UNIVERSIDADE CATÓLICA PORTUGUESA

The influence of public governance in European firm's capital structure

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Católica Porto Business School
2020

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Master Final Work in the modality of Dissertation
presented to Universidade Católica Portuguesa
to fulfill the requirements for the degree of MSc in Finance

by

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April 2020

Acknowledgements

The next paragraphs are intended to thanks all those who, directly or indirectly, have contributed to my success not only in this particular master work but also in my personal life and in my academic career as a whole.

First of all I have to thank my parents who have been my pillars throughout my life. In fact, it was the values they have always instilled me and the affection and support they have always given to me that make possible my continuous evolution to be what I am today. My eternal thanks to them.

Next, I have to leave a special word to my girlfriend, Sofia, for having been by my side in the good times and for having helped me find the best way in the worst times. Thank you very much.

To my friends, family and all those who have been through my life I thank you for making this journey much simpler and more fun. I would also like to thank all the teachers with whom I have had the good fortune to meet in the various stages of my life, since each one has contributed in its own way to my development.

Last but not least, a thank you to my advisor Professor Paulo Alves for all the advice and wisdom shared during this extended period of writing as well as to Professor Ricardo Ribeiro for his patience and help in the construction of the econometric model.

Abstract

The aim of this thesis is to study the influence exerted by public governance in the definition of capital structures of listed companies in 15 European countries - Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom. In order to do it, we used a sample composed of 23 755 companies that in the period 2013-2018 were listed in the stock indices of the 15 countries.

After a review of the most notable capital structure and public governance literature, we analyzed how the determinants of the debt level usually presented in the literature – Tangibility, Profitability, Growth, Size, Non-Debt Tax Shields (NDTS), Taxes, Inflation Rate and Industry – and the worldwide governance indicators – Voice and Accountability, Political Stability and Absence of Violence, Governance Effectiveness, Rule of Law, Control of Corruption, Regulatory Quality – influence companies' choice of capital structure.

According to the results obtained, we can affirm that, with the exception of NDTS, the determinants of the capital structure have an impact in line with what is expected by the existing literature. Regarding public governance, the results show that overall it is a factor influencing the choice of capital structure of companies, with Voice and Accountability, Government Effectiveness and Regulatory Quality having a positive effect on the level of debt and Political Stability and Absence of Violence and the Rule of Law a negative one.

Keywords: capital structure; public governance; European listed companies; worldwide governance indicators;

Resumo

O objetivo desta tese é estudar a influência exercida pela governação pública na definição das estruturas de capitais das empresas cotadas em bolsa em 15 países europeus – Alemanha, Bélgica, Dinamarca, Espanha, Finlândia, França, Irlanda, Islândia, Itália, Holanda, Noruega, Portugal, Reino Unido, Suécia e Suíça. Para tal, recorremos a uma amostra composta por 23 755 empresas que no período 2013-2018 estiveram cotadas nos índices dos 15 países.

Depois de uma revisão à literatura proeminente no âmbito de estrutura de capitais e governação pública, analisamos de que forma é que os determinantes do nível de dívida habitualmente apresentados - a Tangibilidade, a Rentabilidade, o Crescimento, a Dimensão, Outros Benefícios para além da Dívida, os Impostos, a Taxa de Inflação e a Indústria - e os indicadores mundiais de governação – Voz e Responsabilidade, Estabilidade Política e Ausência de Violência, Eficácia do Governo, Estado de Direito, Controlo de Corrupção, Qualidade Regulatória - influenciam a escolha da estrutura de capital por parte das empresas.

De acordo com os resultados obtidos podemos afirmar que, com exceção dos Outros Benefícios para além da Dívida, os determinantes da estrutura de capital têm um impacto em linha com o esperado pela literatura existente. Relativamente à governação pública os resultados demonstram que no global é um fator influenciador na escolha de estrutura de capitais das empresas, sendo que, os indicadores da Voz e Responsabilidade, Eficácia do Governo e Qualidade Regulatório têm um efeito positivo no nível de dívida e a Estabilidade Política e a Ausência de Violência e o Estado de Direito têm um impacto negativo.

Palavras-chave: estrutura de capitais; governação pública; empresas cotadas na Europa; indicadores globais de governação;

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Introduction

With this study we struggle to understand if public governance has some impact on the capital structure of listed companies in 15 European countries (Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom). In fact, we proposed to answer to the question: What is the influence of public governance on the capital structure of European companies?

Given that the focus of this study is on capital structure, we felt the need to review the existing literature on the topic. In 1952, Durand published a relevant work in which the author reflected whether or not the proportion of debt and equity of a company influences the risk inherent to its assets. A few years later, Modigliani and Miller (1958) assuming a perfect and efficient capital market, suggested the capital structure irrelevance theory.

However, its premises have been widely contested by proponents of new theories aimed at optimizing capital structures, such as the Trade-Off and the Pecking Order, who criticize the lack of realism of Modigliani and Miller's argument and denote the existence of market imperfections such as agency costs (Ross, 1973), taxes (Modigliani and Miller, 1963) and information asymmetries (Leland & Pyle, 1977).

In the empirical literature, a set of factors commonly named determinants of capital structure are actually portrayed as proxies of these market imperfections: Tangibility (Rajan and Zingales, 1995); Profitability (Frank and Goyal, 2009); Growth (Harris and Raviv, 1991); Size (Frank and Goyal, 2009); Non-Debt Tax Shields (NDTS) (De Angelo and Masulis, 1980); Tax (Kraus and Litzenberger, 1973); Inflation (Frank and Goyal, 2009); Industry (Leland, 1998).

In this paper, in addition to these traditional determinants of capital structure, we study the impact of public governance on corporate debt levels. Therefore, given

the subjectivity inherent in the term public governance whose definition varies according to the author or institution referred to it, we considered it necessary to follow a single interpretation. As such, we centered on the definition and the Worldwide Governance Indicators (WGI) developed by Kaufmann, Zoido-lobatón, and Kraay (1999): Voice and Accountability; Political Stability; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption.

These WGI and the determinants of capital structure are used in our econometric models as independent and control variables respectively in order to evaluate their impact on the capital structure' choice. According to the results of our regression models, the variables Tangibility, Size, NDTS, Tax, Inflation, Industry, VA, GE and RQ have a positive impact and Profitability, Growth, PS and RL affect negatively the debt levels of a company.

Since we did not find in the literature any paper which relates the worldwide governance indicators with capital structure at an individual level, we had no expectations regarding the impact that each factor would have. However, due to the work of Wei and Zhou (2018) we expected the independent variables to be significant as a whole, as confirmed.

The relevance of this study is accentuated by: (i) being a pioneer work in the combination of some of the traditional determinants of capital structure with a set of individual perceived governance indicators, the worldwide governance indicators (Kaufmann, Zoido-lobatón, and Kraay, 1999) and (ii) allow to answer to the suggestion left by Bancel and Mittoo (2004) of conducting a cross-country capital structure research with more refined country-level indicators. Furthermore, since it involves 15 European countries, the inclusion of new variables to characterize public governance quality and its interaction with capital structure, we hope to be contributing to the improvement of the literature.

This document is organized as follows: Chapter 1 presents the capital structure theories and determinants as well as the public governance concept and its interaction

with capital structure. Chapter 2 contains the research question and hypothesis to test. Chapter 3 describe the variables, sample and methodology. Chapter 4 contains the test and regression results. Chapter 6 presents the limitations and our contributions to the literature. Lastly, we present the conclusions, and references followed by appendices.

Chapter 1

1. Literature Review

1.1. Capital structure: Theories

Capital structure is one of the major subjects on corporate finance. According to the literature, it is defined as the mix of securities and financing sources used to finance real investment by corporations (Myers, 2003). Durand (1952) argued that those companies are managed by businessmen who try to maximize the discounted value of firms' future income instead of maximizing the income as suggested by economic theory in the past. If applied by the entrepreneurs, the adjustment made by Durand's framework enables a change in the way firms project their capital structure, based either on equity, debt or both.

After Durand (1952), Modigliani and Miller (1958) raised the level of controversy related to capital structure. In fact, their work was based on assumptions whose validity was continuously called into question by several authors leading to the growth of some new theories.

In this chapter, will be presented the capital structure irrelevance theory and some of the most prominent theories that have been raised from it. In addition, we will address the capital structure determinants resulting from the various interpretations on the subject.

