Corporate Debt Maturity Structure: A Contemporary Analysis of Macroeconomic and Firm-Specific Influences

Gabriele Ciafrè

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Dr. Leonidas Tsiaras

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Abstract

The study examines the factors influencing the maturity structure of corporate debt, with a focus on the influence of macroeconomic and firm-specific variables on the decision to issue short-term or long-term debt. This research is based on the work of Barclay and Smith, which explores a dataset from 1992, the point at which the analysis of the seminal paper concludes, to 2023. The aim is to evaluate the relevance of traditional theories in the context of significant macroeconomic changes. The analysis considers the same set of variables as the original study: firm size, growth opportunities, regulatory environment, firm quality and term structure of interest rates. The hypothesis that firms with higher growth prospects tend to prefer short-term debt reduction to mitigate the risks associated with underinvestment is supported by the observation of a negative correlation between growth opportunities and debt maturity. Moreover, the study examines the long-term impact of firm size, with larger firms demonstrating a greater proclivity to issue long-term debt, reflecting their enhanced access to capital markets. The impact of post-2008 regulatory changes has yielded mixed results, indicating that firms have inconsistently altered their debt strategies in response to the changing contemporary regulatory landscape. The study identifies alterations in the correlation between debt maturity and macroeconomic variables, particularly the term structure of interest rates, which has proved significant in recent years. This paper contributes to the ongoing discourse on corporate finance by providing contemporary insights into the strategic considerations that companies make when choosing their debt maturity structure.

Keywords: Debt maturity structure, Contracting costs, Financial regulation, Economies of scale, Panel data analysis.

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Author: Gabriele Ciafrè

Resumo

O estudo examina os factores que influenciam a estrutura de maturidade da dívida das empresas, salientando a influência das variáveis macroeconómicas e específicas das empresas. A investigação baseia-se no trabalho de Barclay e Smith, que exploram um conjunto de dados de 1992 a 2023. O objetivo é avaliar a pertinência das teorias tradicionais no contexto de alterações macroeconómicas significativas. A análise considera o mesmo conjunto de variáveis que o estudo original: dimensão da empresa, oportunidades de crescimento, ambiente regulamentar, qualidade da empresa e estrutura temporal das taxas de juro. A hipótese de que as empresas com maiores perspectivas de crescimento tendem a favorecer a redução da dívida a curto prazo para mitigar os riscos associados ao subinvestimento é apoiada pela observação de uma correlação negativa entre as oportunidades de crescimento e a maturidade da dívida. Além disso, o estudo examina o impacto a longo prazo da dimensão da empresa, com as empresas de maior dimensão a mostrarem uma maior propensão para emitir dívida a longo prazo, reflectindo o seu melhor acesso aos mercados de capitais. O impacto das alterações regulamentares pós-2008 produziu resultados mistos, indicando que as empresas alteraram de forma inconsistente as suas estratégias de endividamento em resposta ao panorama regulamentar contemporâneo em mutação. Este artigo contribui para o atual discurso sobre finanças empresariais ao fornecer uma visão contemporânea das considerações estratégicas que as empresas fazem quando escolhem a sua estrutura de maturidade da dívida.

Palavras-chave: Estrutura de maturidade da dívida, Custos de contratação, Regulação financeira, Economias de escala, Análise de dados em painel.

Título: Estrutura de Maturidade da Dívida das Empresas: Uma Análise Contemporânea das Influências Macroeconómicas e Específicas da Empresa

Autor: Gabriele Ciafrè

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1. Introduction

The decision concerning the maturity of a company's debt can have significant implications for the company's financial stability, its capacity to manage risk and, ultimately, its market valuation. In their 1995 study, Barclay and Smith presented a comprehensive framework for understanding the factors that influence the decision to issue short-term or long-term debt. Their research, analysing assumptions on contracting, signalling and tax costs, highlighted the strategic considerations that companies need to make when choosing debt maturity structures. However, with the emergence of new crises and global scenarios, the financial landscape has evolved significantly since that seminal paper. The global financial crisis of 2008, subsequent regulatory changes and shifts in macroeconomic conditions have introduced new dynamics that influence firms' approach to debt maturity selection. The objective of this study is to examine these developments by extending the analysis to a more recent and larger dataset covering the period from 1992 to 2023. This will permit an examination of whether the original determinants of debt maturity, as identified by Barclay and Smith (1995), retain their relevance in the contemporary economic context, or whether new factors have emerged as more significant.

1.1 Research Aim

The main objective of the study is to analyse the factors influencing the maturity structure of corporate debt in the context of contemporary financial markets. Firstly, it examines the extent to which Barclay and Smith's (1995) variables, in particular the term structure of interest rates and regulatory changes, influence corporate debt maturity decisions. Second, by clarifying the complex interplay between these variables and the broader macroeconomic environment, it seeks to examine the influence of firm size and investment opportunities on debt maturity decisions.

1.2 Significance of the study

This research is of value from both an academic and a practical standpoint. From an academic perspective, the study contributes to the ongoing debate on corporate finance by testing the continued relevance of established theories in a modern context and providing empirical evidence

on the impact of macroeconomic and firm-specific factors on debt maturity decisions, with a particular focus on the period following the global financial crisis of 2008.

In practical terms, the findings furnish valuable insights for corporate managers and financial analysts. The awareness of the factors influencing debt maturity and their firm-specific dynamics can facilitate more informed decision-making by those within the organisation regarding their capital structure, particularly in the context of economic turbulence. The research demonstrates the influence of regulatory amendments on corporate financial strategies, informing future regulatory frameworks for corporate policy-making.

In conclusion, the study builds upon the seminal work of Barclay and Smith (1995) and provides a contemporary analysis of the determinants of debt maturity, offering valuable insights for academic and real-world corporate finance.

2. Literature Review

2.1 Overview

This review takes as its point of departure the seminal study by Barclay and Smith (1995) and examines the fundamental theories and empirical findings that have shaped the understanding of corporate debt maturity to date. Subsequent studies that have tested and extended these theories are examined, with a particular focus on the determinants at the time of negotiating debt offers, the information that may be derived from this financing choice, and the potential tax benefits that can be derived.

Their research was crucial in moving beyond the simplistic dichotomy of leverage, identifying a number of key variables that influence the maturity of corporate debt. These include economies of scale, investment opportunities in the industry in which one operates and market and industry-specific conditions. The hypotheses are classified into three categories: the bargaining cost hypothesis, the signalling hypothesis and the tax hypothesis. The results demonstrate that contracting and signalling costs exert a pronounced influence, whereas the impact of tax considerations is less pronounced.

2.2 Detailed review

2.2.1 Contracting Cost Hypothesis

The contracting cost hypothesis postulates that firms choose the maturity structure of debt with the aim of reducing the costs associated with financial contracts and potential conflicts between stakeholders. This hypothesis is based on the work of Fama (1990), who discussed the influence of bargaining costs on financing decisions, and Myers (1977), who introduced the concept of underinvestment resulting from conflicts between bondholders and shareholders.

Myers (1977) proposed that firms with significant growth prospects may choose to avoid long-term debt financing in order to prevent bondholders from claiming the value of potential future investments the firm undertakes. This, in turn, dissuades shareholders from pursuing highly lucrative projects, as they do not want debt holders to take advantage of the increase in value of the company, arising from positive investment options, gained by risking their own share of equity. This behavioural reaction of equity holders gives rise to the phenomenon of underinvestment.

