

**DEBT MATURITY STRUCTURE ACROSS EUROPE:
EVIDENCE FROM GREECE, IRELAND, ITALY, PORTUGAL
AND SPAIN**

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Abstract

The purpose of this empirical work is to examine the determinants of corporate debt maturity structure in Greek, Irish, Italian, Portuguese and Spanish listed firms on the main stock index of each country, using panel data methodology. These countries have been highly affected by sovereign debt crisis that developed in Europe, and firms in these countries operate under different environment conditions, which have implications on firms' debt maturity choice. The sample considers the period 2001-2010, resulting in 855 firm-year observations. We apply the Generalized Method of Moments (GMM) estimation method.

We find evidence that firms in these countries adjust their debt maturity ratio to an optimum target level. Opposite to the liquidity risk theory, we find evidence that firms with high liquidity have higher debt maturity ratios. We also provide evidence that firms which synchronize asset and liability maturities have debt with longer maturities. At the country level the results suggest that firms in developed countries have more access to long-term debt. We also find evidence that firms tend to use less long-term debt in countries with high inflation. Firms use more short-term debt when financial sector has a higher dimension. In countries where the legal system is more effective firms use debt with longer maturities. Finally, we observe a slowdown on firms' debt maturity during the financial crisis. However, these results are statistically insignificant.

Overall, the choice of debt maturity structure is determined by both firms-specific and country-specific effects.

JEL Classifications: G01, G32

Keywords: Debt Maturity Structure, Financial crisis, Panel Data, GMM.

Resumo

O objectivo da presente dissertação é analisar os determinantes da maturidade da dívida para as empresas cotadas no principal índice bolsista da Grécia, Espanha, Irlanda, Itália e Portugal, usando a metodologia de dados em painel. Estes países foram fortemente afectados pela crise das dívidas soberanas que se desenvolveu na Europa e operam em diferentes condições, que têm impacto na maturidade da dívida. A amostra considera o período 2001-2010, resultando em 855 observações. O modelo aplicado foi o Generalized Method of Moments (GMM).

Concluimos que as empresas nestes países ajustam a maturidade da sua dívida para um nível óptimo. Ao contrário do indicado pela teoria de risco de liquidez, verificámos que as empresas que apresentam maior liquidez possuem em média dívida com maturidade superior. Também concluimos que as empresas que sincronizam a maturidade dos activos com a dos passivos apresentam dívida de mais longo prazo. Para os determinantes de cada país verificámos que as empresas que actuam em países com maior desenvolvimento têm dívida com maturidades mais elevadas. As empresas apresentam dívida com maturidades superiores em países em que a inflação é mais reduzida. Quando o sector financeiro apresenta maior dimensão as empresas têm dívida com maturidades mais reduzidas. Em países onde o sistema legal é mais eficiente as empresas apresentam dívida com maturidades mais elevadas. Finalmente, apesar de documentarmos uma diminuição da maturidade da dívida durante a crise financeira, a mesma é estatisticamente insignificante para a sua evolução.

Verificámos assim que a maturidade da dívida das empresas é determinada pelas condicionantes de cada empresa e de cada país.

Classificações JEL: G01, G32

Palavras-chave: Maturidade da Dívida, Crise Financeira, Dados em Painel, GMM.

Executive Summary

Firms that borrow money to finance their operations and investments must make decisions about the optimal maturity of their debt, which directly affects not only investments decisions but also the firms' market value. Researchers have put forward first several hypotheses identifying firm-specific factors that determine corporate debt maturity: the asymmetric information and signaling hypotheses, the "matching" maturity proposition, the agency costs model, the credit and liquidity risk hypotheses and tax hypotheses. Additionally, other authors introduced country-specific effects, such as the institutional and legal environment, and the macro-economic conditions.

This empirical work analyses the determinants of corporate debt maturity structure in Greek, Irish, Italian, Portuguese and Spanish listed firms on the main stock index of each country. On one hand these countries have been highly affected by sovereign debt crisis that developed in Europe since 2009, and on the other hand firms in these countries operate under different environment conditions, which have implications on the firms' debt maturity choice. Our goal is to understand firms' debt maturity structure across our sample and find which determinants better explain the maturity choice. Other papers attempt to understand this relation however most focus only in firm-specific effects or in country-specific effects to explain that choice. Additionally, we want to provide insights of the impact of financial crisis in debt maturity.

Our analysis is based on a sample of 99 firms listed on the main stock index of each country for the period between 2001 and 2010, with a total of 855 firm-year observations. In order to document the relationship between debt maturity and its determinants, panel data methodology is used. Our analysis is divided in two distinct moments: the descriptive statistics and correlation analysis, and the Generalized Method of Moments (GMM) regression model. We applied the GMM estimation model, since it allows determining whether firms adjust the actual maturity of the debt to an optimal level.

First, the descriptive statistics show that the debt maturity ratio increased from 45.42% in 2001 to 53.13% in 2010, providing some indication of an upward trend during the whole sample period. However, we observe during the financial crisis a slowdown in

the average of debt maturity, suggesting that it had an impact in firms' debt maturity evolution across all countries.

Final results are consistent with previous empirical studies reported. Our findings suggest that debt maturity is related with firm-specific factors and country-specific factors, giving mixed support to most of the existing literature. We find evidence that firms in these countries adjust their debt maturity ratio to an optimum target level. The speed of adjustment in those countries suggests a costly and non-instantaneous adjustment.

Opposite to the liquidity risk theory, we find evidence that suggests that firms with high liquidity prefer to raise long-term debt. These findings confirm that quoted firms are less exposed to information asymmetries problems because markets require a constant release of information by listed firms. The insignificant estimates provided to the signaling hypothesis also confirm our explanation, since markets already know about the firms' quality. We also provide evidence that the firms' ability to commit to making debt payments out of future revenues is enhanced by the strength of the lender's threat to seize assets, since firms with slower asset depreciation have debt with longer maturities, confirming the "matching" maturity proposition.

At the country level, consistent with previous empirical studies, the results indicate that the level of development of the economy has an impact in the debt maturity ratio, since in average firms have debt with longer maturities in countries with high economic development. In addition, we also find evidence that firms tend to use less long-term debt in periods with high inflation. The size of the financial sector also has impact in firms' debt maturity, since when it has a higher dimension firms use more short-term debt. These conclusions reflect the preferences of banks to lend short-term debt. When the legal system is more effective firms tend to use debt with longer maturities, giving also support to the "matching" maturity proposition. Finally, we observe a slowdown in firms' debt maturity structure during the financial crisis. However, these results are statistically insignificant in debt maturity evolution.

Overall, the choice of debt maturity structure is determined by both firms-specific and country-specific effects. Through the application of stable macroeconomic policies,

improvements in effectiveness of the legal system and in the development of the banking sector, governments would increase firms' access to long-term debt. The crisis may weaken the incentives for structural reform through a range of channels, and thereby adversely affect potential growth and the resilience of economies to recover.

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1. Introduction

Given the current economic climate many businesses are looking at ways to raise debt and equity capital, in order to finance their investment and operating activities. The capital structure is an important area of decision making that directly affects the cost of capital, investment decisions and the firms' market value.

The theory of capital structure starts in the decade of 50's with Modigliani and Miller (1958). The authors showed that in a perfect capital market the financing decision of a firm is irrelevant, since it is not directly related to its market value. However, according to the authors, it states that based on the assumption of no brokerage, tax and bankruptcy costs, investors can borrow at the same rate as corporations and they would tend to have the same information as management about the firms' future investment opportunities. According to the authors, under these restrictions the ratio debt/equity has no impact on firms' market value, assuming that earnings before income tax are not related to the use of debt.

Later Modigliani and Miller (1963) showed that with the introduction of these variables the ratio equity/debt on corporate structure becomes relevant, since firms can increase their market value. Other authors contribute to improve the knowledge about capital structure choice (Stiglitz, 1974; Jensen and Meckling, 1976; Miller, 1977; and Myers, 1977).

Subsequently, theoretical literature appeared about the role of debt maturity structure on a firms' value. Most of these theories focus only on how firm-specific variables explain debt maturity choice: the asymmetric information and signaling hypotheses (Flannery, 1986; Diamond, 1991), the "matching" maturity proposition (Morris, 1976; Myers, 1977), the agency costs model (Myers, 1977; Barnea et al., 1980), the credit and liquidity risk hypotheses (Diamond, 1991) and tax hypotheses (Brick and Ravid, 1985).

In the asymmetric information and signaling hypotheses, Flannery (1986) demonstrated that firms with positive information have more incentives to opt for short-term debt, since their projects are more valuable in the short-term than in the long-term. We are in presence of a *Signaling equilibrium* since firms that have lower quality tend to opt for

long-term debt, suggesting that they are overvalued, and firms with higher quality fund their projects with short-term debt.

The “matching” maturity approach was first introduced by Morris (1976) and Myers (1977). The authors demonstrated that the maturity of debt should be synchronized with the period of life of its assets. According with them the reason for that is, on one hand if debt exceeds the assets life cycle it may not generate returns to pay the debt service of the firm. On the other hand if the maturity of the debt is lower than the useful life of assets, there may not be sufficient liquidity to meet its present obligations. According to Myers (1977), this “matching” can reduce the agency costs problem.

With regard to agency costs theory, Myers (1977) argued that if the debt matures before the firm exercises their growth options, they can diminish the *under-investment* problem and consequently the agency costs associated. The author stated that firms with higher growth potential should fund their projects with short-term debt. Mixed results were reported by other authors.

In the credit and liquidity risk hypotheses Diamond (1991) argued that firms by financing with short-term debt may face problems of a lack of future liquidity, as generated cash flows may not be sufficient to meet present obligations of the firm. However, the author claims that the debt maturity choice is analyzed as a trade-off between a borrower’s preference for short-term debt due to private information about the future credit rating, and liquidity risk.

Regarding the relation between taxes and debt maturity, empirical studies show mixed results. Kane et al (1985) showed that the optimum debt maturity increases with the decrease of corporate tax shield. Brick and Ravid (1985) demonstrated that if interest rates present a positive evolution, firms should opt for long-term debt, since it allows increasing the present value of tax benefits. Later Brick and Ravid (1991) demonstrated that, assuming that interest rates are uncertain, firms should opt for long-term debt. Kim, Maurer and Stohs (1995) provided insights of an inverse relation between these variables, since firms can maximize the tax-timing option value for its investors through the use of long-term debt.

However, little is known about how variations across countries explain the differences in the debt maturity choices. Two of the first authors to introduce these variables into discussion were Demirgüç-Kunt and Maksimovic's (1999), who studied the capital structure of firms across 30 countries during the period 1980-1991.

