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Determinants of Capital Structure: A Cross-Country Analysis

An empirical analysis on determinants of capital structure in listed firms across the G7 countries

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Abstract

This study aims to investigate how firms operating in different institutional, regulatory, economic and cultural settings determine their capital structure in the period 2012 to 2019. As previous research commonly limits their analysis to a singular country or industry, this thesis emphasises why and how determinants of capital structure may differ between countries. I analysed firms' capital structure across the G7 countries through the lens of the trade-off theory, the information asymmetry theory, and the market timing theory.

Using Debt-to-Capital as the dependent variable measured individually by book values and market values, I identify seven firm-specific factors that reliably determine capital structure across the G7 countries using the fixed effects estimation model and robust standard-errors: *tangibility* (+), *market-to-book ratio* (-), *size* (+), *profitability* (-), *liquidity* (-), *Altman's Z-score* or probability of bankruptcy (-), and *industry median leverage* (+). Furthermore, while demonstrating varying levels of significance across the sample countries, five additional factors were observed as reasonable determinants of capital structure: *non-debt tax shields* (+), *term spread* (+/-), *corporate taxation rate* (-), *revenue volatility* (+/-), and *lagged leverage* (+). The effectualness of these variables is observed to deviate between countries, thereby suggesting a firm's capital structure is heavily influenced by its environment. I argue the cross-country differences in determinants of capital structure originate due to differing economic and institutional development and stability, tax codes and insolvency laws, corporate culture, and exposure to capital markets.

Foreword and Acknowledgements

This thesis marks the end of two thoroughly enjoyed years at the Norwegian School of Economics. Before proceeding, I would like to express my gratitude to my friends and family for their continuous support and for making this milestone far more achievable and gratifying. I would also like to thank my supervisor, Dr Konrad Raff, for his guidance and valuable contributions throughout the research and writing process.

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1 Introduction

1.1 Background and Motivation

The theme of this dissertation has primarily been chosen due to my interest in corporate finance. As the specialisation of my master's degree is in financial economics, studying a topic affiliated with corporate finance for my master's dissertation is to be expected. Considering how capital structure remains a focal point in firms' decision-making, I wanted to further enrich my knowledge of the field. Particularly, I have chosen to examine cross-country differences in capital structure, for which there are various reasons.

For one, as empirical research in the field primarily focuses on specific countries and industries, there is little recent research discussing cross-country differences in capital structure decision-making. Furthermore, despite the existence of well-acclaimed papers on this exact topic, considering how the field of finance is continuously developing, such papers may not be representative of present-day firms. Hence, I aspire to fill this empirical gap. Secondly, seeing how our world is incessantly becoming more globalised, I find it encouraging to better understand finical decision-making around the world. Particularly, I wish to observe and better understand the distinct and analogous best practices seen between countries as the knowledge's useability will not be limited to the country where such practices are first observed and may instead provide a unique perspective when evaluating capital structure decisions. Considering the applicability of capital structure knowledge, I find it likely such knowledge will be highly relevant to me in the future.

Similarly, the are numerous reasons why I aim this study towards the International Group of Seven (G7)[1]. First, the economic significance. The G7 countries remain some of the most prosperous and powerful economies in the world. Thus, studying cross-country determinants of capital structure may provide insights into the global economy's dynamics. Secondly, the countries constituting the G7 have comparatively unique economies, legal environments, and cultural heritages affecting financial decisions. Studying firms operating under unique properties may, therefore. benefit us in understanding how economic, legal and cultural differences affect financial composition. The G7 countries also have

[1] The G7 consists of Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.

highly diversified industrial landscapes, and examining cross-country similarities and differences may help in understanding the breadth of strategies and best practices adopted by firms between countries.

1.2 Research Question

This dissertation aims to find which explanatory factors best explain capital structure decisions on a global level across the G7 countries. Additionally, it also seeks to explore how such explanatory factors may influence capital structure differently depending on the economic, legal, and institutional environments. Specifically, it aims to answer the following research questions:

"Which factors reliably explain capital structure decisions across the G7 countries in the time frame 2012-2019?"

&

"How do determinants of capital structure influence capital structure decisions differently depending on the country of origin?"

1.3 Contribution

Following the introduction of Miller & Modigliani's theorem on capital structure irrelevancy, the role of capital structure became a highly debated topic in corporate finance and has remained fundamental to the field henceforth. The debate has since produced vast literature exploring the drivers of capital structure compositions. Furthermore, the conducted empirical research primarily emphasises the significance of internal drivers but often fails to explain the importance of external, country-level drivers. Despite various academics having successfully conducted research on how capital structure decisions are affected by both internal and external drivers, few clarify how and why the effect of drivers may vary between countries. Most of these, however, utilise dated data and thereby draw conclusions not necessarily representative of the present day. Hence, this dissertation will contribute to existing research by providing a modern overview of drivers of capital structure decisions, why and how these may differ between countries, and, by comparing to past evidence, how the significance of drivers has and will develop over time.

1.4 Outline

This dissertation is organised as follows. *Chapter 2* discusses relevant theories on capital structure on a firm level. *Chapter 3* provides information on institutional differences between the selected countries in the analysis. *Chapter 4* presents information on data selection and handling. Additionally, *Chapter 4* also discusses chosen explanatory and response variables, as well as the expected effects based on the previously discussed theories, past empirical research, and institutional differences. *Chapter 5* offers information on the methodology. Based on the empirical analysis, *Chapter 6* will present the results and subsequentially a discussion of the results. Lastly, *Chapter 7* aims to conclude the thesis and *Chapter 8* will present criticism and suggestions for future research.

2 Literature review

As this paper aims to study how a diverse set of factors affect firms' capital structure, this chapter will establish the fundamentals in discussing the relevancy and importance of multiple firm-level explanatory variables. This is done by first determining what defines capital structure and the multiple measures of leverage, for thereafter to present and discuss what I find to be the four most relevant theories in discussing which factors determine firms' capital structure, namely the Modigliani & Miller theorem in imperfect capital markets, trade-off theory, information asymmetry theory and market timing theory. Lastly, I will also include and discuss highly relevant past empirical research.

2.1 Defining Capital Structure

The term capital structure is often used in conjunction with a firm's relationship between equity and debt. Though, in the capital structure literature there are multiple definitions of capital structure. Berk & DeMarzo (2019, p.525) defined it as "*the relative proportions of debt, equity and other securities that a firm has outstanding* […]", while Van-Horn (2001) defined it as the proportion of debt to the firm's total capital. There are also more complex definitions such as Brealey et al. (2010) stating how it exclusively "*refers to the firm's sources of long-term financing*" (p.4) and later declaring how "*There are many different flavours of debt, at least two flavours of equity* […], *plus hybrids* […]. *The firm can issue dozens of distinct securities in countless combinations*" (p.418) and how firms do this to find the combination that maximises firm value. However, common in most definitions are how capital structure can be viewed as an expression of the financial methods utilised in funding a firm's operations. Furthermore, capital structure decisions are often viewed as one of the more strategic decisions a firm will encounter. Determining the optimal mix between equity and debt may not only

help reduce the weighted average cost of capital but potentially also increase shareholder and firm value (Berk & DeMarzo, 2019). Therefore, capital structure decisions on balancing the use of internal, equity and debt financing are not taken lightly. These three sources are viewed in literature as the main financing methods and consequentially represent firms' capital structure.

2.2 Capital Structure in Imperfect Capital Markets

Under the conditions of perfect capital markets, Miller & Modigliani (1958) demonstrated capital structure's irrelevancy in firms' valuation and cost of capital. However, due to real-world capital markets being subject to market imperfections such as taxes, transaction and issuance costs, and information asymmetry, one cannot consider them perfect capital markets (Berk & DeMarzo, 2019). Eventually, this led to the emergence of several research papers and theories seeking to examine why and how capital structure is relevant when relaxing the assumptions of Miller & Modigliani's (1958) perfect capital markets.

Modigliani & Miller's Theorem in Imperfect Capital Markets

In 1963, Miller & Modigliani adjusted the propositions previously made under perfect capital markets to consider market imperfections such as taxes when estimating firm value and cost of capital. Specifically, with debt assumed to be risk-free, firms are incentivised to be debt-financed due to debt interest expenses being tax deductible. Hence, as leverage increases, taxation payments decrease. Additionally, Miller & Modigliani (1963) also assumed the interest rate to be constant and the value of the interest tax shields to be estimated using permanent debt, meaning the value of the interest tax shield can be held in perpetuity (Berk & DeMarzo, 2019). This led to the development of *Equation 1* (Berk & DeMarzo, 2019).

$$PV(Interest\ tax\ shield) = \frac{\tau_c * \text{Interest}}{r_f} = \frac{\tau_c * (r_f * D)}{r_f} = \tau_c * D \quad (1)$$

Furthermore, this can be used to rewrite the first and second propositions of Modigliani & Miller's theorem in perfect capital markets to consider interest tax shields, shown in *Equations 2* and *3* (Miller & Modigliani, 1963). In both of the propositions, as firm leverage increases, the firm value increases and the cost of equity decreases as a direct result of interest expenses offsetting taxation. Additionally, we can also rewrite the expression for the weighted average cost of capital in the same manner to include the benefits of interest tax shields, shown in *Equation 4*. Also here, as the firm's leverage increases, the tax advantages will increase respectively, ultimately lowering the WACC.

$$\text{Proposition I: } V_L = V_U \rightarrow V_L = V_U + D * \tau_C \quad (2)$$

Proposition II: $r_E = r_A + \frac{D}{E} * (r_A - r_D) \rightarrow r_E = r_A + \frac{D}{E} * (1 - \tau_C) * (r_A - r_D$ (3)

The Weighted Average Cost of Capital:

$$r_{wacc} = \frac{E}{E+D} * r_E + \frac{D}{E+D} * r_D \rightarrow r_{wacc} = \frac{E}{E+D} * r_E + \frac{D}{E+D} * r_D * (1 - \tau_c) \quad (4)$$

Even though Modigliani & Miller's theorem remains highly recognised in capital structure literature, it still has its weaknesses. The theorem's main flaw is it does not represent truly imperfect capital markets. While the theorem considers taxes, bankruptcy costs and information asymmetry, it does not reflect any other market imperfections such as transaction or issuance costs.

Trade-off Theory

Following the publication of Modigliani and Miller's theorem in imperfect capital markets (1963), Kraus & Litzenberger (1973) introduced the static trade-off theory. The theory was a response to how Modigliani and Miller's theorem suggests firms in imperfect capital markets should be entirely debt financed to fully utilise the benefits of interest tax shields. Instead, Kraus & Litzenberger's theory (1973) suggests the optimal capital structure reflects a trade-off between the advantages and disadvantages of using debt. Particularly, they suggest an equilibrium between Modigliani & Miller's interest tax shields (1963) and financial distress costs. These financial distress costs represent the increasing risk of defaulting on debt and bankruptcy as firm leverage increases. Ultimately, the financial distress costs will diminish the firm value due to the costs' exponential increase with growing leverage. Additionally, financial distress costs are often categorised into either direct costs, such as reorganisation costs during a bankruptcy process, and indirect costs such as inefficient liquidation and loss of receivables (Berk & DeMarzo, 2019).

The static trade-off theory proposes the firm value including leverage to equal the sum of the firm value excluding leverage, the benefits of interest tax shields and the burdens of financial distress costs, as seen in *Equation 5*. Moreover, this equation can illustrate the choice of capital structure, as shown in *Figure 1*, and can be used to derive the optimal debt level by finding where the marginal interest tax shields equal the marginal financial distress costs. However, while it implies firms will benefit from setting a target debt level (Frank & Goyal, 2008), the optimal debt level is highly dependent on firm-level and institutional factors, such as the expected impact of financial distress, related bankruptcy costs and tax rates, making the target debt level highly country- and firm-specific.

$$V_L = V_U + PV(Interest\ Tax\ Shield) - PV(Financial\ Distress\ Costs) \quad (5)$$

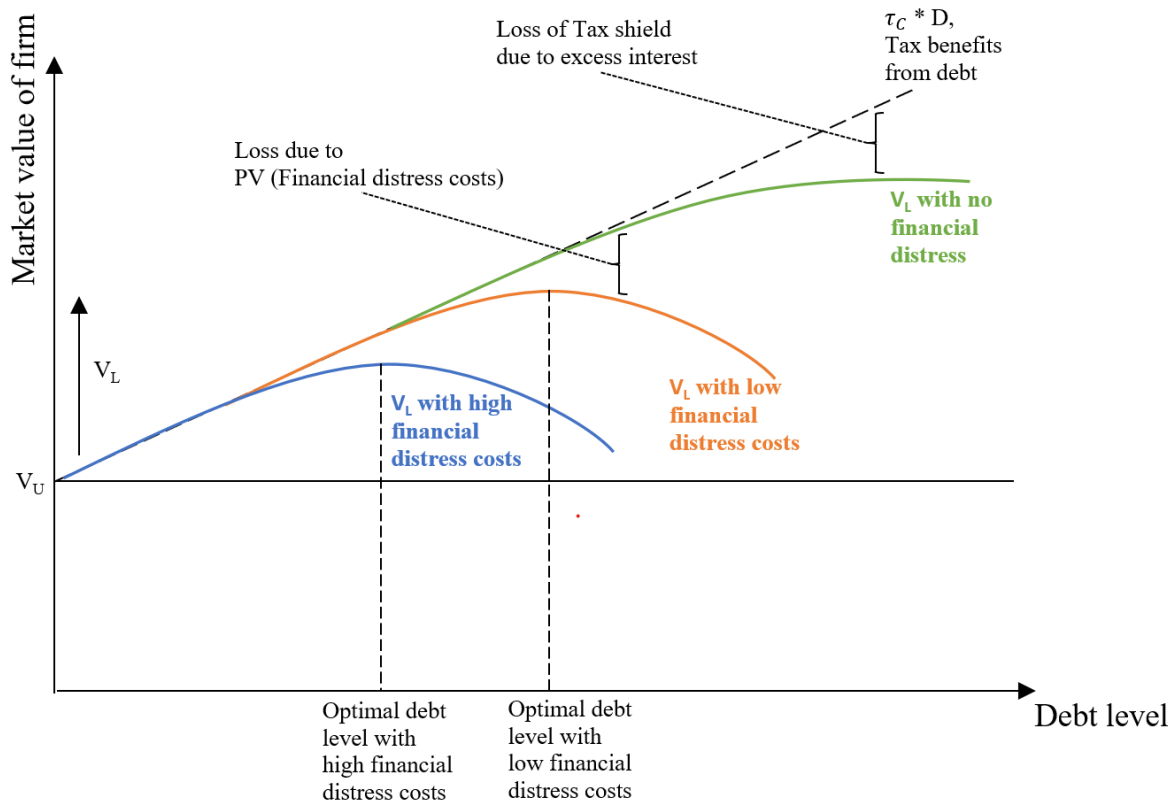
Where: V_L = Value of firm with leverage;

V_U = Value of firm without leverage;

PV(Interest Tax Shield) = The present value of the interest tax shield;

PV(Financial Distress Costs) = The present value of the financial distress costs.

Figure 1 - The Static Trade-off Theory



Source: Adapted from Berk & DeMarzo (2019)

As seen in *Figure 1*, the green line, where taxation is considered the only market imperfection, indicates the maximum firm value is achieved through being completely debt-financed. Furthermore, the dotted line suggests the continuous tax benefit from increasing debt levels. On the other hand, the blue and orange lines represent firm value in the presence of both taxation and financial distress costs. Initially, they follow a similar projection as the green line, where the benefits of tax shields overwhelm the disadvantages of distress costs. Though, as the debt increases, the drawbacks of distress costs begin to surpass the benefits from tax shields, ultimately being value-deteriorating to the firm value. This phenomenon naturally occurs earlier for firms with high distress costs, as seen with the blue line, than in those with low, as shown by the orange line. Lastly, we find the optimal debt level when the value-enhancements of incremental additional debt equal zero. In other words, the optimal debt is found where the marginal benefits from tax shields equal the marginal drawbacks from financial distress.

After the publication of Kraus & Litzenberger's static trade-off theory (1973), multiple extensions of the theory have been published. Primarily, Jensen & Meckling's agency theory (1976) argues debt negatively affects firm value due to costs related to the conflicting interests between the main stakeholders, often referred to as agency costs. Jensen & Meckling (1976) argue that debt financing incentivises excessive risk-taking, as managers are often incentivised to maximise equity value through being personally invested as shareholders rather than maximising debt value. In other words, assuming the managers are acting on their interests as equity holders, they might finance "*negative-NPV, but sufficiently risky, projects*" using debt as the investment's potential failure mainly affects the creditors rather than themselves (Berk & DeMarzo, 2019, p.604). This effect is described as the asset substitution or overinvestment problem, where "*shareholders are incentivised to replace low-risk assets with riskier ones*" at the expense of creditors (Berk & DeMarzo, 2019, p.604). This problem is an agency cost of debt. An additional agency cost of debt financing is the debt overhang or under-investment problem. This problem refers to "*when a firm faces financial distress, it may choose not to finance new, positive- NPV projects*" (Berk & DeMarzo, 2019, p.605) and is costly for both creditors and the firm.

Though, there are also well-recognised articles claiming there are agency benefits in using debt. Predominantly, Jensen (1986) argues that firms can lower their debt-related agency costs by limiting management's debt availability for 'non-crucial activities' or otherwise wasteful spending. He also discusses the disciplinary effect of management being required to pay their debt obligations to avoid bankruptcy. Ultimately, this tells us there is an additional trade-off between agency benefits and costs when pursuing the optimal capital structure.

Information Asymmetry Theory

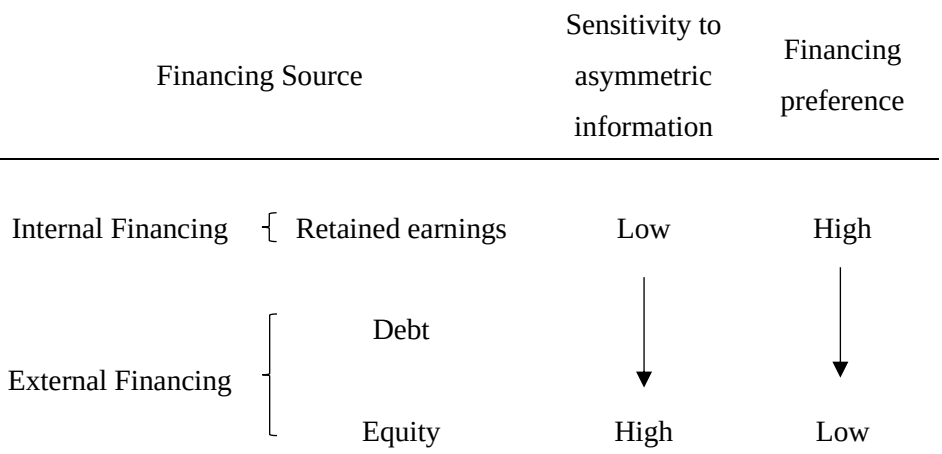
Despite Modigliani & Miller's theorem and the trade-off theory remaining the go-to theories on capital structure, they do not directly explain the corporate behaviour towards asymmetric information and instead serve as a stepping stone for newer theories (Berk & DeMarzo, 2019). Leverage-shifting transactions consistently generate significant stock price fluctuations (Frank & Goyal, 2003), ultimately leading to the emergence of theories based on asymmetric information.

Based on the notion of management and outside investors possessing asymmetric information on firm characteristics, consequentially leading to complications regarding adverse selection[2] when sourcing capital, Myers (1984) and Myers & Majluf (1984) proposed the pecking order theory to rationalise the

[2] Adverse selection refers to a situation where one party have more information than the other, and exploit such an information advantage.

behaviour of outsiders towards management's chosen source of capital. The concept of internal financing being preferred to external by both management and outsiders is the core aspect of Myers' theory. Financing through internal resources, such as retained earnings, incurs no adverse selection complications, in addition to incurring no flotation costs nor requiring additional financial information disclosures of investment opportunities (López-Gracia & Sogorb-Mira, 2008). Myers (1984) therefore states how managers will typically favour internal funding due to the avoidance of sharing otherwise unnecessary financial information and costs related to issuing debt or equity, with the exception of "*occasional unavoidable 'bulges'* [periods] *in the need of funds* [due to financial distress]" (Donaldson, 2000, p.67). In such unavoidable periods of insufficient internal funding, management will have to seek external financing. In comparison to internal financing, equity and debt financing suffer from major and minor adverse selection problems respectively (Frank & Goyal, 2009). On one side, Myers (1984) argues outside investors perceive equity issuance as management viewing their equity to be overvalued. Hereby, the management would be able to raise more capital than the equity's actual value. Whereas, issuing undervalued equity will raise less capital than its intrinsic value at the expense of diluting current investors' investments. Additionally, due to the major adverse selection problems encountered when issuing equity, information asymmetric firms will be confronted with a higher cost of equity, often referred to as an adverse selection premium, eventually leading to sub-optimal investments and a deteriorating firm value (Frank & Goyal, 2009). On the other hand, issuing debt signals management's confidence in the firm's capability to handle increased debt obligations. Though, debt issuance may also signal the management's perception of equity being undervalued due to their expectations of not being able to raise additional capital through equity issuance. Lastly, similar to the increased cost of equity as a direct result of major adverse selection problems, one can also expect an increase in the cost of debt due to the minor adverse selection premiums (Frank & Goyal, 2009). Therefore, the pecking order theory suggests an equilibrium which minimises the overall costs of external financing. Ultimately, the pecking order theory suggests a hierarchy of financing sources seen in *Figure 2*.