1.1.1 Traditional View and Capital Structure Irrelevance Theory

Durand (1952) was responsible the first in-depth work on capital structure. At the time, it was considered (Miller, 1988) the only prior treatment similar in spirit to Modigliani and Miller (1958) . The author presented two distinct approach to measure the impact of capital structure on corporations' value.

The first one, Net Operating Income Method (NOI Method) is considered the pessimist one. It suggests that capital structure of a company does not alter the inherent risk of his assets. Thereby, the combined value of debt and equity does not change by the weight of each on asset's financing.

On the opposite side, the alternative approach Net Income Method (NI Method) is built on the idea that underlying risk of company's assets changes with the form of capitalization. According to this method, the total investment value increases with the proportion of debt in the capital structure and for that reason is looked as the optimist method.[1]

Despite the tendency for an increase in debt ratio to result in a boost in company's value, proponents of this method point out that in the moment that debt burden becomes excessive, the relationship of debt and total investment value is reversed, meaning that more debt will destroy value. The moment immediately before to that turning point defines the weights of debt and equity that maximize the value of a corporation, this is known as optimal capital structure and it is consistency with traditional approach.

Durand believes that none of the methods strictly is the more correct or appropriate, despite this he believes that NOI Method should be accepted in principle even if it required some changes (Durand, 1952).

[1] If a company is financed exclusively with shareholder equity, the two methods will produce the same valuation since they will be using same capitalization rate.

On the other hand, Modigliani and Miller (1958) that would become a reference work on the subject, developed a theory based on three propositions by which they conclude the capital structure irrelevance in the measurement of the company's market value. Those propositions are supported by strong assumptions such as a perfect and efficient capital market, which by author's definition means a tax free world where there are no transaction costs, no bankruptcy costs, no agency costs, no information asymmetry and as a consequence of it there are no chances for arbitrage opportunities. With this article, the authors contradict the NI Method and, consequently, the traditionalist view that there is an optimal capital structure.

Moreover, Modigliani and Miller (1958) holds that companies shall be organized into "equivalent return" classes, also known as risk classes, combining on the same group firms whose return on shares are perfectly correlated. This way shares of firms belonging to the same class are considered perfect substitutes of each other.

I. $V_j = (S_j + D_j) = \bar{X}_j/\rho_k$, for any firm j in class k

The first proposition (I) presented by the authors is strongly related to risk classes' premise and states that market value, V, of any firm j, is independent of the degree of leverage and is obtained by capitalizing its expected return at an appropriate rate, ρ_k, according to its class k. (Modigliani and Miller, 1958).

II. $i_j = \rho_k + (\rho_k - r)D_j/S_j$

Following, the second proposition (II) predicts that any firm j, with debt obligation on its capital structure, has an expected rate of return equivalent to the expected rate of return of a firm belonging to the same class of risk, plus a premium associated with financial risk (debt-to equity ratio of company j, times a spread

between ρ_k and r). Therefore, as the weight of debt in firm's financial structure increases, so does the financial risk and consequently the associated risk premium.

III. $\rho^* \geq \rho_k$

As proposed in the introduction of their article, the authors demonstrated, in the third proposition (III), their view of how the theory that gave rise to the first two propositions allow, in practice, to develop a theory of investment policy. Thereby, the last proposition of this model derives from the previous ones and works as a natural conclusion of them. Assuming that firms' investment policy is decided in the best interest of shareholders, a firm that belongs to a class k, shall only undertake an investment opportunity if the rate of return on investment, ρ^*, is larger or at least the same as the appropriate capitalization rate according to its class, ρ_k, independently of the type of security that can be used to finance the investment.

The principle of capital structure irrelevance by Modigliani and Miller (1958) was largely criticized on its assumptions regardless of positioned itself as a reference and a cornerstone on the subject.

Durand (1959) and Stiglitz (1969) have criticized not only the unrealism of a perfect market assumption and the marginalization of some important risks - such default risk - but also the complexity of creating equivalent return classes that are the support of all theory. Scott (1976) has pointed that the theory does not include the possible negative effect that an excessive debt increase might have on a company. Additionally, such as other authors, he considers that if exist bankruptcy costs and reorganization ones, the debt policy is not irrelevant and can exist an optimal capital structure.

On the other hand, Kraus and Litzenberger (1973) are in accordance with the logic inherent to the principle of irrelevance of the capital structure, even under specific circumstances. In fact, although they added some market imperfections in

their 1973 article, the authors assumed that capital structure is irrelevant to the firm's market value if it belongs in perfect markets, as had been suggested by Modigliani and Miller (1958).

Some of the critical articles quoted and a revision of the theory by Modigliani and Miller (1963) later contributed to the evolution on this topic with the rise of new capital structure policy models. Some of the most important ones will be presented below.

1.1.2 Trade-Off Theory

According to the corrective analysis of Modigliani and Miller (1963), the tax advantages of debt financing are, in fact, greater than those that had been considered in their original paper on capital structure irrelevance. Therefore, contrary to what was stated in Modigliani and Miller (1958), the market value of a company is not independent of its debt. Instead, the authors predicted that increasing the use of leverage will increase firm's market value.

On the same perspective, Robichek and Myers (1966) and Baxter (1967) consent some benefits on financing through debt. The deductibility of interest from corporate income for tax purposes, would, disregarding other factors, tend to reduce the cost of capital in a company with little or no debt. Nevertheless, they also highlighted some risks associated with excessive leverage that could, potentially, exceed the benefits obtained from it. In their point of view, the greater the reliance on debt, the greater the likelihood of bankruptcy and, consequently, the higher the chances of an increase in the cost of capital due to bankruptcy-related expenses. The market value of a company is, therefore, not only affected by debt benefits but also by bankruptcy costs[2]. The trade-off theory embraces both.

[2] Warner (1977) distinguish bankruptcy costs into direct bankruptcy costs - the measurable ones emerged from any conflict between claimholders, for instance, in the form of lawyers' and accountants' fees - and indirect

In accordance with Myers (2001), the trade-off theory aims to balance the benefits of tax and the possible financial distress costs[3] induced by an additional unit of debt. According to the author, it implies an optimal leverage ratio obtained at the point where the present value of benefits and costs associated to the increment of debt are equalized. That point is distinct among different companies and its existence presume moderate debt ratios.

Under Warner (1977), trade-off theory has been formally developed by Kraus and Litzenberger (1973) who stated that the market value of a levered firm is equal to the market value of an unlevered firm plus the present value of its interest tax shields net of bankruptcy costs.

1.1.3 Pecking Order Theory

The pecking order term was introduced by Myers (1984), although the theory's fundamental idea of prioritizing internal funds over external financing had already been mentioned by Donaldson (1961). Myers (1984), inspired by Myers and Majluf (1984), relaxed the assumption embedded in Modigliani and Miller (1958) that market processes full information about the firms' environment. In fact, the theorem focuses on information asymmetries and managerial incentive-signaling mentioning, using the contributes of Leland and Pyle (1977) and Ross (1977) to refute the capital structure irrelevance theory.

This approach to capital structure problematic was developed by considering a firm with assets-in-place and a growth opportunity investment, facing the exhaustion of internal financing capacity and, therefore requiring additional funds to undertake

bankruptcy costs - omitted costs that include lost sales or the incapacity of the firm to obtain credit due to the bankruptcy process.

[3] Myers (2001) include bankruptcy, reorganization and agency costs.

the investment project (Myers, 2001; Myers and Majluf, 1984). It is emphasized the existence of information asymmetry between managers and potential investors – that allows the company to know in advance whether a project add or destroy value and whether their shares are under or overvalued (Leland and Pyle, 1977) - and the importance of managers' actions for the signals they send to the market. Furthermore, is expectable that managers act always in the best interests of existing stockholders (Myers, 2001; Myers and Majluf, 1984).

Myers and Majluf (1984) discussed two hypothetical scenarios by which they conclude the preference for internal funds over external funds and, when external financing is needed, the prevalence of recourse to debt rather than equity.

In a first moment, they created a situation in which companies can only finance their investment opportunity by issuing equity. The authors assume that managers, covering the interests of "old"[4] shareholders and using private information, would only accept to issue overvalued shares. Given the situation, potential investors, aware of information asymmetry and being rational about the signals given by manager's intentions, would evaluate the stock at discount and deter the equity issuance (Fama and French, 2002). On the same logic, undervalued shares would not be issued, unless the net present value of growth opportunity more than offsets the transference of value from existing stockholders to the new ones, in the case of a stock dilution (Myers and Majluf, 1984). In these circumstances, due to the impossibility of using debt, the company would be transgressing the decision rule covered by the financial literature which recommends the acceptance of all positive net present value projects.