With this dissertation we attempt to contribute to the existing literature by identifying which determinants better explain debt maturity choice, using firm-specific and country-specific effects. Additionally, we intend to observe the impact of the financial crisis in firms' debt maturity. The selection of our sample, namely Greece, Ireland, Italy, Portugal and Spain is based on two factors. Firstly, after the debacle of the financial markets which occurred mostly in the USA during the years of 2007 and 2008, since 2009 financial markets have been highly affected by the sovereign debt crisis that developed in Europe. Bond spreads faced by Greece, Ireland, Portugal and to a lesser extent followed by Spain and Italy have increased. Financial crisis shut down traditional modes of financing and we pretend to know how changes in macroeconomic conditions influenced firms' debt maturity. Secondly, firms in these countries operate under different environment conditions, such as legal and institutional determinants and macro-economic conditions that can influence not only the debt maturity but also the country's wealth.

Using the most relevant literature on corporate finance, we built a model to investigate the influence of firm-specific and country-specific determinants on the maturity of debt. For that purpose, we use the listed firms on the main stock index of each country during the period 2001-2010, to identify a trend in debt maturity and the determinants of the debt maturity choice.

This dissertation is organized as follows. In chapter 2 we present the most relevant empirical work that tries to explain the debt maturity choices and the possible impact of the financial crisis on that. Chapter 3 describes data sample, the variables used in our model and the methodology used to study debt maturity. In chapter 4 we describe the impact of firm-specific and country-specific effects on debt maturity in our sample through descriptive statistics and a linear regression. In Chapter 5 we summarize the main conclusions about our empirical study. Finally, in the last chapter we present some limitations in the empirical work and possible future researches.

2. Literary Review

Since the preliminary work developed by Modigliani and Miller (1958) about corporate finance, many authors have tried to explain firms' choices concerning debt maturity. This chapter discusses the main theories and empirical studies and how they potentially affect firms' financing choices. In our approach, we consider firm-specific and country-specific variables. Additionally, we present the possible impact of the Bank and European sovereign debt crisis in debt maturity evolution.

2.1 Firm-Specific Effects

Most of the theoretical literature concerning debt maturity focuses mainly only on how firm-specific variables can explain debt maturity choice: the asymmetric information and signaling hypotheses, the “matching” maturity proposition, the agency costs model, the credit and liquidity risk hypotheses and tax hypotheses.

2.1.1 Asymmetric information and Signaling hypothesis

One of the theoretical hypothesis developed to explain firms' debt maturity derives from the problem of asymmetric information, first formalized by Jensen and Meckling (1976) and later developed by Myers (1977). This theory is based on the idea that firms are better informed about their creditworthiness than are lenders.

According to these authors, we are under asymmetric information when in a transaction one part has more or better information than the other. We often observe this phenomenon since managers have more information about the firms' future, than their creditors and investors.

Flannery (1986) analyzed firms' debt maturity using a model which, in an environment of uncertainty the choice of debt maturity can signal the quality of the firm. According

to the author, investors know that at $t^1=0$ there are good and bad firms in the market that differ in the probability of success of their projects. In addition, investors know the distribution of firms in the market.

In efficient capital markets² an investor can identify the quality of each firm, and consequently, establish the rate (coupon rate) to demand, regardless of the maturity of its debt. On the other hand, each firm chooses its debt maturity in terms of advantages and disadvantages that each option entails. While short-term funding implies a refinancing in future, long-term debt increases the likelihood of credit deterioration.

However, in a market with asymmetric information, investors cannot assess the quality of each firm, valuing in $t=0$ each one in the average population. Consequently, investors tend to undervalue high quality firms, forcing them to offer a higher rate to finance their projects. It is possible to observe the existence of a loss of value for these firms. According to Flannery (1986), firms that have positive asymmetric information have more incentives to opt for short-term debt, since their projects are more valuable in the short-term than in the long-term. In $t=1$ firms can renegotiate their debt structure at a reduced cost, since matters known previously only by management become more public in the course of time. On the other hand, firms with negative asymmetric information tend to opt for long-term debt, since they are overvalued.

Knowing this, rational investors will try to infer insider information from firms' financing strategies. Signaling theory contends that under certain conditions firms' choice of risky debt-maturity can convey the insider information about firm quality.

According to Flannery (1986), we observe an existence of a *signaling equilibrium* since firms that have lower quality projects cannot mimic other firms, as the costs of refinancing short-term debt are higher than the overvaluation of their projects, opting for long-term debt. Additionally, higher quality firms signal their quality, issuing short-term debt.

¹ T = time.

² Efficient capital market is a market without arbitrage opportunities. Developed by Fama (1970), the efficient markets theory states that the price of an asset reflects all relevant information that is available about the intrinsic value of the asset.

Kale and Noe³ (1990) noticed the possibility of a *pooling equilibrium*⁴, contrary to the one demonstrated by Flannery (1986). The authors stated that in the absence of transaction costs, low quality firms always have incentives to mimic high quality firms. Titman (1992) also noticed that *pooling equilibrium* can be obtained. The author considered that the uncertainty of interest rates and the costs of insolvency as key factors for high quality firms to choose long-term debt to finance their projects

Mitchell (1991) suggested that unquoted firms, since they have more information asymmetries problems, are more likely to issue short-term debt.

2.1.2 “Matching” Maturity

At the end of the useful life of assets firms face the problem of having to make new investments. If in this period debt has not matured yet, it may be created an incentive for firms not to invest in projects with positive NPV⁵, or invest in projects with high risk, since the main benefits created by them will go mainly to creditors.

Morris (1976) and Stohs and Maurer (1996) demonstrated that the maturity of debt should be synchronized with the period of life of its assets. According to them, the reason for that is, on one hand if debt exceeds the assets' life cycle it may not generate returns to pay the debt service of the firm. On the other hand if the maturity of the debt is lower than the useful life of assets, there may not be sufficient liquidity to meet their present obligations. In order to reduce the risks mentioned above, the authors proposed that firms must synchronize the maturity of their assets and liabilities.

Hart and Moore (1994) confirmed this matching maturity proposition, demonstrating that slower asset depreciation corresponds to longer debt maturities. Chan and Kanatas (1985) argue that collaterals can reduce asymmetric valuation problems, that is, the conflict that arises when borrowers and lenders disagree about the true value of the

³ The authors also demonstrate that a *signaling equilibrium* may exist, under the assumption that independent changes in firms' value are relaxed.

⁴ Both types of firms take the same action.

⁵ The net present value (NPV) is defined as the sum of the present values of the individual cash flows of the same entity or project.

project. According to the authors, there is usually less uncertainty about the value of collateral than the expected return of the project which has not been undertaken. If collateral is pledged, lenders will feel more confident and will charge a lower interest rate for longer maturities.

Additionally Myers (1977) also stated that firms should synchronize the maturity of their debt with the declining value of their assets in order to reduce agency costs.

“We can interpret matching maturities as an attempt to Schedule debt repayments to correspond to the decline in the future value of assets, currently in place.”
(Myers, 1977: 171)

2.1.3 Agency Costs

Another leading theory states that the conflicts of interest between firms and creditors can also influence the debt maturity choice⁶.

The value of a firm can be calculated by the present value of its assets plus the value of its growth opportunities⁷. Myers (1977) argued that firms' growth opportunities are like options, and their value depends on the probability that they have to be executed, in order to maximize the value of the firm. On the settlement date⁸, a firm will have to decide to exercise its options, that is, whether invest in its growth opportunities or not. This decision depends on its capital structure and in particular in the maturity of its debt.

If firms use debt to finance their investments, the generated return will be split between shareholders and creditors. However, if firms present a high amount of debt in their capital structure, the benefits generated by projects that maximize firms' value, go almost exclusively to their creditors. In these cases, firms have incentives not to invest in projects with positive NPV. Myers (1977) described this problem as *under-investment*. Additionally, firms can opt for high-risk projects, transferring part of the

⁶ The agency costs theory arises from the inefficiency of a relationship between two agents.

⁷ According to Gordon Growth model or constant-growth DDM.

⁸ The settlement date refers the date when a trade can be exercised or completed.

value from creditors to shareholders (*risk shifting problem*, Barnea et al., 1980). The use of debt affects stockholders' investments decisions, producing substantial inefficiency, which is referred to as *agency costs of debt*.

However, the author suggested that firms can avoid this situation in different ways: (i) reducing the amount of debt in their capital structure, (ii) introducing covenants⁹ and (iii) reducing the maturity of their debt. Myers (1977) argued that if debt matures before firms exercise their growth option, they can mitigate the *under-investment* problem. Thus, according to the author, firms that have higher growth potential should opt for short-term debt.

Other empirical studies (Stulz and Johnson, 1985; Ho and Singer, 1982) highlight the advantages of short-term debt. Additionally, the authors suggested that firms may opt for high priority claims¹⁰, which on one hand limit the transfer of value from shareholders to creditors, diminishing the *under-investment* problem, and at the same time in case of insolvency these claims have priority. Smith and Warner (1979) demonstrated that firms that show a high risk profile could benefit from the introduction of covenants in their capital structure, reducing the problems associated with Moral Hazard¹¹.

2.1.4 Credit and Liquidity risk

According to what was discussed in *Asymmetric Information* theory, introduced by Myers (1977), firms that have positive information will opt for short-term debt to finance their projects.

However, Diamond (1991) argued that by financing with short-term debt firms may face problems of lack of future liquidity, as cash flows generated may not be sufficient to meet the present obligations of the firm. Thus, according to the author, the risk of

⁹ A loan covenant is a condition in a loan or bond that requires the borrower to fulfill certain conditions or which forbids the borrower from undertaking certain actions.

¹⁰ In case of bankruptcy this claims have priority.

¹¹ The risk that a party not entered into a contract in good faith, providing misleading information and taking unusual risks, since they cannot take the full consequences and responsibilities of their actions.

illiquidity and the costs associated with possible insolvency, provide incentives for firms to finance on a long-term basis.

Diamond (1991), in accordance with what was demonstrated by Flannery (1986), argued that by opting for short-term debt firms are able to renegotiate their debt when the market has access to information previously unknown. However, if the information available to the market shows an overvaluation of the firm and its projects, firms will present high difficulties in renegotiating their debt, thereby increasing the risk of illiquidity. Diamond (1991) stated that the choice of debt maturity is a trade-off between liquidity risk and private information. According to the author, lower-quality firms, with low cash flows to meet their debt service in the long run, are forced to opt for short-term debt. Firms that have a situation relatively stable, opt for debt in a long-term basis, since they faced major liquidity challenges compared to high quality firms. Finally, high quality firms will opt for funds on a short-term basis, as they have positive information that will allow a renegotiation of the debt at a reduced cost.

“Debt maturity choice is analyzed as a trade-off between a borrower’s preference for short-term debt due to private information about the future credit rating, and liquidity risk.” (Diamond, 1991: 709)

2.1.5 Taxes

Modigliani and Miller (1958) demonstrated that in a perfect capital market the financing decision of a firm concerning its capital structure is irrelevant, since it is not directly related to its market value. However, according to these authors this will only occur in certain market conditions: (i) absence of taxes, (ii) costs of financial distress, (iii) agency costs, (iv) asymmetric information and (v) efficient market.