Figure 2 - The Pecking Order Theory



Source: Myers & Majluf (1984), Hagtvedt (2018)

Even though the pecking order theory is greatly recognised in capital structure literature, it possesses a multitude of limitations. As stated by Myers, "*Of course, the pecking order hypothesis can be quickly rejected if we require it to explain everything*" (1984, p.582). Myers (1984) also discusses how it is limited to only explaining 'typical shareholder behaviour' and does not provide a prediction of an optimal capital structure like the trade-off theory will. Furthermore, the pecking order theory is based on the idea of significant information asymmetry, making it more likely to hold with an increasing amount of asymmetric information and less consistent with lesser asymmetry (Frank & Goyal, 2003). This makes it so the pecking order theory becomes inconsistent when discussing firms with substantial insider holdings (Frank & Goyal, 2003).

Market Timing Theory

In perfect capital markets, there are no opportunistic gains from continuously adjusting one's capital structure due to the cost of capital not varying dependently on capital structure (Modigliani & Miller, 1958). However, in imperfect capital markets, such as our own, managers are incentivised to exploit temporary fluctuations, thereby benefitting from a lower cost of capital relative to the cost of the unadjusted capital. Baker & Wurgler (2002) refer to such practices as equity market timing, defining it as "*the practice of issuing shares at high prices and repurchasing at low prices*" (p.1). Furthermore, Baker & Wurgler (2002) found evidence supporting firms issue equity during favourable conditions relative to past market values and current market-to-book ratios. This implies firms issue equity when the market perceives them as overvalued, and repurchase equity when perceived as undervalued. Additionally, Frank & Goyal (2009) suggests this is also the case for debt, as managers assess both current equity and debt market conditions if in need of financing. Furthermore, if presented with

exceptionally favourable market conditions, the manager might raise funds regardless of their financing needs, while the managers might defer from issuance if neither the debt nor equity market is beneficial (Frank & Goyal, 2009).

The market timing theory, however, does not predict an optimal capital structure. Baker & Wurgler (2002) discuss how a firm's capital structure "[…] *is largely the cumulative outcome of past attempts to time the (equity) market*" (p.29) and "*market timing financing decisions just accumulate over time into the capital structure outcome*" (p.29). Furthermore, Frank & Goyal (2009) briefly discuss the theory's long-term implications, viewing them as potentially inconsistent and having no direct effect on traditional determinants of capital structure, such as tax shields and profitability.

2.3 Past Empirical Research

Along with well-recognised theoretical frameworks on capital structure, a fair amount of empirical research has been carried out to debate the theories' functionality and accuracy. While these research papers vary in their aims and conclusions, they agree on how no singular theory can explain the true practice of firm capital structure. This sub-chapter, therefore, seeks to provide insight into leading empirical research on determinants of capital structure of both cross-country and country-specific analyses.

Country-Specific Studies

Most research papers on the topic of determining factors of capital structure are highly specified towards a country and often industry to provide as precise information and results as feasible. For instance, Titman & Wessels (1988) sought to examine "*the explanatory power of some of the theories of optimal capital structure*" (p.1). They based their research on industrial firms in the United States from 1974 through 1982. Even though Titman & Wessels did not discover any significant relationship between leverage and growth, non-debt tax shields, firm tangibility or revenue volatility, they did obtain results proving the significance of uniqueness, size and profitability. Not surprisingly, both size and profitability were revealed to be negatively correlated to leverage. Titman & Wessels (1988) argued the relationship between size and short-term debt might indicate high transaction costs for small firms when issuing long-term debt, while the negative correlation between past profitability and current debt implies unavoidable transaction costs. Most interestingly, they also discovered firm uniqueness to also be negatively related to firm leverage.

Bevan & Danbolt (2000) expanded the research of Titman & Wessels (1988) and Rajan & Zingales (1995)[3] by analysing capital structure determinants using fresh evidence on British firms. Furthermore, the paper focuses on the difficulties of measuring leverage, as well as testing the robustness of Rajan & Zingales' (1995) cross-country analysis of capital structure. Bevan & Danbolt (2000) found evidence supporting 'maturity matching', with tangibility being negatively and positively correlated to short-term and long-term liabilities respectively. Additionally, they found significant evidence of small firms having difficulties in obtaining long-term debt, as size correlated negatively and positively to short- and long-term debt respectively. Therefore, this evidence indicates that larger firms are more reliant on long-term debt while smaller firms are dependent on short-term debt. They also found evidence supporting firms with high levels of growth opportunities utilise both long- and short-term debt. However, this evidence also indicates a strong leave of the use of short-term debt over their sample period [1987-1991], instead moving towards the use of long-term debt and equity.

Similarly, Frank & Goyal (2009) examined multiple determinants of capital structure to verify which factors reliably predict capital structure. They utilised data on publicly traded US firms from 1950 to 2003. Surprisingly, out of the 25 variables used in testing, Frank & Goyal found seven variables to be reliable determinants when using market values for leverage. Particularly, they found median industry leverage, tangibility, size and expected inflation to have a positive effect on leverage, while expecting market-to-book ratio, dividend-paying status and profitability to have a negative relationship with leverage. When using book values, firm size, market-to-book ratio and expected inflation were not equally reliable. Frank & Goyal ultimately determine the pecking order theory and market timing theory explain these results, but do not provide insight into variables such as tangibility and firm size. The trade-off theory, on the other hand, explain most variables except profitability. Therefore, Frank & Goyal summarise their discussion with "*All models are wrong, but some are useful*" (Box, 1979).

La Rocca et al. (2011) researched capital structure throughout a firm's life cycle. Particularly, they examined small- and medium-sized firms in Italy from 1996 to 2005. They argue empirical literature fails to account for information opacity, and therefore also certain firm characteristics at individual stages of firms' life cycle. Additionally, they discuss how one can expect both firm size and age to represent maturity. La Rocca et al. (2011) discovered, contrary to the pecking order theory, debt has a fundamental role in firm growth, often representing a firm's first choice of financing for medium- and small-sized firms. However, as the firm matures, the pecking order theory shows its application, as they substitute debt for internal financing. In other words, they observed as firm size and age increase, their dependency on debt decreases and internal financing increases. This is also supported by

[3] Rajan & Zingales (1995) are discussed in the next sub-chapter *Cross-Country Studies*.

Kieschnik & Moussawis's (2018) research paper on firm age and capital structure decisions. La Rocca et al. (2011) also argue how increased maturity resulting in declining debt levels is more common in countries with bank-based financial system structures[4]. While lacking evidence, they discuss how firms in the early stages in market-based countries are likely heavily reliant on a mix of debt and equity rather than what was observed in Italy [Bank-based] despite debt representing the optimal choice.

Cross-Country Studies

In addition to multiple research papers being designated to investigate specific countries, there are various studies enacted to investigate how determinants of capital structure vary across countries. For instance, Rajan & Zingales' (1995) cross-country investigation of determinants of capital structure across firms in the G7 countries from 1987 to 1990 remains the fundamental paper this thesis utilises. They limited their research to "*the largest economies* [the G7] *where there are sufficient firms represented to make* [cross-country] *comparisons meaningful*" (1995, p.1423). Interestingly, they found asset tangibility and size to be positively related to firm leverage for both book and market values across all countries except Germany, where they found the firm size to be negatively correlated with leverage. Furthermore, they also found market-to-book ratios, representing higher financial distress costs following increases in market-to-book ratios, to be negatively correlated to firm leverage. Lastly, they found firm profitability to be negatively correlated with leverage. Interestingly, this effect appeared to be much larger for large firms than that for small firms in Japan, Canada and Italy, while the correlation was positive in the United Kingdom, and no significant relationship was discovered in France and Germany. Conclusively, Rajan & Zingales (1995) showed how capital structure decisions are surprisingly similar across countries, despite varying bankruptcy laws, tax codes and financial system structures.

Following the notion of Rajan & Zingales (1995), Antoniou et al. (2002) investigated capital structure determinants of British, French, and German firms starting in 1969, 1983 and 1987 respectively, ending in the year 2000. Additionally, Antoniou et al. (2002) argue their country selection represents differing financial system structures[5], potentially leading to differing values in predictors of capital structure dependent on the country of origin. In addition to using the same four independent variables Rajan & Zingales utilised, thereby discovering supportive findings, they also introduce a handful of new variables. Particularly, they found varying significant results regarding the role of revenue volatility

[4] Bank-based and market-based financial system structures are further discussed in chapter *3.1 The Market-based and bank-based dichotomy.*

[5] For more information on financial system structures, see chapter *3.1 The Bank-based and Market-based Dichotomy.*

across all countries, using both book and market values. Furthermore, they found a relationship between leverage and effective tax rates in the United Kingdom, being positive and negative when using book and market values respectively. Additionally, they also found negative correlations between leverage and firm liquidity, term structure and share price performance, as well as no significant relationship between equity premium and leverage. Ultimately, Antoniou et al. (2002) proved the importance of other new factors than what Rajan & Zingales (1995) introduced, while also finding supportive evidence for previous research.

Later, Antoniou et al. (2008) introduced an expanded variant of their 2002 research paper on capital structure in the United Kingdom, France, and Germany. Following the motivation of wishing to analyse differences across financial system structures, Antoniou et al. included firms from Japan and the United States in their dataset and reduced their sample period lasted to 1987-2000 across all countries. While finding evidence further supporting their previous claims, they also introduced a new set of independent variables. They found firms' previous leverage to play a significantly positive role in determining their current and future leverage, and non-debt tax shields to negatively relate with firm leverage across all countries except the United States. Furthermore, they discovered dividend pay-outs to be a weak determining factor and M&A activity to be negatively correlated with firm leverage. Furthermore, they confirmed a negative correlation between firm leverage and equity premium. Ultimately, Antoniou et al. (2008) discussed the difficulties of predicting firms' capital structure as it is highly dependent on numerous firm and institutional factors, making capital structure decisions vary in and across countries.

Bancel & Mittoo (2004) surveyed managers across 16 countries to examine what firm insiders judge as good determinants of capital structure decisions. They propose capital structures to be the result of "*a complex interaction of several institutional features as well as firm characteristics in the home country*" (Bancel & Mittoo, 2004, p.17). Furthermore, they discovered a country's legal environment explains the importance of several determining factors. Specifically, the quality of a country's legal systems highly affects firms' debt policy, whereas growth opportunities affect common stock policies. Bancel & Mittoo (2004) also discovered how managers view financial flexibility and earnings per share dilution to be important concerns when issuing debt and equity respectively. Additionally, their results *"*[…] *support that most firms determine their optimal capital structure by trading off factors such as tax advantage of debt, financial distress costs and accessibility to external financing*" (Bancel & Mittoo, 2004, p.131), and how firms spend significant resources evaluating how market and institutional conditions may alter firms' financing decisions and structures.

Lastly, de Jong et al. (2008), to paint a complete picture of the firm- and country-specific determinants of capital structure across the world, analyse the role of various determinants of capital

structure in 42 countries between 1997 and 2001. Similar to previous research, de Jong et al. (2008) find firm-specific determinants like tangibility, size, profitability and growth to be significant determinants of capital structure across numerous countries while remaining consistent with the trade-off theory and information asymmetry theory. Next, they found evidence of creditor rights protection, GDP growth rate and debt market development to have a significant impact on corporate capital structure. De Jong et al. (2008) argue this evidence indicates the importance of legal and macro-economic environment during capital structure decisions. Furthermore, they argue the evidence highlights the importance of country-specific determinants and how they should be appropriately controlled when analysing determinants of capital structure.

3 Institutional Differences

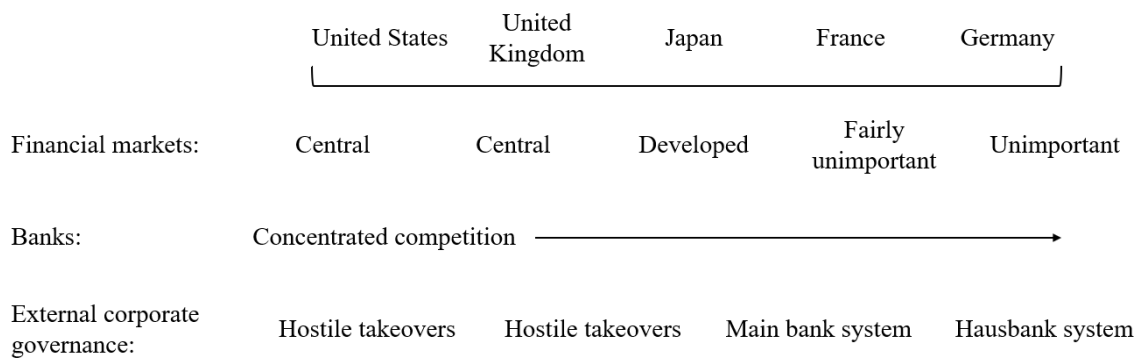
While the previous chapter mostly provides insight into theories and empirical research related to firm-level determinants of capital structure, this chapter aims to highlight and discuss the relevancy of potential country-level factors affecting firms' choice of capital structure. I start by first discussing the bank-based and market-based dichotomy. Thereafter, I will examine cross-country differences in tax codes, bankruptcy law, and lastly ownership and control rights.

3.1 The Bank-Based and Market-Based Dichotomy

In economic literature, national financial system structures are often generalised into either market-based or bank-based financial structures (Hicks, 1969; Demirgüç-Kunt & Levine, 1999; Allen & Gale, 2001; Levine, 2002). This dichotomy is well recognised and is extensively used and discussed when comparing economies with a particular focus on assessing the efficiency of countries' financial systems (Demirgüç-Kunt & Levine, 1999). While the dichotomy has often been criticised for its over-simplified categorisation, it provides a clear and concise overview of any country's firms' preferred methods of raising capital as well as these methods' levels of development in comparison to one another.

Financial system structures referred to as being market-based, firms mainly fund their investments directly through lenders and investors by issuing financial securities or instruments in capital markets. The markets, therefore, serve as a medium for firms to issue and trade equity and debt, ultimately acting as the main channel of financing investments. Demirgüç-Kunt & Levine (1999) established how capital markets "[…] *share the centre stage with banks in terms of getting society's savings to firms, exerting corporate control, and easing risk management*" (p.3). The United States and the United Kingdom are often seen to be on this side of the spectrum. In contrast, in cases of bank-based financial system structures, we see the opposite. Here banks act as the main mobilisers of capital and provider of risk management vehicles (Demirgüç-Kunt & Levine, 1999). Additionally, banks are also responsible for overseeing corporate managers and investment decisions. Germany is often perceived as a great example of such a structure. These key concepts are summarised and illustrated in *Figure 3*. However, financial system structures are naturally a blend between the two classifications and are not binary classifications. The categorisation should therefore be seen as a spectrum where it is natural for one segment to be more dominant than the other (Gambacorta et al., 2014).

Figure 3 - Overview of financial systems



Source: Allen & Gale (2000)

Classifying into Market-based and Bank-based Structures

Literature on bank-based and market-based financial system structures often varies in their approach to classifying countries. The method first popularised by Demirgüç-Kunt & Levine (1999), and later simplified by Cihàk et al. (2012), uses private credit by deposit money banks and other financial institutions as a ratio of stock market capitalisation, outstanding domestic public and private debt to determine a financial system's efficiency and dependence on banks. In addition to the dichotomy of market-based and bank-based structures, Allen & Carletti (2012) introduce a third structure referred to as a mixed financial system structure. They argue that there is no class to accurately capture structures with equally large banking sectors as domestic capital markets, which ultimately may lead to imprecise or spurious categorisation of structures (Allen & Carletti, 2012). Therefore, they introduced the third structure and recommended using large intervals to capture financial structures with similar-sized bank and market sectors.

Alternatively, Allard & Blavy (2011) created a ratio categorising countries dependent purely on funding to the non-financial sector. If the funding from banks exceeds that of the market, the financial system is determined as bank-based and vice versa. Otherwise, one may use the method introduced by Gambacorta et al. (2014) where financial structures are classified depending on how a country's bank assets to GDP ratio are compared to other countries' structures. Though, due to the modest data and sample size provided by Worldbank (2019), the method by Demirgüç-Kunt & Levine (1999) and adjusted by Cihàk et al. (2012) will provide a concise overview based on an idiosyncratic approach less dependent on the sample size of countries. A formal equation (*Equation 6*) and criteria can be seen below. Additionally, *Figure 4* illustrates the classification of various developed European, Asian, and American countries according to the formulated equation.

$$FSS_C^T = \frac{PC_C^T}{SMCAP_C^T + D\,\mathrm{Pr}\,ivD_C^T + DPublD_C^T} - 1 \quad (6)$$

When: $FSS_C^T \geq 0{,}10 \rightarrow FSS = Bank - based;$

$-0{,}10 > FSS_C^T > 0{,}10 \rightarrow FSS = Mixed;$

$FSS_C^T \leq -0{,}10 \rightarrow FSS = Market - based.$

Where: FSS_C^T = The Financial Structure System or Conglomerate Index in country *C* at time *T*;

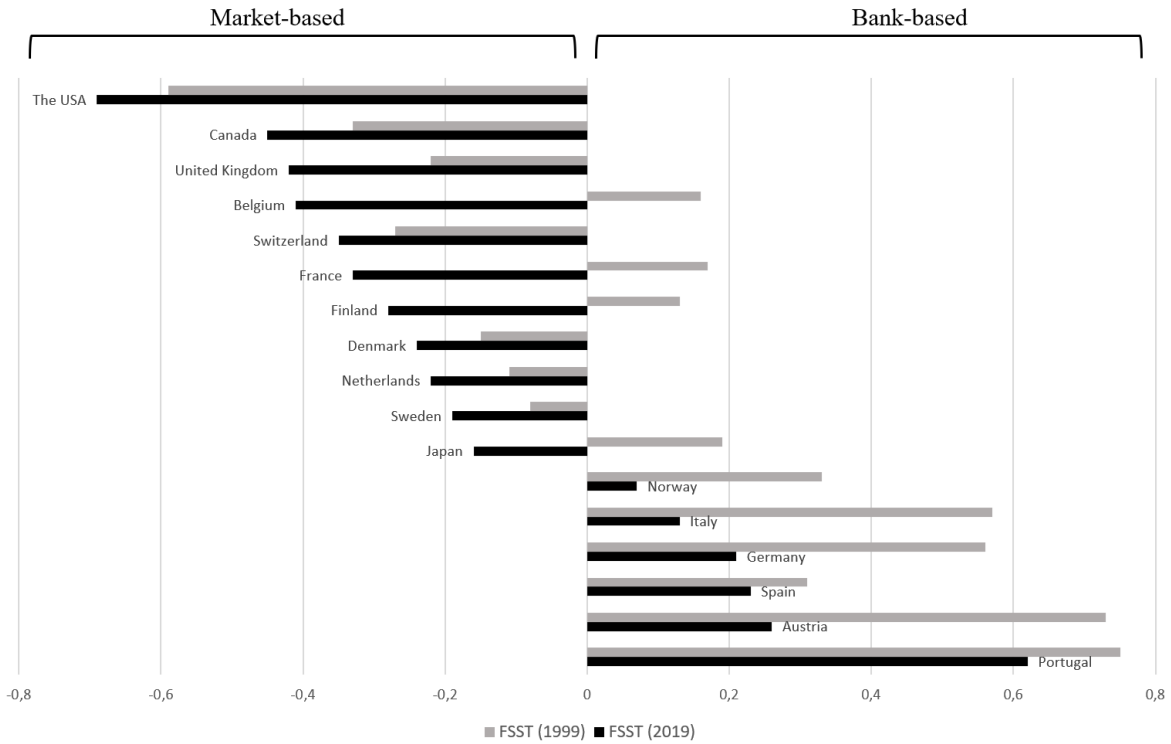
PC_C^T = Private Credit by deposit money banks and other financial institutions to GDP in country *C* at time *T*;

$SMCAP_C^T$ = Ratio of Stock Market Capitalisation to GDP in country *C* at time *T*;

$DPrivD_C^T$ = Ratio of Outstanding Domestic Private Debt securities to GDP in country *C* at time *T*;

$DPublD_C^T$ = Ratio of Outstanding Domestic Public Debt securities to GDO in country *C* at time *T*.