In the second scenario, companies can also issue debt to fill the gap between the internal financing capacity and the existing financial needs. Using debt capacity, the managers' advantage obtained through the use of private information is minimized and potential conflicts of interest between new and existing shareholders are avoided (Myers, 2001). In fact, debt is safer from the investors' perspective, since there are fewer

[4] Referring to the existing shareholders.

discrepancies in the valuation. This option is seen by proponents of pecking order theory as the best option when there is a need to resort to external financing.

Despite the theory establishes debt priority over shareholders' funds, it also sets up a preferred financing order whereby firms prefer internal funding over external. Thus, companies may choose first to finance themselves through retained earnings, defined as internal equity. Subsequently, although it is usually seen as an unwanted financing instrument[1], its target dividend payout ratio can be adjusted, in order to increase the value of retained earnings. Then, if the necessary funding has not yet been obtained, firms should seek external financing. Following a well-defined hierarchical order, they would first resort to safe debt until its emission capacity is exhausted. Thereafter, firms should pass to the issuance of riskier debt followed by hybrid instruments as convertible bonds. Finally, if necessary, firms would issue equity (Myers, 2001; Myers, 1984).

Summarily, according to Myers (1984) pecking order theory does not predict an optimal capital structure. On the contrary, the differentiation of two types of equity – internal and external – encourages the use of this source of financing at different stages of the funding process. Moreover, firms' debt ratio is assumed to be the bulk of external financing required (Myers, 2001) as it is induced by the firm's net cash flows (Fama and French, 2002).

1.1.4 Agency Costs

The agency costs theory relaxes the assumption presented in Modigliani and Miller (1958), according to which, managers always act in the best interests of existing shareholders. This assumption is considered unrealistic (Myers, 2001) since the company is defined as a set of different stakeholders, with misaligned interests, who seek to maximize their own utility (Jensen and Meckling, 1976). Under this theory, the

divergence of stakeholders' intentions is mitigated by contractual relationships among them.

Contractual relationship, also known as agency relationship, is described by Ross (1973) as an agreement in the form of a contract, in which, a person or more (the principal(s)) delegates in another (the agent) tasks that involve decision-making in principal's behalf. However, as utility maximizers, it is expected that some agents' decisions will not coincide with the interests of principals. This may potentiate the agency costs addressed in this theory.

In fact, according to Jensen and Meckling (1976), the probability of the principals' welfare be maximized by agent's actions, at zero cost, is almost null. Hence, principals would implement both incentive measures and monitoring strategies to boost the chances. Nevertheless, despite the attempts to limit the divergence of interests between the agent and the principal, some differences will remain, given the impossibility of writing complete contracts (Myers, 2001). As a consequence, the principal will suffer residual loss, since it is defined as the reduction in principal's welfare, in dollars, as a consequence of the discrepancy of interests between the agent and the principal (Jensen and Meckling, 1976). Thus, the principals' effort to counter the divergence of interests, results in the agency costs since they are defined as the sum of the incentive costs to the agent, the monitoring expenditures by the principal and the residual loss that these measures cannot avoid (Jensen and Meckling, 1976).

The agency problem is recognized by Jensen and Meckling (1976) as a transversal problem to all social organizations and human interactions. Even so, the only agency costs considered by them are the ones resulting from the conflict of interests between managers-shareholders and debtholders-shareholders. This business standpoint of the agency problem leads to the discussion on the consequences of the capital structure choices to the goal of minimization of the agency problem.

Jensen (1986) states that, due to the promise of debt payment, the use of debt would reduce the agency costs of free cash flow, since, there would be less free cash

flow available for spending at the judgment of the manager. Despite this, and because the debt also has associated costs, the author argues that the debt-to-equity ratio that maximizes the value of firm is the one where marginal costs of debt are just equal to the marginal benefits of it.

In sum, this theory and particularly the 1976 article from Jensen and Meckling, provide an excellent contribution to the capital structure issue. In fact, by introducing the discussion on how the covered divergence of interests would influence financing and investment decisions in companies with different capital structures and management styles, the authors were boozers of new thoughts.

1.2. Capital structure determinants

The capital structure' theories mentioned in the previous topic reflect on the best approach to capital structure. There are theories that consider the chosen capital structure to be irrelevant, other that consider the debt to more advantageous and, still, others considering the opposite. However, for all theories that do not advocate the existence of a perfect market, there are some crucial factors that must be weighted when a firm defines its debt levels, the so-called determinants of the capital structure.

The determinants, while decisive for leverage's explanation, are far from consensual since they are intrinsically linked to opinions and perspectives. In fact, different theories tend to defend distinct determinants of debt and even if they do the same, the determinants tend to have a dissimilar expected impact on leverage depending on the theory.

Over the course of time, several authors addressed this topic, from Myers and Majluf (1984) to Harris and Raviv (1991), through Titman and Wessels (1998) or Frank and Goyal (2009). These works, and others, resulted in a vast list of determinants from company-specific factors to characteristic factors of a country or sector. For our

purpose, we compiled only the most relevant ones and those that were most often portrayed. Therefore, from now on we consider the following as capital structure determinants: nature of assets, profitability, growth rate, size of the company, non-debt tax shields, tax rate, the inflation recorded in the country where the company is listed and, finally, the debt benchmark from the sector to which the firm belongs.

Later, in chapter 4, will be defined proxies for these determinants in order to use them as control variables, since, although important to explain Leverage, these determinants are not the purpose of this dissertation.

1.3. Governance

The World Bank and the United Nations Organization define governance as the way by which power is exercised in the management of social and economic resources of a country with a view to its development (Kaufmann and Kraay, 2008). The United Nations Development Programme (UNDP) describe it in a bit more detail as the necessary management at the political, economic and administrative level in order to ensure the normal functioning of the country at all stages. In their point of view, all institutions, mechanisms and processes are annexed to this definition, through which citizens exploit their interests and rights, fulfil their obligations and mitigate their differences (Committee of Experts on Public Administration, 2006).

A different perspective is taken by Martin (1991) and Hyden (1990) that included culture as a key for governance explanation. In their point of view, considering a country's culture guides and shapes the social patterns and behavior. Any political programme or economic ideology that may come into force should adapt to the existing culture and not the opposite.

Directly and indirectly, governance factors impact organizations. More specifically and of interest to this work, we are interested in the impact of governance

on listed companies' capital structure, which raises the problem of having to deal with different perspectives on governance. To mitigate the difficulties raised by the heterogeneity of the concept we will focus on the approach of Kaufmann, Zoido-lobatón and Kraay (1999) which is aligned with the International Monetary Fund (IMF) and the Institute for Governance.

Kaufmann, Zoido-lobatón and Kraay (1999) define governance as the exercise of authority, in a country, through traditions and institutions. Electoral acts and subsequent monitoring of elected governments are included. Furthermore, the ability of governments to define and implement policies as well as the respect that both citizens and the state nourish for the institutions that supervise social and economic interactions, are also considered.

The measurement of governance, as done by the authors, allows quantifying the points they mention in an annual and/or a country perspective. In fact, adopting an unobserved components methodology, Kaufmann, Zoido-lobatón, and Kraay (1999) created six aggregated indicators which cover the various dimensions of the concept as follow:

- **Voice and accountability** – measures the rights and freedom given to which a given society is subject.
- **Political stability and absence of violence/terrorism** – indicates society perception of the likelihood of political instability or violence/terrorism motivated by political issues.
- **Governess effectiveness** - measures the credibility of a government and the quality of public services and its degree of independence from political pressure.
- **Regulatory quality** - assesses the capacity of government to create and implement laws that encourage private sector development.

- **Rule of law** - evaluates society's trust in the power of contracts, property rights, police forces and courts as well as the perception of the likelihood of crimes and violence.
- **Control of corruption** - measures the perception of the vassal of political power for the benefit of private economic groups and the elite of society, both in terms of small favors and large schemes of corruption.

This governance treatment differs from the others in both theoretical and practical terms. First, in its amplitude, since it covers some interactions that are not normally portrayed from a theoretical point of view, as the perceptions transmitted by the various actors involved in society.

On the other hand, in practical terms, considering the distinct way in which governance is measured. The authors use the sensations transmitted by citizens, experts and private sector companies, granting a different view from that evidenced by the available and generally used quantitative and descriptive data.