Later Modigliani and Miller (1963) stated that with the introduction of taxes, if the costs of debt are tax deductible, there is an incentive for firms to change equity for debt, since dividends are not tax deductible. Other authors (Brenan and Schwartz, 1978; Kim, 1978; and Scott, 1976) propose a "trade-off theory" in which managers can optimize the value of the firm through an optimum target between the tax advantages that debt

provides and the costs of financial distress that it causes. However, Miller (1977) argued that the tax benefits resulting from the use of debt are neutralized with the introduction of personal taxes.

Later Kane et al. (1985) introduced a model based on the “trade-off theory” which determined that the optimum debt maturity increases with the increase in floating costs and with the decrease in corporate tax shield.

Through the use of a model that calculates the price of options (Black-Scholes Formula) Brennan and Schwartz (1978) demonstrated, that in an environment where there are taxes, firms should fund their projects with short-term debt, since in a future date firms may not have taxable income to deduct the interest on their funding, coming into default. Brick and Ravid (1985) reformulated the model developed by Brennan and Schwartz (1978), and noticed that if interest rates present a positive development, firms should opt for long-term debt, since it allows an increase in the present value of the tax benefits. Brick and Ravid (1991) also claimed that, assuming that interest rates are uncertain, firms should opt for funding in a long-term basis.

Through the results obtained from the use of Black-Scholes Model Kim, Mauer and Stohs (1995) demonstrated that firms can maximize the tax-timing option value for their investors by using long-term debt, since it increases the market value of the firm.

2.2 Country-Specific Effects

As we can observe, many authors show that the optimal choice of debt structure depends on firm-specific variables. However, the amount of information available to investors and their capacity to protect their investment depends in many cases on the institutional and legal system of each country.

In addition to the theories and hypotheses developed before, the choice of debt structure might depend on the country-specific characteristics. Recent studies show that debt decisions are determined not only by firm-specific characteristics, but also by country-specific factors such as legal system, economic conditions and institutional

environment. Prominent among them is the Demirgüç-Kunt and Maksimovic's (1999) study, on the capital structure of firms in 30 developing and developed countries during the period 1980-1991.

2.2.1 Legal determinants

With the increasing globalization and consequent growth of international competitiveness, firms need to play an active role in seeking new growth opportunities. To finance their projects, firms can use both equity instruments or debt. While shares entitle their holders to take an active role in firms' future, debt instruments allow creditors, in the event of bankruptcy to recover their investments through liquidation of firms' collaterals. Without the existence of these rights, creditors would have great difficulty in recovering the invested cash flow, allowing firms to invest in risky projects.

The legal environment can facilitate the use of collateral and the ability to enforce claims in the event of default. A recent study found that efficient contract enforcement is associated with greater access to credit for firms. Bae and Goyal (2009) show that financial institutions react to poor enforceability of contracts by reducing loan amounts, shortening loan maturities, and increasing loan spreads.

Since the quality of these rights, as well the ability of the holders to enforce them may vary substantially from country to country, it is possible to notice the role that the legal system can play in determining the maturity of corporate debt.

LLSV (La Porta, Lopez-de-Silanes, Andrei Shleifer and Robert Vishny, 1998) demonstrated that the legal system has implications in the firms' corporate structure. The authors argued that in countries where the law is based on common-law there is a greater protection of creditors' rights. For this purpose, they defined, according to the existing literature, the countries that integrate the two traditional legal systems - common-law and civil-law¹²-, and used four variables to measure creditor rights across

¹² Civil Law or Roman Law has its features compiled and codified into a collection for ready reference. On the other hand, Common Law has its rules and regulations administered by judges and vary on a case to case basis. Greece, Italy, Portugal and Spain are under Civil law, while Ireland is under Common Law.

countries¹³. The authors also indicated that existing laws and the efficiency of them are important factors in the protection of creditors' rights.

Diamond (1991, 1993) and Rajan (1992) were the first to document that the short-term financing is used more than the long-term when the legal system is inefficient, or has high costs in its use. According to the authors, efficient enforcement procedures are particularly important for movable property, which generally depreciates over time. They argued that the use of short-term debt largely prevents companies to deceive creditors, since the period is lower. The creditor can also monitor the company's policies more precisely. According to Demirgüç-Kunt and Maksimovic (1998, 1999), large firms have more long-term debt relative to assets and their debt is of longer maturity in countries with effective legal systems. In addition, these authors stated that strong creditors rights increase the incentives for financial institutions to monitor firms.

2.2.2 Institutional determinants

To understand the role that the institutional environment can play in the firms' capital structure and consequently on debt maturity, it is necessary to understand how monitoring can solve the problems between borrowers and lenders.

If we take as an example a contract in which there is no monitoring, the debtor in the course of its economic activity has the possibility of applying the cash flow for their own use. Since one of the major functions of financial institutions is to monitor their debtors, it is possible to observe that the institutional environment can influence the firms' debt maturity choice.

Fama (1985) argued that financial institutions have a competitive advantage compared to other investors, since they can better monitor their customers. In order to maximize this competitive advantage, most of loans are short-term. By reducing the maturity of

¹³ They study: (i) if regulations impose an automatic stay on assets in case of reorganization; (ii) if secured creditors have the right to be paid first in case of bankruptcy; (iii) if regulations force firms to consult with creditors before filing for reorganization; and (iv) if regulations force a removal of the firms' management during reorganization.

debt, the financial institutions can keep a strong bargaining power and influence the investment strategies of firms.

However, Demirgüç-Kunt and Maksimovic (1999) demonstrated that in countries where the financial sector has a higher dimension, firms use more long-term debt, since the responsibility of financial institutions in the monitoring of contracts allows them to offer higher maturities. Diamond (1984) also stated that financial institutions can achieve economies of scale in monitoring their creditors. When banks share information about credit histories and risk analysis, loan officers can assess borrowers' creditworthiness using objective criteria, providing loans with longer maturities.

In contrast, Fan et al. (2004) also argued that debt maturity is negatively associated with the dimension of the financial sector. The author stated that a developed financial sector leads to an increase in short-term debt, since this form of financing allows financial institutions to use their competitive advantage in monitoring debtors. From the microeconomic perspective, the main reason for a financial institution to prefer short-term debt, concerns the possibility of renegotiating the terms of the contract when there is an increase in available information.

Additionally, an increasing number of authors have showed that large firms are more likely to have access to capital markets (Titman and Wessels, 1988) and from their assets, collateralize long-term loans. Whited (1992) showed that in contrast with large firms, small businesses have limited access to capital markets since the proportion of their assets serving as collateral for future investments are reduced.

Demirgüç-Kunt and Maksimovic (1999) also argued that in countries where the stock market is more developed, there is an incentive for companies to replace debt instruments for capital. However, other authors noticed that since stock markets require a constant release of information by listed firms, the problem of information asymmetry is mitigated, allowing firms to finance their growth needs on a long-term basis. According to these authors, information sharing helps creditors to assess the creditworthiness of clients.

2.2.3 Macro-Economic determinants

The macroeconomic conditions also play an important role in firms' debt maturity on two levels: (i) firms' growth opportunities depend largely on the level of development of the economies where they operate, and (ii) a low level of inflation may facilitate the issuance of long-term debt.

Myers (1977) and Barnea et al (1980) stated that firms with more growth opportunities should use short-term debt to finance their investment projects. According to the authors, if the debt matures before the firm exercise their growth opportunities, the problem of *under-investment* is solved since the benefits generated by projects that maximize the firms' value will go almost exclusively to shareholders. As such, the level of development of an economy can influence the maturity of the debt contracted by firms, since firms' growth opportunities largely depend on the wealth of the economy where they act.

However, according to Demirgüç-Kunt and Maksimovic (1999) and Fan et al (2004) firms operating in developing countries have debt with maturity lower than firms that operate in developed countries.

Additionally, inflation may also influence the maturity of the debt issued by firms. Some authors (Klein, 1975; Miller, 1992; Demirgüç-Kunt and Maksimovic, 1999) demonstrated that debt maturity decreased with the increase of inflation¹⁴. For the authors this phenomenon was explained by the uncertainty in the inflation rate. Miller (1997) found evidence that political instability and polarization have an important role in creating inflation uncertainty and thus shorter debt maturities.

Aarstol (2000) also provided evidence between the role that long-term debt markets have in low inflation countries, and the negligible that they play in countries with high inflation, showing that the maturity of the debt decreases with the increase of inflation. However, according to the author this is justified by the fact that changes in relative prices follow inflation. The author argued that *risk-shifting* problem is aggravated by an increase in the inflation volatility.

¹⁴ Guerrero (2006) also found evidence for the publicly traded Turkish corporations during the period 1988-1994 that a high rate of inflation reduces the maturity structure of corporate debt contracts.

2.3 Bank and European Sovereign debt Crisis

Europe has been beset by two interrelated crisis since the autumn of 2008: (i) banking crisis resulting from losses in capital markets and (ii) a sovereign debt crisis aggravated by expenditures in public resources by European Union governments to rescue failing banks, economic recession and poor fiscal management of some European countries.

While the financial crisis has been common to all developed economies including EU Member States¹⁵, it has affected them in different ways. Figure 1 shows that bond spreads faced by Greece, Ireland, Portugal and to a lesser extent Spain and Italy have substantially increased.

Figure 1 - Sovereign debt 10 year yields, %.



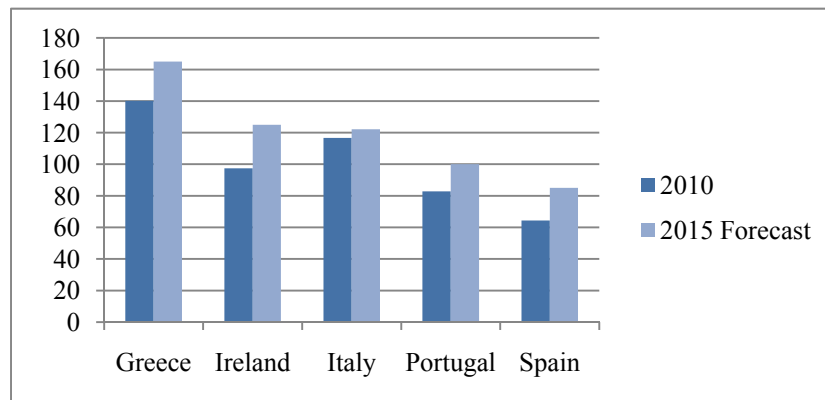
Source: Bloomberg

Bank credit losses were the primary reason for the problems in the banking system. The financial crisis led to the decline in economic activity from the fourth quarter of 2008 onwards. It has affected firms and specific sectors through a severe contraction of credit and loans, accompanied by a tightening of credit standards. The main drivers were the negative economic outlook, but also the impact on banks' ability to obtain sufficient financing in the interbank market. Ensuring sufficient lending to the non-financial sector became a further immediate challenge for banks and governments.

¹⁵ Members of the European Union are: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

The global financial crisis forced European Union central banks and governments to adopt an extraordinary expansionary macroeconomic policy to provide stability and stimulus, increasing government deficits.