Figure 4 - Classification of Market-based and Bank-based Countries in 1999 and 2019



Source: World Bank, Global Financial Development Database (2019)

One can observe the US, Canada, and the UK's placement. As previously noted, these countries are often seen as central cases of market-based financial system structures due to their remarkable equity and debt markets. These markets are often viewed as being highly liquid and sophisticated, consequentially making them the countries' main channel of funding investment activities. Additionally, despite Western European countries often being recognised as bank-based structures, we instead see an opposite progression towards more market-based structures. Countries such as Belgium, France and Finland are progressing towards more market-dependent structures seeing how their financial sectors may be considered modern and sophisticated with vibrant equity and debt markets. The same can be stated for Japan, as it was previously recognised for utilising a heavily bank-based structure. While banks play a crucial role in financial activities in Japan, Japan's debt and equity markets have in the past decades seen substantial development and use, ultimately leading their structure to be recognised as more market-based. On the other hand, countries such as Germany, Austria, Italy, and Norway, while still progressing towards more market-based structures, remain more bank-based due to banks' current central role in providing financial services and yet-to-fully-mature capital markets. However, in recent years, countries such as Norway and Italy have witnessed significant development in capital markets, being compromised of banks, debt and equity markets, and other financial intermediaries. This reliance on capital markets is likely to further increase over time, eventually leading to the financial system structures of Norway and Italy shifting towards being primarily market-based. Lastly, countries such as Portugal and Spain, are expected to remain bank based. Even though both Spain and Portugal have in recent times seen widespread financial reforms aimed to promote the use of capital markets to fund investment activities, banks still play a central role in their respective economies.

Determining Factors of Financial System Structures

In light of exploring how financial system structures affect capital structure decisions, investigating the determining factors of financial systems may provide valuable insights to keep in mind when evaluating how capital structure decisions vary between countries. Allen & Gale (2000) argue financial system structures should be optimised to leverage the comparative advantages of capital markets and banks in minimising financial obstacles. Hence, financial system structures should evolve organically reflecting the most efficient institutional structures for external financing given past and current juridical, political and economic conditions.

As outlined by Allen & Gale (2000), there are multiple factors which determine the development of financial system structures. For one, the legal and regulatory framework plays a significant role in the development of financial system structures. Juridical frameworks may provide greater protection for capital market financiers, such as shareholders, and create a transparent market to encourage investor

confidence in financial markets. Such regulatory environments are often observed in countries utilising common law, such as the United States and the United Kingdom, whereas banks thrive when the enforcement of contracts is weak, more commonly observed in civil law countries relative to common law countries[6] (Allen & Gale, 2000). Secondly, economic and political stability remains essential to the development of both bank-based and market-based financial system structures by providing strong and supportive infrastructures, availability of capital for financial institutions and businesses, and well-established regulatory environments protecting institutions and investors (Levine, 2002). Furthermore, in more economically developed countries, sophisticated and complex financial systems promoting increased transparency and availability of finance are more probable and encourage the development of market-based financial systems. Similarly, large economies often produce financial systems of greater financial diversity, complexity, and availability of resources. On the other hand, economies consisting of opaque and modest firms allow banks to flourish due to their ability to collect information through sustained creditor-debtor relationships, as well as the invariable expenses related to accessing financial markets, thereby promoting bank-based financial systems (Langfield & Pagano, 2016). Next, cultural attitudes to finance may lead to the development of highly specific types of financial services, thus the development of highly circumstantial financial system structures (Stulz & Williamson, 2003). For instance, some cultures might emphasise the importance of entrepreneurship, innovation, and openness to risk, thereby developing highly market-based financial system structures. Some cultures may instead stress the importance of saving through banks, thereby leading to more bank-based financial systems despite the potential development of complex and diverse saving techniques. Lastly, Langfield & Pagano (2016) claim financial system structures largely emerge as a direct result of past political ideologies and policies. Furthermore, they claim Europe's financial systems centred around banks previously receiving extensive and long-lasting regulatory biases to be a great example of such developments.

Advantages of Market-based and Bank-based Structures

Economists have long debated the merits of the bank-based and marked-based dichotomy. While some emphasise the relative advantages of market-based system structures in "*allocating capital, providing risk-management tools, and mitigating problems related to excessively powerful banks*" (Levine, 2002, p.398), others argue the bank-based system structures' aptitude towards identifying lucrative investments, employing rigorous corporate monitoring and controlling, and mobilising funds to be superior. Altogether, economists provide vast theoretical insights comparing one system's comparative advantages to the other, which can be considered important in better understanding the financial system

[6] For more information, see chapter *3.3 Bankruptcy Law* and *3.4 Ownership and Control Rights*.

dichotomy, as well as understanding potential dissimilarities in cross-country determinants of capital structure.

To begin with, difficulties related to information symmetry, such as moral hazards[7] and adverse selection, are handled vastly differently between the two financial structures. For instance, banks mitigate, either partly or fully, adverse selection through thorough screenings of potential borrowers and moral hazards through active monitoring of the borrowers' investment decisions. Furthermore, banks commonly maintain close relationships with borrowers, allowing for more detailed monitoring through the collection of private and advantageous information regarding their borrowers, ultimately further mitigating the information asymmetry. Additionally, such relationships, particularly long-term ones, may also result in both cheaper and more accessible debt due to the banks' active monitoring of improving the borrowers' reputation of good creditworthiness (Allen & Gale, 2000). However, the banks' ability to collect valuable information on their borrowers is a mixed blessing. The banks' information advantage, while allowing them to take a more 'appropriate' share of the borrowers' profits, will affect the borrowers' incentives to perform, potentially leading to further moral hazards. Though, Allen & Gale (2000) argue such bank activities may be avoided if the borrowers also have access to funding through capital markets, providing competition and therefore limiting the bargaining power of the banks. On the other hand, capital markets do not similarly mitigate problems of information asymmetry. Even though markets produce public information aggregated into the assets' prices, the diverse sectors of financial markets often produce and handle vastly different kinds of information (Hellwig, 2005). Hence, the methods utilised in limiting information asymmetry will differ. While heavily information-based investments may appear lucrative, as they allow investors to employ similar methods of circumventing information asymmetry to that of banks, they ultimately promote a free-rider problem of other investors utilising the same public information and dismissing their responsibility of monitoring the firm or their projects. Instead, investors in capital markets mitigate problems of information asymmetry by employing courts and contract covenants (Gambacorts et al., 2014). Based on the traditional view of banks versus capital markets, multiple economists view banks to be far superior in the production of high-quality information. However, Allen & Gale (2000), while agreeing on banks produce highly valuable information, argue they overlook the capital markets' ability to collect a vast number of diverse opinions. Hence, they believe capital markets to be far superior in the utilisation of the available information, but to be lacking in information production when compared to banks.

[7] Moral hazards refers to situations where one party take on additional risk knowing the other party will protect them despite incurring additional cost on the other party.

Secondly, markets and institutions diverge in how they exert corporate governance. Banks commonly exercise corporate governance directly by influencing firm policies and loan covenants, and indirectly by limiting the free cash flow available for management (Levine, 1999). On the other hand, markets discipline management and improve corporate governance through threats of hostile takeovers and an active takeover market, incentivising management by linking their payment to performance, and shareholder's voting rights. However, market-based financial system structures are often criticised for their 'myopic investor climate', as liquid markets with negligible transaction costs lead to insufficient monitoring incentives due to shareholders' ability to easily and inexpensively sell their shares (Demirguc-Kunt & Levine, 1999). Consequentially, such markets are exposed to a free-rider problem, where, due to the lack of incentives to exert corporate governance, shareholders discard their responsibility of monitoring and governing the management while silently collecting the benefits. Comparatively, banks might exert insufficient corporate governance if the bank's management exploits the information advantage in pursuing their self-interest, as well as potentially expropriating minority shareholders if the bank participates as a large shareholder or indirectly expropriating shareholders while remaining as a large debt obligation[8].

Lastly, financial institutions differ in their approach to diversifying risk. Allen & Gale (2000) argue markets, while providing noteworthy tools and methods for cross-sectional risk diversification, are comparatively worse when dealing with non-diversifiable risk. Specifically, markets offer less traditional investment vehicles and techniques, allow investors to share risk by dividing investments into numerous smaller securities, and offer more sophisticated and tailor-made risk-management solutions. However, their position on non-diversifiable risk is limited due to households in marked-based economies often holding more risky assets, such as equity, whereas households of bank-based economies instead hold considerably safer assets relative to equity (Allen & Gale, 2000). Banks, on the other hand, are often argued to provide better intertemporal risk diversification tools (Beck, 2011). That is, due to banks' lower degree of dealing with uncertainty and innovation, their inherent bias towards traditional investment techniques and vehicles, as well as the banks themselves bearing a significant portion of the risk in addition to their clients', they limit themselves to utilising safer assets, such as bonds (Allen & Gale, 2000). Furthermore, banks are often criticised for "*zombie-lending, or the extension of new credit or prolonging of existing loans to low-productivity firms*" during crises (Lenzo et al., 2021, p.1), as well as having a highly pro-cyclical credit supply (Gamacorta et al., 2014).

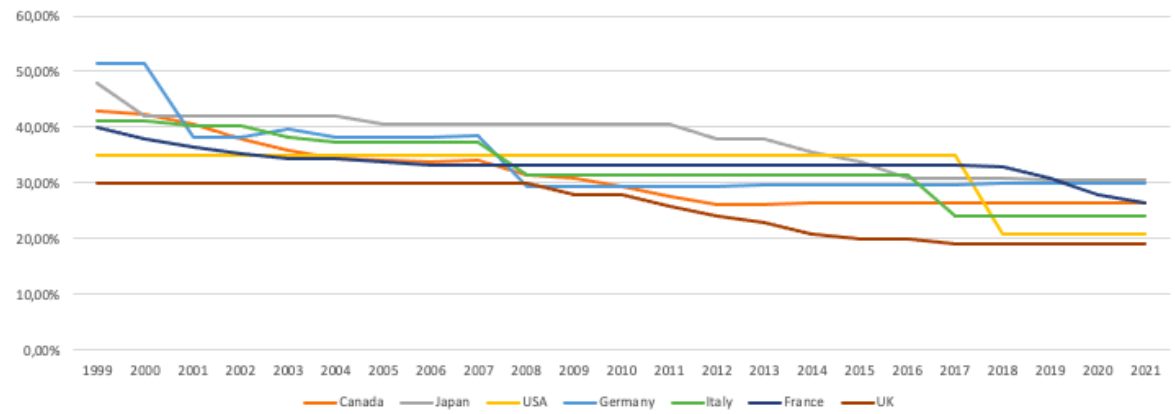
[8] For more information on how bank-based countries' insolvency and corporate governance law commonly favour creditors over shareholders, see chapter *3.3 Bankruptcy Law* and *3.4 Ownership and Control Rights*.

3.2 Tax Code

After the publications of Modigliani & Miller's theorem in imperfect capital markets, taxation has been viewed as a fundamental component in determining a firm's capital structure. In particular, the static trade-off theory suggests an optimal capital structure is found by balancing the tax advantages of debt and financial distress costs, implying how differing taxation rates may lead to dissimilar advantages of tax on debt across various countries, ultimately affecting firms' capital structure decisions related to the issuance of debt. However, capital structure literature is often seen to simplify the concept of taxation to only consider corporate income tax rates to advance the use of associated capital structure theories. Miller (1977) and DeAngelo & Masulis (1980) argue capital structure decisions are also subject to investors' personal taxation, and how the tax treatment of interest, dividends and retained earnings may result in otherwise unobserved effects on the tax advantages of debt. Therefore, this chapter serves to give an overview of the tax code across the G7 and how it may affect decisions regarding debt differently.

Corporate income tax is levied on corporate gross incomes or net profits and is one of the most essential tax variants applied globally. Countries commonly develop and utilise distinct codes for the taxation of corporate income, hence significant dissimilarities are expected. For one, regulations regarding tax-deductible items are considered more flexible in Germany than in the United Kingdom and the United States, due to allowing for a wide range of deductions to incentivise business growth, innovation, strong corporate cultures and social responsibility (Fisher, 2014). Furthermore, the G7 countries also differ in how they allow firms to offset losses against the taxes of future earnings. While the United States allow firms to carry forward losses indefinitely, Canada may offset them for up to 20 years, Japan for up to ten years, and Italy for the following three years without limit (PwC, 2023). One may also note how selected countries provide tax credits for specific activities to promote firm growth and innovation. For example, Italy offers tax credits corresponding to twenty per cent of eligible research and development expenses, Japan eight per cent, and the United Kingdom 33 per cent (PwC, 2023). Lastly, due to countries utilising distinct tax codes, they can reasonably freely adjust their taxation rates. As shown in *Figure 5.* the G7 countries adjust their tax rates relatively frequently to account for factors such as increased competition for foreign investments, encouragement of innovation and entrepreneurship, globalisation and tax havens, fiscal and economic instability, and political pressure, ultimately promoting a downward trend in taxation rates (Brys et al, 2011). Furthermore, one may also observe the United States and the United Kingdom's comparatively low taxation rates to Japan and Germany's high rates. Such positioning is likely due to, but not limited to, the desire for maintaining their historic competitive advantage of entrepreneurship, innovation, and foreign investments, as well as the current and historical political and economic environment.

Figure 5 - Development of Corporate Income Tax across the G7 Countries



Source: PwC, Own Contribution

However, Miller (1977), DeAngelo & Masulis (1980) and Lin & Flannery (2013) argue personal tax treatments of capital gains, dividends and interests likely impact the comparative cost of equity and debt financing, consequentially disturbing firms' optimal capital structure when facing significant changes in personal tax treatments. Considering how countries utilise distinctly developed tax codes, variations between the G7 treatment of personal tax, and thereby how they affect capital structure decisions, are expected. For instance, Germany and Japan subject dividends to ordinary income tax and tax capital gains at a flat rate, whereas the United Kingdom taxes capital gains dependent on other income and taxes dividends independently of other income but exponentially after exceeding a pre-determined 'allowance' (PwC, 2023). Furthermore, while Italy and France generally subject dividends and capital gains to individual income tax, investors may receive tax exemptions and allowances on capital gains depending on the security sold and the duration of the investment to promote long-term investments and avoid double taxation (PwC, 2023). Lastly, Canada and the United States generally tax capital gains and dividends at comparatively lower rates to mitigate double taxation. Additionally, the Canadian tax treatment of capital gains only considers half of the capital gains as eligible to be taxed, and the United States taxes short-term capital gains as ordinary individual income. Regardless of these differences, a downward trend in personal taxation is expected largely due to factors such as the encouragement of domestic and foreign investors, to spur economic growth and innovation, globalisation and offshore finance, political pressure, and fiscal and economic stability (Zee, 2005). However, these cross-country differences in personal tax produce problems related to not easily quantifying investors' income tax. Previous research on the relationship between personal income tax and capital structure decisions commonly utilises ratios of personal and corporate tax rates to observe

the net tax advantages[9]. Such estimates are heavily based on assumptions of rigid and uncomplicated tax treatments of personal income, possibly leading to spurious or unholistic conclusions derived from the oversimplification of complex tax treatments. Therefore, the tax treatment of personal income will not be further included in the analysis despite Rajan & Zingales' (1995) recommendations for doing so.

3.3 Bankruptcy Law

Financial distress may create conditions where managers will act on behalf of their self-interests, rather than shareholders' or creditors' interests, ultimately leading to sub-optimal decisions for one or multiple stakeholders. Countries attempt to manage such difficulties through insolvency laws. While insolvency laws across countries naturally diverge in how they seek to protect creditor rights, reorganisation and management control, and liquidation rights while experiencing financial distress, former research has discussed and examined how such insolvency laws affect determinants of capital structure and firm value (Warner, 1976; James & Scott 1977; Rajan & Zingales, 1995; Franks et al., 1996; Acharya et al., 2011; Alves & Ferreira, 2011). Thus, discussing how differing countries' insolvency laws may affect financing choices is of high interest to create an explicit image of determining factors of capital structure.

[9] Rajan & Zingales (1995), Lin & Flannary (2013), and Faccio & Xu (2015), amongst others, utilise the formula $1 - \frac{(1-Corporate\ Tax\ Rate)*(1-Capital\ Gain\ Tax\ (or\ Dividend\ Tax))}{Personal\ Income\ Tax\ Rate}$ to derive the net tax advantage.

Table 1 - Main Features of Bankruptcy Law across the G7

Country	Law System	Forms of Liquidation	Rescue and reorganisation procedures	Management Control in Bankruptcy	Automatic Stay	Rights of Secured Creditors
Canada	Common law + Civil law	Bankruptcy can be initiated voluntarily by debtors, involuntarily by creditors or due to failure of BIA proposals.	CCAA proceedings, initiated by either debtors or creditors, BIA proposal, initiated by creditors, and Receivership, which can be initiated by secured creditors.	Management ceases control of their assets and affairs to a trustee. Otherwise, the trustee may instead act as a monitor as the management remains in control.	Provide automatic stay on all forms of reorganisation.	Secured creditors' priority is only triumphed by 'super-priority' claims.
Germany	Civil law (Bürgerliches Recht)	Insolvency proceedings (*Regelinsolvenz*) can be initiated by debtors, voluntarily, or creditors, involuntarily.	Restructuring-plan (*Restrukturierungsplan*) can only be initiated by debtors, and non-insolvency restructuring proposals such as trustee relationships and negotiation of payment deferments may be initiated by debtors in addition to regular restructuring plans.	The management may remain in control under the supervision of a court-appointed administrator. Management may request supervision by a custodian (self-administration) (*Sachwalter*).	Only unsecured creditors automatically stay.	Secured creditors' claims to immovable and moveable assets have priority only after the owner.
France	Civil law (*Droit civil*)	Liquidation procedures (*liquidation judiciaire*). Initiated by either creditor, involuntary, or debtor, voluntary.	Safeguard proceedings (*prodédure de sauvegarde*) expedited safeguard proceedings (*Sauvegarde accélérée*), Ad hoc proceedings (*mandate ad hoc*), and conciliation proceedings (*conciliation*) are considered rescue procedures, and Rehabilitation procedures (*redressement judiciaire*). These are filed by either debtors or court-appointed administrators.	The management may remain in control. An insolvency agent (*juge commissaire*) will overlook the process, and an administrator (*Administrateur*) will supervise, assist or entirely control the management.	A safeguard, rehabilitation, or liquidation triggers an automatic stay for 'proceedings against the company and its assets'. Other procedures do not trigger any automatic stay.	Secured creditors' priority is complex. Their priority is triumphed by pre-petition claims by employees (*superprivilége des salaries*), post-petition costs, workout agreements by lenders, and post-petition claims and costs.
Italy	Civil law (*Codice civile*)	Bankruptcy (Fallimento) must be initiated by debtors, voluntarily, creditors or the public prosecutor, involuntarily.	Preventative composition, restructuring agreements, and reorganisation plans must be initiated by debtors.	By declaring bankruptcy, the debtor is disposed of their assets and control, which is supervised by a bankruptcy trustee.	Preventative composition will trigger an automatic stay on all creditors while restructuring agreements might trigger an automatic stay, dependent on the firm's circumstances.	Preferred and secured claims (*crediti privilegiati*) are only prioritised under senior-ranked claims (*crediti prededucibili*).

				However, when undergoing reorganisation proceedings, management remains in control.	Lastly, reorganization plans do not trigger any automatic stay.	
Japan	Civil law (*Minpō*)	Either creditor, involuntary, or debtor, voluntary, can initiate bankruptcy liquidation (*Hasan*). Special liquidation proceedings (*Tokubetsu Seisan*) are initiated by the debtor's shareholders (involuntary)	Civil rehabilitation (*Minji Saisei*), and corporate reorganisation (*Kaisha Kosei*). Only debtors can file for the first, and debtors, creditors and shareholders with large enough holdings can file for the second.	The firm's management retains most control. A supervisor (*Kantoku-iin*) is appointed by the court to overlook the proceedings and may appoint a trustee (*Kanzainin*) if viewed as necessary in firm rehabilitation or reorganisation.	All unsecured creditors stay in court-supervised bankruptcy, otherwise, all creditors stay.	During bankruptcy proceedings (*Hasan*), secured credits have the highest priority and voting rights in reorganisation/renegotiation.
United Kingdom	Common law	Liquidation. May be voluntary, initiated by shareholders, or compulsory [involuntary] initiated by either the shareholders, creditors, the firm's director, or the firm itself by presenting a petition.	The administration procedure may be initiated by the company itself, its director direct or at least one creditor. A company voluntary agreement may be initiated by the director, the administrator from the administration procedure or the liquidator. Lastly, the scheme of agreement and restructuring plan may be initiated by the firm itself, creditors, administrator, or liquidator.	In most cases, the debtors are removed from control or at the very least heavily supervised, with some exceptions during a scheme of arrangement and restructuring plans.	Automatic stay on all creditors during the administration procedure, an automatic stay on non-secured creditors on liquidation, and no stay during company voluntary agreements, scheme of agreement or restructuring plans.	Secured or preferred creditors are prioritised third, while unsecured fifth.
United States	Common law	Chapter 7: Liquidation. May be voluntary, filed by debtors, or involuntary, filed by creditors.	Chapter 11: Reorganisation may be voluntary, filed by debtors, or involuntary, filed by creditors.	Chapter 7: A trustee appointed by the Bankruptcy Court. Chapter 11: The firm's management retains control.	Chapter 11: If voluntary, filed by debtors, the automatic stay protects the debtor and its assets from creditors.	Chapter 11: Secured creditors have the highest priority. Certain actions, such as collecting payments, need to be approved by the trustee or court.