1.3.1. Governance and capital structure

Although governance' concept is comprehensive and susceptible to different interpretations, is increasingly consensual that it influences the choice of capital structure. In fact, the study of the interaction between public governance and firms' capital structure has been growing in financial literature. Some authors (Paolo (2013); Porta, Lopez-De-Silanes, Shleifer, and Vishny, (1997); Bancel and Mittoo, (2004); Carlin and Mayer (2003)) have already found that in addition to the specific factors of each company, also country-specific factors influence the choice of the debt level.

Rajan and Zingales (1995) suggest that a firm's debt ratio results from the combination the firm's characteristics, its interaction with other institutions and the

home country features. The authors add that some variables as bankruptcy laws, patterns of ownership or tax rate are also responsible for the differences on capital structures of companies. On the other hand, Bancel and Mittoo (2004), by comparing corporate capital structures between European countries, found some differences in the way managers approach the issue, especially between the Scandinavian and non-Scandinavian countries. In addition, the authors argue that debt-related factors are more influenced by governance characteristics, mainly the quality of legal system, than the equity factors themselves.

As reflected by the references used in the previous paragraph, the literature around this topic has focused mainly on legal factors. In fact, those tend to be the only ones consistently pointed as preponderant in the relationship between the institutional structure of a country and the capital structure of companies. Still, contrary to the trend, Wei and Zhou (2018) proves that there others. Compiling the six variables indicated in Kaufmann, Zoido-lobatón, and Kraay (1999) into a single indicator, the authors study the impact of governance on listed firms' capital structure. They concluded that equity weight is higher when institutional quality increase and that the stake of long-term debt in total debt rises under the same conditions.

Chapter 2

2. Research question and research hypothesis

2.1. Research question

In order to evaluate the relationship between the capital structure of a firm and the attributes of a country, it is mandatory to understand the existing theories of capital structure, how they are determined and, of course, what is public governance and which of its attributes can affect the choice of debt by a company. The literature previously reviewed is thus the basis to answer the following research question: What is the influence of public governance on the capital structure of European companies?

An answer to this research question is quite relevant to literature since: (i) To my knowledge, it is the first work that measures the impact of public governance on the capital structure of companies using a set of perceived indicators separately instead of using either public governance as a single indicator or perceived indicators agglomerated into a single one; (ii) Being a pioneering work in this interaction, it will be important to realize if the diversity existing at different levels between some countries also affects the capital structure of companies; (iii) Again, being a pioneering work, it is expected that will trigger several curiosities and new questions to be answered; (iv) This study allows a response to a suggestion made by Bancel and Mittoo (2004) about future cross-country research with more refined country-level indicators.

To answer the proposed research question, a research hypothesis was formulated by taking into account the existing literature on the relationship between capital structure and quality of public governance.

2.2. Research hypothesis

According to Wei and Zhou (2018), better institutional quality in general provides less investor fears about a possible dilution of debt. The same way, Porta et al. (1997) argued that better quality in a country's legal system causes less investor concerns and so higher firms' debt levels.

On the other hand, Titman, Fan, and Twite (2016) state that corruption is negatively correlated with debt and Cao, Duan, and Uysal (2013) support a negative relationship between political stability and leverage by stating that political instability would compress credit supply and, so reduce companies' ability to borrow.

In sum, in line with the previous mentioned authors, public governance quality is positively correlated with firm's leverage.

Research Hypothesis: There is a positive correlation between public governance and firm leverage.

Chapter 3

3. Variables, sample and methodology

This chapter starts with the introduction of the dependent and independent variables, being characterized and revealed the impact that is expected them to have on leverage. Therefore, will be presented the sample and some descriptive statistics and finally, the methodology used for regression analysis.

3.1. Variables

In this topic we can distinguish between two types, by the way data was collected: **objective** and **perceptual variables**.

The objective variables encompass the dependent variable, leverage, and the control variables, the traditional determinants of the capital structure defined in chapter 1. This type of variables is accepted and disseminated in the financial literature and are supported by objective data.

On the other hand, perceptual variables, which comprise the independent variables, are based on opinions and perceptions and are represented by the worldwide governance indicators (WGI). These variables are measured on a scale ranging from -2.5 for the most negative values to 2.5 for the most positive ones.

Variable	**Formula**	**Expected effect**
Leverage	$\frac{total\ debt}{total\ assets}$	

Tangibility	$\frac{net\ property\ plant\ and\ equipment}{total\ assets}$	+
Profitability	$\frac{EBITDA}{total\ assets}$	-
Growth	$\frac{CAPEX}{total\ assets}$	-
Size	$Log(total\ assets)$	+
Non-debt tax shields (NDTS)	$\frac{depreciation, depelation \text{ and } amortization}{total\ assets}$	-
Tax	$\frac{income\ taxes\ paid}{pre-tax\ earnings}$	+
Inflation	$inflation\ rate$	+
Industry	$\frac{median\ total\ debt}{total\ assets}$	+
WGI (VA, PS, GE, RQ, RL e CC)	Perceptual data	+

Table 1 - Formula and expected effects of each variable

In order to make outputs comparable, it is essential that all variables, whether primary or final, are expressed in the same currency unit. Thus, all of collected panel data were measured in Euros.

3.1.1 Dependent variable

Leverage is the only dependent/explained variable in our regression models. It is defined by the bulk of studies as a debt ratio as noted by Frank and Goyal (2009). However, given the diversity of possible descriptions for it, is important to detail the

concept before verifying the factors that determine its choice. According to Myers (1977), the book value of debt is a better proxy for the managers, because it expresses more accurately the assets in place instead of the growth opportunities evidenced by market value of leverage. Therefore, and due to the available data on Thompson Reuters DataStream, we use the book measures of total debt and total assets to construct the explained variable defined as the ratio between total debt and total assets of a company i in year t. Authors like Frank and Goyal (2009), Fama and French (2002), Rajan and Zingales (1995) and Harris and Raviv (1991) use this ratio as well.

3.1.2 Control variables

The variable **Tangibility** is defined as the ratio of net property plant and equipment to total assets and it quantifies the proportion of tangible assets in a company i in the year t. According to Rajan and Zingales (1995) and Frank and Goyal (2009), the greater the tangibility, the easier the valuation of assets by outsiders and, consequently, its collateralization. Thus, it is expected a positive relationship between this variable and debt level since the high levels of tangibility translates into lower expected distress costs and debt-related agency costs (Titman and Wessels, 1988).

Profitability quantifies the relative amount of profit of a company i in the year t. It is constructed through the ratio between EBITDA and total assets. Jensen (1986), fitting the agency costs theory, argues that debt is more valuable for profitable firms. However, as profitable firms accumulate profits, the relationship between profitability and debt levels is expected to be negative (Kayhan and Titman, 2007). This vision is shared by pecking order's proponents that refer that a company prefer internal finance over external funds (Frank and Goyal, 2009).

Growth is designed as the ratio between CAPEX and total assets of a company i in the year t. According to Harris and Raviv (1991), the relationship between this

variable and leverage is questionable depending on the differences in the methods applied and the different periods under analysis.

Aligned with pecking order conclusions, Kester (1986) states that debt levels increase as growth increases. On the other hand, Titman and Wessels (1988), based on theoretical arguments, suggest the existence of a negative relationship between the variables even without statistically significant evidence. In turn, Frank and Goyal (2009), confirms a negative impact of growth on debt levels. The authors explain, based on an empirical analysis that the debt-related agency costs as well as the costs of financial distress implicit on the variable, tend to lower a firm's debt ratio. Since the growth proxy used is the same as Frank and Goyal's one, it is expected a negative relationship between the variables.

Size measures the logarithm of assets of company i in the year t. This variable is applied by Graham, Leary, and Roberts (2015) and Frank and Goyal (2009) as a proxy of the size of a company and is expected to reflect a positive relationship with leverage. According to the referred authors, larger firms are awaited to present higher leverage levels than smaller ones as they address lower default risk.

The variable **Non-Debt Tax Shield (NDTS)** measures the tax deductions arising from depreciation, depletion and amortization as a percentage of total assets for a company i in the year t. This is a proxy for the variable used by DeAngelo and Masulis (1980) with the same name. The authors demonstrate that non-debt tax shields can replace the tax benefits of leverage. According to Frank and Goyal (2009), this proxy maintain a negative relationship with debt ratio.