Figure 2 – Gross Government Debt (% of GDP).



Source: The Economist, IMF, European Commission, Citigroup, Thomas Reuters

Despite the macroeconomic policies implemented by European Union governments, financial crisis shut down traditional modes of financing, such as commercial paper, bond placements and bank loans. At the same time it has become more difficult for firms to obtain long-term debt. According with Gorton (2008) the liquidity crisis¹⁶ that affected financial institutions dealing with subprime-based derivatives, had an immediate effect on instruments that are traded among financial institutions as well as those used to fund credit facilities used by corporations.

¹⁶ Almeida et al. (2009) also suggested that the liquidity crisis that affected financial institutions dealing with subprime-based derivatives forced firms to decrease investment in order to be able to repay their maturing debt.

3. Research Methodology

This chapter provides a full description of the sample and the variables which have been used to conduct the empirical work. It also describes the methodology and assumptions applied to the study of debt maturity structure.

3.1 Data

In order to carry out our empirical research on the determinants of debt maturity structure in different countries (Greece, Ireland, Italy, Portugal and Spain), the sample includes all non-financial firms traded on the main stock index of each country on 31 of March of 2011. The sample covers a period from 2001 to 2010. We exclude all financial firms such as “financial services and insurance”, since their capital structure tends to be very different from the firms listed in our sample, due to regulatory factors.

Firms’ financial data were obtained from Bloomberg, however we only take into consideration data from the period during which those firms were publicly traded on the main stock index. After the adjustments made, the final sample includes 99¹⁷ different firms with a total of 855 firm-year observations for the period 2001-2010.

The gathered data includes Total and Long-term Liabilities, Market and Book value per share, Current Assets and Liabilities, Income taxes and Pretax Income, Total Assets, Net Fixed Assets and Depreciation, Net Income and Total Equity, which were used to determine all the firm-specific variables¹⁸.

For our sample to be robust and avoid the problem of extreme observations, we checked the frequency distributions for every variable for the period 2001–2010 to reduce the effect of possible spurious outliers¹⁹. We consider the range of values where 98% of

¹⁷ See appendix 1.

¹⁸ The financial statements of the firms in our sample are presented in accordance with IFRS.

¹⁹ In order to avoid the use of arbitrary cut-off points to drop the extreme observations, an alternative way is proposed by Stohs and Mauer (1996). They ran a pooled time series cross sectional regression of the debt maturity on the independent variables and they checked the influence of extreme values on this regression.

observations fall. For the values outside this range we use the winsorized mean approach²⁰.

3.1.1 Dependent Variable

The dependent variable in our empirical work is debt maturity. There is no global definition to distinguish short-term from long-term maturity. Barclay and Smith (1995) followed accounting definitions and consider long-term the debt that is payable after three years. Other authors (Guedes and Opler, 1986) preferred to measure long-term by using the maturity of the issued bonds. Stohs and Mauer (1996) used the weighted average of all debt. Our approach, like Barclay et al. (2003) and Antoniou et al. (2006), follows the balance-sheet approach, and we measure long-term debt as the proportion of debt that matures after one year.

$$Deb\ Maturity = \frac{Long - term\ debt}{Total\ Debt} \quad (I)$$

3.1.1 Independent Variables

3.1.1.1 Firm-specific Determinants

To test the main hypothesis of the determinants of the debt maturity discussed in the relevant empirical work, we use different variables: market-to-book ratio, the firms' liquidity ratio, the effective tax rate, the firms' size, the asset maturity and the firms' quality.

According to Myers (1977) firms that have higher growth potential should choose short-term debt instead of long-term debt, since the *under-investment* problem can be mitigated. In order to measure the growth potential of a firm we use the market to book ratio because the firms' stock price will include investor's valuation of future

²⁰ Method of averaging that initially replaces the smallest and largest values with the observations closest to them.

investments. The ratio is the market value of a share divided by the book value of a share, or its accounting price.

$$\text{Market to book} = \frac{\text{Market value of a share}}{\text{Book value of a share}} \quad (\text{II})$$

Diamond (1991) argued that by financing with short-term debt firms could face problems of lack of liquidity in the future, since the cash flows generated may not be sufficient to meet the present obligations of the firm. According to the author firms with better quality should prefer short-term debt. The liquidity ratio is calculated through the division of current assets by current liabilities.

$$\text{Liquidity} = \frac{\text{Currren Assets}}{\text{Current Liabilities}} \quad (\text{III})$$

Kane et al. (1985) determined that the optimum debt maturity increases with the increase of floating costs and with the decrease of corporate tax shield. However, other authors showed mixed results. In order to measure the effective average tax rate of the firm we use the ratio of income taxes to pretax income.

$$\text{Taxes} = \frac{\text{Income taxes}}{\text{Pretax Income}} \quad (\text{IV})$$

In accordance with the Hazard theory, smaller firms are more likely to have problems between shareholders and debt holders. Additionally they predict a positive relationship between firms' size and debt maturity. To measure the size of the firm we use the natural logarithm of the book value of assets.

$$\text{Size} = \text{Ln}(\text{book value of assets}) \quad (\text{V})$$

According to Morris (1976) and Stochs and Mauer (1996) firms tend to match the maturity of the assets with the maturity of liabilities, in order to reduce the agency costs

of debt. We use the ratio of property, plant and equipment to depreciation and amortization, to measure this variable.

$$\text{Asset Maturity} = \frac{PPE}{\text{Depreciation} + \text{Amortization}} \quad (\text{VI})$$

Finally, under asymmetric information conditions firms should issue short-term debt in order to signal their quality to the market. We calculate the firms' quality through the ROE (Return on Equity) ratio.

$$ROE = \frac{\text{Net Income}}{\text{Total Equity}} \quad (\text{VII})$$

3.1.1.2 Country-Specific Determinants

To understand the role that characteristics of the countries can play in firms' debt maturity, we group the variables into three groups: (i) legal determinants, (ii) macroeconomic determinants, and (iii) institutional and market determinants.

The variables used to measure the legal component are Law and Order, and Protection of property rights. Law and Order is an indicator produced by the country risk rating agency International Country Risk²¹ (ICR). This indicator measures the strength and impartiality of the legal system, and the popular observance of the law. Protection of property rights is produced by the Global Competitiveness Report²² and measures if property rights including financial assets are clearly and well protected by law and the ability to enforce claims in the event of default. These indicators score between 0 and 10, where the highest suggest more efficiency/enforcement levels.

To test the influence that institutional and financial determinants can play on the debt maturity, we used Domestic Credit and Market Capitalization. The first is measured by the domestic credit provided by banking sector in percentage of GDP. Market

²¹ www.prsgroup.com/ICRG

²² www.gcr.weforum.org

Capitalization is the market capitalization of listed companies in percentage of GDP. Both variables were produced by the World Bank²³.

Finally, to analyze how macroeconomic conditions influence debt maturity we define two variables: (i) GDP per capita and (ii) inflation. GDP per capita is measured as real GDP per capita expressed in current US dollars. Inflation is the inflation rate. These variables were produced by the World Bank.

3.2 Methodology

This empirical study analyses the relationship between firms' debt maturity and firms/country specific effects through the use of the Panel data Methodology (or longitudinal data). The main advantage of using this methodology is to control for unobserved characteristics²⁴.

The major literature on corporate debt maturity structure used pooled Ordinary Least Squares (OLS). In Ooi (1999) the significance of the pooled OLS results is at least not worse than that of other methods. However this method, does not consider the unobservable firm-specific and country-specific effects in case of panel data analysis. OLS regression assumes that all independent variable are exogenous²⁵, and in our opinion shocks that affect debt maturity ratio can also affect the explanatory variables.

In assessing the statistical significance of unobservable individual effects of static panel models, we use the Lagrange Multiplier²⁶ test (LM), which verifies the null hypothesis assuming that the unobservable individual effects are not relevant in explaining the company's debt against the alternative hypothesis of relevance of unobservable individual effects in explaining the debt maturity ratio. The pooled regression

²³ www.worldbank.com

²⁴ According to Wooldridge (2009), the unobserved factors are all time constant factor that affect the dependent variable.

²⁵ Demirgüç-Kunt and Maksimovic (1999) argue that a potential problem in explaining differences in financial structures across nations by institutional factors is that some of these institutions can themselves be influenced by firms' financing decisions or by the development of other institutions.

²⁶ The Breusch–Pagan Lagrange Multiplier (1980) test is used to test for heteroskedasticity in a linear regression model. It tests whether the estimated variance of the residuals from a regression are dependent on the values of the independent variables.

hypothesis was rejected [$X^2(1) = 1,393.49$; $p < 0.0000$]. We conclude that an OLS regression is not the most appropriate way to examine the relationship between debt and its determinants, and to proceed with the estimation we admit the existence of random or fixed unobservable individual effects.

However, static models for panel data do not allow analyzing the potential dynamism between variables in explaining debt maturity choices, or the introduction of the lagged dependent variable as an explanatory variable of the debt maturity ratio. They also do not take into account the endogeneity²⁷ problem. Dynamic models allow determining whether firms adjust the actual maturity of the debt to an optimal level.

In order to estimate debt maturity, we use the regression model which is present by the following formula:

$$Y_{it} = \beta_0 + \beta_1 Y_{i,t-1} + \sum_{k=1}^N \gamma_k FF_{k,i,t} + \alpha_i + \alpha_t + \varepsilon_{it} \quad (\text{VIII})$$

Where,

Y_{it} = represents the dependent variable, in this particular case it refers to debt maturity of firm i in year t .

$Y_{i,t-1}$ = represents the lagged dependent variable of firm i in year t .

β_1 = is the coefficient for previous independent variable.

$FF_{k,i,t}$ = vector of firms i with k specific factor, in year t .

α_i = ($i=1 \dots n$) is the unknown intercept for each firm.

α_t = ($t=1 \dots n$) is the unknown intercept for each period.

ε_{it} = is the error term.

²⁷ Occurs when the independent variable are correlated with the error term.

To test the existence of an optimal debt maturity, like Ozkan (2000) and Antoniou et al. (2006) a lagged debt maturity variable is included. If a firm presents an optimal level of debt maturity the coefficient of the lagged variable is significantly positive between 1 and 0. The speed of adjustment is measured by 1 minus the coefficient of the lagged variable. If the coefficient of the variable is greater than 1, it implies that does not have a target debt maturity ratio.

As demonstrated by Antoniou et al. (2006) GMM–SYS regression is more appropriate than GMM-DIF, since this method causes information loss across cross-section firms. We use the two-steps GMM estimator.

To confirm the suitability of the instruments we use the Sargan test, which test the null hypothesis of significance of the used instruments against the alternative hypothesis of non-validity of the used instruments. The null hypothesis was not rejected [$X^2(43) = 42.26; p < 0.5035$]

In model 1 we run a GYM-SYS regression to test the firm-specific and country-specific variables as determinants of the firms' debt maturity and to verify whether firms adjust the actual maturity of the debt to an optimal level. Additionally, to test if the bank and sovereign debt crisis had an impact on firms' debt maturity, in model 2 we re-estimate the previous regression including a dummy variable that equals 0 if it ranges during the period pre-crisis between 2001-2008 and 1 if it ranges in the period during crisis, between 2009-2010²⁸. Finally, in model 3 and as a robustness test we run a fixed effects regression. All regressions include robust standard errors.