Source: Own contribution based on Rajan & Zingales (1995) and Thomson Reuters Practical Law

A country's legal environment and bankruptcy law have numerous significant effects related to a firm's capital structure (La Porta et al., 2012). Particularly, one can immediately take notice of creditors' rights and the strict enforcement of their rights from the provided overview in *Table 1*. A further investigation shows how even after three decades, bankruptcy law across the G7 countries still provides superior creditor protection, allowing creditors to easily penalise the controlling management (Rajan & Zingales, 1995). Creditors' capabilities to discipline the management and shareholders, heavily incentivise the former stakeholders to maintain healthy relations with their creditors. One can also observe [bankruptcy] courts' ever-increasing standing in the enforcement of creditors' rights, leading to lower financial distress and contracting costs, and lower time misused on potential violations of contracts between investors and management. Therefore, one can easily conclude debt financing appears highly appealing to stakeholders. Lastly, countries previously noted as being heavily bank-based have shown to provide numerous legal alterations mainly in favour of both shareholders and creditors as they transition towards more market-based financial system structures as a means of promoting funding through capital markets. These changes are implemented through law reforms, such as France's extensive insolvency law reform of 2005 and 2014 to promote firm restructuring.

La Porta et al. (2012) discovered evidence confirming how legal environments, both legal rules and level of enforcement, play a highly significant role in the development of a country's financial markets. They argue an investor-supporting legal environment will protect investors from transgressing managers, "*increasing their willingness to surrender funds in exchange for securities, and hence expanding the scope of capital markets*" (La Porta et al., 2012, p.1149). Furthermore, they discovered civil law countries to have both the weakest investor protection and least developed financial markets when compared to their common law counterparts. Particularly, French civil law countries, such as France and Italy, stood out to be especially underachieving in this area. Similarly, Bancel & Mittoo (2004) discovered significant evidence of the legal environment's role in firms' debt-financing policies. They argue the varying quality in legal systems systematically explains cross-country differences in firm debt policies. Furthermore, Bancel & Mittoo (2004) observed how institutional structures, particularly legal systems, do not influence equity-financing policies, as they instead remain dependent on firm-level factors such as market opportunities and credit rating. Relatedly, Öztekin (2015) find similar evidence, as they observe how institutional quality significantly affects levels of debt. Particularly, legal systems favouring more efficient creditor protection relative to that of equity holders generally lead to higher debt levels, arguing institutions that safeguard creditors by enhancing contractibility and incentivising management to avoid bankruptcy, would lead to cheaper debt relative to equity Accordingly, in cases of legal systems favouring shareholder protection relative to credit protection, one would expect lower debt levels and cheaper equity. Öztekin (2015) also indicate that

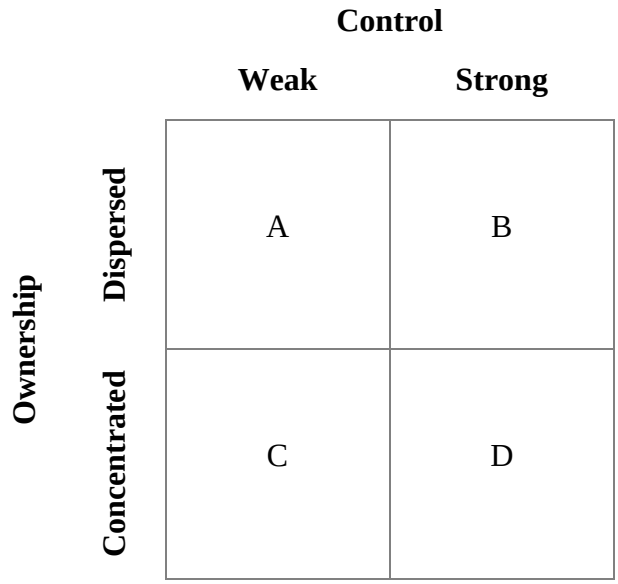
low-quality legal systems should result in higher debt levels, as debt contracts remain cheaper to enforce.

3.4 Ownership and Control Rights

The last major institutional theme discussed in this paper are ownership concentration and corporate control rights. The agency relationship between shareholders and managers is often discussed and have demonstrated to have significant capabilities to influence decision-making related to operations and financial activities (Short, 1994; Brailsford et al., 2002; Goergen, 2012). This notion has also been demonstrated to vary between nations (La Porta et al., 2002; Gillan & Starks, 2003; Goergen, 2012; Lepore et al., 2017), and is highly relevant in discussing cross-country determinants of capital structure.

Literature generally distinguishes between ownership and control rights, where ownership rights refer to the holders' cash flow rights and liquidation rights when the firm remains operating or while being liquidated. La Porta et al. (2002) differentiate between dispersed and concentrated ownership. Dispersed ownership structures are often associated with a lower cost of capital, as a direct result of increased liquidity due to few controlling shareholders, and managers being disciplined through the exposure of an active and hostile takeover market. Though, these ownership structures are also exposed to a free-rider problem where each individual shareholder may discard their role of monitoring the management, making the firm bear the costs of the absent monitoring, but will nevertheless share the benefits equally relative to their holding. On the other hand, control rights refer to the holders' right to participate in determining the firm's management and strategic direction through the right to vote in shareholders' meetings. Goergen (2012) also distinguishes between weak and strong control. Here strong control is associated with certain shareholders being provided with sufficient incentives and enough control to appropriately monitor the management. This is commonly done by creating wedges between ownership and control through methods involving violating the 'one share, one vote' principle and instead adapting, for example, dual-class shares or a pyramid ownership structure. Ownership structures with specific shareholders with strong control are therefore subject to minority shareholder expropriation. As a result, one cannot objectively classify one ownership or control structure to be superior to the other. However, specific combinations of ownership and control structures have been identified to be more common in certain areas. A general overview of these combinations is shown in the matrix in *Figure 6*.

Figure 6 - Combinations of Ownership and Control



Source: Goergen (2012)

First, combination A, being the combination of weak control and dispersed ownership, is most common among firms in the United States and the United Kingdom (Goergen, 2012). These nations are often associated with liquid and active takeover markets, as well as comparatively insufficient monitoring incentives. Active takeover markets may pressure firms to increase debt, in turn making them unattractive to potential takeovers (Zwiebel, 1996). Ultimately, the main agency conflict faced in combination A is one between the management and shareholders. Next, Combination B is currently widespread in most countries outside the United States and the United Kingdom (Goergen, 2012). Dispersed ownership allows firms to be reasonably liquid through active capital markets, while strong control provides high monitoring incentives. Though, due to the strong control, firms experience less discipline through reduced takeover possibilities and an increased possibility of minority shareholder expropriation. While the lack of an active takeover market may reduce firms' incentives towards issuing debt, the main agency conflict occurring between minority and controlling shareholders may perceive it differently. If the controlling shareholders are either banks, in which the banks may have an interest in reducing outside funding and increasing borrowing from banks, or undiversified owners, which may be opposed to debt to avoid further risk (Rajan & Zingales, 1995). Lastly, combinations C and D, being the least common, provide few examples where such structures prosper. While combination C lack monitoring incentives and liquidity but protects minority shareholders' rights and creates agency conflicts between management and shareholders, combination D provide comparatively high monitoring incentives, reduced takeover possibilities and low liquidity, generating agency conflicts between controlling and minority shareholders. One can therefore easily recognize how both combinations C and D carry multiple of the same characteristics of A and B respectively.

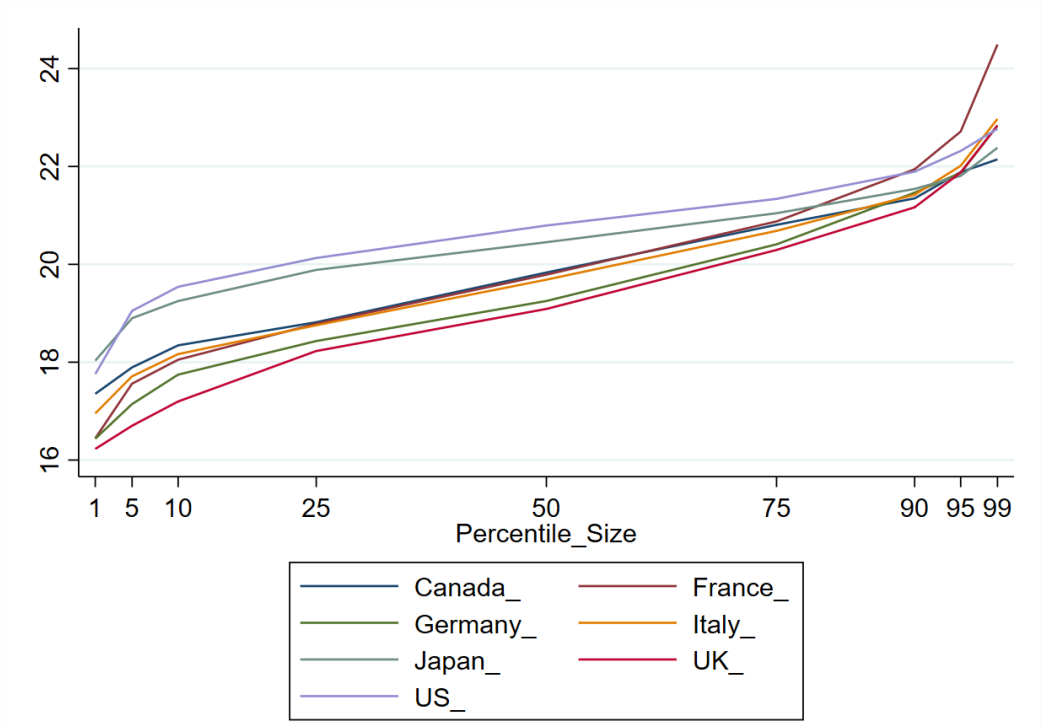
4 Data

The following chapter contains information on the data collection. First, the chapter is initiated by giving a brief overview of the data's sources and selection criteria. The following two sub-chapters discuss how I seek to correct for conflicting accounting standards, and further correcting of missing data and extreme outliers. Finally, I will give an in-depth description of the variables included in the regression models and how these variables are expected to affect capital structure according to the previously presented theories, and empirical research.

4.1 Sample Selection

Due to the immense amount of variation in data quantity and reporting quality, I limit the dissertation's focus to equally established countries with a statistically satisfactory number of firms and reportage quality to enable meaningful cross-country comparisons. Specifically, the international group of seven [G7], containing Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States, clearly stands out due to their mutually close political and economic history and development. The data sample, therefore, consists of 1722 publicly traded firms across the G7 countries between 2012 and 2019. The firms were selected based on the recommendations of Rajan & Zingales (1995) in using recognised indices in acquiring firm lists. In this dissertation, local Refinitiv and Morgan Stanley Capital International indices were utilised. Additionally, the data sample excludes financial institutions considering they are "*strongly influenced by implicit investors* […], *and their debt-like liabilities not being strictly comparable to the debt issued by non-financial firms*" (Rajan & Zingales, 1995, p.1424). Furthermore, only firms listed on their respective domestic stock exchanges with their headquarters and main business being primarily 'locally' practised were selected to represent their respective countries. The data sample is collected on an annual basis in Euros, where only firms with fully reported key balance sheet items were included, and all relevant accounting information was collected using Refinitiv Eikon by Thomson Reuters. Additional restrictions on size were incorporated as only firms with a book value of total assets within the interval of 50 million and 3 billion Euros as of 2019 were included to avoid considerable complications regarding size-varying determinants of capital structure, while also enabling to make comparisons on how firms of varying size may behave (La Rocca et al., 2011). The general distribution of firm size is illustrated in *Figure 7*. However, despite these restrictions generating biases related to not examining 'average, non-listed firms' and only investigating what can be considered "*the tip of the proverbial iceberg*" (Rajan & Zingales, 1995, p.1424), the evidence gathered based on 'the tip' will, however, have broader implications on how firms of varying size may act. Therefore, I view the resulting data sample as a fair representation of small- and medium-sized firms.

Figure 7 - Size (Natural Logarithm of Total Assets (Book value)) distribution



Source: Own contribution

The macroeconomic data were collected through Worldbank, Refinitiv Eikon and PwC, supplemented by KPMG's database if the data provided by the previous sources were unsatisfactory. Particularly, GDP and economic growth rates, and inflation rates were collected using Worldbank's database, while information on MSCI world indices, and 3-month and 10-year government bonds were gathered through Refinitiv Eikon. Lastly, PwC was used for information on corporate tax rates.

4.2 Accounting Standards

Despite gaining significant insight by performing a cross-country comparison of balance sheets and financial statements, not considering inconsistent accounting practices may lead to spurious and deceptive conclusions. Fortunately, the majority of the countries included in the G7 utilise the International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board. Specifically, Canada, France, Germany, Italy and the United Kingdom have since 2005 required

all publicly listed firms to adhere to the IFRS (IFRS, 2023)[10], as opposed to Japan and the United States following the Japanese and US Generally Accepted Accounting Principles (GAAP) respectively. While the IFRS is often considered a principle-based accounting approach, thereby providing an intuitive and flexible framework, the GAAP, in both Japan and the United States, is instead based on rules remarking specific details with little room for interpretation. Despite this, IASplus refers to the Japanese GAAP as "*essentially equivalent to and consistent with internationally recognized systems* [IFRS]" (2003, p.4). However, there are a few key differences between the GAAP variants and the IFRS which generate a disconnect, consequentially not allowing for a direct or clear comparison between firms utilising separate accounting practices. For one, the GAAP allows for the utilisation of either the *last-in,first-out* (LIFO) or *first-in, first-out* (FIFO) treatment and valuation of inventory, whereas the IFRS fully prohibit LIFO due to its tendency to understate the value of inventory (PwC, 2020; PwC, 2023). Precisely, the Japanese GAAP primarily utilise FIFO but allows for the utilisation of LIFO, while the US GAAP only use FIFO when certain criteria are met. Additionally, the GAAP does not allow for the re-evaluation of any assets to their original price in the case of impairment loss[11], whereas IFRS allows for this under certain conditions. Consequentially, GAAP may therefore further understate the inventory's true value. Another significant difference between the accounting standards is the treatment of intangible assets. IFRS recognise intangible assets separately from goodwill and are amortised over the respective life expectancy, while GAAP allows for goodwill and amortisation of intangible assets to be recognised if the asset has a finite life expectancy, potentially resulting in differences in reported assets (PwC, 2020; PwC, 2023). Lastly, there is also a noteworthy difference in revenue recognition. Under GAAP, revenue should only be recognised when the firm has completed its obligation to deliver on the customer's purchase and is thereafter accepted by the customer. IFRS instead recognise revenue when the firm has successfully transferred control of the customer's service or good. However, in the case of long-term contracts, both GAAP and IFRS primarily utilise the *percentage-of-completion* method, thereby recognising revenue similarly (PwC, 2020; PwC, 2023). A complete list of smaller additional differences can be found in *Appendix 10.1*

To correct for the differences between IFRS and GAAP, researchers primarily utilise one of two methods (Nobes, 2012). First, one may restate the balance sheet and financial statements to ensure uniformity. Due to requiring vast amounts of additional information and being a time-consuming process, this method is rarely used despite the consistent and standardised results. Furthermore, this method will not be utilised in this dissertation due to the substantial information requirements. Next,

[10] Firms that only list debt securities and firms who have applied for listing may delay the adoption to 2007 (IFRS, 2023).

[11] Impairment loss is the depreciation in the fair market value of an asset in excess of the asset book value stated in the financial statement.

normalisation techniques that involve directly and appropriately adjusting the differences by modifying ratios or by attempting to remove elements highly altered by differing accounting practices, such as inventory, are commonly used. Rajan & Zingales (1995), amongst others, utilise this method in adjusting total assets, liabilities, and equity to ensure comparability. Although the method may correct for the difference in accounting standards, the technique may introduce new problems of falsely representing capital structure. For instance, inventory is a critical component of a firm's operations, and its importance is likely to vary between countries. Consequentially, simply excluding it may create a distorted representation of firms' capital structure decisions and market positions relative to the decisions of firms in a different country. Therefore, this method is carefully utilised to ensure comparability between countries and to previous empirical research. As outlined by Rajan & Zingales (1995), total assets are adjusted by subtracting cash and short-term securities, pension liabilities and intangible assets. Total liabilities by subtracting pension liabilities and cash and short-term securities and adjusting the total book value of equity by adding provisions and deferred taxes, and subtracting intangible assets. Furthermore, I have decided to not adjust for inventory and to instead take it into account when discussing the implications of the empirical analysis.

4.3 Industry Distribution

Another possible problem affecting the interpretation of the empirical and comparative analysis concerns the degree of industry distribution between countries. In other words, the analysis may produce spurious conclusions if a significant portion of a country's sample partakes in industries that are not similarly active in other countries. To observe which industries the sample of each country participates in, *Appendix 10.2 Industry Distribution* displays industry participation as a fraction of the total sample per country and is categorised based on the Global Industry Classification Standard (GICS). While the table primarily indicates insubstantial cross-country differences in industry activity in most industries, one may observe a larger variation in certain industries. For instance, the Canadian sample contains more firms participating in the industries of *Energy Equipment & Services* and *Metals & Mining*, whereas the Japanese sample has comparatively more firms in *Machinery* and *Chemicals*. However, in the grand scheme of things, such differences are likely insignificant when included in substantial samples with otherwise few cross-country differences. Additionally, as GICS only register each firm to a singular industry, firms may be partially miscategorised due to commonly participating in multiple industries. Regardless, such differences may help explain lesser cross-country differences in the empirical analysis and should therefore not be ignored.

4.4 Correcting for Outliers and Missing Data

Outliers are generally defined as extraordinary data points in any given population and may arise due to wrongful calculations or inconsistent data sources (Stock & Watson, 2019). In some cases, these outliers might be extreme observations on the distribution's tail ends, consequentially not being representative of the rest of the sample and could subsequently produce confusing or spurious results. Wooldridge (2019) argues there are three regularly used methods to control for these outliers: the rule of thumb, winsorization, and robust estimations. To begin with, the rule of thumb follows the idea of excluding observations perceived to not be within a predetermined interval. This method is particularly useful in determining and omitting 'unreasonable' observations and has been employed in the removal of 'impossible' financial ratios. For instance, this includes the removal of all variables of long-term debt as a ratio of total assets outside an interval of zero and one. *Table 2* partially displays the removal of such observations. Next, winsorization refers to replacing the furthermost extreme ends of the distribution with the most extreme non-adjusted and non-omitted values. Specifically, I decided on winsorizing both ends of the distribution of all firm-level observations at a 1% level. Country-level observations were not winsorized due to the macroeconomic data not containing 'unreasonable' outliers. Lastly, robust estimations generally refer to "*any regression* [method] *that limits the influence of unusual observations on the values of its estimates*" (Andersen, 2008, p.4), and is further discussed in Chapter *5.3 Choice of Regression Model*.

As previously stated in the sub-chapter *4.1 Sample selection*, only firms with complete key balance sheet items were included in the sample. In the case of missing or incomplete key data points, the firm would be omitted. Therefore, in addition to presenting the removal of observation due to implausible financial ratios, *Table 2* also display the removal of observations due to incomplete information.

Table 2 - Correction of implausible data, missing and incomplete information.