Tax is a variable that captures the effective tax rate of a company i in a given year t. In line with studies as Gungoraydinoglu and Öztekin (2011) and Djankov et al. (2008) we define tax as the percentage of the resulting ratio between the total income taxes paid by a company and its pre-tax earnings. According to the tax corrective article of Modigliani and Miller (1963), Kraus and Litzenberger (1973) and J. K. Graham (1996)

the relationship between tax and debt is expected to be positive since the increase in leverage is associated in an increase in tax benefits.

The variable **Inflation Rate** reflect the inflation rate recorded in the country i in the year t. The literature is not elucidative about the correlation between this variable and the dependent one. On one side, Gungoraydinoglu and Öztekin (2011) indicates a negative repercussion since higher inflation levels tend to increase the bankruptcy costs of debt. Frank and Goyal (2009), in opposition, not only reveal a positive influence of expected inflation on leverage through an empirical work but also point out this variable as one of the six main in the determination of capital structure[5].

Industry is computed as the ratio between median total debt and total assets by sic code[6] and by year t. This variable is used to evaluate the impact of industry leverage benchmark on firm's leverage levels. According to Bradley, Jarrell and Kim (1984), it has a positive impact in leverage definition since the managers tend to make their capital structure choices based on industry peers ones (Leland, 1998).

3.1.3 Independent variables

Voice and Accountability (VA) reflect not only the freedom granted to citizens to participate in the choice of governments but also the freedom of expression and association and the independence of the media in a country j in the year t. Some proxies of the political process and both political and civil rights are included in the calculation of this aggregate governance indicator (Kaufmann, Kraay and Zoido, 1999).

Political Stability and Absence of Violence/Terrorism (PS) measures the likelihood of overthrow or destabilizing a government through unconstitutional and/or violent acts in country j in the year t. According to Kaufmann, Kraay and Zoido

[5] The author highlights that inflation rate is the least reliable factor on the list, since the sample (54 observations) is not as significant as the other variables (270 000 firm-year observations).
[6] It refers to Standard Industrial Classification code.

(1999), the quality of governance is affected by this possibility as it conditions both the continuity of the policies established and the capacity of citizens to elect people in power.

The variable **Government Effectiveness (GE)** demonstrate the perceived competence of the government's commitment to its own policies and the quality of public services and public servants in country j in the year t. It also evaluates the excellence of existing bureaucracy and the capacity of the civil service to be insurmountable in the face of political pressures (Kaufmann, Kraay and Zoido, 1999).

The **Regulatory Quality (RQ)** aggregate indicator evaluates the incidence of price control policies or deficient bank supervision as well as unreasonable regulation on critical areas to business development such as foreign trade in country j in the year t.

The **Rule of Law (RL)** is composed by several individual indicators through which is assessed the citizens confidence on society rules and their acceptance to live in consonance with them in a country j in the year t. It includes the consciousness on judiciary capability and predictability, the degree of violence in the crimes committed and the efficacy of contracts (Kaufmann, Kraay and Zoido, 1999).

Control of Corruption (CC) measures perceptions of corruption in country j in the year t. According to Kaufmann, Kraay and Zoido (1999) corruption represents a disrespect for the rules and its seen as a failure of governance.

3.2. Worldwide governance indicators - construction

The construction of the worldwide governance indicators (explanatory variables) started with the collection of data from more than 30 different sources, including surveys and official reports. In fact, the mix of sources is important in the treatment of perceptual data, as it allows the reduction of the risk of bias given the increased

robustness of the database. In this case, this made it possible to identify the perception that ordinary citizens, entrepreneurs and experts from both public enterprises, private companies and NGOs have about the quality of public governance in a country. Otherwise, using a single source of information, we would only perceive the impression of a sole class or sector.

Once the data has been collected, some difficulties appeared. The first of them, which make the information incomparable, arises from unitary or scale differences among the collected data. Another is related to the extension of the term governance. In order to solve it, Kaufmann, Zoido-lobatón, and Kraay (1999) divided the concept into six clusters. According to the authors, each cluster represent one of the six broad dimensions by which the quality of governance of a country should be assessed.

Then, in order to compile, organize and make the information comparable, Kaufmann, Zoido-lobatón, and Kraay (1999) used, for each of the 6 dimensions, the statistical methodology known as Unobserved Components Model (UCM). This method allows to (i) homogenize the data making it comparable, (ii) use a weighted average of primary variables to produce an aggregate governance indicator, and (iii) build margins of error that demonstrate the inaccuracy of the perceptual data collected.

3.3. Sample

In order to study the relevance of a set of variables on capital structure we extracted data for different companies and several years from Thompson Reuters DataStream. We chose to analyze all companies (24 302) which between 2013 and 2018 were listed in any of 15 European countries – Belgium, Denmark, Finland, France,

Germany, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

However, we decided to disregard all entities that had no information on the industry classification. Thus, we were left with a sample of 23 755 companies distributed geographically as mirrored in table 2.

Listed Country	Number of firms
Belgium	201
Denmark	210
Finland	203
France	1 017
Germany	15 708
Iceland	19
Ireland	75
Italy	491
Netherlands	237
Norway	319
Portugal	70
Spain	267
Sweden	800
Switzerland	1 142
United Kingdom	2 996
Total	**23 755**

Table 2 - Number of firms by country

In fact, to make the analysis more comprehensive, we characterize the panel data according to 20 supersectors as suggested by the Industry Classification Benchmark (ICB). This method allows us to aggregate companies by main income source, ensuring a high degree of homogenization in terms of business model within each supersector. Furthermore, the supersectors organization made it possible to detect whether potential differences in capital structures between countries are generalized or related only to specific sectors of economic activity.

Supersector	Number of firms
Automobile and Parts	355
Banks	915
Basic Resources	2 828
Chemicals	547
Constructionand Materials	691
Financial Services	1 593
Food and Beverage	810
Health Care	1 953
Industrial Goods and Services	3 408
Insurance	422
Media	898
Oil and Gas	1 742
Personal and Household Goods	1 170
Real Estate	1 221
Retail	971
Technology	2 430
Telecommunications	424
Travel and Leisure	793
Utilities	584
Total	**23 755**

Table 3 - Number of firms by supersector

3.4. Descriptive statistics

Having defined the sample to be studied we verified, after a first contact with the 91 366 firm-year observations, that some variables presented abnormal maximum and minimum values in relation to what is considered reasonable by the literature. As such, we decided to mark the values on which each variable can fluctuate to not adulterate the analysis. By truncating the intervals in which the variables can oscillate, we will be able to demonstrate more faithfully the relationship between the explanatory variables and the explained one.

Variable	Range of values
Leverage	We will exclude values greater than 1, according to Kayhan and Titman (2007)
Tangibility	Values range from 0 if there are no tangible assets to 1 if all assets are tangible. All values outside the interval [0; 1] will be dropped.
Profitability	Following Frank and Goyal (2009), both tails of this variable distribution will be truncated at 0.50% of the most extreme values.
Growth	All the values not included in the range [-1; 1] will be excluded, since It is abnormal to have a CAPEX proxy higher than total assets.
Size	As it is a logarithm variable it is already well-defined.
Non-Debt Tax Shield (NDTS)	It is anomalous to have depreciations values higher than total assets, so all the variables not included in the range [0; 1] will be dropped.
Tax	In order to remove the outliers from this variable we will drop the 0.50% most extreme values from both tails of distribution.
Inflation	Since the values were computed through the World Bank Group, this is already a well-defined variable.
Industry	In agreement with Frank and Goyal (2003), we will truncate the sample, in order to exclude the industry values which are most extreme 0.50% in either tail of distribution.
WGI (VA, PS, GE, RQ, RL e CC)	All WGI variables were collected from the World Bank Group and it is already well defined between [-2.5; 2.5]

Table 4 - Possible intervals for each variable

Despite reducing the number of firm-year observations by 7 917 to 83 449, the intervals limitation allows us to stay in line with the logic shown by the revised financial literature so far. In fact, the application of the previously constructed intervals in our sample enable us to build a reliable table of descriptive statistics as table 5.