²⁸ Despite the financial crisis began in 2008 with the bankruptcy of the Lehman Brothers, it only began to be felt with some degree in Europe in the start of 2009. Because of that our dummy variable measures the crisis during the period 2009-2010.

4 Empirical Results

In order to understand if firm-specific and country-specific variables have impact in firms' debt maturity, in this chapter we conducted an empirical work that is divided in two major areas. First, we use the main descriptive statistics and the Pearson Correlation Coefficients to understand debt maturity evolution across countries and the relationships that can be established between variables. Second, a dynamic panel data analysis using a GMM – SYS regression in order to understand which variables are more valuable in explaining the debt maturity choice.

4.1 Descriptive Statistics Analysis

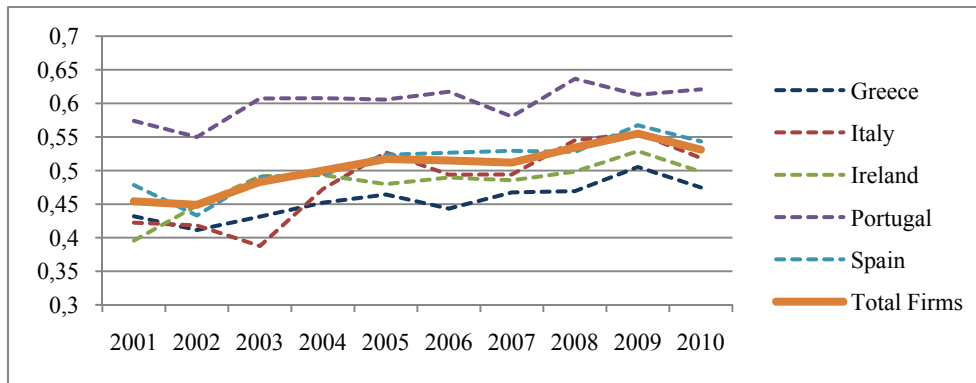
Table 1 reports the main descriptive statistics for the dependent and explanatory variables for the whole sample from 2001 to 2010. On average firms have 50.83%²⁹ of their debt maturing after one year. The median value for debt maturity is 54.16%. If we observe the results reported in Table 2, from 2001 to 2010 we observe a substantial increase in the average debt maturity ratio for the whole sample. The descriptive statistics in Table 2 show that the debt maturity ratio increased from 45.42% in 2001 to 53.13% in 2010, providing some indication of an upward trend. However, during the financial crisis it is observed a slowdown in the average of debt maturity ratio, decreasing from 55.49% in 2009 to 53.13% in 2010, suggesting that it had an impact in firms' debt maturity evolution. Standard deviation presents similar values for all years and the number of observations has also been increasing.

Turning our focus to the evolution of the dependent variable at the country level, we observe in Figure 3 a trend of increasing maturity of the debt for all countries in the period 2001-2010. Portugal is the country with the highest maturity with the average debt maturity ratio of 62.08%, while Greece is the country with the lowest debt maturity ratio, of 47.47%. However, during the financial crisis all the analyzed countries present

²⁹ In the text some values are presented in percentage to provide a better understanding, although in outputs the main values are presented as proportions.

a slowdown in debt maturity ratio, with the exception of Portugal, which shows a stable evolution.

Figure 3 - Debt Maturity evolution across Countries.



With regard to the independent variables (see Table 1), we find that on average firms have higher market value than their book value, and their current assets are bigger than their current liabilities, with mean values of 2.98 and 1.32 respectively. These results suggest that investors assign more value to firms than their accounting value and also that firms have sufficient liquidity to meet their present obligations. In terms of taxes, firms pay on average 22.82% of their pretax income, and each share has a profitability of 15.13%.

Table 3 presents the results of all variables for each country. We can notice the existence of differences when comparing the results of independent variables between countries. The ratio of market to book ranges from the highest 3.566 in Ireland to the lowest 2.574 in Italy, reflecting the market oriented system in Ireland. In all countries, firms present on average higher current assets than their current liabilities. It is also worth to notice that Ireland³⁰ has the lowest tax ratio of the countries in our sample. Although Italy and Spain have the biggest firms in terms of assets, Greece has on average the most profitability ones.

In relation to macro-economic conditions, it is possible to note (see Table 1) that on average countries have a GDP per capita of 29,610 US current dollars. Ireland has the

³⁰ Ireland has a corporate tax of 12.5% for trading firms and 25% for non-trading firms.

highest GDP per Capita, while Portugal the lowest, with 46.613 and 18.929 US current dollars, respectively. Inflation present a positive average rate of 2,5% during the period 2001-2010, however since the start of the European sovereign debt crisis, we can observe on average negative growth rates in our sample.

In terms of institutional variables, the results show that in Spain firms listed on the main stock index have a higher weight as a percentage of GDP, with 87.16%. With regard to the percentage of domestic credit provided by banks, it ranges from the highest 176.93% in Spain, to the lowest 108.61% in Greece. For both variables we observe a mean value of 53.94% and 149.67% respectively.

Finally, Ireland is the country with the strongest and most impartial legal system, while Greece is the lowest (10 and 6.05, respectively). Considering the protection of property rights, we observe that individuals in Ireland have the highest score in this variable³¹.

4.2 Correlation Analysis

In order to examine the relationship between variables, we used the Pearson Correlation Matrix. In Table 4, we present the Pearson linear correlation coefficients for our all variables and the associated significance levels. We do not find any correlations near ± 1 . For the 2001-2010 sample period the strongest correlation is 0.7033 between Law and Order and Protection of property rights.

Table 4 displays, as well, a significant negative relation between debt maturity and market-to-book and between debt maturity and liquidity. These estimates are consistent with Myers's (1977) argument that firms which have higher growth potential should choose short-term debt and with Diamond (1991) which stated that firms with high quality should prefer short-term debt. We also notice a significant positive relation between the dependent variable and size as well as between the dependent variable and asset maturity, which agrees with the "matching maturity" approach.

³¹ These results are consistent with those provided by other studies in common-law countries.

In accordance with previous studies, we notice a significant negative relationship between debt maturity and inflation, as well as a significant positive relationship between debt maturity, domestic credit and protection of property rights. These estimates indicate that debt maturity decreases with the increase of inflation and increases with the size of the banking sector and the level of enforcement of the property rights.

Table 1 - Descriptive statistics for firm-specific and country-specific variables.

Table 1 presents the main descriptive statistics for firm-specific and country-specific variables for the whole sample. The dependent variable is Debt maturity and it is defined as the proportion of debt that matures after one year. The independent variables are defined as follows: The Market to book is calculated through the ratio of the share market value of a share divided by its book value. Liquidity is defined as the ratio of current assets divided by the current liabilities. Taxes are obtained through the ratio of income taxes to pretax income. Size is defined as the natural logarithm of the book value of the assets. Asset maturity is calculated by the division of property, plant and equipment to depreciation and amortization. ROE (Return On Equity) is obtained through the division of net income to equity. GDP capita is the GDP per capita expressed in current US dollars. Inflation is the inflation rate. Market capitalization is the market capitalization of listed companies as a percentage of GDP. Domestic credit is measured by the domestic credit provided by banking sector as a percentage of GDP. Law and Order are two indicators that measure the strength and impartiality of the legal system, as well as the popular observance of the law. Protection of property rights measures if property rights including financial assets are clearly and well protected by the law. For both indexes lower scores indicate lower efficiency/enforcement levels. N is the number of observations of each variable.

Variables	2001 - 2010 Period					
	N	Mean	Median	Std. Dev.	Min.	Max.
Debt maturity	855	0.5083	0.5415	0.2128	0.0242	0.8735
Market to book	852	2.9787	2.2232	2.6124	0.3681	16.7075
Liquidity	855	1.3245	1.1523	0.7116	0.3397	4.2533
Taxes	853	0.2282	0.2549	0.3015	-1.5966	1.2273
Size	855	8.4483	8.3263	1.4428	5.1779	11.7574
Asset maturity	816	18.2183	15.7514	12.3001	3.6349	74.6693
ROE	855	0.1513	0.1414	0.1731	-0.4685	0.9602
GDP capita	855	29,610	28,936	10,968	11,662	59,573
Inflation	855	2.5014	2.7916	1.6295	-4.4799	4.8799
Market capitalization	855	0.5394	0.5183	0.2696	0.1347	1.2484
Domestic credit	855	1.4966	1.3968	0.4269	0.9298	2.3632
Law and Order	855	7.9962	8.3333	1.4261	5.000	10.0000
Protection of property rights	855	6.6184	6.5408	1.0188	4.6667	9.0000

Table 2 - Debt maturity evolution for the whole sample.

The sample includes all non-financial firms traded on the main stock index in Greece, Ireland, Italy, Portugal and Spain, on 31st of March 2011, and covers a period from 2001 to 2010. Firms' financial data were obtained from Bloomberg and only take into consideration data from the period during those firms were publicly traded on the main index market. The dependent and independent variables were cleaned by winsorizing all outliers at the top and bottom 1% level. Sample includes 99 different firms with a total of 855 firms-year observations for the period 2001-2010. We measure long-term debt as the proportion of debt that matures after one year.

Year	N	Mean	Std. Dev.	Min.	Max.
2001	71	0.4542	0.2182	0.0242	0.8735
2002	75	0.4489	0.1984	0.0242	0.7634
2003	75	0.4830	0.2109	0.0242	0.8735
2004	80	0.4999	0.2263	0.0242	0.8735
2005	84	0.5172	0.2165	0.0242	0.8735
2006	88	0.5149	0.2206	0.0242	0.8649
2007	93	0.5119	0.2064	0.0376	0.8735
2008	94	0.5343	0.2067	0.0342	0.8665
2009	96	0.5549	0.2072	0.0242	0.8735
2010	99	0.5313	0.2054	0.0242	0.8735

Table 3 - Descriptive statistics for firms-specific and country-specific variables for each country.

Table 3 presents the main descriptive statistics for firm-specific and country-specific variables for each country in period 2001-2010. The dependent variable is Debt maturity and it is defined as the proportion of debt that matures after one year. The independent variables are defined as follows: The Market to book is calculated through the ratio of the market value of a share divided by its book value. Liquidity is defined as the ratio of current assets divided by the current liabilities. Taxes are obtained through the ratio of income taxes to pretax income. Size is defined as the natural logarithm of the book value of the assets. Asset maturity is calculated by the division of property, plant and equipment to depreciation and amortization. ROE (Return On Equity) is obtained through the division of net income to equity. GDP capita is the GDP per capita expressed in current US dollars. Inflation is the inflation rate. Market capitalization is the market capitalization of listed companies in percentage of GDP. Domestic credit is measured by the domestic credit provided by banking sector in percentage of GDP. Law and Order are two indicators that measure the strength and impartiality of the legal system, and the popular observance of the law. Protection of property rights measures if property rights including financial assets are clearly and well protected by law. For both indexes lower scores indicate lower efficiency/enforcement levels. N is the number of observations of each variable.