Year	Canada		France		Germany		Italy		Japan		United Kingdom		United States	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
2013	266	88	435	177	331	179	237	83	834	510	555	201	314	121
2014	266	90	435	190	331	186	237	84	834	544	555	210	314	133
2015	266	96	435	190	331	193	237	96	834	570	555	236	314	139
2016	266	101	435	197	331	200	237	107	834	575	555	259	314	143
2017	266	107	436	200	331	202	237	111	834	598	555	279	314	152
2018	266	112	436	207	331	214	237	117	834	550	555	293	314	168
2019	266	112	436	206	331	214	237	117	834	549	555	293	314	168
Total	1862	706	3048	1367	2317	1388	1659	715	5838	3896	3885	1771	2198	1024

4.5 Measuring Capital Structure – Dependent Variables

"*Given the differences in the composition of liabilities, before undertaking any investigation of leverage it is appropriate to define what is meant by this term* [Leverage]" (Rajan & Zingales, 1995, p.7).

As the 'optimal' measure of leverage is highly dependent on the analysis' objective, modern literature and empirical research provide multiple potentially helpful measures in determining which factors affect capital structure decisions. Most research papers use some variation of a debt ratio to avoid excessive noise from unrelated items included in liabilities[12], thereby only reflecting the interest-bearing liabilities. Particularly, acclaimed literature (Rajan & Zingales, 1995; Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008; Frank & Goyal 2009 amongst others) utilises one or more of the following ratios: (1) *Total-Debt-to-Total-Assets*, (2) *Total-Debt-to-Net-Assets*, (3) *Total-Debt-to-Capital*, and (4) *Interest Coverage Ratio*.

As outlined by Rajan & Zingales (1995), all measures of leverage come with respective strengths and weaknesses. For one, while *Total-Debt-to-Total-Assets*[13] appropriately shows creditors' ownership of the firm and provide a decent overview of the possibility of financial distress in the near future, it fails to account for how some assets may be offset by certain non-debt liabilities[14]. Similarly, although *Total-Debt-to-Net-Assets* does not include items potentially used to offset assets, it is subject to being affected by factors not related to a firm's financing abilities, such as pension liabilities. Alternatively, Rajan & Zingales (1995) argue that *Total-Debt-to-Capital* best represents past financial decisions due to almost exclusively including equity and debt finances, thereby accounting for the previously stated disadvantages. The majority of empirical research follows either the reasoning of Rajan & Zingales (1995), thereby utilising *Total-Debt-to-Capital* as the dependent variable (Titman & Wessels, 1988; Bevan & Danbolt, 2000; La Rocca et al., 2011, amongst others), or by using *Total-Debt-to-Total-Assets* (Ozkan, 2001; Antoniou et al., 2002; Antoniou et al., 2008; Frank & Goyal, 2009, amongst others), primarily arguing it holistically depicts capital structure decisions. Lastly, the *Interest Coverage Ratio* (ICR) portrays how easily the interest on outstanding debt is payable. Furthermore, ICR provides separate measures depending on whether it is believed that new investments should equal depreciation

[12] Examples of such items include accounts payable, accrued expenses, and pension liabilities,

[13] Total debt reflects all long-term and short-term interest-bearing debt obligations, which is almost exclusively used in empirical research as opposed to total liabilities.

[14] Particularly, Accounts payable.

required for the firm to remain stably running. If so, earnings before interest and taxes (EBIT) are utilised, while earnings before interest, taxes, depreciation and amortisation (EBITDA) it used otherwise. However, ICR entirely disregards short-term liabilities, is highly sensitive to revenue variabilities, and is significantly less studied than the other leverage measures.

Another crucial decision when studying how certain factors affect capital structure decisions is whether to utilise market or book values when calculating firm leverage. As outlined by Frank & Goyal (2009), market values are generally determined by the present value of a firm's current and future success, thereby representing prospective measures, whereas book values instead signify retrospective measures due to only accounting for past actions. Therefore, prospective measures will not necessarily be identical to their backwards-looking equivalents, as there is no inherent justification for such expectations (Barclay et al., 2006). Older empirical research mostly favours book measures of debt, arguing it represents the correct values of the asset base in case of liquidation. Newer research, on the other hand, tends to favour market measures due to firms primarily adjusting their capital structure based on current and future success instead of that of the past (Baker & Martin, 2011). Additionally, according to Welch (2004), book values hold little managerial significance and instead serve as a means to balance the accounts.

Considering the aforementioned aspects of leverage measures, *Debt-to-Capital* of both market and book value will be utilised as the dependent variables to allow for comparative analysis of both old and modern empirical research. This gives two equations:

$$Debt\ to\ Capital_{Book\ value} = \frac{Total\ Debt_t}{Total\ Debt_t + Book\ value\ of\ Total\ Equity_T} \quad (7)$$

$$Debt\ to\ Capital_{Market\ value} = \frac{Total\ Debt_t}{Total\ Debt_t + Market\ value\ of\ Total\ Equity_T} \quad (8)$$

4.6 Capital Structure Determinants – Independent Variables

Based on previous empirical research (Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008) on capital structure, I have categorised the independent variables into two groups: *Tier 1* and *Tier 2* determinants. These categories represent the results in preceding research, in which the most prominent and significant variables across numerous papers are included in *Tier 1*. On the other hand, *Tier 2* determinants include more empirically rare, more speculative, and highly theoretically and circumstantial variables, and include both firm- and country-level variables. Additionally, these variables are narrowly researched, with relatively few researchers including them in their analyses

when compared to the *Tier 1* variables. Next, on each independent variable, I present specific hypotheses on how they relate to firms' capital structure in light of theoretical frameworks and empirical research.

Tier 1 Determinants

I. Tangibility

An asset's tangibility refers to its finite monetary value and physical form. Tangible assets often give creditors security during financial distress by working as collateral. Hence, higher asset tangibility generally reduces the risk of debt through increased security and reduced financial distress costs, further increasing creditors' willingness to fund the firm. The trade-off theory, therefore, predicts a positive relationship between leverage and asset tangibility. Furthermore, the information asymmetry theory predicts a negative relationship. Harris & Raviv (1991) claim lower information asymmetry will result in lowered cost of equity, subsequentially leading to lower debt levels. However, Frank & Goyal (2009) argue if costs of adverse selection are considered, a positive relationship between tangibility and leverage would be expected. Though, staying consistent with the predictions of the trade-off theory and the arguments of Frank & Goyal (2009), previous empirical research observed a positive relationship between leverage and asset tangibility (Rajan & Zingales, 1995; Bevan & Danbolt, 2000; Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008; de Jong et al., 2008; Frank & Goyal; 2009; La Rocca et al., 2011).

Per acclaimed literature (Rajan & Zingales, 1995; Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008; de Jong et al., 2008; Frank & Goyal; 2009; La Rocca et al., 2011), I have used *Net Property, Plant & Equipment* (PP&E) as a ratio of the book value of *Total Assets* as a proxy for asset tangibility.

$$Tangibility\ (TAN) = \frac{Net\ Property,Plant\ \&\ Equipment\ (PP\&E)_t}{Total\ Assets\ (Book\ Value)_t} \quad (9)$$

H_0: Asset tangibility has either a negative or no relationship with firm leverage
H_1: Asset tangibility has a positive relationship with firm leverage

II. Market-to-Book Ratio

The market-to-book ratio is most often utilised as a proxy for investment opportunities or future growth opportunities and has been observed to be the most reliable variable to do so (Adam & Goyal, 2008). Here, the market value of assets seeks to represent the present value of all future cash flows from both

existing assets and future investment opportunities, whereas the book value of assets represents the value generated from only existing assets. The information asymmetry theory predicts conflicting expectations of how the market-to-book ratio may affect leverage. While the theory expects increased information asymmetry, thereby increasing the cost of debt and subsequentially decreasing debt levels, it also promotes the use of debt in funding investment opportunities when the investment costs exceed the firm's available capital, ultimately increasing debt levels. Additionally, the theory implies firms with more investment opportunities will increase their debt levels over time if profitability remains constant (Frank & Goya, 2009). Next, the trade-off theory predicts a negative relationship based on the idea of growth reducing potential availability problems of free cash flow and increasing costs related to financial distress, debt-related agency problems, and empire-building by managers. The market-to-book ratio also serves as a proxy for market timing, predicting a negative relationship between the market-to-book ratio and leverage. According to the market timing theory, a high market-to-book ratio should result in reduced debt levels considering the firm would be incentivised to issue equity to exploit the equity misprising and collect additional capital. A lower market-to-book ratio would result in increased debt ratios, as the firm might exploit the undervaluation of equity to repurchase equity or issue debt. Lastly, previous empirical research primarily finds a negative relationship (Rajan & Zingales, 1995; Antoniou et al., 2002; Frank & Goyal, 2003; Bancel & Mittoo, 2004; Antoniou et al., 2008; de Jong et al., 2008; Frank & Goyal; 2009). Though, Frank & Goyal (2009) observed the connotation to be dependent on whether book negative or market values were used [negative and positive connotation respectively], while La Rocca et al. (2011) examined a negative relationship using book value of leverage.

In line with previous research, I use the market value of equity plus total liabilities as a ratio of the book value of equity plus liabilities as a proxy for future growth opportunities (Rajan & Zingales, 1995; Bevan & Danbolt, 2000; Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008; Frank & Goyal; 2009; La Rocca et al., 2011).

$$Market\ to\ book\ ratio\ (M2B) = \frac{Market\ Value\ of\ Total\ Equity_t + Total\ Liabilities_t}{Book\ Value\ of\ Total\ Equity_t + Total\ Liabilities_t} \quad (10)$$

H_0: The market-to-book ratio is positively related to firm debt levels
H_1: The market-to-book ratio is negatively related to firm debt levels

III. Size

Firm size may act as a proxy for risk of financial distress and operational transparency, where larger firms are often associated with lower financial distress risk, lower debt-related agency costs, higher

operational transparency and thereby lower asymmetric information. Naturally, such relations may lead to both a lower cost of equity and a cost of debt. Additionally, firms of larger sizes are also often linked with lower revenue volatility and other cash flow-related problems (La Rocca et al., 2011.). Following this argument, the pecking order theory predicts large firms use less debt and more retained earnings. On the other hand, the trade-off theory predicts a positive relationship. Given large firms' lower risk of financial distress, lower revenue volatility, and higher credit rating in debt markets, large firms' cost of debt would be expected to be relatively low, allowing large firms to easily fully benefit from interest tax shields. Following this notion, firms' debt levels increasing with size as their risk of financial distress decrease is expected to diminish as the firm size becomes notably large. Most empirical research discovered evidence supporting the trade-off theory (Fischer et al., 1989; Rajan & Zingales, 1995; Bevan & Danbolt, 2000; Antoniou et al, 2002; Frank & Goyal, 2003; Antoniou et al, 2008; de Jong et al., 2008; La Rocca et al., 2011). However, Titman & Wessels (1988) observed evidence supporting the pecking order theory of size being negatively related to debt levels.

As a proxy for firm size, following acclaimed empirical papers (Frank & Goyal, 2003; Frank & Goyal, 2009; La Rocca et al., 2011), the natural logarithm of the book value of total assets has been used.

$$Size\ (SIZE) = Log(Book\ value\ of\ Total\ Assets_t) \quad (11)$$

H_0: Firm size is negatively related to leverage
H_1: Firm size is positively related to leverage

IV. Profitability

Profitability is a metric frequently used in determining a firm's financial efficiency. Rather than being an absolute amount, profitability instead examines a firm's financial success relative to its size, providing an easily comparable measurement. According to the trade-off theory, firms with greater profitability are incentivised to utilise debt to fully benefit from interest tax shields. Additionally, profitable companies are also exposed to lower financial distress costs as a result of having additional free cash flows available. Thus, the trade-off theory predicts a positive relationship between leverage and profitability. Contrarily, the pecking order theory claims profitable firms have better access to retained earnings, leading to firms utilising internal funds rather than external. Therefore, the pecking order theory predicts a negative relationship between leverage and profitability. Similarly, past empirical research observed this negative relationship (Titman & Wessels, 1988; Rajan & Zingales, 1995; Bevan & Danbolt, 2000; Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008; de Jong et al., 2008; Frank & Goyal; 2009; La Rocca et al., 2011).

Per previous research, I define profitability as the current EBITDA as a ratio of the book value of total assets. This is in accordance with Rajan & Zingales (1995), Bevan & Danbolt (2000), Frank & Goyal (2003; 2009), and de Jong et al. (2008).

$$Profitability\ (PRO) = \frac{EBITDA_t}{Book\ Value\ of\ Equity_t + Total\ Liabilities_t} \quad (12)$$

H_0: Firm profitability is positively related to debt levels
H_1: Firm profitability is negatively related to debt levels

V. Liquidity

Liquidity refers to a firm's ability to efficiently convert an asset to cash without affecting the asset's market value. Hence, it shows how easily a firm can meet its short-term obligations in the case of financial distress or lack of sufficient earnings. The pecking order theory predicts liquidity exerts a negative impact on debt levels. Firms with easily convertible assets may utilise the inflows of such liquidations to fund new investments when retained earnings are limited, preferring internal financing to external (Morellec, 2001). On the other hand, the static trade-off theory argues for lower liquidity increases the risk of firms not being able to meet their short-term obligations, thereby predicting a positive relationship between liquidity and leverage. In other words, as liquidity increases, the risk of default decreases, thereby increasing the accessibility of debt. Following the notion of the pecking order theory, empirical research observes a negative relationship (Ozkan, 2001; Antoniou et al., 2002; de Jong et al., 2008).

Per Ozkan (2001), Antoniou et al. (2002) and de Jong et al. (2008), a ratio of the book value of total current assets to total current liabilities serves as a proxy for firm liquidity.

$$Liquidity\ (LIQ) = \frac{Total\ Current\ Assets(Book\ Value)_t}{Total\ Current\ Liabilities_t} \quad (13)$$

H_0: Asset liquidity is positively related to debt levels
H_1: Asset liquidity is negatively related to debt levels

VI. Non-Debt Tax Shield

Firms utilise tax shields to claim tax deductions on taxable income. Particularly, the trade-off theory predicts firms will increase their debt levels to minimise tax payments, attempting to maximise the benefits from tax shields. However, due to the complexity of quantifying interest tax shields without

precise information on firms' cost of debt, I will instead utilise non-debt tax shields to observe the effect of tax shields on capital structure. Firms are not limited to obtaining tax deductions solely from using debt, and can also utilise depreciation and amortisation costs, charitable donations, and net operating loss carryforwards in generating tax shields. Particularly, DeAngelo & Masulis (1980) claim such tax deductions substitute the taxation benefits of debt. Furthermore, they argue firms with significant non-debt tax shields may not fully utilise interest tax shields. Therefore, the trade-off theory predicts negative relations between leverage and non-debt tax shields, suggesting firms with larger non-debt tax shields will utilise less debt to fully benefit from the tax shields. Contrarily, literature primarily observed a positive relationship (Bradley et al., 1984; Antoniou et al., 2002; Antoniou et al., 2008; Frank & Goyal, 2009). This may be due to non-debt tax shields potentially being a proxy for tangibility. Though, Frank & Goyal (2003) observed a negative relationship, consistent with DeAngelo & Masulis (1980) and the trade-off theory.

Per Antoniou et al. (2002; 2008) and Frank & Goyal (2009), I measure non-debt tax shields by a ratio of depreciation and amortisation to the book value of total assets.

$$Non - Debt\ Tax\ Shields\ (NDTS) = \frac{Depreciation\ \&\ Amortization_t}{Total\ Assets(Book\ Value)_t} \quad (14)$$

H_0: Non-debt tax shields are positively related to leverage
H_1: Non-debt tax shields are negatively related to leverage

Tier 2 Determinants

I. Economic Growth

During periods of higher economic activity, it is often expected for firms' profitability to increase. As previously discussed, increased profitability may lead to increased free cash flow availability and lower costs of financial distress, thus increasing the potential benefits of interest tax shields. As economic growth encourages the use of debt, the trade-off theory predicts a positive relationship between economic growth and debt levels. Contrarily, the market timing theory and the pecking theory predict negative relationships. The market timing theory argues firms would favour equity rather than debt during economic growth, due to management's incentives of collecting additional equity by 'timing the market' and thereby decreasing debt levels. The pecking order theory predicts firms will utilise the increased retained earnings originating from economic growth rather than issue debt to finance investments. Interestingly, empirical research (de Jong et al., 2008; Frank & Goyal, 2009) observed

economic growth to be positively related to the use of debt, supporting the predictions of the trade-off theory.

Following the method of measurement of de Jong et al. (2008) and Frank & Goyal (2009), annual real growth in GDP is used as a proxy for economic growth.

$$Economic\ Growth\ (EGRO) = \ Real\ GDP\ growth_t * 100 \quad (15)$$

H_0: Economic growth is not related to firm leverage
H_1: Economic growth and leverage are positively related

II. Inflation

For many, inflation acts as an indicator of changes in macroeconomic conditions, especially when examining debt market conditions. Firms may exploit significant increases in inflation by issuing debt when interest rates are comparatively low to inflation, thereby gathering cheap debt funding. Additionally, periods of high inflation rates are not considered favourable conditions in equity markets, resulting in firms refraining from financing investments through equity. Following this argument, the market timing theory predicts a positive relationship between leverage and inflation. On the other hand, the trade-off theory predicts mixed results. For once, Taggart (1985) observed the value of interest tax shields to be higher during periods of high inflation. On the other hand, one might expect inflation to result in higher financial distress costs due to decreases in financial performance and profitability, as well as an increased risk of defaulting on current debt, thereby increasing the cost of debt. However, supporting the market timing theory and the findings of Taggart (1985), Frank & Goyal (2009) observed expected inflation to be positively related to leverage.

Following the approach of Frank & Goyal (2009), inflation is measured as "*the expected change in the consumer price index over the coming year*" (p.33).

$$Inflation\ (INFL) = \ Expected\ Inflation_t * 100 \quad (16)$$

H_0: Inflation is not related to firm leverage
H_1: Inflation is positively related to firm leverage

III. Term Spread

The term spread, being defined as the difference between long- and short-term government securities, is often viewed as a significant predictor of economic performance and conditions of debt markets. Particularly, a negative term spread might be considered an early warning sign of poor economic output and potential financial crises, while a positive term spread may imply high economic performance (Parker & Schularick, 2021). Therefore, the market timing theory predicts term spread to be negatively related to leverage, as management is incentivised to 'time' equity and debt issuance for additional capital, per a high term spread, and cheaper debt, per a low term spread respectively. The trade-off theory, on the other hand, predicts mixed results. For instance, the theory argues during economic downtimes, firms would experience an increase in financial distress costs due to the increased risk of default, thereby increasing the cost of debt and lower debt levels. However, during periods of economic performance, as represented by a high term spread, due to potential increases in profitability, firms would benefit from increasing their interest tax shield and thereby increasing their debt levels. Lastly, empirical evidence (Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008; Frank & Goyal, 2009) fully and partly support the market timing theory and trade-off theory respectively, by observing term-spread to be negatively related to leverage.

Per Antoniou et al. (2002; 2008) and Frank & Goyal (2003; 2009), term spread is defined as the difference between the local government's 10-year and 3-month bonds. Additionally, due to term spread predicting future economic conditions, the term spread will be measured by government bonds from the previous period.

$$Term\ Spread\ (TS) = (10\ Year\ Government\ Bond_{t-1} - 3\ Month\ Government\ Bond_{t-1}) * 100 \quad (17)$$

H_0: Term spread is not related to firm leverage
H_1: Term spread is negatively related to firm leverage

IV. Corporate Tax Rate

For firms to fully benefit from interest tax shields, they are expected to increase their debt levels with corporate income tax due to interest payments from interest-bearing debt being tax deductible. The trade-off theory, therefore, predicts corporate tax rates to be positively related to debt levels. Empirical research (Fischer et al., 1989; Antoniou et al., 2002; Antoniou et al., 2008; Frank & Goyal, 2009), however, primarily observes a negative relationship, thereby opposing the predictions of the trade-off theory. Hennessy & Whited (2005) argue such results are likely due to transaction costs associated with the issuance of debt complicating the empirical identification of corporate tax rate's effect on debt policy. This may also explain why corporate income tax could affect debt policies differently

dependent on the country. Hence, firms in countries with relatively low transaction costs may experience changes in debt levels supporting the trade-off theory.