Variable	Mean	Median	Standard Deviation (Std. Dev.)	Minimum	Maximum
Leverage	0.23	0.20	0.20	0.00	1.00
Tangibility	0.26	0.16	0.27	0.00	1.00
Profitability	0.03	0.07	0.22	-1.86	0.40
Growth	0.04	0.02	0.06	-0.85	1.00
Size	13.35	13.39	2.89	1.05	21.93
NDTS	0.04	0.03	0.04	0.00	1.00
Tax	0.17	0.20	0.31	-2.06	2.19
Inflation	0.01	0.01	0.01	-0.02	0.04
Industry	0.19	0.21	0.09	0.04	0.40
VA	1.39	1.41	0.12	0.95	1.74
PS	0.74	0.70	0.29	-0.10	1.40
GE	1.65	1.73	0.25	0.37	2.17
RQ	1.66	1.72	0.25	0.64	2.05
RL	1.69	1.69	0.28	0.28	2.10
CC	1.78	1.84	0.35	-0.03	2.40

The number of firm-year observations is 83 449

Table 5 - Descriptive statistics for each variable

3.4.1 Dependent variable

Analyzing the descriptive statistics, we notice that for the median company in the median year, debt was about 20% of its total assets. Furthermore, despite we can see a slight upward trend in the 2014-2016 sub period, it should be noted that the constitution of the median company's capital structure remained relatively constant through the historical period under review (2013-2017).

From 2013 to 2014, the level of indebtedness dropped from 19.4% to 19.2%. After that, there was a successive increase that culminated with a rate of 20.1% of the median company total assets in 2016. Finally, in 2017, there was a decrease in debt level of about 3.0% compared to the previous year to 19.5%.

Still on this variable, it is interesting to highlight the existing heterogeneity in the sample countries, since the one with the highest debt on its capital structure had more than twice the lowest. In the highest extreme we have Portugal that reported for the median company in the median year a debt level of 36.4%. On the opposite side, Ireland and Sweden registered 16.08% and 16.3% respectively

Year	2013	2014	2015	2016	2017
Leverage	19.36%	19.17%	19.94%	20.10%	19.51%

Table 6 - Medium leverage percentage by year

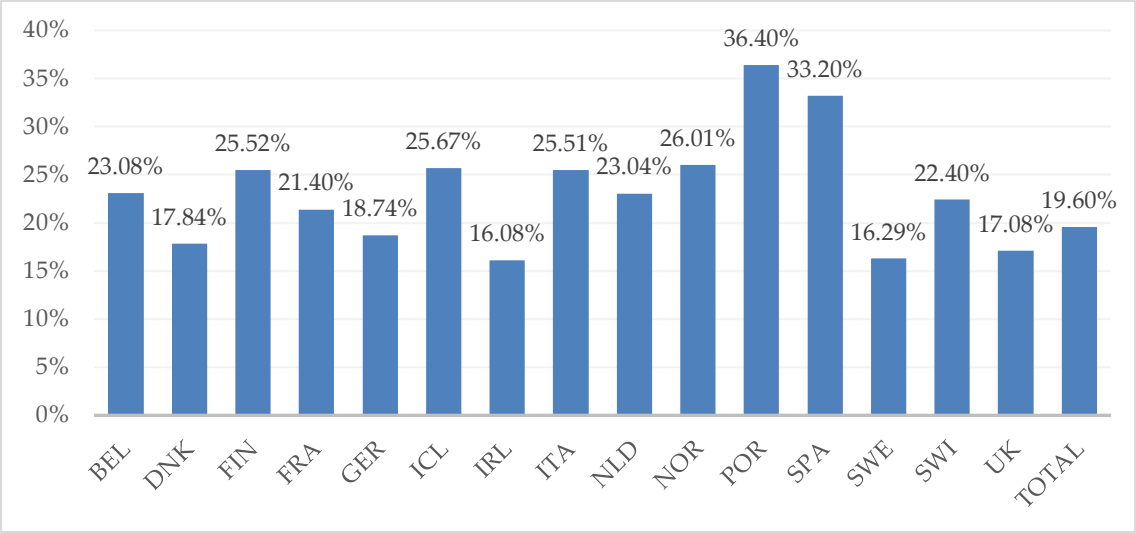

Figure 1 - Mean leverage percentage by country

3.4.2 Control variables

According to **tangibility** statistics, the percentage of tangible assets in the median company in the median year was 16.0%. In 2013, this variable was fixed at 15.6% and grew to 17.0% in the following year. Since 2015, it has stood around 16.2%. From countries point of view, it is worth noting the wide range of values assumed by this

variable. Belgium had the highest median value of tangibility 23.3% and, in the opposite side, Sweden had 5.9%.

In terms of **profitability** we observed a stabilization in values close to 7.4% for the median firm over the years. Nevertheless, we can point out differences in the behavior of this variable depending on countries, since Iceland reached 12.5% while Norway only 5%.

The median company showed a **growth** of 2.37% for the median year and remained constant in the course of time. Nevertheless, it should be mentioned that the growth of listed companies in Belgium (3.06%) and Switzerland (3.12%) was the most pronounced. On the contrary, the growth in Sweden (1.21%) and Portugal (1.44%) was smaller compared to the remaining sample.

The median company in the median year reported a value of €650 938 on total assets item. The median **size**, however, is only a figure that is not characteristic of the sample given the high annual and country-wide volatility. The annual indicator evolution shows an increasing trend from 2013 (€ 539 533) to 2016 (€ 767 635) with a slight decrease in 2017 (€ 753 308). In addition, companies in Switzerland (€ 6 985 450) and the Netherlands (€ 5 979 634) have the most positive influence on the median this and Sweden (€ 95 348) and Iceland (€ 198 075) are in the opposite situation.

The level of depreciation, depletion and amortization for the median company in the median year was 3.00% of its total assets and, as expected by the conservative nature of this item itself, it did not show oscillations in the time span of the sample. The **non-debt tax shields**, also proved to be homogeneous for the sample countries.

The median quoted company in Ireland was subject to the lowest marginal **tax** rate in the sample. On the contrary, the median company listed in Switzerland or France paid a marginal tax rate 11 percentage points above. Historically, this rate has been decreasing since in 2013 for the median company it was 20% and 2017 recorded 19%.

For the median country, the **inflation** variable showed a general increase in the prices of products and services of 1.80% in 2013. This percentage fell to 0.10% in 2015. After that, we observed a positive trend of the variable that culminated in the 1.80% registered in 2017. In the period 2013-2017, most of the countries have faced an inflation rate between 0% and 1% in median terms, although Norway reached 2% and Spain faced deflation of 0.20%. In the median year, taking into account all countries, the inflation rate was 0.80%.

The annual tendency in the variable **industry** has been the maintenance in values close to the 20.82% of the historical median. Over the periods, this variable has remained 1 percentage point above the median of the leverage which means that companies have been following the industry median leverage as a benchmark.

3.4.3 Independent variables

The **voice and accountability (VA)** indicator showed heterogeneous behavior in the different sample countries. In fact, there was a clear gap in this variable between bottom countries, as Italy or Spain, and high ranked countries, such the majority of the Nordic[7] countries. Despite that, there was low volatility in the median value over the years, being always close to the value of 1.41 obtained for the median year and country.

The **political stability (PS)** has been deteriorating over the years. At the beginning the median was 0.93 and culminated in 2017 with 0.58. Over the years, countries such as Spain or France have proved to be politically unstable, unlike countries such as Iceland or Switzerland.

The **indicator of regulatory quality (RQ)** had an opposite path to the previously variable. In 2013 it presented the lowest value with a median of 1.55 and in 2017 reached the highest with 1.78.

[7] Nordic countries in the sample are Denmark, Finland, Iceland, Norway and Sweden.

The variables **governance effectiveness (GE)** and **control of corruption (CC)** had a similar behavior in the period 2013-2017. Both had a growth from 2013 to 2014 and then a stabilization around the median value for the median year, 1.84 in GE and 1.73 in CC. According to GE and CC indicators, Italy with a median score of 0.46 and 0.05 respectively, stands out once again for the negative. On the opposite side, there were Switzerland and Finland for GE and the Nordic countries for CC.

The **rule of law (RL)** suffered an increase from 2013 to 2014 and since then it has been decreasing. Its median value for the median year was 1.69 and we can clearly make a performance distinction between countries. On one hand, Italy again, which obtained a median value of 0.33. On the other hand, countries like Finland, Norway or Sweden, all of them with median values around 2.00.

3.5. Methodology

In order to answer to the research question, we start by collecting unbalanced panel data (we have data missing for certain firms and years) which cover a period of 5 years (2013-2017) and contain information from 24 302 companies listed in 15 different European countries. This option for cross-sectional time series data, allow us to reduce the exposure to casualty, which is inherent to the data collected for a single period (Berrington, 2006).

