1367	-0,0178	-0,1122	0,0071
Av. Yield Spread AvrgYldSprd						1,0000	-0,0066	-0,0248	0,0033
Share Price Perf. Yearspp							1,0000	0,1179	0,2143
Term Premium TP								1,0000	0,0137
Inflation Rate Inflt									1,0000

Appendix L: Correlations PSI20 & IBEX35 (2010-2019)

The table presents the correlation matrix of the entire time spectrum regarding both indexes. DW is the ratio between the total book value of debt and the total value of assets. Efftx is the ratio of tax paid to taxable income, also known as the effective tax rate. MM is the ratio between PPE and depreciation book value. Prof is the ratio between the EBITDA the total book asset value. AvrgYldSprd is the difference between each firm's bond yield minus the country's bond yield. Yearspp is the difference between annual share prices divided by the current observation's year share price. TP is the difference between the country's 3-month bond yield and the 10-year bond yield. Inflt is the index of consumer price inflation.

Variables	Firm Size FS	Debt Weight DW	Effective Tax Rate efftx	Maturity Matching MM	Profitability Prof	Av. Yield Spread AvrgYldSprd	Share Price Perf. Yearspp	Term Premium TP	Inflation Rate Inflt
Firm Size FS	1,0000	-0,0314	-0,0241	0,0865	-0,2531	-0,2752	-0,0669	-0,1466	0,0884
Debt Weight DW		1,0000	-0,0451	0,1798	0,3011	-0,2793	0,0863	0,0544	0,0146
Effective Tax Rate Efftx			1,0000	-0,1044	0,1479	0,0642	-0,0179	0,0975	0,0125
Maturity Matching MM				1,0000	0,1453	-0,1052	0,0936	0,0443	0,0427
Profitability Prof					1,0000	-0,2449	-0,0025	0,1689	0,0534
Av. Yield Spread AvrgYldSprd						1,0000	0,0079	-0,0169	-0,0231
Share Price Perf. Yearspp							1,0000	0,2725	0,1099
Term Premium TP								1,0000	0,5956
Inflation Rate Inflt									1,0000