Following the approach of Frank & Goyal (2009) and Antoniou et al. (2002; 2008), the independent variable is measured as the statutory corporate income tax rate.

$$Corporate\ Tax\ Rate\ (CTR) = \ Statutory\ Corporate\ Income\ Tax_t * 100 \quad (18)$$

H_0: Corporate Tax Rate is not related to firm leverage
H_1: Corporate Tax Rate will be negatively related to firm leverage

V. Stock Market Condition

Similar to the variables *Inflation* and *Term Spread*, stock market condition serves as a proxy for current capital market conditions. However, while *Inflation* and *Term Spread* represent how the conditions of debt markets may affect capital structure decisions, stock market condition seeks to represent capital structure adjustments devised based on the equity market environments. To begin with, considering managers would actively 'time' the market by exploiting market mispricing to gather additional funding or repurchase issued equity at a cheaper price during good and bad market conditions respectively, the market timing theory predicts leverage to be negatively related to the conditions of equity markets. On the other hand, the trade-off theory claims firms would continuously readjust their debt levels to what is deemed optimal during periods of high market performance. Such periods would increase equity values, thereby lowering firm leverage to a sub-optimal debt level. Due to how firms would therefore issue debt to re-achieve optimal leverage, the trade-off theory predicts a positive relationship between firm leverage and stock market condition. However, empirical research (Antoniou et al., 2002; Antoniou et al, 2008; Frank & Goyal, 2009) primarily observe the variables to be negatively related, supporting the predictions of the market timing theory. Furthermore, although Welch (2004) observed a negative relationship in the short run, he discovered a significant positive relationship in the long run, supporting the trade-off theory. Due to the contradicting theoretical predictions and empirical observations, the hypothesis of how stock market conditions will affect leverage will be based on the newer evidence provided by Frank & Goyal and Antoniou et al. (2002; 2008), and consequentially also the market timing theory.

As a proxy for stock market conditions, local MSCI indices' annual performance is utilised.

$$Stock\ Market\ Conditions\ (SMC) = \ MSCI\ Index\ Annual\ Performance_t * 100 \quad (19)$$

H_0: The stock market condition is not related to firm leverage
H_1: The stock market condition is negatively related to firm leverage

VI. Probability of Bankruptcy (Altman's Z-score)

The risk of bankruptcy remains a core variable in capital structure decisions. For instance, firms with an increased probability of bankruptcy are expected to face increased financial distress costs, thus increasing the cost and accessibility of debt. The trade-off theory, therefore, predicts firms with an increased risk of bankruptcy use less debt. Oppositely, the pecking order theory predicts firms exposed to a lower risk of bankruptcy use less debt considering how financially stable firms commonly have access to retained earnings. Furthermore, the theory also claims firms would issue debt if the utilisation of retained earnings is limited, thus increasing debt levels with the risk of bankruptcy. However, one can immediately notice the caveats of such conclusions, as firms in immense financial distress would likely have substantial limitations on acquiring debt and may instead utilise equity. Myers commented on such arguments by stating: "[…] *the pecking order hypothesis can be quickly rejected if we require it to explain everything*" (1984, p.582). Empirical research, while limited in quantity, observed a lower risk of bankruptcy to be related to lower debt levels (Frank & Goyal, 2003).

In accordance with Frank & Goyal (2003), Altman's Z-score[15] is utilised to measure the probability of bankruptcy. Using five financial ratios multiplied by respective coefficients, Altman's model predicts the probability of firm bankruptcy within two years, with a low [0-1,8] and high[3,0-4,0] value indicating a high and low probability of bankruptcy respectively (Altman, 2000). Using a sample of bankrupt and non-bankrupt firms, Altman (2000) observed the model to correctly classify 96% of the to-be bankrupt firms as bankrupt and 79% of the non-bankrupt firms as not-to-be bankrupt within the two-year timeframe. Additionally, in subsequent tests, Altman observed the model to correctly predict bankruptcy prior to the bankruptcy filing with an 80-90% accuracy (Altman, 2000). Due to the Z-score's ability to outline financially distressed firms, I utilise it in determining financial distress' effect on capital structure. Lastly, the Z-score and probability of bankruptcy are inversely related. In other words, as the Z-score decreases, the probability of bankruptcy increases. Therefore, as the probability of bankruptcy (Z-score) decrease (increase), firm debt levels are expected to decrease as outlined by the pecking order theory and previous research.

[15] For more information on Altman's Z-score, see Altman (1968)

$$Proability\ of\ Bankruptcy\ (Z) = \ Altman's\ Z - score = \ 1{,}2 * \frac{Working\ Capital_t}{Total\ Assets_t} + 1{,}4 * \frac{Retained\ Earnings_t}{Total\ Assets_t} + 3{,}3 * \frac{EBIT_t}{Total\ Assets_t} + 0{,}6 * \frac{Market\ Capitalization_t}{Total\ Assets_t} + 0{,}999 * \frac{Revenue_t}{Total\ Assets_t} \quad (20)$$

H_0: Probability of Bankruptcy is unrelated to firm leverage

H_1: Probability of Bankruptcy (Altman's Z-score) is positively (negatively) related to firm leverage

VII. Dividend Pay-out Ratio

Dividends are often used as a tool in reducing agency costs due to their ability to limit wasteful spending by restricting managers' accessibility to free cash flows. Furthermore, Frank & Goyal (2009) argue firms with stable pay-outs ratios have fewer long-term financial constraints and are exposed to additional market monitoring, thereby reducing information asymmetry and problems of adverse selection, allowing for lower cost of debt and increased debt accessibility. Thus, the information asymmetry theory predicts the dividend pay-out ratio and leverage to be positively related. However, the theory also predicts an inverse relationship based on the notion of dividends signalling future earnings and a lower cost of equity due to decreased asymmetric information, ultimately resulting in more favourable conditions for financing by equity issuance. Empirical research (Antoniou et al., 2002; Antoniou et al., 2008; Frank & Goyal, 2009) supports the latter prediction, indicating a negative relationship.

Per Antoniou et al. (2002; 2008), dividends are measured as dividends paid to common shareholders as a ratio to operating income.

$$Dividend\ Payout\ Ratio\ (DIV) = \frac{Dividends_t}{Operating\ Income_t} \quad (21)$$

H_0: Dividends are unrelated to firm leverage

H_1: Dividends are negatively related to firm leverage

VIII. Revenue Volatility

Due to its affiliation with firm risk, revenue volatility is often utilised as a proxy for financial stability. Antoniou et al. (2002) argue firms with high revenue volatility carry the additional risk of not meeting their debt commitments, thereby leading to costlier debt to compensate for the added risk of default. Furthermore, when earnings become more volatile, fully exploiting interest tax shields becomes gradually more difficult. The trade-off theory, therefore, predicts an inverse relationship between

revenue volatility and firm leverage. The information asymmetry theory, on the other hand, predicts positive outcomes. Due to higher costs associated with adverse selection when revenue volatility is high, the information asymmetry theory suggests managers would issue debt rather than equity when retained earnings are scarce. Similarly, Bradley et al. (1984), Antoniou et al. (2002) and de Jong et al. (2008) all observed revenue volatility to negatively impact firm leverage.

Revenue volatility is measured as the absolute value of the logarithmic difference between a firm's revenue at time *t* and its mean revenue between 2012 and 2019.

$$Revenue\ Volatlity\ (RV) = ABS(Log(Revenue_t) - mean(Log(Revenue)) \quad (22)$$

H_0: Revenue Volatility is unrelated to firm leverage
H_1: Revenue Volatility is negatively related to firm leverage

IX. Age

Age is often used as a proxy for firm maturity. Particularly, it provides information on the current position of the firm in its lifecycle, reputation, quantity of information and level of transparency (Diamond, 1991; Petersen & Rajan, 1994; La Rocca et al., 2011). Diamond (1991) claims reputation built up over the firm's length of service is a significant factor in acquiring relatively cheap debt. Furthermore, as age indicate financial stability and longevity, it signifies a low long-term risk of financial distress, in addition to lower levels of asymmetric information (La Rocca et al., 2011). This also implies older firms have fewer cash flow-related problems, in which the pecking order theory predicts older firms utilise retained earnings before debt and equity, ultimately lowering debt levels. Interestingly, La Rocca et al. (2011) also argue debt is less common in young firms due to higher risks of financial distress and lower transparency. However, they also note as the firm ages from young to middle aged, they gradually use more debt. Contrarily, the trade-off theory instead argues as firms grow older, they demonstrate financial stability through lower risk of financial distress and higher credit ratings, and will therefore utilise more debt to fully benefit from interest tax shields, thereby predicting a positive relationship between age and leverage. Similarly, empirical research (Frank & Goyal, 2009; La Rocca et al., 2011) observes a positive relationship, supporting the predictions of the trade-off theory.

Firm age is measured as the natural logarithm of the sum of years since the firm's establishment.

$$Age\ (AGE) = Log(Age_t) \quad (23)$$

H_0: Age is unrelated to firm leverage
H_1: Age is positively related to firm leverage

X. Lagged Leverage Ratio

In capital structure literature (Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008), past leverage ratios are commonly utilised in examining if firms have target debt levels, whether they deviate from optimal leverage ratios, and determining firms' adjustment speeds, of which the latter remain outside this dissertation's scope. Based on the idea of target and optimal debt levels, the trade-off theory argues for a positive relationship. Additionally, by including a lagged dependent variable one may control for additional unobservable and difficult-to-account-for effects (Frank & Goyal, 2003).

Per Frank & Goyal (2003) and Antoniou et al. (2002; 2008), lagged leverage ratio is measured as the lagged total debt divided by the lagged book value of total assets.

$$Lagged\ Leverage\ Ratio\ (PREV) = \frac{Total\ Debt_{t-1}}{Total\ Debt_{t-1} + Total\ Equity(Book\ Value)_{t-1}} \quad (24)$$

H_0: Lagged Leverage Ratio is unrelated to firm leverage
H_1: Lagged Leverage Ratio is positively related to firm leverage

XI. Industry Leverage

"*Firms in an industry face common forces that affect their financing decisions*" (Frank & Goyal, 2009, p.8). For one, median industry ratios may be utilised as benchmarks for subsequent leverage adjustments, serving as target debt levels. This interpretation supports the trade-off theory, predicting the variables to be positively related. Furthermore, Frank & Goyal (2009) argue the market timing theory prediction of a positive relationship is only valid in the case of valuations across firms in their respective industries being correlated and in the absence of nonsymmetric mispricing. Empirical research (Ozkan, 2001; Frank & Goyal, 2003; Frank & Goyal, 2009) supports the theoretical predictions of industry leverage to be positively related to firm leverage.

Following the approach of Frank & Goyal (2003; 2009) and Ozkan (2001), industry leverage is measured as the median leverage grouped by year and industry.

$$Industry\ Leverage\ (INDU) =$$

$$median_{by\ Year\ and\ Industry}\left(\frac{Total\ Debt_t}{Total\ Debt_t + Total\ Equity(Book\ Value)_t}\right) \quad (25)$$

H_0: Industry Leverage is unrelated to firm leverage

H_1: Industry Leverage is positively related to firm leverage

Summary

The following section serves to summarise the theoretical predictions and observations from previous empirical research. *Table 3* provides an overview of predictions based on theories, while *Table 4* gives an overview of the results from previous empirical research. Additionally, an overview of all variables and affiliated formulas is located in *Appendix 10.3 Variable Overview*.

Table 3 – Theoretical Predictions of Determinants

		The Static Trade-off Theory	Information Asymmetry Theory (The Pecking Order Theory)	The Market Timing Theory
Tier 1 Variables				
Firm-level Factors				
Tangibility	TAN	+/-	-	
Market-to-Book Ratio	M2B	-	+/-	-
Size	SIZE	+	-	
Profitability	PRO	+	-	
Liquidity	LIQ	+	-	
Non-Debt Tax Shield	NDTS	-		
Tier 2 Variables				
Country-level Factors				
Economic Growth	EGRO	+	-	-
Expected Inflation	INFL	-		+
Term spread	TS	+/-		-
Corporate Tax Rate	CTR	-		
Stock Market Condition	SMC	+		-
Firm-level Factors				
Altman's Z-score	Z	+	-	
Dividends	DIV		+/-	
Revenue Volatility	RV	-	+/-	
Age	AGE	+	-	
Lagged Leverage Ratio	PREV	+		
Industry Median Leverage	INDU	+		+

Source: Own contribution

'+' and '-' indicates a positive and negative relationship between leverage and the independent variable respectively. Blank indicates the theory does not offer any explanation or prediction on how the variable may affect leverage.

Table 4 – Empirically based Predictions of Determinants

	Country-Specific Studies						Cross-Country Studies			
	Titman & Wessels (1988)	Bevan & Danbolt (2000)	Ozkan (2001)	Frank & Goyal (2003)	Frank & Goyal (2009)	La Rocca et al. (2011)	Rajan & Zingales (1995)	Antoniou et al. (2002)	Antoniou et al. (2008)	de Jong et al. (2008)
Tier 1 Variables										
Firm-level Factors										
Tangibility	.	+***		+***	+***	+***	+*** / +***	+** / +***	+*** / +**	+***
Market-to-Book Ratio		-***		-***	-*** / +***	+***	-*** / -***	-** / -***	-***	-***
Size	-**	+***	.	+***	+*** / -***	+***	+*** / +***	+***	+***	+***
Profitability	-***	-***	-***	-***	-***	-***	-*** / -***	-***	-***	-***
Liquidity			-***					-**		-**
Non-Debt Tax Shield	.		-***	-*	+***			+***	+***	
Tier 2 Variables										
Country-level Factors										
Economic Growth					+***					+***
Expected Inflation					+***					
Termspread				-**	-***			-***	-*** / -**	.
Corporate Tax Rate	.				-*			-*	-**	.
Stock Market Condition					-***			-**	-**	
Firm-level Factors										
Probability of Bankruptcy (Z-score)				-**						-***
Dividends				-***	-***			.	.	
Revenue Volatility	.		.	.				-**	.	-***
Age						+***				
Lagged Leverage Ratio					+***			+***	+***	
Industry Median Leverage			+***	+***	+***					
Firm Fixed Effects	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes
Time Fixed Effects	No	Yes	NA	Yes	No	Yes	No	Yes	Yes	Yes
Sample period	1975-1982	1991-1997	1984-1996	1950-2000	1950-2003	1996-2005	1987-1991	1987-2000	1989-2000	1997-2001
Observations	N/A	6001	5070	223656	180552	69694	3739	44161	4823	47380
Sample	US	UK	UK	US	US	Italy	G-7	Britain, France & Germany	G-5	42 different countries
Industry	Industrial firms	Non-financial, publicly traded firms	Non-financial, publicly traded firms	Non-financial, publicly traded firms	Non-financial, publicly traded firms	Non-financial, publicly traded firms	Non-financial, publicly traded firms	Non-financial, publicly traded firms	Non-financial, publicly traded firms	Non-financial, publicly traded firms
Dependent variable	Short-term Debt / Equity, Long-term Debt / Equity	Short-term Debt / Equity, Long-term Debt / Equity	Total Debt / Total Assets, Long-term Debt / Total Assets	Total Debt / Total Assets, Long-term Debt / Total Assets	Total Debt / Total Assets	Total Debt / Equity	Total Debt / Equity	Total Debt / Total Assets	Total Debt / Total Assets	Long-term debt / Total Assets

"+" and "-" indicates a positive and negative relationship between leverage and the independent variable respectively. "." Indicates the variable was tested but no significant relationship was observed, blank indicates the variable was not tested, and "NA" indicates the information was not available. Lastly, if two signs are given, it signifies both market value (left) and book value (right).

**** - Statistical significance at 10% level*

*** - Statistical significance at 5% level*

** - Statistical significance at 1% level*

5 Methodology

In this section, I present the dissertation's methodology. I initiate by presenting the empirical framework of a panel data analysis. Thereafter, I discuss to which degree the multiple linear regression (MLR) assumptions are fulfilled. Finally, the method of estimation is presented.

5.1 Empirical Framework

Datasets composed of repeated cross-sections over a specified time interval are often referred to as panel data. Due to panel data's otherwise complex composition, the utilisation of equivalently complex estimation methods is needed. Particularly, the three commonly used regression estimation methods considered to be utilised in this dissertation's panel data analysis are *Pooled Ordinary Least Squares*, *Fixed Effects*, and *Random Effects*.

Pooled Ordinary Least Squares

The Pooled Ordinary Least Squares estimation method, commonly referred to as Pooled OLS, is utilised to minimise the spread between fitted values and residuals adapted to accurately describe variables using panel data (Wooldridge, 2019)[16]. However, the estimation method fails to account for multidimensional measurements[17], thereby being highly dependent on inflexible assumptions to deliver reliable results. Specifically, the assumptions state there must be zero covariance between all independent variables and time-variant or time-constant unobservable factors that impact the dependent variable. Otherwise, the estimation method is likely to produce spurious results.

Fixed Effects

The Fixed Effects (FE) estimation method aims to control for unobservable effects fixed over time, hence the name *Fixed Effects*. The estimation method splits the unobserved effects into time-variant and time-invariant variables, allowing control of the time-invariant effects and thereby making the

[16] Pooled OLS is the regular Ordinary Least Squares adjusted for cross-sectional data and panel data.

[17] Time variant and cross-sectional data.

method less strict than pooled OLS (Wooldridge, 2019). The FE method's approach to controlling time-invariant effects starts by considering the fundamental model in *Equation 26*:

$$y_{it} = \beta_0 + \beta_1 x_{1,it} + \cdots + \beta_j x_{j,it} + a_i + u_{it}, \quad t = 1, 2, \dots, T \tag{26}$$

Where: y_{it} = *the dependent variable for a firm i at time t*

β_0 = *The Intercept*

β_j = *The parameter associated with* $x_{j,it}$

$x_{j,it}$ = *The independent variable j*

a_i = *Unobserved time-invariant effects*

u_{it} = *Unobserved time-varying error (Idiosyncratic error)*

Due to the purpose of the FE estimation method being the elimination of the unobserved time-invariant effects, the method allows for correlation between the independent variables and time-invariant errors (Wooldridge, 2019). Furthermore, by doing so, the FE estimation method control for harmful homoskedasticity in the time-invariant effects. This is accomplished by averaging *Equation 26*, resulting in *Equation 27*, and thereby subtracting *Equation 27* from *Equation 26*. This results in *Equations 28* and *29*, where one can notice the removal of unobserved time-invariant effects (a_i). Despite this, the FE estimation method is still prone to several limitations. For one, the estimation method's results are particularly prone to producing spurious and unreliable results if any assumptions[18] are violated when the panel data contains a large number of periods with few observations (Wooldridge, 2019). Additionally, due to the FE estimation method's removal of any time-invariant variables, the method does not allow for time-invariant independent variables as these would be entirely removed.

$$\bar{y}_{it} = \beta_0 + \beta_1 \bar{x}_{1,it} + \cdots + \beta_j \bar{x}_{j,it} + a_i + \bar{u}_{it}, \quad t = 1, 2, \dots, T \tag{27}$$

$$(y_{it} - \bar{y}_{it}) = \beta_0 - \beta_0 + \beta_1 (x_{1,it} - \bar{x}_{1,it}) + \cdots + \beta_j (x_{j,it} - \bar{x}_{j,it}) + (a_i - a_i) + (u_{it} - \bar{u}_{it}),$$
$$t = 1, 2, \dots, T \tag{28}$$

Or

$$\widehat{y_{it}} = \beta_1 \widehat{x_{1,it}} + \cdots + \beta_j \widehat{x_{j,it}} + \widehat{u_{it}}, \quad t = 1, 2, \dots, T \tag{29}$$

[18] These assumptions are explained in Appendix *10.4*, and tested and discussed in chapter 5.2 and Appendix *10.5*.

Random Effects

Along with the FE method, the Random Effects (RE) estimation method is commonly utilised for panel data sets. The estimation method is particularly useful if we suppose the time-varying effects (a_i) to be completely uncorrelated to all explanatory variables, as it provides more efficient estimators by not unnecessarily eliminating the time-varying effects (a_i). However, to produce reliable results, the RE estimation method is subject to additional assumptions than what the FE method requires (Wooldridge, 2019). First, the RE method also requires the unobserved time-varying effect (a_i) to be entirely uncorrelated to all explanatory variables as shown by *Equation 30*. Additionally, it is required for the expected value and the variance of the unobserved time-varying effect (a_i), given all the independent variables, to be constant as shown in *Equations 31* and *32* respectively. Under these assumptions, in addition to those proposed when utilising the FE method, the RE method produces consistent results (Wooldridge, 2019).

$$Cov(a_i, x_{j,it}) = 0, \quad t = 1, 2, \dots T; j = 1, 2, \dots, k \tag{30}$$

$$E(a_i | x_{j,it}) = \beta_0 \tag{31}$$

$$Var(a_i | x_{j,it}) = \sigma_a^2 \tag{32}$$

There are multiple advantages to using the RE estimation method. In addition to providing more efficient estimators and shrunken residuals relative to those produced using the FE method, the RE method also allows for independent variables to be time-invariant (Wooldridge, 2019). However, if the additional assumptions of the RE method are violated, the method yields biased and unreliable results. Lastly, while the FE method is prone to producing unreliable results if any assumption is violated when the dataset contains few observations and large time intervals, the properties of the RE method in such scenarios are unknown despite being previously utilised during such conditions (Wooldridge, 2019).

5.2 Testing MLR Assumptions

In this sub-chapter, the validity of the assumptions for multiple linear regression (MLR) is discussed. Furthermore, the results will provide insight into which empirical framework is the most suited for the paper's analysis. The MLR assumptions, in addition to related tests, graphs, and affiliated discussions can be found in the appendix[19].