In support of this thesis, it can be hypothesised that more debt also avoids managerial discretion, since in this situation the manager is not able to adopt opportunistic behaviour using the company's cash flow, since he has an imminent debt to repay. In particular, long-term debt for a firm with few growth options functions as a discipline mechanism, limiting the liquidity available to managers and increasing the ability to monitor the decisions of bondholders, through the renewal of debt (Stulz, 1990).

In relation to this managerial discretion, the bargaining cost hypothesis suggests that firms subject to regulation tend to have debt with longer maturities than those operating in a less regulated environment. This is because industry regulation already has a power to constrain managerial discretion, effectively reducing the agency costs associated with long-term debt, thus making it more incentivising for firms in highly regulated industries to finance themselves through debt with longer maturities (Smith, 1986). This direct impact of regulatory and governance structures on firms' financing strategies is a key piece of this research.

The size of the firm is correlated with the maturity of the debt and related to the assumption of contracting costs. Large firms also benefit from the economies of scale associated with public debt issuance, which tends to have high fixed costs. As a result, larger firms are able to access long-term financing more easily than smaller ones, due to the greater efficiency with which the former access such financing and due to the negotiating power they wield by moving huge amounts of capital. The latter, unable to exploit the same economies of scale, choose to resort to consolidated debt, which has lower fixed costs (Blackwell & Kidwell, 1988). Lower total costs imply lower flotation costs, so small companies opting for bank debt have shorter maturities.

In a further development of these theories, Barclay and Smith (1995) conducted an empirical test of the bargaining cost hypothesis using a large dataset and significant variables for debt structure analysis. The results showed that firms with higher growth prospects were more likely to use short-term debt, thus supporting the thesis that short-term debt can facilitate the resolution of underinvestment problems. Furthermore, the study emphasised the impact of firm size, suggesting that larger firms, which face lower relative contracting costs, are more likely to issue long-term debt.

The use of short-term debt serves to mitigate agency problems arising from greater growth opportunities (Johnson, 2003; Stephan et al., 2011). Second, in terms of firm size in realzioen to

information asymmetry, larger firms are more transparent than smaller firms, which increases lenders' confidence in lending at a lower cost. Moreover, larger firms, which are less vulnerable to bankruptcy costs, have easier access to external financing and exploit economies of scale to take on larger long-term debt obligations at a lower cost than smaller firms (Antoniou et al., 2006; Cai et al., 2008; Stephan et al., 2011).

In light of the confirmation of the assumptions made in Barclay and Smith's (1995) seminal article by subsequent research on the topic, this study therefore shifts the focus from agency costs (the bargaining cost hypothesis) to growth opportunities and firm size.

2.2.2 Signaling Hypothesis

The signalling hypothesis proposes that companies use their choice of debt maturity as an information tool to send signals to the market about their quality. This theory is based on the concept of information asymmetry, according to which those inside the firm have greater knowledge of its future prospects than outside investors. Flannery (1986) and Diamond (1991) proposed that firms with positive private information deliberately choose to issue short-term debt in order to convey a sound financial position and a minimal propensity to default. Conversely, firms with less favourable information choose to use long-term debt to secure financing on more convenient terms and to avoid the future risks associated with frequent refinancing on worse terms than before.

Empirical evidence supporting the signalling hypothesis was provided by Barclay and Smith (1995), who showed that higher quality firms are more likely to issue short-term debt. The results demonstrate the signalling mechanism behind the choice of debt maturity has empirical validity, which aligns with the theoretical predictions postulated in the work of Flannery and Diamond.

Given the distortion resulting from information asymmetry, markets are unable to distinguish between low- and high-quality firms, which leads high-quality firms to issue short-term debt (Cai et al., 2008). This phenomenon occurs when the deterioration of the creditworthiness of long-term debt exceeds that of short-term debt, resulting in a higher risk profile for the former. The scenario described assumes that the transaction costs associated with short-term debt are higher than those associated with long-term debt. As a result, companies with the financial capacity to bear the higher

transaction costs associated with short-term debt are companies with strong profits and higher quality. Furthermore, if we view long-term debt as vulnerable to fluctuations in firm value relative to short-term debt, in the absence of differentiation between low- and high-quality firms, high-quality firms will tend to issue short-term debt, while low-quality firms will issue long-term debt (Kale & Noe, 1990). Based on Flannery's (1986) argument, Kale and Noe also find that when changes in firm value are positively correlated, high quality firms tend to issue short-term debt, while low quality firms tend to issue long-term debt.

These arguments suggest an inverse relationship between debt maturity structure and firm quality. However, a recent study by Fan et al. (2012) presents an opposite argument, namely that profitable firms tend to have longer debt maturity structures. This is because when firms borrow more to increase their tax shield, it is known that profits increase with longer maturity periods. This suggests a positive correlation between profitability and debt structure. Moreover, highly leveraged firms seek to mitigate financial risk and the potential for bankruptcy by extending debt maturities. Although a higher debt ratio increases the probability of liquidation, issuing long-term debt serves to delay firms' exposure to this risk (Antoniou et al., 2006).

Gopalan et al. (2014) show that leverage has a positive impact on debt maturity, indicating that refinancing risk decreases when firms take on long-term debt. Berger et al. (2005) argue that long-term debt is associated with low information asymmetry and, therefore, firms with high levels of long-term debt in their corporate structure are considered to be of good quality. A higher liquidity risk associated with long-term debt is another factor that deserves to be considered, as it contrasts strongly with the arguments put forward by the proponents of the signalling theory.

It is therefore unclear what the expected relationship between firm quality and debt maturity structure is. In this paper, we adopt the approach of Barclay and Smith (1995), who treat signalling costs as future abnormal returns that incentivise the use of short-term debt.

2.2.3 Tax Hypothesis

The objective of the tax hypothesis is to analyse how tax deductibility affects interest payments, since it is the firm that determines the maturity structure. Brick and Ravid (1985) argue that firms

prefer to have long-term debt in order to benefit from a stable long-term interest rate, which is beneficial for providing a predictable and easily controllable tax shield.

Long-term interest rates have a greater fiscal impact over time than short-term interest rates because of their upward slope. When the yield curve is upward sloping, the expectations hypothesis predicts that a one- or two-year liability can be traded and borrowed at a lower interest cost than one would expect to pay for a ten-year liability, even if the interest cost declines in subsequent years. In this context, Brick and Ravid argue that companies issue long-term debt in order to reduce their expected tax burden and thereby increase their current market value. In the context of a downward sloping term structure, the issuance of short-term debt is associated with an increase in firm value. The tax hypothesis predicts that firms are more likely to use long-term debt when the term structure has a positive slope.

In their empirical investigation of the tax hypothesis, Barclay and Smith found contradictory results. Although tax considerations do influence debt maturity decisions, they are less important than contracting costs and signalling effects. This result was further confirmed by Lewis (1990), who argued that taxes do not affect the optimal maturity of debt. He disproved Brick and Ravid's hypothesis by suggesting that what they claimed is true if a firm chooses leverage before debt maturity. If leverage and debt maturity are chosen simultaneously, the latter becomes superfluous.

2.2.4 Empirical Findings

A large amount of empirical research has been conducted to investigate the factors influencing the maturity of corporate debt in different contexts and time periods following the seminal work of Barclay and Smith.