Variables	Greece		Ireland		Italy		Portugal		Spain	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
Debt maturity	106	0.4562	149	0.4885	238	0.4839	134	0.6035	228	0.5148
Market to book	105	3.3532	149	3.5660	236	2.5741	134	2.8344	228	2.9260
Liquidity	106	1.4727	149	1.6050	238	1.3850	134	1.0263	228	1.1842
Taxes	104	0.2958	149	0.1015	238	0.3139	134	0.1880	228	0.2144
Size	106	7.7086	149	7.3043	238	8.9654	134	8.2092	228	9.1406
Asset maturity	68	17.4939	148	19.7106	238	16.8601	134	16.3300	228	19.9933
ROE	106	0.2234	149	0.1521	238	0.1233	134	0.1125	228	0.1694
GDP capita	106	22,667	149	46,613	238	30,786	134	18,929	228	26,776
Inflation	106	3.3067	149	2.3224	238	2.1277	134	2.3142	228	2.7441
Market capitalization	106	0.5107	149	0.4552	238	0.3668	134	0.3969	228	0.8716
Domestic credit	106	1.0861	149	1.7189	238	1.1998	134	1.6376	228	1.7693
Law and Order	106	6.6002	149	10.0000	238	7.0084	134	8.3333	228	8.1686
Protection of property rights	106	6.0650	149	7.9645	238	5.8756	134	6.8647	228	6.6265

Table 4 - Correlation matrix of firms-specific and country-specific variables for the whole sample.

Table 4 presents Pearson correlation for firm-specific and country-specific variables for the whole sample. The dependent variable is Debt maturity and it is defined as the proportion of debt that matures after one year. The independent variables are defined as follows: The Market to book is calculated through the ratio of the market value of a share divided by its book value. Liquidity is defined as the ratio of current assets divided by the current liabilities. Taxes are obtained through the ratio of income taxes to pretax income. Size is defined as the natural logarithm of the book value of the assets. Asset maturity is calculated by the division of property, plant and equipment to depreciation and amortization. ROE (Return On Equity) is obtained through the division of net income to equity. GDP capita is the GDP per capita expressed in current US dollars. Inflation is the inflation rate. Market capitalization is the market capitalization of listed companies in percentage of GDP. Domestic credit is measured by the domestic credit provided by banking sector in percentage of GDP. Law and Order are two indicators that measure the strength and impartiality of the legal system, and the popular observance of the law. Protection of property rights measures if property rights including financial assets are clearly and well protected by law. For both indexes lower scores indicate lower efficiency/enforcement levels.

	2001 - 2010 Period												
	v1	v2	v3	v4	v5	v6	v7	v8	v9	v10	v11	v12	v13
Debt Maturity	1												
Market to book	-0.1733***	1											
Liquidity	-0.1507***	0.0091	1										
Taxes	0.0337	0.0246	-0.0139	1									
Size	0.4037***	-0.3029***	-0.3017***	0.0926***	1								
Asset maturity	0.3197***	-0.0790**	-0.2035***	-0.0011	0.0677*	1							
ROE	-0.2106	0.3856***	0.0304	0.1200***	-0.1892***	-0.0200	1						
GDP per capita	-0.0009	0.0523	0.1981***	-0.1201***	-0.0773**	0.1096***	0.0542	1					
Inflation	-0.0947***	0.0643*	-0.0211	0.0353	-0.0942***	-0.0331	0.1066***	-0.1830***	1				
Market capitalization	-0.0287	0.1573***	-0.0700**	-0.0066	0.1237***	0.0642*	0.1363***	-0.1674***	0.2732***	1			
Domestic credit	0.1701***	-0.0221	-0.0390	-0.1610***	0.01241***	0.1300***	0.0173	0.4454***	-0.3914***	0.1357***	1		
Law and Order	-0.0277	0.0611*	0.0039	-0.1844***	-0.1615***	0.0252	-0.0449	0.3800***	-0.0368	0.0932***	0.4308***	1	
Protection of property rights	0.0794**	0.1566***	0.0586*	-0.1639***	-0.1623***	0.1073***	0.0742**	0.5739***	-0.0562	0.1604***	0.5219***	0.7003***	1

*Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level

4.3 Regression Analysis

After we have documented an upward trend in the debt maturity evolution across our sample, we will investigate the main theories in literature that receive support from our panel data. Table 6 presents the findings using the GMM – SYS regression:

$$\begin{aligned} \text{Debt Maturity}_{it} = & 0.447572 \text{ Debt Maturity}_{it-1} - 0.002031 \text{ Market to book}_{it} + 0.108255 \\ & \text{Liquidity}_{it} + 0.001662 \text{ Taxes}_{it} + 0.015059 \text{ Size}_{it} + 0.002556 \text{ Asset maturity}_{it} - 0.047485 \\ & \text{ROE}_{it} + 0.000003 \text{ GDP per capita}_{it} - 0.452887 \text{ Inflation}_{it} - 0.019679 \text{ Market} \\ & \text{capitalization}_{it} - 0.058635 \text{ Domestic credit}_{it} + 0.008419 \text{ Law and Order}_{it} - 0.004626 \\ & \text{Protection of property rights}_{it} \end{aligned}$$

When observing the regression estimated coefficients we notice that in terms of economic relevance, *Liquidity* and *Asset maturity* are the two most important firm-specific characteristics that affect the debt maturity structure. In relation to the country-specific effects, we find that the most important explanatory variables are *Inflation* and *Domestic credit*. According to the most relevant literature³² in corporate finance, we would expect the following relations:

Table 5 – Expected determinants’ impact on the debt maturity choice.

An increase in the explanatory Variables	Expected Sign
Market to book	-
Liquidity	-
Taxes	+ / -
Size	+
Asset maturity	+
ROE	-
GDP per capita	+
Inflation	-
Market capitalization	+ / -
Domestic credit	+
Law and Order	+
Protection of property rights	+

³² See appendix 3 with the comparison of the regression results in debt maturity literature.

4.3.1 Firm-specific effects on debt maturity

Debt Maturity Lagged

The lagged variable presents a positive and significant coefficient at the 1% level, providing an indication that firms in these countries have an optimal debt maturity structure. The coefficient of the lagged variable (1- p) in Table 6 shows that, on average, firms have an adjustment speed of (0.55), suggesting a costly and non-instantaneous adjustments³³. This implies that the cost of being off-target is similar than the cost of adjustment process. These estimates are similar to those provided by Newberry and Novack (1999) and by Antoniou et al. (2006) for French, German and English firms, and implies that firms in these countries trade-off between adjustments costs and costs of being off-target.

Growth Options

According to Myers (1977), firms that have higher growth potential should choose short-term debt instead of long-term, since the *under-investment* problem can be mitigated. The author predicts a negative relation between debt maturity and firms' growth opportunities. However, our results give weak support to this theory, suggesting that the market-to-book ratio has no significant effect on firms' debt maturity³⁴ at the 10% level, with a t-statistic of (-1.23). Growth options and the associated *under-investment* problem, do not seem to have influenced decisions concerning corporate debt maturity structure. The estimates are in line with the Chan-Lau's (2001) argument which claimed that bank-oriented systems mitigate the conflicts between shareholders-managers and, consequently, the *under-investment* problem. The author also argued that the advantages of firms are not necessarily related to information asymmetries.

³³ Deesomak et al. (2009) provided similar results to Thailand, Malaysia and Singapore and Australia.

³⁴ Esho et al (2002) obtained similar results for Australian firms. Deesomak et al. (2009) also find similar estimates for growth opportunities in Thailand, Malaysia and Singapore.

Liquidity

The estimates reveal a positive significant association between *Liquidity* ratio and debt maturity at the 1% level, with a t-statistic of 6.46. On average, an increase of 1 unit in liquidity ratio leads to an increase of 0.11 pp in debt maturity ratio. This relation suggests that firms with high liquidity prefer to raise long-term debt. These estimates are similar to those provided by Antoniou et al. (2003) for the German firms. However, these results do not support the liquidity risk theory introduced by Diamond (1991). The author argued that the debt maturity choice is analyzed as a “trade-off” between a borrower’s preference for short-term debt, due to private information about the future credit rating, and liquidity risk. According to the author, firms with high quality should prefer short-term debt, because they can renegotiate their debt with better terms after information is known by the market. A possible explanation for firms with high liquidity choose debt with longer maturities is the fact that quoted firms are less exposed to information asymmetries problems since stock markets require a constant release of information. At the same time, high liquidity firms have more access to long-term debt markets, since banks and investors know that low liquidity firms are more likely to default, requiring higher rates to finance their projects in the long-run.

Taxes

The association between debt maturity and corporate effective tax rate is positive and insignificant at the 10% level, with a t-statistic of 0.14. According to our model, and in line with Ozkan (2000, 2002) findings, effective tax rates do not produce any impact on debt maturity ratios. Antoniou et al. (2006) also provide similar conclusions for French and English firms. However, in contrast with these estimates is the Kane et al. (1985) theory, which assumes a significant negative relation between these variables, since firms increase their debt maturity as tax benefits decline.

Firm Size

In addition, Table 6 shows a positive but insignificant relation between firm size and debt maturity at the 10% level, with a t-statistic of (0.61), suggesting that the firm size

has no impact on debt maturity ratio³⁵. These estimates give weak support to the theory which predicts that large firms tend to have more long-term debt in their capital structure, since they have lower asymmetric and agency problems. However, the insignificant relation between these variables can be explained by the fact that our sample only considers listed firms on the main stock index of each country.

Asset Maturity

In accordance with earlier studies, the matching maturity theory has a significant and positive impact on our model at the 5% level, with a t-statistic of 2.24. On average an increase of 1 unit in the asset maturity ratio leads to an increase of 0.003 pp in debt maturity ratio. These results confirm that a slower asset depreciation leads to debt with longer maturities, since firms' ability to commit to making debt payments out of future revenues is enhanced by the strength of the lender's threat to seize assets. It also supports Myers's (1977) argument that firms should synchronize the maturity of their assets and liabilities in order to reduce the agency costs.

Firm Quality

Under asymmetric information conditions firms should issue short-term debt in order to signal their quality to the market, predicting a negative relation between firms' quality and debt maturity. However, like Ozkan (2000) and Antoniou et al. (2006) we find weak support to this theory³⁶. Our estimates reveal a negative insignificant relation between these variables at the 10% level, with a t-statistic of (-1.04). For this insignificant relation, there are a few possible explanations. Firstly, according to Diamond (1991), a non-monotonic relationship between debt maturity and firms' quality may exist, since low and high quality firms choose both short-term debt and medium quality firms opt for long-term debt. Secondly, high quality firms prefer a combination between short and long-term debt, since short-term debt may cause

³⁵These results are based on firm size measured by the natural logarithm of assets. Alternative size measurement by total assets did not alter the quality of results.