Assumption 1 - Linearity

The linearity assumption is commonly tested using augmented partial residual plots. Mallows (1986) argues these plots "give insights that are not available from standard errors or added-variable points" (p.313) and are computationally cheap to perform on independent variables. By utilising such plots, I argue the linearity assumption to be satisfied. The affiliated discussion and residual plot are to be found in *Appendix 10.4*.

Assumption 2 – Random Sampling

Considering the data sample is selected through the use of multiple local equity indices with broad inclusion requirements, one can argue the assumption is to be fulfilled. However, based on the notion of the data sample must be randomly selected from the total population of firms to make statistical inferences, the assumption may be violated if we consider the exclusion of non-listed firms. Therefore, assuming the selected sample is representative of and does not deviate from the total population, the assumption of random sampling is fulfilled.

Assumption 3 – No Perfect Collinearity

To avoid problems with numerous independent variables exhibiting fully deterministic relationships, thereby affecting causal inference, I utilise a correlation matrix[20] to examine the relatedness between the variables. Following the approach of Johannessen et al.'s (2010) method of identifying potential problems of multicollinearity if the correlation of independent variables is greater than 0,7, one can briefly conclude with there appearing no indication of multicollinearity in the correlation matrix. However, "[…] *the absence of high correlations does not imply the lack of collinearity because the correlation matrix may not reveal* [all potential] *collinear relationships*" (Mason & Perreault, 1991,

[19] An overview of the MLR assumptions is provided in *Appendix 10.4*, and affiliated tests and discussion are located in *Appendix 10.5*.

[20] The correlation matrix is located in *Appendix 10.5*.

p.270). Per Mason & Perrault (1991), the correlation matrix is therefore complemented by a Variance Inflation Factor (VIF) test, where a VIF-value of greater than 10 signals harmful multicollinearity. The test results presented in *Appendix 10.5* indicate values far lower than the previously defined threshold, implying there is no perfect collinearity problem present.

Assumption 4 – Zero Conditional Mean

The assumption of zero conditional means states unobserved or omitted variables correlated to at least one independent variable may be harmful to causal inference. The likelihood of not-accounted-for variables being correlated with the explanatory variables included in my model is reasonably high. Whether it is due to a lack of measurability, data availability or nescience, the potential violation of the zero conditional mean assumption should not be disregarded.

Assumption 5 - Homoscedasticity

Homoscedasticity refers to the presence of constant residual variance in the regression model. To test for the absence of homoscedasticity, and thereby if the assumption is violated, a Breusch-Pagan Lagrange multiplier test, a White's test, and plots showing explanatory variables against least squared residuals have been utilised. Based on an overall assessment of the plot and tests' results found in *Appendix 10.5,* I find the assumption of homoscedasticity to be violated.

Assumption 6 - Normality

To imply causal inference, the assumption of normality states a normal distribution of residual values is needed to ensure a well-modelled data sample. To test for normality, a multitude of methods have been utilised. First, each regression model has been tested by plotting the residual density using univariate kernel density estimates. Secondly, the residual normal distribution has been tested by plotting quantiles of the regression model against that of the normal distribution, as well as using a standardised normal probability plot. Lastly, a test for residual skewness and kurtosis has also been utilised. The test results presented in *Appendix 10.5* indicate residual normality, fulfilling the assumption.

Assumption 7 - Autocorrelation

The assumption of autocorrelation states no correlation between regression residuals in subsequent time intervals should be observed. To search for autocorrelation, the standard Wooldridge test has been utilised. The test results presented in *Appendix 10.5* strongly indicate the presence of autocorrelation, violating the assumption.

5.3 Choice of Regression Model

The tests' results and affiliated discussions of the MLR assumptions provide evidence of the assumptions of zero conditional mean, homoscedasticity, and autocorrelation to be violated. Therefore, due to the fixed effects (FE) and random effects (RE) estimation methods' dependency on less restrictive assumptions, they appear more appropriate to perform the panel data analysis. To determine whether the FE estimation method is more suitable or *vice versa*, the Hausman test[21] is used and the results are presented in *Table 5*. The test results reject the null hypothesis of the RE and FE method estimating significantly indifferent results at a p-value lower than 0,05 across both regression models and all countries. The Hausman test, therefore, recommends utilising the fixed effects estimation method due to its fewer limiting assumptions. However, due to the challenges associated with producing unreliable results when dealing with a small number of panels or the removal of any time-invariant variables when utilising the FE estimation method, it cannot be referred to as a flawless estimation method. Alternatively, the system Generalised Methods of Moments (GMM) may be utilised. The estimator directly addresses the endogeneity problems experienced when violating the strict exogeneity assumptions of the FE estimation method, thereby potentially producing more reliable results. However, due to how comparing modern determinants of capital structure to those previously observed by, Rajan & Zingales (1995) and Antoniou et al. (2008) amongst others, remains a core fragment of this dissertation, I will utilise the FE estimation method to avoid unnecessary dissimilarities. Furthermore, I do not believe the endogeneity problem will remain a major problem throughout the paper due to the modest number of panels and both firm- and macro-level variables being analysed.

[21] The Hausman test compares the estimation results of RE and FE. If the two estimation methods provide significantly different results, the Hausman test suggests the use of FE due to more flexible assumptions. If, however, the estimation results are sufficiently close, the Hausman test fails to reject and the RE estimation method should be used due to efficiency. For more information on the Hausman test, see Wooldridge (2019, p.473-474).

Table 5 - Hausman Test Results

	Total-Debt-to-Capital (Book value)		**Total-Debt-to-Capital (Market value)**	
	Chi2	Prob>Chi2	Chi2	Prob>Chi2
Canada	38.863	.001	40.556	0
France	53.725	0	46.714	0
Germany	130.124	0	106.811	0
Italy	169.169	0	59.455	0
Japan	536.654	0	434.879	0
United Kingdom	200.973	0	83.438	0
United States	28.604	.027	56.941	0

Note: Results from the Hausman test for both regression models across all G7 countries.

In addition to utilising the FE estimation method, Hoechle (2007) recommends employing robust standard errors to ensure reliable inference when one or more MLR assumptions are violated. Hoechle (2007) does, however, note how employing robust statistics will neither assess nor correct for the violated assumptions, but will warrant robust inference by heightening the requirements for statistical inference.

The regression models are shown in *Equations 33* and *34*, where the first only includes Tier 1 variables, while the latter contains both Tier 1 and Tier 2 determinants.

$$\widehat{D2C_{b,it}} = \beta_0 + \beta_1 \widehat{TAN_{it}} + \beta_2 \widehat{M2B_{it}} + \beta_3 \widehat{PRO_{it}} + \beta_4 \widehat{NDTS_{it}} + \beta_5 \widehat{SIZE_{it}} + \beta_6 \widehat{LIQ_{it}} \quad (33)$$

$$\widehat{D2C_{b,it}} = \beta_0 + \beta_1 \widehat{TAN_{it}} + \beta_2 \widehat{M2B_{it}} + \beta_3 \widehat{PRO_{it}} + \beta_4 \widehat{NDTS_{it}} + \beta_5 \widehat{SIZE_{it}} + \beta_6 \widehat{LIQ_{it}} + \beta_7 \widehat{EGRO_{it}} + \beta_8 \widehat{INFL_{it}} + \beta_9 \widehat{TSPR_{it}} + \beta_{10} \widehat{CTR_{it}} + \beta_{11} \widehat{SMC_{it}} + \beta_{12} \widehat{Z_{it}} + \beta_{13} \widehat{EV_{it}} + \beta_{14} \widehat{AGE_{it}} + \beta_{15} \widehat{DIV_{it}} + \beta_{16} \widehat{PREV_{it}} + \beta_{17} \widehat{INDU_{it}} \quad (34)$$

Where: *b = The dependent variable using either market value or book value of equity*

i = Firm

t = Time period

6 Empirical Analysis

In the following chapter, the empirical analysis is presented. It is initiated by explanatory data analysis. Here the analysis' descriptive statistics are presented and discussed. Thereafter, the regression results are discussed in relation to the empirical, institutional, and theoretical frameworks previously presented.

6.1 Explanatory Data Analysis

Before conducting the regression analysis, I find it imperative to study descriptive statistics due to it providing fundamental insight into the 'average' firm's capital composition and financial position. Furthermore, analysing cross-country differences in descriptive statistics and incorporating literature on institutional differences will also offer deeper insights into why firms of certain countries utilise certain capital compositions as opposed to the firms of other countries, thereby laying the groundwork for a better understanding of the regression estimation results. The descriptive statistics are mainly compared to the findings of Rajan & Zingales (1995), Antoniou et al. (2008) and de Jong et al. (2008), as these are considered studies of high relevancy to this dissertation. However, due to the previous researchers' utilisation of data samples from 1987-1991, 1989-2000 and 1997-2001 respectively, deviations from my sample are expected.

Table 6 presents the mean balance sheet of all firms contained in the sample from their respective countries in the year 2019. The table only displays the main items of interest, where the omitted items are either excluded due to the lack of consistency or are included in the item denoted 'other' in each respective section. To begin with, one can immediately observe the large variations in the items related to current assets. Specifically, the British-American countries[22] have proportionally lower current assets in their balance sheet than their continental European and Japanese counterparts. This is likely due to variations in factors such as technological developments, risk tolerance, management practices and business model composition, considering how the British-American countries are often thought to be at the forefront of innovation and management. Interestingly, when compared to Rajan & Zingales (1995), one will observe a significant increase in the item cash & short-term investments, a substantial decrease in inventory and accounts receivable, and ultimately a decrease in total current assets across all countries. These developments can be traced to factors such as advancements in technology allowing for more efficiently managed inventory and accounts receivable, the shift towards service-based economies, and the increased focus on efficiently managing marketable securities and minimising the resources tied up to accounts receivable and inventory. Lastly, one may also take notice of the significant variations in the composition of current assets in continental Europe and Japan. For instance, while Japan has proportionally larger cash & short-term investments and accounts receivable, continental Europe commonly has a higher inventory.

[22] The British-American countries refers to Canada, the United Kingdom, and the United States.

Table 6 – Mean Balance Sheets for 2019

	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Cash & Short-term Investments	0.08	0.20	0.14	0.15	0.21	0.12	0.15
Accounts Receivable	0.09	0.16	0.14	0.20	0.21	0.15	0.12
Inventory	0.11	0.15	0.17	0.13	0.12	0.12	0.15
Other Current Assets	0.01	0.03	0.02	0.01	0.02	0.02	0.01
Total Current Assets	**0.29**	**0.54**	**0.47**	**0.49**	**0.56**	**0.41**	**0.43**
Tangible Assets	0.47	0.24	0.27	0.25	0.27	0.29	0.31
Intangible Assets	0.15	0.09	0.09	0.12	0.03	0.14	0.12
Long-Term Investments	0.07	0.11	0.13	0.10	0.09	0.12	0.10
Other Non-Current Assets	0.02	0.02	0.04	0.05	0.05	0.04	0.04
Total Non-Current Assets	**0.71**	**0.46**	**0.53**	**0.51**	**0.44**	**0.59**	**0.57**
Total Assets	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Accounts Payable	0.08	0.14	0.09	0.17	0.13	0.10	0.07
Current Debt	0.05	0.06	0.07	0.08	0.06	0.05	0.04
Accrued Expenses	0.04	0.07	0.03	0.04	0.02	0.07	0.05
Other Current Liabilities	0.04	0.10	0.10	0.09	0.09	0.07	0.05
Total Current Liabilities	**0.20**	**0.36**	**0.29**	**0.38**	**0.30**	**0.28**	**0.21**
Long-term Debt	0.19	0.19	0.23	0.14	0.21	0.19	0.21
Deferred Taxes	0.04	0.02	0.02	0.02	0.02	0.03	0.04
Other Non-Current Liabilities	0.09	0.06	0.10	0.08	0.07	0.08	0.09
Total Non-Current Liabilities	**0.32**	**0.27**	**0.35**	**0.24**	**0.30**	**0.30**	**0.34**
Total Liabilities	**0.52**	**0.63**	**0.64**	**0.62**	**0.59**	**0.58**	**0.55**
Shareholder Equity	**0.48**	**0.37**	**0.36**	**0.38**	**0.41**	**0.42**	**0.45**
Liabilities & Equity	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**

Note: The values are calculated as a fraction of the book value of total assets and represent the mean values of all firms in the respective countries of the year 2019. Furthermore, the numbers represent values unadjusted for accounting differences. For more information, see Chapter 4.2.

The British-American firms are observed to have proportionally higher fixed assets, in which tangible assets and intangible assets constitute the majority. Canadian firms are observed to have significantly more fixed assets than firms in any other country, likely due to a business and industry culture that promotes fixed assets. Comparatively, Japanese firms have strikingly low intangible assets mainly due to the Japanese GAAP's preference for tangible assets rather than intangible assets, the Japanese's larger emphasis on research and development, and strong government protection of intellectual property rights (Markle & Shackelford, 2012). Expectantly, when compared to Rajan & Zingales (1995), Intangible assets have increased substantially, thereby demonstrating the rising importance of intellectual property and the emergence of industries less dependent on fixed assets, whereas tangible assets have decreased, indicating a complete shift in the composition of assets. Furthermore, long-term

investments and other non-current assets are observed to be moderately consistent across all countries and have faced a reasonable and minor increase since 1991 respectively.

Furthermore, by examining current liabilities, one can observe the accounts payable and current debt of British-American firms are slightly lower than that of the other G7 countries. This is likely due to factors such as more favourable supplier payment terms, more efficient inventory management, and shorter operating cycles than firms in continental Europe. Similarly, I also find the continental European and Japanese firms to commonly have higher levels of other current liabilities. A possible explanation involves firms in these regions having higher social security contributions, higher legal liabilities related to higher levels of liability insurance and product liability, higher tax liabilities due to higher tax rates and more complex tax law, and stronger workforce protection regulations. However, this does not explain Germany's otherwise low current liabilities. Instead, the comparatively low current liabilities reflect the German firms' prioritisation of long-term financial stability, strong corporate governance with strict reporting requirements and structures with a higher degree managers with a personal investment in the firm, and conservative cash flow management. Hence, their reliance on short-term financing is reduced. In comparison, Rajan & Zingales (1995) observed higher levels of current debt in all items.

Lastly, non-current liabilities appear relatively consistent across all the G7 countries. However, one may notice Italian firms' proportionally lower dependency on long-term debt. This may be due to various reasons. For instance, Italy's regulatory environment is more restrictive towards long-term debt, as well as how Italian firms are more reliant on inter-firm loans as a source of financing. Similarly, one may observe Germany's comparatively high levels of non-current debt as a direct consequence of the previously noted unique corporate structures and long-term financial approach. Additionally, we do not observe any evidence of British-American firms having higher levels of liabilities to shield against aggressive takeover markets. In comparison, Rajan & Zingales (1995) observed higher levels of long-term debt in these countries. Furthermore, Rajan & Zingales (1995) observed similar results on total liabilities, where the American and Canadian firms employed higher levels of non-current liabilities, specifically long-term debt, while European and Japanese firms used higher levels of current liabilities. Comparatively, European, and Japanese firms have since 1991 seen a moderate increase in the employment of long-term debt, thereby shifting the composition to becoming what was previously only observed in British-American firms. Lastly, as British-American firms have lower levels of total liabilities than their G7 peers, they naturally utilise more equity financing. Similarly, Rajan & Zingales (1995) observed British and Canadian firms utilised significantly more equity financing than any other G7 firms. However, since 1991, all firms across the G7 have seen increases in the utilisation of shareholder equity, stretching from a mean of 0,34 in 1991 to 0,42 in 2019.

To summarise, *Table 6* presents cross-country variations in balance sheet items related to current and fixed assets, and current and non-current liabilities. British-American firms are observed to hold proportionally less current assets and more fixed assets than their Japanese and continental European peers. Particularly, Canadian firms hold significantly more non-current assets than firms of any other country. Furthermore, intangible assets have increased substantially when compared to Rajan & Zingales' (1995) results from 1991, reflecting the rising importance of industries less dependent on fixed assets. British-American firms are also observed to have generally lower levels of accounts payable and current debt. Similarly, German, and Japanese firms have relatively low current liabilities with a larger emphasis on financing through long-term debt. Non-current liabilities appear moderately consistent across all countries. Finally, the utilisation of shareholder equity, while observed to hold a more significant role in British-American firms than firms of other G7 countries, has seen increases since 1991 (Rajan & Zingales, 1995).

Table 7 presents the mean and median values of the dependent and independent variables for the firms of the G7 countries included in the sample. The table reveals, on average, firms from the United States and Japan have the highest book value debt ratios, whereas France and Japan have the highest debt levels when using market values. On the other end, Italy and the United Kingdom appear to borrow the least, implying the importance of financing through equity rather than debt. This supports the idea outlined by Antoniou et al. (2008) of countries with strong main-bank relations, such as Japan, France, and Germany, have proportionally higher and consistent debt levels. Furthermore, they argue fluctuating market values corresponding to variations in the capital markets point to firms' dependency on financing through debt and equity markets. Such variation is particularly observed in the United States, the United Kingdom and Canada. Additionally, they also argue high variations in debt levels may be explained by aggressive takeover markets leading to increases in firm debt levels to protect against hostile takeovers. Next, one may observe how firms in countries perceived to have well-developed and complex financial markets tend to have significant variations between the market and book value of the debt ratio. Particularly, when compared to the results of Antoniou et al. (2008), where firms primarily had a lower market value of leverage than the book value, it appears most countries had an inverse development, signifying a move towards more market-based financial systems. Lastly, based on the observations of Antoniou et al. (2008), there has been little development in the market value of leverage in Germany and Japan since 2001 despite the significant growth in book value. This suggests that Japanese and German firms raise more debt than equity, further emphasising the strong lender structure in Japan and Germany.

Table 7 - Summary Statistics of Independent and Dependent Variables

	Canada		France		Germany		Italy		Japan		United Kingdom		United States	
	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean
Dependent Variables														
D2C (B)	0.3	0.31	0.35	0.36	0.29	0.31	0.21	0.24	0.36	0.37	0.22	0.26	0.35	0.37
D2C (M)	0.24	0.28	0.33	0.34	0.2	0.26	0.21	0.25	0.34	0.46	0.14	0.18	0.23	0.26
Tier 1														
Firm-level Factors														
TAN	0.27	0.34	0.12	0.17	0.18	0.22	0.15	0.19	0.26	0.27	0.15	0.21	0.15	0.23
M2B	1.19	1.35	1.04	1.26	1.23	1.5	1.04	1.17	0.96	1.1	1.42	1.73	1.4	1.65
PRO	0.11	0.1	0.08	0.07	0.11	0.11	0.07	0.07	0.08	0.09	0.11	0.11	0.11	0.09
NDTS	0.02	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.01	0.01	0.02	0.03	0.03	0.03
LIQ	1.83	2.15	1.41	1.66	1.75	2.17	1.23	1.46	1.79	2.11	1.41	1.76	1.98	2.4
SIZE	19.6	19.5	19.3	19.5	19	19.2	19.4	19.4	20.4	20.4	18.8	18.9	20.6	20.5
Tier 2														
Country-level Factors														
EGRO	1.9	2.06	1.1	1.29	1.1	1.46	0.9	1.07	0.8	1.01	1.8	2.07	2.3	2.3
INFL	1.48	1.32	0.99	0.87	1.88	1.78	0.94	1.04	0.42	0.48	1.79	1.67	1.79	1.71
TS	0.6	0.61	1.11	1.34	0.56	0.77	2.28	2.95	0.1	0.21	0.94	1.1	1.43	1.32
CTR	26.5	26.4	33.3	33	29.7	29.8	31.4	28.1	30.9	33.4	20	20.4	35	30.8
SMC	0.1	0.07	0.11	0.12	0.03	0.09	0.13	0.08	0.1	0.1	0	0.07	0.13	0.15
Firm-level Factors														
Z	1.72	1.69	1.87	1.73	2.31	2.37	1.32	1.41	2.38	2.45	2.27	2.29	2.15	2.08
RV	0.15	0.23	0.11	0.18	0.12	0.2	0.13	0.29	0.09	0.12	0.15	0.23	0.16	0.23
AGE	2.89	2.79	3.33	3.34	2.89	3.07	3.83	3.69	4.21	3.99	3.05	3.17	3.09	3.15
DIV	0.16	0.26	0.09	0.17	0.15	0.22	0.08	0.15	0.17	0.20	0.18	0.24	0.11	0.16
PREV	0.30	0.38	0.34	0.29	0.29	0.31	0.35	0.37	0.21	0.25	0.23	0.29	0.34	0.37
INDU	0.29	0.31	0.34	0.32	0.28	0.3	0.34	0.36	0.18	0.22	0.21	0.23	0.36	0.35
N	706		1367		1388		715		3896		1771		1024	

Note: All variables are explained in Chapters 4.5 and 4.6, and an overview is provided in Appendix 10.3. All firm-level variables are winsorized at a 1% level on the upper and lower tail-end. The values utilise adjusted assets, liabilities, and equity.