For example, Aivazian, Ge and Qiu (2005) analysed the impact of debt maturity structure on firms' investment decisions. Their results suggest that short-term debt can help mitigate the underinvestment problem in firms with significant growth opportunities.

Similarly, Stohs and Mauer (1996) conducted an in-depth analysis of the debt maturity structure of firms in different industries and showed that firm size and growth opportunities are critical factors in determining the choice of debt maturity.

In general, these studies support the contracting and signalling cost hypotheses, suggesting that firms with higher growth opportunities and higher quality tend to favour short-term debt. However, the impact of tax considerations remains unclear as the evidence on their importance is inconclusive.

2.3 Contemporary Literature Gaps and Criticisms

Despite a substantial body of research that also seems to project a well-defined trajectory, there are still significant gaps and criticisms in the existing literature on corporate debt maturity. One of the main criticisms is the issue of generalisability across different sectors and economic conditions. One shortcoming of existing studies is that they frequently concentrate on a particular sector or economic context, which may not fully align with the broader market dynamics. For instance, the findings related to the technology sector may not be applicable to traditional manufacturing industries, given the distinct risk profiles and growth prospects.

Technological advances, such as the advent of digital communication technologies and increased financial transparency, have had a significant impact on the way companies present their quality to the market. It is becoming increasingly evident that these technological advancements are transforming traditional reporting procedures. The increased transparency and better dissemination of information through digital platforms have altered the way investors assess the quality of companies, which in turn influences companies' decisions on the maturity of their debt (Brown, Martinsson, Petersen, 2013).

The evolution of the financial instrument landscape, with the advent of new instruments including derivatives and securitised debt, has had a radical impact on the corporate finance landscape. These instruments have the potential to exert considerable influence on debt maturity decisions, offering alternative avenues for managing risk and capital structure. The increased complexity introduced by these financial innovations suggests that traditional theories of debt maturity may need to be revised to take these changes into account (Stulz, 2004).

In addition, regulatory changes, particularly those that have emerged in the wake of the global financial crisis, have had a significant impact on the evolution of corporate financing strategies. The introduction of new regulatory frameworks, such as the Basel III Accord, has led to the

imposition of more stringent capital requirements and risk management standards on financial institutions. In light of these regulations, firms have adjusted their debt maturity structure to comply with the new requirements and to more effectively manage regulatory risks (Acharya, Pedersen, Philippon, Richardson, 2010). In a regulated environment, companies are required to maintain a certain level of liquidity and capital reserves, which directly influences their debt maturity preferences.

The increased integration of global financial markets has enabled established firms to overcome many of the barriers to financial development (Rajan & Zingales, 2003), thereby expanding their access to international capital and influencing their financing strategies. Lane and Milesi-Ferretti (2008) emphasise the significant influence of globalisation on corporate finance. The capacity to access a range of finance sources and navigate cross-border financial risks has enabled firms to more effectively align debt maturity with their strategic objectives.

In the context of globalisation, which is so different from the 1995 scenario, this paper aims to replicate Barclay and Smith's analysis using updated data from 1972 to 2023. This will serve to validate the continued relevance of the original assumptions and explore how modern developments have reshaped the determinants of corporate debt maturity. The comprehensive approach taken will provide new insights into the strategic considerations underlying debt maturity decisions in today's financial environment. It will also fill gaps in the existing literature and contribute to a broader understanding of the dynamics of corporate finance.

3. Data

This study employs a comprehensive dataset derived from the COMPUSTAT/Capital IQ database, focusing on US-listed companies for the period from 1992 to 2023. The selection of data was guided by the necessity to extend the analysis of corporate debt maturity structures beyond the period covered by Barclay and Smith (1995), whose seminal work analysed data from 1974 to 1991. By examining a more recent and extended period, the aim of the research is to explore the evolutionary dynamics of debt maturity in response to changes in the modern economic and regulatory environment. Furthermore, the analysis of the contemporary context will provide insights that could inform recommendations for companies, in addition to offering a comparison with the reference paper.

3.1 Exogenous variables

The key variables of interest are the firm's market-to-book ratio, firm size (calculated using the natural logarithm of the firm's value), the regulatory dummy (indicating whether the firm operates in a regulated sector), firm quality (represented by abnormal profits) and the term structure of interest rates (capturing the difference between long-term and short-term government bond yields). The selection of these variables is based on their theoretical and empirical relevance in influencing firms' financing policies, particularly with regard to the choice of debt maturities.

The market-to-book ratio is used as a proxy for the firm's growth potential. Firms with this high ratio tend to have a higher proportion of short-term debt, as they are better able to navigate opportunistic behaviour from managers and avoid the issue of underinvestment.

The natural logarithm of firm value was included as a measure of firm size to quantify the effect of economies of scale on the cost and availability of external financing. Larger firms are more likely to be able to negotiate favourable terms and access finance more easily, thus favouring long-term debt at a lower cost.

A dummy variable was included to measure the extent to which sectoral regulations affect financing decisions. Companies operating in regulated sectors are often constrained and influenced by a number of factors, so they favour long-term debt to ensure their financial stability.

Company quality, represented by abnormal earnings, is indicative of the company's ability to generate higher-than-expected profits, which is a leading indicator of financial strength and the ability to sustain long-term debt.

Understanding the term structure of interest rates is crucial for grasping the link between financing decisions and the broader macroeconomic environment. A high spread between long-term and short-term rates may force companies to choose a long-term solution to obtain fixed interest rates, thus reducing the risk of future refinancing at unfavourable terms.

3.2 Data treatment

The data were subjected to rigorous preparation for analysis, ensuring the uniformity of measurements for all variables throughout the entirety of the sample period. In order to address the issue of extreme values present in the tails of the distributions, a winsorisation procedure was initially applied. This procedure served to mitigate the influence of outliers by constraining extreme values to the 5th and 95th percentile levels. This technique was employed with the dual objective of maintaining the overall distribution of the data while simultaneously reducing the impact of outliers. However, in instances where subsequent analysis indicated the necessity for further adjustment, it was deemed appropriate to directly remove observations that exceeded the first and 99th percentiles. In cases of particularly complex scenarios, a more extreme form of winsorization was employed, with the first and 99th percentiles subjected to this treatment. This more rigorous approach was employed with caution to ensure that significant variability in the data was preserved. The aforementioned data treatment process permitted an optimal equilibrium to be maintained between the robustness of the analysis and the representativeness of the original distributions.

3.3 Descriptive statistics

Table I offers substantial insight into the financial dynamics of the companies under analysis, particularly with regard to their debt management strategies. The ratio of long-term debt to total debt exhibits an average of 76.8%, accompanied by a standard deviation of 33 percentage points. This suggests that, although the majority of companies tend to favour a debt structure oriented

towards the long term, there are notable variations between companies. Indeed, the 25th and 75th percentile values, at 63.9% and 95.5% respectively, indicate a relatively broad distribution, reflecting differences in the financing policies adopted by companies, likely in response to their particular market and strategic circumstances.