³⁶Dennis et al. (2000) also obtained similar conclusions.

inefficient liquidation. Thirdly, listed firms are less exposed to the problems of information asymmetries since markets require a constant update of information.

4.3.2 Country-specific effects on debt maturity

Macro-economic determinants

Turning our focus to the role that macroeconomic variables play in debt maturity, our results shows a positive and significant coefficient for GDP per capita at the 1% level, with a t-statistic of 2.94. Our results are consistent with findings provided by Demirgüç-Kunt and Maksimovic (1999) and Fan et al (2004) which showed that firms operating in countries with high development have debt with a lower maturity. However, the impact in the debt maturity ratio is relatively weak.

With concern to the relation between debt maturity and inflation, we observe a significant negative relation between these two variables at a 10% level, with a t-statistic of (-1.86). On average, an increase of 100% in inflation leads to a decrease of 0.45 pp in debt maturity ratio, providing evidence that debt maturity decreases when inflation increase. This conclusion is consistent with previous studies (Klein, 1975; Miller, 1992; Demirgüç-Kunt and Maksimovic, 1999), which demonstrated that debt maturity decreases with the increase of inflation. For these authors, this phenomenon is explained by the uncertainty of the inflation rate.

Institutional determinants

Additionally, Table 6 shows a insignificant negative relation between market capitalization and debt maturity at the 10% level, with a t-statistic of (-0.92). Our estimates are not consistent with Demirgüç - Kunt and Maksimovic (1999) findings, which suggested that in countries where the stock market is more developed there is an incentive for firms to replace their debt instruments for capital.

The association between debt maturity and domestic credit is significant negative at the 1% level, with a t-statistic of (-2.82). These results suggest that the size of the banking sector does not enable firms to extend the maturity of their loans. Although our results do not agree with Demirgüç - Kunt and Maksimovic (1999) findings, which predict a positive relation between these two variables, they are in line with the studies conducted by Fan et al (2004), which stated that debt maturity is negatively related to the size of the banking sector, as this form of financing enables intermediaries to use their comparative advantage in monitoring debtors.

Legal determinants

Finally, we find a reliable relation between the variables Law and Order and debt maturity at the 10% level, with a t-statistic of (1.69). We observe that Law and Order present a positive and significant impact on debt maturity evolution, suggesting that the more tradition for law and order allows firms to obtain debt with longer maturity. This is consistent with Demirgüç - Kunt and Maksimovic (1999) findings, that firms in the countries with high law enforceability are more likely to obtain long-term debt. These results show that financial institutions and investors react to enforceability of contracts by increasing loan maturities. In terms of Protection of property rights we do not observe any relation between this variable and debt maturity, suggesting that this variable does not influence debt maturity choice during this period.

4.3.3 Bank and Sovereign debt crisis impact

In order to study the impact that financial crisis had in debt maturity, in Model 2 we introduce a dummy variable that takes a value of 1 for the observation in the period 2009-2010 and 0 if the observation in the period 2001-2008. As we documented in the previous chapter, firms decreased their debt maturity during the financial crisis. We observe a negative relation between debt maturity and the crisis dummy but not significant at the 10% level, with a t-statistic of (-0.88). For this negative, but insignificant relation, there are a few possible explanations. Firstly, although ensuring

sufficient lending to the non-financial sector was a challenge for banks, the EU governments adopted an extraordinary expansionary macroeconomic policy providing sufficient liquidity to economies during the financial crisis. Secondly, EU governments have only been approving policies of credit contraction and deleverage to reduce government's deficits since 2010, and for that reason its impact on the countries has only begun to be felt just recently. For the other explanatory variables, obtained estimates show similar values. At the economic relevance we only observe changes in the variable Domestic Credit.

4.3.4 Robustness Test

In order to give robustness to our findings and test the estimates provided by the dynamic System GMM model, we also run a fixed effects regression. The estimates from the fixed effects model presented in Model 3 of Table 6 shows, in terms on firm-specific effects, similar results from those provided GMM System model. The liquidity and matching maturity theories still present positive and significant relevance in determining the debt maturity structure, despite different levels. The results for the remaining firm-specific variables show similar conclusions.

At the economic relevance for country-specific effects, we observe changes in variables Domestic Credit and Law and Order. The coefficients of these variables have turned insignificant at the 10% level. However, in terms of macro-economic variables, GDP per capita and Inflation remain important in the debt maturity structure. Overall, the results provided by the fixed effects model are not opposing those provided by the dynamic GMM System model.

In summary, we can state that our findings are in line with some theoretical predictions (see Table 6). However, in our sample some determinants are more powerful than others. The estimates, confirming our expectation, show that country-specific effects are as important as firm-specific effects in determining debt maturity structure. Additionally, the estimates provided by Model 2 show that, although the Bank and European sovereign debt crisis has negatively influence debt maturity structure, they also show that it is insignificant at the 10% level.

Table 6 – Regressions estimating the debt maturity determinants for the whole sample.

The sample includes all non-financial firms traded on the main stock index in Greece, Ireland, Italy, Portugal and Spain, at 31 of March of 2011, and covers a period from 2001 to 2010. The dependent and independent variables were cleaned by eliminating all outliers at the top and bottom 1% level. Sample includes 99 different firms with a total of 855 firms-year observations for the period 2001-2010. We measure long-term debt as the proportion of debt that matures after one year. The dependent variable is Debt maturity and is defined as the proportion of debt that matures after one year. The independent variables are defined as follows: The Market to book is calculated through the ratio of the market value of a share divided by its book value. Liquidity is defined as the ratio of current assets divided by the current liabilities. Taxes are obtained through the ratio of income taxes to pretax income. Size is defined as the natural logarithm of the book value of the assets. Asset maturity is calculated by the division of property, plant and equipment to depreciation and amortization. ROE (Return On Equity) is obtained through the division of net income to equity. GDP capita is the GDP per capita expressed in current US dollars. Inflation is the inflation rate. Market capitalization is the market capitalization of listed companies in percentage of GDP. Domestic credit is measured by the domestic credit provided by banking sector in percentage of GDP. Law and Order are two indicators that measure the strength and impartiality of the legal system, and the popular observance of the law. Protection of property rights measures if property rights including financial assets are clearly and well protected by law. For both indexes lower scores indicate lower efficiency/enforcement levels. N is the number of observations of each variable. In Model 1 and 2 are GMM-SYS regressions, while Model 3 is a fixed effects regression. All regressions include robust standard errors. Model 2 and 3 include a crisis dummy. All regressions are statistically significant according to the F-Test. T-Test values are reported in parentheses.

Table 6 – Regressions estimating the debt maturity determinants for the whole sample (continued).

		Model 1	Model 2	Model 3
Variables	Expected Sign	Full Sample Estimate	Full Sample Estimate	Full Sample Estimate
Debt maturity $t-1$		0.447572 (6.21)***	0.448392 (6.43)***	
Market to book	-	-0.002031 (-1.23)	-0.002089 (-1.35)	-0.000197 (-0.09)
Liquidity	-	0.108255 (6.46)***	0.107224 (6.46)***	0.073184 (3.36)**
Taxes	+ / -	0.001662 (0.14)	0.002003 (0.16)	0.019347 (1.47)
Size	+	0.015059 (0.61)	0.017258 (0.70)	0.041064 (1.53)
Asset maturity	+	0.002556 (2.24)**	0.002542 (2.10)**	0.002893 (3.23)***
ROE	-	-0.047485 (-1.04)	-0.045935 (-1.01)	-0.026928 (-0.75)
GDP per capita	+	0.000003 (2.94)***	0.000003 (2.32)**	0.000002 (2.04)**
Inflation	-	-0.452887 (-1.86)*	-0.020903 (-1.83)*	-0.384319 (-1.44)*
Market capitalization	+ / -	-0.019679 (-0.92)	-0.020903 (-0.91)	0.011113 (0.39)
Domestic credit	+ / -	-0.058635 (-2.82)***	-0.042978 (-1.29)	-0.004575 (-0.12)
Law and Order	+	0.008419 (1.69)*	0.008971 (1.79)*	-0.002997 (-0.55)
Protection of property rights	+	-0.004626 (-0.72)	-0.007425 (-1.16)	-0.009057 (-1.41)
Crisis Dummy	-		-0.016349 (-0.88)	-0.002092 (-0.11)
AR (1)		-3.9414***	-3.9713***	-
AR (2)		-0.19446	-.23595	-
Wald test		185.59 (13)***	197.22 (14)	-
Sargan test		42.25 (43)	40.51 (43)	-
Adjusted R-Square				0.3524
Observations		723	723	813

*Significant at the 10% level; **Significant at the 5% level; *** Significant at the 1% level

5. Conclusions

This dissertation intends to investigate the effects of firm-specific and country-specific effects across Greece, Ireland, Italy, Portugal and Spain. The main objectives of this empirical work were two. On one hand, verify which factors influence firms' debt maturity in these countries, taking into account the main existing theories in literature. On the other hand, realize the impact of the banking and sovereign crisis on the debt maturity evolution.

Following closely the approach adopted by Antoniou et al. (2006), we conclude for the countries surveyed, that firms have an optimal level of debt maturity structure, for the period between 2001 and 2010. The speed of adjustment in those countries suggests a costly and non-instantaneous adjustment. Consistent with previous empirical studies reported, our findings suggest that debt maturity is related with firm-specific factors and country-specific factors, such as the macroeconomic conditions and the legal and institutional environment.

With regard to firm-specific effects, we conclude that, in contrast with the liquidity risk theory, in these countries firms with high liquidity prefer to raise long-term debt. This relation reflects the need to avoid expensive and long bankruptcy process. Our findings confirm that listed firms are less exposed to information asymmetries problems, since stock markets require a constant release of information by listed firms. The insignificant estimates provided to the signaling hypothesis and growth options also confirm our explanation, since markets already know firms' quality and the advantages are not necessarily related with information asymmetries. The "matching" maturity approach also receives support in these countries. We observe that firms that match the maturity of their assets and liabilities have debt with longer maturities, since it reduces the *underinvestment* problem and firms' ability to commit to making debt payments out of future revenues is enhanced by the strength of the lender's threat to seize assets.

Macro-economic conditions further appear to influence debt maturity and this effect depends on the country's economic development and the level of inflation. However these two determinants have contradictory signals. In accordance with previous

empirical studies, our findings suggest that firms operating in countries with high development have debt with longer maturities. Additionally, we conclude that debt maturity decreases when inflation increases, confirming the important role that inflation has in long-term debt markets.

The size of financial institutions is also an important determinant of firms' financing choice. Firms in countries with large banking system tend to have debt with shorter maturities, which is result of banks' preference to lend on a short-term basis. We also find evidence that firms operating in countries which enforce law more effectively are more likely to obtain long-term debt. This suggest that financial institutions react to poor enforceability of contracts by reducing size of loans, shortening loan maturities and increasing loan spreads.