Given the option for panel data structure, it will be applied fixed effect (FE) models, in order to allow the control of endogeneity problems caused by the non-zero correlation between the explanatory variables and the error term. In fact, this solution, namely the set of firm and year fixed effects, is in line with Flannery and Rangan (2006) which, having some empirical studies on basis, reiterated the importance of the use of these effects on capital structure issues. In addition, we will also distinguish the

explanatory variables, crucial to answer the research question, from the control variables, which are traditionally used in literature to determine the causes of leverage.

Thus, in order to explain the impact of public governance on capital structure choices, we will analyze the following model:

$$\begin{aligned} Lev_{i,t} = \beta_0 &+ \beta_1 Tangibility_{i,t} + \beta_2 Profitability_{i,t} + \beta_3 Growth_{i,t} + \beta_4 Size_{i,t} \\ &+ \beta_5 NDTS_{i,t} + \beta_6 Tax_{i,t} + \beta_7 Inflation_{i,t} + \beta_8 Industry_{i,t} + \beta_9 VA_{i,t} \\ &+ \beta_{10} PS_{i,t} + \beta_{11} GE_{i,t} + \beta_{12} RQ_{i,t} + \beta_{13} RL_{i,t} + \beta_{14} CC_{i,t} \\ &+ \sum_{i=1}^{n} \alpha_i \, Dfirm_i + \sum_{t=1}^{n} \gamma_t \, Dyear_t + \varepsilon_{i,t} \end{aligned}$$

Where:

- i: represents the firm
- t: represents the year
- Lev: represents the Leverage variable
- $Tangibility$: represents the Tangibility variable
- $Profitability$: represents the Profitability variable
- $Growth$: represents the Growth variable
- $Size$: represents the Size variable
- $NDTS$: represents the Non-Debt Tax Shields variable
- Tax: represents the Tax variable
- $Inflation$: represents the Inflation variable
- $Industry\ Benchmark$: represents the Industry Benchmark variable
- VA: represents the VA variable
- PS: represents the PS variable
- GE: represents the GE variable

- RQ: represents the RQ variable
- RL: represents the RL variable
- CC: represents the CC variable
- $Dfirm$: represents a dummy variable that takes the value 1, if the observation i is related to firm i.
- $Dyear$: represents a dummy variable that takes the value 1, if the observation t is related to year t.
- ε: represents the error term

In this model, we can identify the dependent variable (Lev), control variables (Tangibility, Profitability, Growth, Size, NDTS, Tax, Inflation and Industry), independent variables (VA, PS, GE, RQ, RL and CC) and fixed effects dummies (*Dfirm* and *Dyear)*.

Moreover, as explained below, the construction of this model will allow us to evaluate, through tests of significance, which variables are individually relevant to the explanation of the dependent variable. Similarly, we will be able to perceive the quality of the model as a whole. Significance tests will thus play a key role in defining the next steps.

In the individual significance tests, we will consider, for each variable, two hypotheses: H0: β_k=0 (null hypothesis) and H1: $\beta_k \neq 0$ (non-null hypothesis). The decision to accept or reject the null hypothesis (acceptance of H1) depends on the level of significance used in the test. In this model will be considering a significance level (α) of 10%. Thus, we will accept the null hypothesis whether the value obtained by the p-value test is below 10% (significance level) and reject otherwise.

According to the result obtained in p-value test, if we reject H0, we conclude that the independent/control variable has an impact on the dependent variable. In contrast, if the null hypothesis prevails, we determine that the inclusion of the variable in the model does not bring benefits for the quality of the model.

After testing the relevance of each explained/control variable for the model explanation, we will test the overall significance of the model. It will be applied the test statistic, F-test from which will result, once again, one of two hypothesis: the null hypothesis, which according to this test is given by H0: $\beta_1=\beta_2=\beta_3=\beta_4=...=\beta_k$ or the non-null hypothesis defined as H1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq ... \neq \beta_k$. In this case, if the test value is higher than the 10% of significance level (α) we will accept H0.

Chapter 4

4. Statistical tests and regression results

4.1. Statistical tests

In order to produce unbiased estimates that are normally distributed in large samples, it is necessary that the model respect some fundamental assumptions (Greene, 2002).

The first of them is endogeneity. The introduction of fixed effects allows us to control the endogeneity problems resulting from the correlation between the independent variables and the omitted variables that are part of the error term. However, the introduction in simultaneous of firm and year fixed effects does not solve endogeneity problems caused by variables that oscillate by company and by year (Ribeiro, 2018). Thus, resorting on financial literature, we conclude that studies with similar variables and the same fixed effects do not face de endogeneity problem (Wei and Zhou, 2018).

The second assumption relates to the heteroscedasticity. In this context, it is known that the use of robust standard errors in models with large samples makes the problem of heteroscedasticity inconsequential. Thus, in order to control the heteroscedasticity in the model, we opted for the robust estimation, since, according to Greene (2002), this solution is compatible with the estimation of fixed effect models.

The third and last assumption to be validated is the multicollinearity[8]. To do it, we decided to rely on Variance Inflation Factor (VIF) test. This test has an inherent theory which suggests that the higher the output for an independent variable, the

[8] According to Hair et al. (2010), it refers to the amount of an independent variable which is explained by the group of all other independent variables.

higher the degree of multicollinearity. Furthermore, according to Hair et al. (2010), the maximum acceptable threshold as output for VIF is 10 and the independent variables whose test values exceed that limit should be excluded from the model until the problem is solved.

The table below presents the results of VIF tests.

Variable	VIF	
	(1)	(2)
CC	17.27	-
VA	11.34	8.59
GE	10.56	9.36
RL	8.00	6.40
RQ	4.65	4.09
PS	4.38	4.00
Inflation	1.54	1.43
Tangibility	1.39	1.39
Growth	1.33	1.33
Size	1.24	1.24
Profitability	1.19	1.19
Industry	1.15	1.15
NDTS	1.10	1.10
Tax	1.06	1.06

Table 7 - VIF test results

From VIF (1) we conclude that we are facing a multicollinearity problem resulting from the CC variable. Thus, as recommended in the literature, we must remove the variable that caused the problem and performed the VIF again. As we can

see from the results of VIF (2), the problem has been overcome and the only variable to be removed from the model is CC.

Once the necessary assumptions have been validated, we can move on to model estimation and presentation of the main results.

4.2. Regression results

First of all, we must bear in mind that regression coefficients are not always interpreted in the same way. In our models, they can have three distinct meanings:

- An increase of one unit on the variables Tangibility, Profitability, Growth, NDTS, Tax, Inflation or Industry, has an expected impact on Leverage of β_x.
- A one percent growth on a logarithmic variable as Size, corresponds to an impact on the explained variable of $\frac{\beta_x}{100}$ units.
- An increment of one standard deviation on variables with no well-defined unit value as VA, PS, GE, RQ and RL leads to a Leverage increase of β_x.

After clarifying how to interpret each coefficient of estimation, we can now proceed to the introduction of table 9, our results table.

Variable	**Regression Models**					
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**
Tangibility	0,12***	0,12***	0,12***	0,12***	0,12***	0,12***
	(0,009)	(0,009)	(0,009)	(0,009)	(0,009)	(0,009)
Profitability	-0,07***	-0,07***	-0,07***	-0,07***	-0,07***	-0,07***
	(0,005)	(0,005)	(0,005)	(0,005)	(0,005)	(0,005)

Growth	-0,02 (0,014)	-0,01 (0,014)	-0,01 (0,014)	-0,01 (0,014)	-0,01 (0,014)	-0,01 (0,014)
Size	0,03*** (0,002)	0,03*** (0,002)	0,03*** (0,002)	0,03*** (0,002)	0,03*** (0,002)	0,03*** (0,002)
NDTS	0,26*** (0,031)	0,26*** (0,031)	0,26*** (0,031)	0,26*** (0,031)	0,26*** (0,031)	0,26*** (0,031)
Tax	0,00* (0,001)	0,00* (0,001)	0,00* (0,001)	0,00* (0,001)	0,00* (0,001)	0,00* (0,001)
Inflation	0,00 (0,001)	0,00 (0,001)	0,00 (0,001)	0,00** (0,001)	0,00* (0,001)	0,00** (0,001)
Industry	0,52*** (0,035)	0,51*** (0,035)	0,51*** (0,035)	0,51*** (0,035)	0,51*** (0,035)	0,51*** (0,035)
VA	-	-0,04*** (0,015)	-0,02 (0,016)	0,00 (0,016)	0,01 (0,016)	0,01 (0,016)
PS	-	-	-0,03*** (0,005)	-0,04*** (0,005)	-0,03*** (0,005)	-0,03*** (0,005)
GE	-	-	-	0,05*** (0,006)	0,01 (0,008)	0,01* (0,008)
RQ	-	-	-	-	0,05*** (0,008)	0,05*** (0,008)
RL	-	-	-	-	-	-0,02*** (0,007)
Firm fixed effects	Yes					
Year fixed effects	Yes					
Adjusted R-squared	0.8266	0.8267	0.8268	0.8270	0.8271	0.8271
Overall F-Test	82.35***	76.55***	73.97***	73.83***	71.01***	67.14***
Firm-year observations	83 449					

Table 8- Regression results

*, ** and *** indicate that coefficients are significantly different from 0 at 10%, 5% and 1%, respectively. Coefficients were estimated base on robust standard errors. The variables included in the models are the follow: Model (1) - control variables; Model (2) - control variables plus VA; Model (3) – previous model plus PS; Model (4) – previous model plus GE; Model (5) – previous model plus RQ; Model (6) – previous model plus RL.