Table I

Summary Statistics of the Determinants of Corporate Debt Maturity

Summary Statistics for the long-term debt on total debt and the firm's market-to-book ratio, the natural log of firm value, the dummy variable for firms in regulated industries, the firm's future abnormal earnings, and the risk-free term structure. Sample: All firms on COMPUSTAT/Capital IQ between 1992 and 2023.
(307,556 firm-year observations)

Variable name	Mean	25th Percentile	Median	75th Percentile	Standard Deviation
Long term debt/Total debt	.768	.639	0.955	1	.33
Market-to-book	6.144	1.402	10	10	4.159
Log of firm value	8.931	6.042	10.771	11.991	3.469
Regulation dummy	.076	0	0	0	.265
Abnormal earnings	2.304	0	0.407	4.923	2.473
Term structure	1.359	.57	1.280	2.15	1.188

It is also noteworthy that the market-to-book ratio exhibits a mean value of 6.144 and a standard deviation of 4.159. This considerable variability indicates that the companies in the sample are perceived in markedly different ways by the market. Some are regarded as having high growth potential, as evidenced by a market-to-book ratio that is markedly higher than their book value. Conversely, some may be regarded as being associated with a higher risk or limited growth potential.

The mean value of enterprise value, expressed as the natural logarithm of value, is 8.931, with a standard deviation of 3.469. This indicates a considerable diversity of company sizes within the sample. This extensive range, with the 25th percentile at 6.042 and the 75th percentile at 10.771, demonstrates the existence of both substantial corporations with straightforward access to capital markets and smaller organisations that may be at disparate stages of their corporate life cycle.

Furthermore, the distribution of the regulatory dummy is worthy of note, indicating that only 7.6% of firms operate in regulated sectors. Although they constitute a minority, these companies are subject to stringent regulations that could exert a significant influence on their financing decisions, prompting them to favour long-term debt as a means of stability in a regulated environment.

The companies' abnormal profits, with an average of 2.304 and a standard deviation of 2.473, demonstrate a notable degree of variability, reflecting the diverse performance outcomes observed across the sample. Some firms achieve significantly higher profits than expected, while others may be in more unfavourable conditions, reflecting different capacities to generate value in the market environment.

In conclusion, the term structure of interest rates, with a mean of 1.359 and a standard deviation of 1.188, indicates that the study period was characterised by considerable variations in the macroeconomic environment. Such fluctuations may have had a direct impact on firms' decisions regarding debt maturity, influencing their preference for long-term or short-term debt, depending on the prevailing market conditions.

4. Methodology

4.1 Research Design

This study employs a research design that is consistent with the methodological approach adopted by Barclay et al. (1995). The objective is to estimate the relationship between the maturity of long-term corporate debt and a set of exogenous variables. Furthermore, the concepts of the research are applied to a more recent dataset, thus enabling a contemporaneous analysis of the determinants of corporate debt maturity.

Figure I
Corporate Debt Maturity Regression Model

The level of debt maturity is dependent upon the firm's investment opportunities, the determinant of regulation across sectors, the size of the firm, the (hidden) quality of firm and the risk-free term structure.

$$Debt\ maturity_{i,t} = \alpha + \beta_1\, growth\ options_{i,t} + \beta_2\, \text{size}_{i,t} + \beta_3\, regulation_{i,t} + \beta_4\, firm\ quality_{i,t} + \beta_5\, term\ structure_{i,t} + \epsilon_{i,t}$$

Figure I illustrates the regression model implemented, which assesses the impact of debt maturity on a number of key determinants. In particular, the model assesses the influence of a firm's growth opportunities, which serve as a proxy for its prospective expansion potential and risk. Furthermore, it takes into account the influence of regulatory circumstances across diverse industries, acknowledging that firms operating within more regulated sectors may pursue distinct debt strategies compared to those operating in less regulated environments. The variable of firm size is included as a key determinant, due to better access to capital and more flexibility in debt maturity choices for larger firms. Moreover, the model incorporates a measure of the quality of the firm, which is often not visible to the market and may influence its capacity to obtain favourable financing terms. Finally, the term structure of risk-free interest rates is included in order to account for broader macroeconomic conditions that may influence the attractiveness of long-term versus short-term debt.

The study employs a systematic approach to provide robust and comprehensive insights into the factors that drive corporate debt maturity decisions, which are crucial for both academic researchers and corporate finance practitioners.

4.1.1 Investment Opportunity Set

To represent the investment opportunities of companies, the market-to-book ratio was employed. This is defined as the ratio between the market value of a company's assets and their book value. This is because growth opportunities are not reflected in companies' financial statements and therefore cannot be quantified using traditional accounting methods. Instead, they can be quantified by the difference between a company's market value and its book value. The variable was initially defined by Smith and Watts (1992) and Gaver and Gaver (1993), who employed it to examine the growth opportunities of firms in relation to their choice of corporate policy, with a particular focus on funding, remuneration and dividend strategies. The findings of the paper indicate that the ratio is a determining factor in observed policy choices. Barclay and Smith subsequently identified the market-to-book ratio as the primary proxy variable for investment opportunities. This empirical result was subsequently corroborated by numerous other studies (Kallapur and Trombley, 2001; Adam and Goyal, 2008), which asserted that the market-to-book ratio is the most informative indicator of investment opportunities.

The variable is calculated by estimating the market value of the company's assets as the sum of the respective book values of the assets, minus the book value of equity, plus the market value of equity. The ratio is defined as the quotient of the estimated market value and the book value of the assets. The market-to-book value ratio is indicative of market growth expectations, with higher values indicating greater unrecognised growth opportunities. The estimated value exhibited extreme observations, which could otherwise exert undue influence on the regression results. To avoid this, a winsorization procedure was applied at the 5% level. As the values in the upper tail of the distribution exhibited maximum values in excess of 300, a further adjustment was made, resulting in the elimination of observations above the 99th percentile.

4.1.2 Firm Size

The size of the firm was gauged by employing the natural logarithm of the firm's market value. The size of a firm is a significant factor that can affect its capacity to access capital markets, which in turn influences the maturity choices of debt instruments. The greater resources and access to credit available to larger companies enable them to issue long-term debt with greater ease than

their smaller counterparts. It should be noted that an analysis of a company's financing choices according to its size can also result in completely different debt policy scenarios. Therefore, this variable requires further specification. An illustrative example can be found in the work of Koralun-Bereźnicka (2017), who divided his sample of companies into three distinct size groups: small, medium, and large.

4.1.3 Regulation dummy

To quantify the impact of sectoral regulation on debt maturity policies, a dummy variable was incorporated into the regression model, taking the value of one in instances where the firm operates within a regulated sector and zero otherwise. The financial decisions of firms operating in regulated sectors are subject to considerable influence from regulatory constraints. In order to ensure greater stability, firms operating in these sectors tend to prefer long-term debt.

In defining the variable, consideration was given not only to the type of sector, but also to the various stages of regulation and deregulation within the sectors in question. The regulated sectors were identified using SIC (Standard Industrial Classification) codes, and the subsequent phases of these regulated markets were defined. The phase of greater regulation was defined as 1, while the phase of deregulation or (with discretion and in relation to legislative manoeuvres) a phase of less regulation was defined as 0.