We also find that during the financial crisis firms decreased their debt maturity. According to our estimates it had, however, an insignificant impact on debt maturity structure as the effects of the policies implemented by European Union governments of credit contraction has begun to be felt only recently.

In summary, we conclude that not only firm-specific effects play an important role in debt maturity structure. The results indicate that governments can influence this choice. Through the application of stable macroeconomic policies, improvements in effectiveness of the legal system, as well as, the development of the banking sector, firms would increase their access to long-term debt. The crisis may weaken the incentives for structural reform through a range of channels, and thereby adversely affect potential growth and the resilience of economies to recover. Governments can promote economic growth, since firms can maximize their long-term investments through the use of debt with extended maturities.

6. Final Comments

This study contributes to the existing literature on corporate finance. It allows understanding what kind of firm-specific and country-specific determinants influence debt maturity choice, but also what was the impact of the financial crisis on debt maturity evolution.

Naturally, there are a few limitations in this empirical work, especially the limited explanatory power of data and variables. The data presented in this empirical work are fully based on the accounting data, and this approach was used to define the independent variable. The size of the sample and type of the firms which were considered in our approach can also constitute a limitation in our analysis, since data used for each country only contains firms that are quoted on the main stock markets. In Demirgüç-Kunt and Maksimovic (1999) paper, the author reported some differences between small firms and big firms across countries. Finally, our data was gathered from different sources.

Our variables are used to measure the determinants of the firms' debt maturity. However, defining a proxy to measure a determinant is not always a simply and consensual process (e.g. growth options and company's quality). The use of different variables could lead to different conclusions and it is possible that we not measure all the determinants that have an impact in firms' debt maturity choice.

In addition, alternative methodologies and the use of other assumptions could lead to different results in terms of the economic relevance of the determinants of debt maturity.

Despite the existence of some limitations in our study, our findings suggest that country-specific factors play an important role in firms' debt maturity. Through the use of debt with extended maturities, in theory, firms can maximize their long-term investments and promote economic growth. A very interesting possibility for future researches is to study the relation between investment horizons and debt maturity, and between investment horizons and country-specific factors to induce economic growth across European countries.

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Appendix 1 – Firms present in the sample.

Firms	Country	Period
A2A SpA	Italy	2001-2010
Abengoa SA	Spain	2001-2010
Abertis Infraestructuras SA	Spain	2001-2010
Acciona SA	Spain	2001-2010
Acerinox SA	Spain	2001-2010
ACS Actividades de Construccion y Servicios SA	Spain	2001-2010
Altri SGPS SA	Portugal	2005-2010
Amadeus IT Holding SA	Spain	2010
Ansaldo STS SpA	Italy	2006-2010
ArcelorMittal	Spain	2001-2010
Aryzta AG	Ireland	2009-2010
Atlantia SpA	Italy	2002-2010
Autogrill SpA	Italy	2001-2010
Brisa Auto-Estradas de Portugal SA	Portugal	2001-2010
Bulgari SpA	Italy	2001-2010
Buzzi Unicem SpA	Italy	2001-2010
C&C Group PLC	Ireland	2005-2010
Cimpor Cimentos de Portugal SGPS SA	Portugal	2001-2010
Coca Cola Hellenic Bottling Co SA	Greece	2004-2010
CRH PLC	Ireland	2001-2010
Davide Campari-Milano SpA	Italy	2001-2010
DCC PLC	Ireland	2001-2010
DiaSorin SpA	Italy	2007-2010
Dragon Oil PLC	Ireland	2001-2010
Ebro Foods SA	Spain	2001-2010
EDP - Energias de Portugal SA	Portugal	2001-2010
EDP Renovaveis SA	Portugal	2008-2010
Elan Corp PLC	Ireland	2004-2010
Ellaktor SA	Greece	2001-2010
Enagas SA	Spain	2002-2010
Endesa SA	Spain	2001-2010
Enel Green Power SpA	Italy	2010
Enel SpA	Italy	2001-2010
ENI SpA	Italy	2001-2010
Exor SpA	Italy	2009-2010
Ferrovial SA	Spain	2004-2010
Fiat SpA	Italy	2001-2010
Finmeccanica SpA	Italy	2001-2010
Fomento de Construcciones y Contratas SA	Spain	2001-2010
Galp Energia SGPS SA	Portugal	2006-2010
Gamesa Corp Tecnologica SA	Spain	2001-2010
Gas Natural SDG SA	Spain	2001-2010
Glanbia PLC	Ireland	2001-2010
Grafton Group PLC	Ireland	2001-2010
Greencore Group PLC	Ireland	2001-2010
Grifols SA	Spain	2006-2010
Hellenic Petroleum SA	Greece	2001-2010
Hellenic Telecommunications Organization SA	Greece	2001-2010
Iberdrola Renovables SA	Spain	2007-2010
Iberdrola SA	Spain	2001-2010

Appendix 1 – Firms present in the sample (continued).

ICON PLC	Ireland	2001-2010
Impregilo SpA	Italy	2001-2010
Independent News & Media PLC	Ireland	2001-2010
Inditex SA	Spain	2002-2010
Indra Sistemas SA	Spain	2001-2010
International Consolidated Airlines Group SA	Spain	2010
Jeronimo Martins SGPS SA	Portugal	2001-2010
JUMBO SA	Greece	2001-2010
Kerry Group PLC	Ireland	2001-2010
Kingspan Group PLC	Ireland	2001-2010
Lottomatica SpA	Italy	2002-2010
Luxottica Group SpA	Italy	2001-2010
Mediaset Espana Comunicacion SA	Spain	2004-2010
Mediaset SpA	Italy	2001-2010
Mota-Engil SGPS SA	Portugal	2001-2010
Motor Oil Hellas Corinth Refineries SA	Greece	2001-2010
Mytilineos Holdings SA	Greece	2001-2010
Obrascon Huarte Lain SA	Spain	2001-2010
OPAP SA	Greece	2001-2010
Paddy Power PLC	Ireland	2001-2010
Parmalat SpA	Italy	2005-2010
Pirelli & C SpA	Italy	2001-2010
Portucel Empresa Produtora de Pasta e Papel SA	Portugal	2001-2010
Portugal Telecom SGPS SA	Portugal	2001-2010
Prysmian SpA	Italy	2007-2010
Public Power Corp SA	Greece	2001-2010
Red Electrica Corp SA	Spain	2001-2010
REN - Redes Energeticas Nacionais SA	Portugal	2007-2010
Repsol YPF SA	Spain	2001-2010
Ryanair Holdings PLC	Ireland	2001-2010
Sacyr Vallehermoso SA	Spain	2001-2010
Saipem SpA	Italy	2001-2010
Semapa-Sociedade de Investimento e Gestao	Portugal	2001-2010
Smurfit Kappa Group PLC	Ireland	2007-2010
Snam Rete Gas SpA	Italy	2001-2010
Sonae	Portugal	2001-2010
Sonae Industria SGPS SA	Portugal	2005-2010
Sonaecom - SGPS SA	Portugal	2001-2010
STMicroelectronics NV	Italy	2001-2010
Tecnicas Reunidas SA	Spain	2006-2010
Telecom Italia SpA	Italy	2001-2010
Telefonica SA	Spain	2001-2010
Tenaris SA	Italy	2002-2010
Terna Rete Elettrica Nazionale SpA	Italy	2003-2010
Titan Cement Co SA	Greece	2001-2010
Tod's SpA	Italy	2001-2010
United Drug PLC	Ireland	2001-2010
Viohalco	Greece	2001-2010
Zon Multimedia Servicos de Telecomunicacoes e Multimedia SGPS SA	Portugal	2001-2010

Appendix 2 - Debt maturity evolution for each country from 2001 to 2010.

The sample includes all non-financial firms traded on the main stock index in Greece, Ireland, Italy, Portugal and Spain, at 31 of March of 2011, and covers a period from 2001 to 2010. Firms' financial data were obtained from Bloomberg and only includes since firms were publicly traded on stock index markets. The dependent and independent variables were cleaned by winsorizing all outliers at the top and bottom 1% level. Sample includes 99 different firms with a total of 855 firms-year observations for the period 2001-2010. We measure long-term debt as the proportion of debt that matures after one year.

Years	Greece		Ireland		Italy		Portugal		Spain	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2001	10	0.4319	13	0.4224	19	0.3956	11	0.5739	18	0.4783
2002	10	0.4115	13	0.4184	21	0.4478	11	0.5498	20	0.4331
2003	9	0.4315	13	0.3877	22	0.4914	11	0.6073	20	0.4905
2004	11	0.4522	14	0.4725	22	0.4932	11	0.6078	22	0.4938
2005	11	0.4644	15	0.5271	23	0.4799	13	0.6055	22	0.5235
2006	11	0.4433	15	0.4939	24	0.4895	14	0.6172	24	0.5264
2007	11	0.4675	16	0.4942	26	0.4854	15	0.5804	25	0.5293
2008	11	0.4694	16	0.5452	26	0.4985	16	0.6367	25	0.5277
2009	11	0.5053	17	0.5557	27	0.5288	16	0.6129	25	0.5675
2010	11	0.4747	17	0.5186	28	0.4982	16	0.6208	27	0.5435

Appendix 3 – Comparison of Regression Results in literature.

Regression Model	Expected Sign	Stohs and Maurer (1996)	Ozkan (2000)	Ozkan (2002)	Scherr and Hulgurt (2001)	Heyman et al. (2003)	Antoniou et al. (2003)	Fan et al. (2003)	Körner (2006)	Demirgüç-Kunt and Maksimovic's (1999)
		FE	GMM, OLS	CSR	OLS	OLS, FE; CSR	OLS, GMM	OLS	FE	OLS
<i>Growth Options</i>	-	Significant positive	Significant negative	Significant negative	Insignificant negative	Insignificant negative	Significant positive for UK	Significant negative	Insignificant negative	
<i>Firm size</i>	+	Significant positive	Significant positive	Significant positive	Significant negative	Significant negative	Significant positive for UK	Significant positive	Significant positive	
<i>Firm quality</i>	-	Significant negative	Insignificant negative	Insignificant positive	Significant negative		Insignificant negative/positive	Significant positive		
<i>Liquidity</i>	-						Significant positive for Germany			
<i>Asset maturity</i>	+	Significant positive	Significant positive	Significant positive	Significant positive	Significant positive	Significant positive for UK	Significant positive	Significant positive	
<i>Corporate tax rate</i>	+/-	Significant negative	Insignificant negative	Insignificant negative				Significant negative/positive	Insignificant negative	
<i>Economic development</i>	+									Significant Positive
<i>Inflation</i>	-									Significant Negative
<i>Market capitalization</i>	+/-									Significant Positive
<i>Banking Size</i>	+/-									Significant Positive
<i>Efficiency of Legal System</i>	+									Significant Positive

Note: FE is fixed effects, CSR is cross-sectional regression, GMM is the generalized method of moments, and OLS is ordinary least squares.