The table above contains the results of six regressions with firm and year fixed effects. As we can see , model [2] is constructed as model [1] plus the variable VA, model [3] is identical to model [2] with the addition of variable PS and so successively until the model six [6], which contemplates all the control and explanatory variables.

Focusing, for now, exclusively on the regression results of model [6], we conclude that: (*i*) it is a good quality model since it has a 0.83[9] coefficient of determination; (*ii*) it has some explanatory power as proved by the overall F-Test at a 5% significance level (*iii*) the variables Tangibility, Profitability, NDTS and Industry are the ones with higher impact on Leverage; (*iv*) Growth and VA have an insignificant impact on the explained variable; (*v*) Profitability, PS and RL have a negative impact on Leverage and (*vi*) Tangibility, Size, NDTS, Tax, Inflation, Industry, GE and RQ have a positive relationship with the dependent variable.

Moreover, as models presented on table 9 relate to each other as nested[10] models, it is easier for us to make a comparison of the performance of variables and indicators of the models when we add or remove a variable and thus to complement the model [6] analysis.

In general, we see that the quality of the various models is quite similar and they all have explanatory power. Besides that, we realize that some variables that were significant in initial models are no longer significant in models with more variables and vice versa. The variable VA is the most glaring case of it since it not only lost its significance, but also went from negatively affecting the explained variable to positively affecting it.

To conclude the analysis on the regressions results, we will check if the behavior of the variables is in accordance with what would be expected based on the literature. This way, further than identifying possible deviations, we can confirm or not the research hypothesis formulated in chapter 2.

[9] On a scale ranging from 0 to 1 (Greene 2002)
[10] According to Mccoach (2012) if a model contains all the terms of other model with an additional term, the two models are considered nested.

Variable	Expected Effect	Results	T-test	
Tangibility	+	+	Significant	
Profitability	-	-	Significant	
Growth	-	-	Insignificant	
Size	+	+	Significant	
NDTS	-	+	Significant	
Tax	+	+	Significant	
Inflation	+	+	Significant	
Industry	+	+	Significant	
VA	+	+	Insignificant	Significant
PS		-	Significant	
GE		+	Significant	
RQ		+	Significant	
RL		-	Significant	

Table 9 - Expected effects, results and variables significance test

In general, the regression results demonstrate that literature expectations on variables performance are corresponded. However, in the variables Growth and NDTS (Non-Debt Tax Shields) there are some differences compared to what was expected by most authors. In Growth, although the relationship with Leverage is negative as predicted by Frank and Goyal (2009), the variable is insignificant to explain the behavior of the model's target variable. Concerning NDTS, despite being a preponderant variable in the model explanation, it presents a different sign from the expected one by Fama and French (2002) and DeAngelo and Masulis (1980). According to the referred authors, a negative impact should be observed instead the positive impact verified in the regression coefficient.

On the other hand, the possible differences found in the WGI variables (PS and RL) are not taken into account since the literature only refers to the expected impact of the variables as a whole and not of each at the individual level.

Chapter 5

5. Limitations and contributes

During the elaboration of this study have been identified some limitations caused both by the lack of depth of the existing literature and by the timing of the accomplishment of this work. Nevertheless, it was the overcoming of these barriers that allowed us to add something new to the literature, as proposed by Bancel and Mittoo (2004), and thus create conditions for new future approaches.

One of our limitations was the time span of our data that coincides with the post-subprime crisis period which has affected most European countries. In fact, in the years following the fall of Lehman Brothers bank, the European economy was badly affected, so that the so-called European sovereign debt crisis was established. Therefore, the results obtained may have been biased by the unfavorable economic context and so may justify, in part, some deviation from the literature.

Another limitation to the development of this study was the lack of literature that properly combines our two main concepts. Although the abundance of papers on capital structure and public governance, there are few authors who relate them and those who do so seem to have, in general, a very short view of public governance as they only consider preponderant for it characterization factors as the tax rate or the quality of bankruptcy laws (Rajan and Zingales (1995)). In fact, papers like Gungoraydinoglu and Öztekin (2011) and Wei and Zhou (2018) are exceptions that present a broader view of public governance term by adding social and cultural dimensions to it. However, even in these cases it is not possible for us to evaluate the impact that each characteristic has on companies´ capital structure choices since they are all clustered in a single variable.

Finally, the separation of the six worldwide governance indicators made in our analysis enable us to transform the initial lack of literature' limitation into a contribution by allowing, for instance, the evaluation of whether the ability to control corruption or the stability of political power affects positively or negatively the level of debt instead of assessing the impact of public governance as a whole, as it had been until then.

Conclusion

The central purpose of this study is to answer to the question "What is the influence of public governance in European firm's capital structure?" and to do it so, it seemed reasonable to start by presenting both capital structure and public governance concepts. In addition, we collected some panel data on companies that between 2013 and 2017 were listed in one of 15 European countries. That data collection resulted in 83 449 treated observations and allow us to initiate the analytical process.

Based mainly on Kaufmann, Zoido-lobatón, and Kraay (1999), Frank and Goyal (2009) and Gungoraydinoglu and Öztekin (2011) we designed a model in which our dependent variable, the debt level, is explained by six public governance indicators, our independent variables - VA, PS, GE, RQ, RL and CC – and has, as control variables, some macro-economic indicators and accounting ratios - Tangibility, Profitability, Growth, Size, Non-Debt Tax Shields, Tax, Inflation and Industry. Despite that, the realization of tests on some assumptions as suggested by Greene (2002) – endogeneity, heteroscedasticity and multicollinearity - led us to drop the CC variable which did not overcome the VIF test for multicollinearity. Thus, the final model was regressed with only five independent variables in addition to the control ones.

The final model regression allow us to conclude that, in general, public governance factors influence the decision on the capital structure as evidenced by the significance test presented in Table 10. Individually, we can state that VA is insignificant to explain the dependent variable contrary to what succeeds with the remaining independent variables: PS, GE, RQ and RL. Furthermore, the most important variables in the debt level explanation are PS, RQ and RL as they are significant with a significance level of 1%. Apart from these, GE is significant at a 10% level.

Regarding the way in which public governance affects Leverage, if negatively or positively, one would expect, supported by Wei and Zhou (2018) that the higher the quality of public governance, the higher the percentage of corporate debt. However, due to the sub-division created on the public governance concept, we can only infer on the influence of each factor separately. That way, we have that PS and RL affect our dependent variable negatively while GE and RQ do so positively.

Finally to answer the research question initially proposed, "What is the influence of public governance in European firm's capital structure?" we determinate that: (*i*) the rights and freedom to which the people of a given country are subject have no influence on the choice of capital structure by listed companies in that country; (*ii*) the political stability and the authority exercised by the rules (contracts, property rights, courts or police forces) in a country society have a negative influence on the debt radios of listed companies in that country; (*iii*) the quality of public services and their independence from political pressures as well as the ease with which a government manages to create and implement laws tend to weigh positively on the choice of debt over equity on the part happens;

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Appendices

Appendix A – Expected and Verified correlation

Variable	Leverage	
	Correlation	**Expected correlation**
Tangibility	0,27	+
Profitability	0,07	-
Growth	0,09	-
Size	0,26	+
Non-debt tax shields (NDTS)	0,10	-
Tax	0,01	+
Inflation	-0,02	+
Industry	0,29	+
VA	-0,03	+
PS	0,01	+
GE	-0,04	+
RQ	-0,07	+
RL	-0,05	+
CC	-0,06	+

Appendice 1 - Correlation table