To illustrate, in the case of the energy sectors (SIC 4911 - Electric Services, 4931 - Electric and Other Services Combined, 4939 - Combination Utilities, NEC), prior to 1990, the market was subject to strict regulation (Dummy = 1). In the 1990s, numerous states, including California and Texas, initiated the deregulation of the energy market (Dummy = 0). This was followed by a partial return to regulation in the wake of the 2000-2001 energy crisis (Dummy = 1). In the case of the natural gas sector (SIC 4922 - Natural Gas Transmission), the process of deregulation commenced in the 1980s and 1990s, with the enactment of legislation such as the Natural Gas Wellhead Decontrol Act (U.S. Congress, 1989) and the issuance of orders by the Federal Energy Regulatory Commission, notably Order No. 888 (1996) (Dummy = 0). However, from 2008 onwards, an intensification of environmental regulation resulted in the dummy returning to a value of 1 (Lo, 2009).

A significant contribution to the analysis is the robust regulatory framework that has been imposed on the banking and insurance sector (SIC 6021 - National Commercial Banks, 6311 - Life Insurance). Prior to 2007, the sector underwent a period of intense deregulation, which was subsequently followed by a return to regulatory control with the enactment of the Dodd-Frank Act in 2010 (U.S. Congress, 2010). In the telecommunications sector (SIC code 4812 and 4813), the period between 1992 and 1995 was characterised by a high level of regulatory control, followed by a period of deregulation between 1996 and 2007, in accordance with the Telecommunications Act (U.S. Congress, 1996). From 2010 onwards, a reintroduction of regulation was observed. In the energy sector (SIC code 4911-4939), the period from 1992 to 2000 was characterised by significant deregulation. In response to scandals such as Enron (Tan and Yeo, 2006), new regulations were implemented from 2001 to 2016. From 2017 to 2023, there were efforts to reduce regulatory oversight. The transport sector (SIC codes 4011, 4210, 4213, 4512) has undergone a process of deregulation since the 1980s, which was partially reversed from 2008 onwards. This reversal involved the reintroduction of regulations aimed at ensuring safety and reducing environmental impact. In conclusion, the healthcare sector (SIC code 8000-8099) demonstrated a consistent level of regulation throughout the analysed period. Following the implementation of the Affordable Care Act (U.S. Congress, 2010), a notable tightening of regulations was observed, which was further intensified during the Biden administration from 2021 to 2023. In the media and entertainment sector (SIC 4833 and 7812), regulation remained high until 2017, after which it was partially relaxed under the Trump administration. However, there is a possibility that it will be reinstated under Biden. In the oil and gas sector (SIC 1311 and 2911), environmental regulations were tightened after the Deepwater Horizon accident in 2010. They were subsequently partially relaxed under Trump.

4.1.4 Firm Quality

In order to evaluate the quality of company performance, the variable of future abnormal profits was employed. This method is based on the signalling theory, which posits that high-quality companies, undervalued by the market, send positive signals through higher abnormal profits. Conversely, low-quality companies, which are overvalued by the market, generate negative signals through lower or negative abnormal earnings. The variable is defined as the discrepancy between

the earnings per share forecast for year t+1 (excluding extraordinary items and discontinued operations) and the earnings per share for the current year (t), divided by the current share price.

This approach is predicated on the assumption that company managers possess information that is not available to outside investors, and that this information is reflected in changes in future earnings compared to market expectations. Additionally, it was necessary to apply a winsorization adjustment to eliminate the potential for bias in the results and to ensure a more accurate estimation of firm quality, as extreme observations in the 5th percentile could have an undue influence on the results. The relationship between abnormal earnings and firm quality is therefore of central importance in the assessment of debt structure and financial decisions made by firms.

4.1.5 Term structure

The term structure of interest rates, defined as the difference between yields on ten-year and six-month government bonds, constitutes a significant factor in the determination of corporate debt maturity. In this analysis, the term structure was constructed by first collating monthly yield data from the Federal Reserve Economic Data (FRED) database. Subsequently, the yield spread for each month was calculated by employing the six-month and ten-year bond yields, which represent the slope of the yield curve.

In order to incorporate this macroeconomic indicator into the corporate finance framework, the calculated yield differential was aligned with the fiscal year-end month for each company in the COMPUSTAT dataset. This matching process ensured that the term structure variable reflected the prevailing economic environment at the time when firms were making critical decisions regarding the maturity of their debt. The FRED data were merged with the firm-level data using Stata, with a particular focus on the fiscal year-end month as the key linkage point.

The term structure variable is pivotal in evaluating the tax hypothesis, which posits that firms may gravitate towards long-term debt to capitalise on a stable tax shield when the yield curve is inclined upwards. Conversely, in the context of a flat or downward-sloping yield curve, short-term debt may be preferred in order to minimise interest expenses. The incorporation of the term structure into the analysis allows for an investigation of the manner in which shifting macroeconomic circumstances impact firms' debt maturity preferences. This, in turn, offers insights into the

strategic financial decisions that are driven by the interplay between interest rate expectations and fiscal considerations.

4.2 Regressions techniques

In this study, three principal regression techniques were utilised to examine the factors influencing corporate debt maturity. These were ordinary least squares (OLS), cross-sectional regression using time series, and the fixed effects model (FEM). Each of these methods offers a distinctive perspective on the data, facilitating a comprehensive investigation of the relationships between variables while addressing potential issues such as unobserved heterogeneity and serial correlation.

4.2.1 Pooled Ordinary Least Squares

The analysis commenced with a pooled ordinary least squares (OLS) regression, which represents one of the most straightforward methodologies for estimating relationships between variables. In a pooled OLS model, all observations from different periods and companies are aggregated into a single cross-sectional dataset, thereby disregarding the intrinsic panel structure of the data. This method is predicated on the assumption that there are no individual-specific effects that could bias the results; all firm-year observations are treated as independent and identically distributed. Although the pooled OLS technique is less robust in handling unobserved heterogeneity than other techniques, it provides a useful baseline for analysing general trends and relationships within the data. The straightforward nature of pooled OLS enables the identification of general patterns without the necessity of adjusting for potential within-firm correlations over time.

4.2.2 Cross-Sectional Regression Using Time-Series Means

To enhance the precision of the analysis, a cross-sectional regression was conducted applying the time series averages of each respective data point for each company. This technique entails the averaging of each variable over the entire time period for each company, thereby transforming the panel data into a single cross-section. By averaging the data in this way, the regression focuses on long-term relationships, thereby reducing the influence of year-to-year fluctuations and

emphasising persistent differences between companies. This approach is particularly effective in eliminating the serial correlation problem, as it treats the data as a snapshot rather than as a time series. The use of cross-sectional regression with time series averages is advantageous for the purpose of highlighting the way firm-specific factors exert an influence on the results when time variability is averaged.

4.2.3 Fixed Effects Model

The final technique employed was the fixed effects model (FEM), which is particularly suited to panel data analysis as it accounts for unobserved heterogeneity by controlling for firm-specific time-varying characteristics. In the fixed effects model (FEM), firm-specific averages are subtracted from each observation, thereby eliminating the influence of unobserved, firm-specific factors. This method allows for an examination of temporal variations within each company, thereby facilitating an investigation of the impact of variables within the same company. In this approach, the fixed effects model (FEM) addresses the potential for omitted variables that are constant over time but vary between firms, thereby ensuring that results are not confounded by unobserved characteristics that are unique to each firm. This makes the fixed effects model a particularly valuable tool for understanding the relationship between debt maturity decisions and firm-specific changes over time.

5. Results

The results of the empirical investigation into the determinants of corporate debt maturity are presented in the form of three main regression models in Table II. The empirical investigation employs three regression models: pooled OLS, cross-sectional regression, and fixed effects regression. The results will be compared with hypotheses derived from the existing literature, in particular the work of Barclay and Smith (1995), in order to assess how these relationships have evolved over time.

Table II

Estimated Regression Model for Determinants of Corporate Debt Maturity

The percentage of long-term debt is regressed on the firm's market-to-book ratio, the natural log of firm value, the dummy variable for firms in regulated industries, the firm's future abnormal earnings, and the risk-free term structure. The table presents estimates from pooled OLS, cross-sectional OLS and FE regressions.
Sample: The entire US dataset from COMPUSTAT/Capital IQ, comprising all available data between 1992 and 2023
(t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1)

		(1)	(2)	(3)
Independent Variable	Predictive Sign	Pooled OLS Regression	Cross-Sectional Regression	Fixed Effects Regression
Market-to-book ratio	-	-1.37***	-1.67***	-1.39***
		(-68.57)	(-23.06)	(-51.19)
Log of firm value	+	3.40***	4.29***	2.14***
		(139.83)	(53.25)	(61.79)
Regulation dummy	+	2.34***	3.27***	0.09
		(10.75)	(5.52)	(0.24)
Abnormal earnings	-	0.30***	0.79***	-0.31***
		(11.60)	(8.29)	(-10.46)
Term structure	+	-0.34***	-4.78***	0.27***
		(-7.08)	(-26.03)	(6.43)
Intercept		54.45***	50.97***	66.62***
		(309.17)	(82.64)	(311.41)
Observations		307,556	30,749	307,556
Adjusted R^2		7.50	17.09	1.38

5.1 Pooled OLS regression

In accordance with expectations, the market-to-book ratio, employed as an indicator of growth opportunities, exhibits a notable negative correlation of -1.37%, indicating that firms with heightened growth prospects tend to eschew recourse to long-term debt to a greater extent. This is consistent with the bargaining cost hypothesis, which posits that firms with higher growth opportunities avoid long-term debt to circumvent the underinvestment problem (Myers, 1977). The stability of this relationship over time, despite differing economic conditions, serves to reinforce the robustness of this theoretical framework.

The log of firm value demonstrates a robust positive correlation with long-term debt, with a coefficient of 3.40%. The greater financial resources available to larger firms facilitate their access to long-term financing, thereby supporting the economies of scale thesis proposed by Blackwell and Kidwell (1988). This positive correlation remains consistent with the findings of Barclay and Smith (1995), which indicate that firm size continues to play a crucial role in determining debt maturity.

The regulation dummy, which indicates whether the firm operates in a regulated industry, is also found to be positively associated with long-term debt (2.34%). This result corroborates the hypothesis that firms in regulated industries tend to prefer long-term debt instruments as a means of mitigating the impact of regulatory constraints. Nevertheless, the magnitude of this coefficient is somewhat smaller than that reported by Barclay and Smith (1995), which could reflect changes in the regulatory environment or greater adaptability of firms over time.

The term structure variable, defined as the difference between ten-year and six-month government bond yields, has a negative coefficient of -0.34%. The predictive sign, as postulated by Barclay and Smith (1995), was hypothesised to be positive. In accordance with the tax hypothesis theory, a more pronounced yield curve, indicative of elevated interest rates, should prompt firms to favour long-term debt in order to secure reduced financing costs in the future, thereby optimising the advantages of the tax shield by fixing long-term rates. However, while the predictive sign was positive in theory, the one presented by Barclay and Smith (1995) yielded a negative coefficient, which was similar to what they had observed. In the context of a steep yield curve, firms may be more inclined to choose a shorter maturity. This may be due to concerns about locking in higher

long-term rates under uncertain economic conditions. Consequently, it can be inferred that other factors, such as market volatility or liquidity preferences, may drive firms' debt maturity decisions.

5.2 Cross-sectional regression

The coefficient of the term structure in the cross-sectional regression is significantly larger than that observed in the pooled regression results, with a difference of -4.78%. In the long run, changes in interest rate expectations exert a more pronounced influence on debt maturity decisions. Furthermore, the expansion in the magnitude of this coefficient may also be indicative of structural alterations in financial markets, such as the heightened responsiveness to macroeconomic indicators subsequent to 2008.

The coefficient of the regulatory dummy remains positive and statistically significant (3.27%), exhibiting a slight increase in comparison to the pooled OLS model. This increase could signify that, when firm-specific averages are taken into account, the regulatory environment exerts a more pronounced influence on long-term debt preferences. The consistent significance of this variable across models serves to reinforce the importance of regulatory factors in the context of corporate financial strategy.

The analysis also reveals a significant difference in firm quality, as indicated by abnormal earnings. In contrast with the negative coefficients observed in the Barclay and Smith (1995) analysis and in the FE regression, the positive coefficient of 0.79% suggests that firms with higher abnormal profits over time may prefer long-term debt. This may be a sign of financial stability for outside investors.

5.3 Fixed-effects regression

The fixed effects model provides crucial insights into the manner in which alterations within firms over time affect decisions regarding debt maturity. In contrast to the results obtained in previous models, the regulatory variable is not found to be significant (0.09%), in contrast to its significance in both pooled and cross-sectional OLS regressions. This result indicates that, when firm-specific characteristics are taken into account, the regulatory environment may exert a diminished influence

on the selection of debt maturity within individual firms. This suggests that the impact of regulation may be more pronounced at the industry or sector level than within individual firms, particularly in the most recent period between 1993 and 2023.

The term structure variable displays a positive coefficient (0.27%) in this model, representing a reversal of the Pooled OLS and Cross-Sectional results. This outcome substantiates the tax hypothesis. In response to changes in the yield curve, firms would adjust the maturity of their debt, preferring long-term debt when the yield curve steepens. This positive relationship may be indicative of a strategic shift in debt management practices, particularly as firms increasingly resort to long-term debt in order to obtain favourable rates in an environment of economic uncertainty. This result is at odds with the negative sign that was originally predicted by theory but not observed in the decades of analysis conducted by Braclay and Smith (1995). It serves to illustrate how market dynamics and perceptions of long-term debt have evolved.

The positive coefficient of 2.14% for firm size continues to demonstrate a robust positive relationship with debt maturity, a finding that is consistent across all models. Nevertheless, the magnitude of this coefficient is less pronounced than in the OLS and cross-sectional models. This discrepancy indicates that the impact of firm size is more evident when examining industry-level trends rather than temporal shifts at the firm level. The persistence of this positive relationship serves to underscore the continued importance of firm size in determining access to long-term debt, even in the context of broader economic changes.

Furthermore, the overall R^2 of the fixed effects model is significantly lower than that reported by Barclay and Smith (1995). This discrepancy may be indicative of the fact that other factors, not included in this analysis, play a more significant role in determining debt maturity in the current economic environment. The discrepancy in the term structure coefficient between the models also indicates that the factors influencing debt maturity have undergone a shift, potentially due to alterations in macroeconomic conditions or the implementation of new corporate strategies in response to the post-2008 financial landscape.

5.4 Synopsis of the tested hypothesis

The results of this study largely confirm the assumptions made by Barclay and Smith (1995), although there are some discrepancies. The consistently negative association between the market-to-book ratio and long-term debt in all models serves to reaffirm the relevance of the contractin cost hypothesis. It reinforces the assertion that firms with more investment options favour short-term debt in order to mitigate the costs associated with the risk of underinvestment. The stability of this result over time serves to emphasise the centrality of growth opportunities in determining the maturity structure of debt even in a dataset updated to 2023.

Although short-term debt is still used as a signalling instrument in a context of strong opportunities, in accordance with theoretical expectations, the relationship between term structure and firm performance appears to have evolved over time, providing only partial support for this hypothesis. In particular, in the fixed effects model, the coefficient of the term structure becomes positive, which could indicate that, in the current economic environment, short-term debt is no longer a robust indicator of firm quality. This could be due to changes in the way companies manage their financing strategies and the broader macroeconomic landscape.

In agreement with the results of Barclay and Smith, the tax assumption in this study does not seem to exert a considerable influence on the choice of debt maturity. Despite the potential influence of tax considerations on borrowing decisions, the data indicate that these factors are of secondary importance compared to contracting and reporting costs. This consistency across periods shows that tax implications, while theoretically relevant, are often overshadowed by more pressing concerns, such as agency costs and market signalling.

6. Robustness tests

The analysis compares data from before and after 2008 with the objective of identifying any changes in the influence of these factors due to the global financial crisis. Moreover, a specification check is conducted on growth opportunities, the primary variable of interest, and the analysis is further refined by considering the role of firm size in accordance with the approach proposed by Koralun-Bereźnicka (2017). These checks ensure the reliability of the results in a variety of contexts.

6.1 Macroeconomics changes

Table III illustrates that the term structure variable maintains a robust correlation with debt maturity, consistently across all models. This indicates that, following the 2008 global financial crisis, companies continued to demonstrate sensitivity to the slope of the yield curve in their financing decision-making processes. The positive coefficient identified in the fixed effects model indicates that, as the yield curve steepened, firms demonstrated a preference for long-term debt. These findings align with the hypothesis proposed by Barclay and Smith (1995), which suggests a tendency among firms to seek to fix favourable long-term rates in mitigation of the risks associated with refinancing in an uncertain economic environment. The consistency of the impact of this variable across periods serves to reinforce its critical role in the formulation of corporate financial strategy.

Table III

Estimated Regression Model for Determinants of Corporate Debt Maturity after 2008

The percentage of long-term debt is regressed on the firm's market-to-book ratio, the natural log of firm value, the dummy variable for firms in regulated industries, the firm's future abnormal earnings, and the risk-free term structure. The table presents estimates from pooled OLS, cross-sectional OLS and FE regressions.
Sample: The entire US dataset from COMPUSTAT/Capital IQ, comprising all available data between 2008 and 2023
(t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1)

	(1)	(2)	(3)
Independent Variable	Pooled Regression (Post-2008)	Cross-Sectional Regression (Post-2008)	Fixed Effects (Post-2008)
Market-to-book ratio	-0.86***	-1.32***	-1.34***
	(-34.99)	(-20.41)	(-32.13)
Log of firm value	4.32***	4.88***	3.36***
	(138.24)	(63.79)	(57.45)
Regulation dummy	**-1.54*** **	**-1.89*** **	**-0.10**
	(-6.29)	(-3.12)	(-0.16)
Abnormal earnings	-0.53	-0.01	-0.79***
	(-14.41)	(-0.05)	(-19.30)
Term structure	**-0-31*** **	**-1.48*** **	**0.22**
	(-5.14)	(-8.53)	(3.99)
Intercept	49.69***	46.95***	N.A.
	(208.62)	(73.47)	
Observations	157,614	19,970	149,942
Adjusted R^2	14.29	24.75	12.20
Firms			19,266

In contrast, the regulatory variable demonstrates a discernible shift in behaviour following the year 2008. Prior to the crisis, the analysis yielded results that were similar to the general model (for details, please see Table VI in the Appendix), indicating a positive influence of regulation on the

utilisation of long-term debt. However, the results subsequent to 2008 are inconclusive. In particular, in some regressions, the coefficient of the regulatory variable assumes a negative value. This unexpected result may be attributed to the deregulation trends that followed the crisis, which may have reduced the protective benefits of regulation in some sectors. Furthermore, the elevated costs associated with compliance with novel regulatory frameworks may have deterred firms from assuming long-term debt obligations, prompting them to instead pursue shorter-term financial instruments.

These findings indicate that, while the fundamental relationships identified by Barclay and Smith remain relevant, the post-crisis period has introduced new dynamics that have altered firms' borrowing strategies. Therefore, it is imperative to consider the evolving macroeconomic and regulatory landscape when evaluating corporate financing decisions.

6.2 Specification Check for Investment opportunities' proxy

As demonstrated in the primary analysis, the potential for investment opportunities serves as a pivotal criterion in determining the optimal debt structure, a conclusion that aligns with the findings presented by Barclay and Smith (1995). The robustness of the market-to-book ratio as a proxy for growth opportunities was analysed by comparing this measure with three other proxies: the research and development (R&D) expenditure on the enterprise value, the earning-price ratio, and depreciation as a percentage of firm value. The objective was to ascertain whether the observed relationships with the market-to-book ratio could be replicated using these alternative variables.

Table IV
Specification Checks for Estimated Regression Model for Determinants of Corporate Debt Maturity

The percentage of long-term debt is regressed on a proxy for the firm's investment opportunity set, the natural log of firm value, the dummy variable for firms in regulated industries, the firm's future abnormal earnings, and the risk-free term structure. The investment-opportunity-set variables include the R&D expense divided by firm value, the earnings-price ratio and depreciation expense divided by firm value. Sample: The entire US dataset from COMPUSTAT/Capital IQ, comprising all available data between 1992 and 2023
(t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1)

Independent Variable	(1)	(2)	(3)
R&D/firm value	**-20.89*** (-11.80)**		
Earning-price ratio		**0.08*** (23.91)**	
Depreciation/firm value			**-9.86*** (-5.24)**
Log of firm value	1.14*** (34.67)	1.01*** (30.31)	1.20*** (37.00)
Regulation_dummy	-4.33*** (-5.92)	-4.60*** (-6.31)	-3.41*** (-4.68)
Abnormal earnings	-1.18*** (-16.57)	-0.92*** (-12.81)	-1.16*** (-16.29)
Term structure	-0.54*** (-5.79)	-0.49*** (-5.22)	-0.51*** (-5.40)
Intercept	66.01*** (198.32)	65.92*** (210.53)	64.88*** (205.42)
F	379.37	467.44	356.60
Observations	97,483	97,483	97,483
Adjusted R^2	1.90	2.34	1.79

In the initial regression, the coefficient for R&D/firm value was found to be negative and statistically significant. This result indicates that companies that allocate a greater proportion of their resources to R&D tend to favour short-term debt. This preference may be attributed to the necessity of maintaining financial flexibility in an environment characterised by considerable uncertainty regarding the returns on investment in innovation. The second proxy, depreciation/firm value, also yielded a significant negative coefficient, indicating that firms with high depreciation, and thus high investment in physical capital, tend to reduce debt maturity. This behaviour may be indicative of a strategy to retain flexibility and minimise the risks associated with long-term financing in a context of rapid technological or market change.

Conversely, the earnings-price ratio exhibited a significant positive coefficient, indicating that firms with high earnings relative to share price may favour long-term debt. This may be indicative of a perception of reduced growth potential or an undervalued market valuation, which prompts these companies to stabilise capital costs by issuing long-term debt.

These results confirm the validity of the market-to-book ratio as a robust proxy, but also highlight the importance of considering other measures to capture different dimensions of growth opportunities. Indeed, the various proxies offer a more comprehensive representation of the relationship between growth opportunities and debt maturity decisions, thereby supporting the notion that financial flexibility is of paramount importance for firms with robust growth prospects.

6.3 Specification Check for Firm size's magnitude

The analysis of firm size as a determinant of corporate debt maturity reveals intricate dynamics that vary considerably by firm size class (Table V). The results of the regressions, which divide the sample into small, medium and large enterprises, demonstrate a notable change in the coefficients associated with firm size, reflecting the disparate financing strategies adopted by firms of varying sizes.

In the case of small firms, the coefficient of firm size is positive and statistically significant, indicating that these firms tend to issue long-term debt. This behaviour can be explained by the necessity for small firms to stabilise their finances and reduce the risk of refinancing, given that they often have limited access to capital markets and may encounter difficulties in refinancing

short-term debt in unfavourable market conditions. The ability to fix interest rates for longer periods provides these firms with enhanced financial security and predictability.

Table V
Specification Checks for Estimated Regression Model for Determinants of Corporate Debt Maturity

The percentage of long-term debt is regressed on the same variables as the original regression, but the sample is divided into three sub-samples based on the percentiles of the natural log of firm value. Sample: The entire US dataset from COMPUSTAT/Capital IQ, comprising all available data between 1992 and 2023 (t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1)

Independent Variable	(1) Small Size Firms	(2) Medium Size Firms	(3) Large Size Firms
Market-to-book ratio	-1.82***	-0.226***	0.774***
	(-35.02)	(-3.42)	(10.50)
Log of firm value	**4.48*** **	**1.12*** **	**-13.37*** **
	(43.03)	(14.29)	(-16.04)
Regulation dummy	3.89***	7.27***	1.94***
	(6.69)	(24.72)	(7.30)
Abnormal earnings	-1.69***	-3.50***	2.99***
	(-24.40)	(-71.96)	(87.51)
Term structure	-0.0774	-0.580***	-0.787***
	(-0.71)	(-7.45)	(-12.95)
Constant	52.29***	76.99***	225.60***
	(96.82)	(115.67)	(23.89)
Observations	76,889	76,889	153,778
Adjusted R^2	6.60	8.48	5.61

In contrast, in large companies, the coefficient becomes negative and equally significant, indicating a preference for short-term debt. This may be attributed to the enhanced financial flexibility of large companies, which can more readily access capital markets and leverage favourable market conditions to optimise capital costs. Large companies frequently have the capacity to refinance their debts at more frequent intervals and to adapt their financial strategies in

response to changes in interest rates in a way that small companies are unable to do with the same agility.

The contrasting sign between the overall sample and the subsample of large firms indicates that, for the latter, short-term debt may be a more advantageous form of financing, as it allows them to maintain greater operational flexibility and minimise costs in a changing market environment. This result is consistent with the existing literature, with the work of Koralun-Bereźnicka (2017), which explores how firm size influences the choice of debt maturity. The findings of this study align with those of the author, indicating that large firms tend to favour flexibility and adaptability in their approach to financing.

7. Conclusion

The objective of the study was to ascertain the continued relevance of the fundamental factors identified by Barclay and Smith (1995) in the context of significant macroeconomic and regulatory changes that have occurred in the contemporary era. These factors include considerations of contracting costs, signalling, and tax implications.

The empirical analysis confirmed several key findings. First, the market/book ratio was found to have a negative coefficient in relation to long-term debt consistently throughout the analysis, thus confirming the still strong importance of growth opportunities as a determinant of debt maturity. Thus, firms with higher growth prospects tend to favour short-term debt, in accordance with the bargaining cost hypothesis, as this offers greater financial flexibility and reduces the possibility of the underinvestment problem. This result was robust across regression models and time periods, thus reinforcing its emphasis.

The analysis of macroeconomic variables, in particular the term structure of interest rates, has shown that companies are very sensitive to changes in the yield curve. The positive relationship between term structure and long-term debt in the post-2008 period indicates that firms are increasingly seeking favourable rates (including fixed and long-term rates) in an environment of economic uncertainty, showing a trend consistent with the tax hypothesis. This indicates that companies are changing their borrowing strategies to navigate a new complex financial environment as it is today.

Furthermore, the study found significant changes in the behaviour of the dummy variable associated with regulation in the post-2008 period. Prior to the global financial crisis, there was a positive correlation between regulation and long-term debt, reflecting the stability and predictability associated with regulated industries. However, the post-2008 period saw a reversal of this relationship, likely attributable to the effects of deregulation and the increased costs associated with compliance with new regulatory frameworks. The protective benefits of regulation have thus diminished, prompting firms to reconsider new debt accumulation strategies as a response to the recent regulatory change.

Firm size was identified as a crucial factor, with larger firms showing a strong propensity to take on debt in the long run due to their easier access to funding and the economies of scale associated with debt issuance. It should be noted that when the sample was split into small, medium and large

companies, a discernible change in behaviour was observed. The propensity for long-term debt was observed among small companies, which adopted this strategy to stabilise their financial position. Larger companies, on the other hand, showed a propensity for short-term borrowing, used to maintain operational flexibility. This divergence highlights the complex role of firm size in debt maturity decisions and suggests that financial strategies are closely tailored to the firm's market position and availability of resources.

In conclusion, this paper expands the analysis of factors influencing corporate debt maturity, confirming the continued relevance of established theories and highlighting new dynamics introduced by macroeconomic and regulatory changes. The findings have significant implications for the field of corporate finance, offering valuable insights for firms operating in a complex and ever-changing financial landscape. However, further research is needed to explore these dynamics in more depth, particularly in the context of emerging financial instruments and global financial integration.

8. Appendix

Table VI
Estimated Regression Model for Determinants of Corporate Debt Maturity after 2008

The Percentage of long-term debt is regressed on the firm's market-to-book ratio, the natural log of firm value, the dummy variable for firms in regulated industries, the firm's future abnormal earnings, and the risk-free term structure. The table presents estimates from pooled OLS, cross-sectional OLS and FE regressions.
Sample: The entire US dataset from COMPUSTAT/Capital IQ, comprising all available data between 1992 and 2008
(t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1)

Indipendent Variable	(1) Pooled Regression (Pre-2008)	(2) Cross-Sectional Regression (Pre-2008)	(3) Fixed Effects (Pre-2008)
Market-to-book ratio	-1.52***	-1.53***	-1.05***
	(-46.75)	(-15.75)	(-26.09)
Log of firm value	2.83***	3.86***	1.48***
	(74.97)	(37.25)	(30.36)
Regulation dummy	6.88***	6.92***	-2.99***
	(17.17)	(8.09)	(-2.87)
Abnormal earnings	0.06	0.057	-0.23***
	(1.60)	(0.53)	(-5.50)
Term structure	-0.26***	-6.20***	0.05
	(-3.53)	(-17.77)	(0.88)
Intercept	57.33***	54.94***	N.A.
	(227.47)	(69.28)	
Observations	157,614	19,970	157,614
Adjusted R^2	4.03	9.65	2.90
Firms			19,970

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