TAN=Tangibility, M2B=Market-to-Book ratio, SIZE=Size, PRO=Profitability, LIQ=Liquidity, NDTS=Non-Debt Tax-Shield, EGRO=Economic Growth, INFL=Inflation, TS=Term Spread, CTR=Corporate Tax Rate, SMC=Stock Market Conditions, Z=Altman's Z-score (Probability of bankruptcy), DIV=Dividend Pay-out Ratio, RV=Revenue Volatility, AGE=Age, PREV=Previous Leverage Ratio, INDU=Industry Median Leverage

The mean TAN multiple appears to vary significantly between countries. Particularly, Canada and Japan have comparatively higher mean TAN than their peers. This is in line with previous research (Antoniou et al., 2008; de Jong et al., 2008), as Canadian and Japanese firms commonly prioritise more tangible assets over intangible or short-term assets. Antoniou et al. (2008) and de Jong et al. (2008)

also observed fixed assets to have a more prominent role in firms across all countries than what is observed in *Table 7*. Similarly, M2B is significantly reduced across all countries when compared to the results of Antoniou et al. (2008) and de Jong et al. (2008). This is likely due to slower economic growth, changes in institutional and personal investors' risk preferences as investors are less willing to pay high premiums for firms with uncertain futures, and increased competition leading to smaller profit margins and thereby lower valuations. One may also observe the M2B to be larger in countries more reliant on capital markets such as the United States and the United Kingdom. On the other hand, PRO appear relatively constant across all countries. However, Italy, Japan and France have been subject to lower economic growth relative to their G7 peers, which is reflected in their average PRO. Interestingly, Antoniou et al. (2008) and de Jong et al. (2008) observed higher levels of PRO in France and Italy, and lower levels in Canada, Germany, the United Kingdom, and the United States, possibly indicating comparatively higher recent economic growth and development in the latter group. Similarly, NDTS are relatively constant across all countries except for Japan. This is in line with Antoniou et al.'s (2008) observations. Additionally, since 2001, it appears firms across the G7 utilise non-debt tax shields less. This progression is likely due to, amongst other reasons, the development of more complex and diverse financial markets, thereby increasing the accessibility of cheaper debt, and the downward trend in corporate taxation. Next, Italian, French and British firms have comparatively low LIQ multiples than firms of other G7 countries. This is also present in de Jong et al.'s (2008) results from 2001 despite the overall downward development in LIQ across all countries. While the overall downward trend is likely due to business innovation and economic conditions, the comparatively low LIQ of Italian, French and British firms may be a result of differences in regulatory environments, business model trends, and decreasing economic growth. Lastly, I find the American and Japanese samples to contain larger firms than other G7 samples, which remain comparatively constant. Additionally, the SIZE multiples contain far less skewness than most other variables included as the reported median and mean are in most cases practically identical. Comparatively, Antoniou et al. (2008) observe Japanese and French firms to have the largest SIZE multiples. The comparison also indicates significant growth in SIZE across all countries. Specifically, the average Japanese firm included in Antoniou et al.'s (2008) study equalled the natural logarithm of 18.3, while equalling 20.4 in 2019[23].

Table 7 indicates the United Kingdom, the United States, and Canada underwent high economic growth and inflation relative to most of continental Europe and Japan. Furthermore, the difference between the mean and median indicates these movements were quite constant throughout the sample period.

[23] Despite this study following a similar approach to collecting sample to Antoniou et al. (2008), one should keep in mind sample differences are likely and values not presented as ratios might therefore be difficult to compare to previous research.

On the other hand, TS are relatively low and constant across the G7 except for Italy. This implies investors across the G7, except for Italy, expect little economic and political changes in the near future. Italy's high TS, however, reflect Italian investors' beliefs of imminent economic shifts. Next, SMC is the highest in the United States and the lowest in the United Kingdom. However, the high levels of skewness observed in the United Kingdom, Germany and Italy indicates their stock markets experience periods of significant growth but also periods of substantial loss, whereas Japan, France and the United States instead experienced stable growth.

The variable Z implies firms in the United States, the United Kingdom, Japan and Germany have a lower probability of bankruptcy than French, Canadian and Italian firms. Considering how the latter group has been subject to comparatively weak economic conditions, market growth, and regulatory environments, I find the statistics to be reasonable. Next, when examining RV one may observe the substantial skewness. This indicates a large portion of the firms in the sample have reasonable revenue volatility, whereas a smaller portion has exceptionally high revenue volatility, thereby increasing the mean. Despite this, I find British-American firms to have comparatively high medians of RV, likely due to, but not limited to, differences in business culture, and market and economic conditions. Continuing, Japan and Italy are observed to have the oldest firms in the sample. However, these countries are well-known for their cultural emphasis on tradition, likely contributing to the longevity of firms, whereas Germany and France have gone through significant economic, cultural, and political changes, thereby contributing to the turnover of older firms despite Germany and France being recognised for having small, family-owned firms. On the other hand, DIV is relatively varied across all countries, with the British, Canadian, Japanese, and German firms paying the most dividends. In comparison to Antoniou et al.'s (2008) results, dividends are observed to, on average, have reduced among British and American firms, while increasing in all other G7 countries. Lastly, both PREV and INDU are observed to follow the dependent variables quite closely, indicating most firms across the G7 value previous leverage ratios and the industry median leverage highly when determining future leverage.

In summary, *Table 7* reveals that American and Japanese firms have the highest ratios of leverage when using book values, while French and Japanese firms have the highest ratios when using market values. On the other hand, Italian and British firms appear less dependent on debt financing with comparatively low leverage ratios. Canadian and Japanese firms have higher levels of tangibility and liquidity, whereas profitability and non-debt tax shields appear relatively constant across all countries. Market-to-book ratios are observed to be higher in the more market-based economies such as the United States and Canada. While the British-American countries are observed to have the highest levels of economic and capital market growth, British-American firms have also experienced higher inflation levels and exhibit higher revenue volatility than most of their continental European and Japanese peers.

Term spread appears highest in Italy, suggesting Italian investors' belief in future economic instability. German and Japanese firms have, on average, the highest levels of Altman's Z-score, implying German and Japanese firms exhibit a lower probability of bankruptcy than most of their G7 peers. Furthermore, Japanese firms also appear to be the most mature firms measured by age. Lastly, previous leverage ratios and the industry median leverage is observed to largely follow the respective countries' debt-to-capital levels, suggesting their importance in determining capital structure is constant across the G7.

6.2 Estimation Results

In the following sub-section, the regression results are presented and discussed. First, the estimation results of Tier 1 explanatory variables are examined and the estimates' implications relative to the book and market values of Debt-to-capital are discussed. Furthermore, rather than examining and discussing each country separately, I will instead outline patterns across countries and explain major cross-country differences. Afterwards, the Tier 2 variables' estimation results are introduced and discussed. As previously noted, the regressions are estimated utilising the fixed effects estimation method, as well as robust standard errors to compensate for heteroskedasticity and serial correlation. Additionally, a summary of the significant capital structure determinants is found in *Appendix 10.6*.

Regression Results of Tier 1 Explanatory Variables

Table 8 presents the estimation results from the regression model using the book value of debt-to-capital as the dependent variable and only containing Tier 1 explanatory variables. The estimated model has weak to moderate explanatory power given adjusted R^2 ranging from .124 to .24. Furthermore, the model's F-statistic, ranging from 4.43 to 17.90, indicates the model's overall level of significance to be adequate.

Table 8 - Regression Results for Tier 1 Variables (Book Value)

	Debt-to-Capital (Book Value)						
	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Tier 1							
Firm-level Factors							
TAN	.531*	.369***	.165*	.324**	.174*	.284**	.147
M2B	-.005	-.04*	-.004	.039	-.003	.008	.02
SIZE	.096***	.08***	.08***	.118***	.043***	.072*	.076***
PRO	-.24*	-.345**	-.273**	-.698**	-.836***	-.127	-.325*
LIQ	-.019**	-.051***	-.024***	-.047***	-.055***	-.041***	-.042***
NDTS	1.758*	.077	.188	.612	1.308**	1.015*	.039
Intercept	-1.727***	-1.258***	-1.173***	-1.852***	-.505	.024	-1.043**
N	706	1367	1388	715	3896	1771	1024
Adj R^2	.24	.161	.16	.146	.241	.157	.124
F-Stat	5.78***	13.54***	17.90***	11.49***	36.11***	4.43***	12.35***

TAN=Tangibility, M2B=Market-to-Book ratio, SIZE=Size, PRO=Profitability, LIQ=Liquidity, NDTS=Non-Debt Tax-Shield
**** - Statistical significance at 1% level, ** - Statistical significance at 5% level, * - Statistical significance at 10% level*

To begin with, asset tangibility (TAN) is observed to be significantly and positively related to the book value of debt-to-capital. The rational idea is how tangible assets work as collateral for creditors, thereby lowering the financial distress costs. However, this effect is expected to decrease in countries using bank-based financial system structures, such as Germany and Japan, as Berger & Udell (1994) argue the close relationship between the firm and its creditors substitutes the need for physical collateral by instead providing the creditors with additional information through closer monitoring. Hence why the coefficient of tangibility in Germany and Japan is lower than their peers. Antoniou et al. (2008) also suggest that bank-oriented economies have less strict institutional restrictions on granting unsecured loans. Germany and Japan's coefficients of .165 and .174 imply a one percentage point increase in fixed assets relative to total assets will, on average, increase the debt-to-capital ratio by .00165 and .00174 respectively. Comparatively, Canadian, French, Italian, and British lenders have higher dependencies on physical collateral due to, amongst other reasons, a stricter regulatory framework on granting loans, where the role of collateral is crucial in raising debt, and more industries which are reliant on fixed assets. These findings support the static trade-off theory and are in line with the previously discussed empirical studies.

The market-to-book ratio (M2B) does not appear to impact capital structure when using the book value of debt-to-capital as the dependent variable. The model did, however, produce a negative coefficient of .04 at a significance level of 10% for French firms. This polarity can be explained through all three

capital structure theories. The market-to-book ratio could indicate expected profitability and future growth opportunities, suggesting a negative relationship following the pecking order theory and trade-off theory respectively. Additionally, according to the market timing theory, a negative polarity could imply management's attempt to time the market to acquire additional funding through equity issuance.

Next, size (SIZE) is observed to be positively related to the book value of debt-to-capital and is significant across each G7 country at levels of 1% and 10%. According to the trade-off theory, the relationship could be explained by how large firms commonly are more diversified and robust and are therefore exposed to lower risks of financial distress. Thus, increasing the accessibility of relatively inexpensive debt. One may also observe the comparatively low coefficient of firm size among Japanese firms. Rajan & Zingales (1995) suggests how Japanese firms are commonly tied to large banks, thereby lowering risks of financial distress as the banks may arrange corporate rescues if needed. In comparison, large Italian firms are observed to have a stronger dependence on debt than their G7 peers. La Rocca et al. (2011) argue this is likely a result of the Italian tax code incentivising the use of debt, how Italian firms strongly emphasise the preservation of control and ownership, and lastly a comparatively underdeveloped equity market. The Italian coefficient can be interpreted as a 1% increase in firm assets will increase the debt-to-capital with 0,00102 points. These findings are in accordance with Frank & Goyal (2003; 2009), La Rocca et al. (2011), Rajan & Zingales (1995), Antoniou et al. (2002; 2008), and de Jong et al. (2008).

Profitability (PRO), measured as EBITDA to total assets, is found to be negatively related to the book value of leverage at significance levels of 1%, 5%, and 10%. The pecking order theory argues the negative polarity is a result of how increased accessibility and utilisation of retained earnings naturally follow increased firm profitability. Interestingly, Italian and Japanese firms have comparatively high coefficients. De Jong et al. (2008) suggest that Japanese firms have strong cultural values resulting in conservative, long-term financial practices, and strict regulatory standards, ultimately leading to lower debt levels. La Rocca et al (2011) argue that Italian firms' reliance on retained earnings originates from a culture of prioritising the maintenance of control, an unstable economy, and few comparatively cheap sources of financing. The Italian and Japanese coefficients can be interpreted as per 1% increase in profitability relative to total assets the debt-to-capital levels decrease by .00698 and .00836 respectively. When compared to previous empirical research (Antonioue et al., 2002; 2008), a steady increase in reliance on retained earnings is observed across all countries. Lastly, the findings of negative coefficient polarity are also observed in all the previously discussed empirical studies.

Liquidity (LIQ) is negatively related to leverage at significance levels of 5% and 1% across all countries. Specifically, an increase of one percentage point in total current assets relative to total current liabilities is associated with a reduction of .00041 and .00042 units in debt-to-capital for the

United Kingdom and the United States respectively. The pecking order theory suggests this is due to firms with easily convertible assets will utilise the resources acquired from converting such assets to fund new investments rather than issuing debt. Additionally, this observation is per previous research (Ozkan, 2001; Antoniou et al., 2002; de Jong et al., 2008). One may observe the comparatively low coefficients representing Canadian and German firms. While the Canadian coefficient could be explained by Canadian firms' higher levels of long-term assets and investments, and a regulatory system favouring creditors, thereby discouraging the use of debt, the German coefficient may result from Germany's strong legal framework for insolvency proceedings, conservative and long-term financial practices, and German firms' traditional reliance on funding through banks.

Lastly, non-debt tax shields (NDTS), measured as amortization and depreciation as a ratio of total assets, are positively related to leverage at significance levels of 5% and 10%. This observation opposes the trade-off theory, arguing firms with large non-debt tax shields will utilise less interest-bearing debt to benefit from tax shields. Nevertheless, the positive polarity is supported by empirical literature (Antoniou et al., 2002; Antoniou et al., 2008; Frank & Goyal, 2009). Antoniou et al. (2008) argue "[…] *a positive effect is possible when the depreciation of tangible assets is the major component of non-debt tax shields*" (p. 80). This aligns with the observations presented in *Table 6 –Mean Balance Sheets of 2019*, as the tangible assets constituted significant portions of the total assets. This was especially the case for Canadian and Japanese firms, which is reflected in their coefficients of 1.758 and 1.308 respectively.

Table 9 provides the FE estimation results for when the market value of debt-to-capital is utilised in combination with the Tier 1 variables. In comparison to when the book value of leverage was used, the model has moderate explanatory power with adjusted R^2 varying between .19 and .357. The model also implies greater overall significance in the samples including British and Canadian firms, with a reported F-statistic of 15.46 and 9.90 respectively.

Table 9 – Regression Results for Tier 1 Variables (Market Value)

	Debt-to-Capital (Market Value)						
	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Tier 1							
Firm-level Factors							
TAN	.356***	.354***	.153*	.378***	.204***	.296***	.004
M2B	-.107***	-.08***	-.062***	-.152***	-.096***	-.062***	-.053***
SIZE	.086***	.062***	.053***	.12***	.018	.083*	.089***
PRO	-.134	-.309***	-.205**	-.586***	-.719***	-.24**	-.408***
LIQ	-.009	-.04***	-.022***	-.048***	-.056***	-.018**	-.027***
NDTS	1.893***	.785**	.046	.398	1.392**	.741*	.473
Intercept	-1.418***	-.761**	-.629**	-1.713***	.124	-.19	-1.368***
N	706	1367	1388	715	3896	1771	1024
Adj R^2	.342	.19	.199	.357	.325	.224	.29
F-Stat	9.90***	10.34***	19.03***	19.71***	30.27***	15.46***	11.17***

TAN=Tangibility, M2B=Market-to-Book ratio, SIZE=Size, PRO=Profitability, LIQ=Liquidity, NDTS=Non-Debt Tax-Shield.
**** - Statistical significance at 1% level, ** - Statistical significance at 5% level, * - Statistical significance at 10% level*

Even though the estimation results of *Table 9* remain principally alike to those presented in *Table 8*, there are some key differences. For one, while the previously observed pattern in tangibility remains, where British, Canadian, French, and Italian firms rely more upon fixed assets, the coefficients' significance has improved to levels of 1%. Similarly, this is also observed between the coefficients of non-debt tax shields. An explanation could be how the economic value of assets and liabilities may not be fully captured by the book value and is better recognised using market values. Another argument could be how market values better reflect firms' abilities to generate future tax shields, thus impacting non-debt tax shields' ability to predict future debt levels. The latter argument also helps explain the increase of significance in the coefficient of profitability, as market values may better predict a firm's ability to generate future profits. However, the estimation model using the market value of debt-to-capital is also observed to produce less significant coefficients of liquidity and size. Despite the coefficients mostly remaining similar to the results reported using the book value of leverage, the decrease in significance may indicate how market values do not reflect the impact of firm size and asset liquidity equally well to the book values.

The market-to-book ratio is significantly different where it is observed to be negatively related to the market value of debt-to-capital at a significance level of 1% across firms in all G7 countries. As previously noted, this could be explained by the trade-off theory, the pecking order theory and the market timing theory, and is in accordance with the findings of Rajan & Zingales (1995), Antoniou et

al. (2002; 2008) and de Jong et al. (2008). One can observe the coefficients to be comparatively small among firms in the United States and the United Kingdom. Antoniou et al. (2008) suggest this is due to the "[…] *regulations and provisions pertaining to investors' protection and corporate governance*" (p.79) commonly observed in heavily market-based countries. Another explanation could revolve around difficulties in accurately and substantially timing highly complex and sophisticated capital markets. Investors of such markets are likely to produce fewer valuation errors, consequentially producing fewer opportunities for managers to exploit investors' miscalculations. The latter argument may also help explain the positive development of market-to-book ratios across all G7 members when compared to the results of Rajan & Zingales (1995) and Antoniou et al. (2008), as the capital markets across the G7 have significantly improved and become more complex since 1991 and 2001. Interestingly, German firms follow a similar pattern to American and British firms, with a market-to-book ratio coefficient of -.062. This could be explained by Germany having a comparatively underdeveloped equity market, a strong culture of financing through an intricate bank market and retaining control by not issuing equity despite the additional funding of timing the market, lower market volatility, and lower expectations of growth (Rajan & Zingales, 1995; Antoniou et al., 2008; de Jong et al., 2008).

In summary, the regression results indicate a positive relationship between leverage and tangibility and size, while profitability and liquidity are observed to be negatively related to leverage. These observations are significant in firms across most G7 members when either the book value or market value of leverage is utilised as the dependent variable. On the other hand, the market-to-book ratio is only observed to be significant across all G7 members when the market value of debt-to-capital is used. Lastly, non-debt tax shields are only observed to be a significant determinant of capital structure in Canada, France, Japan and the United States regardless of the leverage measure utilised.

Regression Results of Tier 1 and Tier 2 Explanatory Variables

The Tier 2 variables are of interest for multiple reasons. For one, if a new explanatory variable in some way affects one of the Tier 1 variables' coefficient or significance, it is interesting. Secondly, if a new variable in some way accounts for additional, previously unexplained variation, it may add value to the analysis. Hence, *Table 10* presents the regression estimation results for Tier 1 and Tier 2 explanatory variables in relation to the book value of debt-to-capital. The model yields moderate explanatory power with an adjusted R^2 between .198 and .417, and statistically significant F-statistics with a minimum value of 15.59.

Table 10 - Regression Results for Tier 1 + Tier 2 Variables (Book Value)

	Debt-to-Capital (Book Value)						
	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Tier 1							
Firm-level Factors							
TAN	.381*	.350***	-.002	.248*	.149*	.212*	.019
M2B	-.096**	-.097***	-.086***	-.214***	-.102***	-.082**	-.055***
SIZE	.083***	.088***	.083***	.096***	.028***	-.006	.053***
PRO	-.316***	-.382***	-.267***	-.557***	-.412*	-.341***	-.329**
LIQ	-.011**	-.02***	-.008***	.001	-.022***	-.017**	-.015**
NDTS	.043	.904***	.549***	-.344	.675**	.033	-.497
Tier 2							
Country-level Factors							
EGRO	.033	0.0001	.003	.001	-0.0001	-.056	.009
INFL	-.033	.007	.040***	.035	-.001	-.014	.007
TS	.02	.004	-.017**	.002	.073***	.047*	-.015
CTR	-.151***	-.004	-.164***	-0.00002	-.004***	-.005	.001
SMC	.069	.023	-.027**	.024	.02***	.056	-.07
Firm-level Factors							
Z	-.088***	-.114***	-.126***	-.236***	-.139***	-.108**	-.078***
DIV	-.001	-.001	-.018*	-.011	-.004	-.022***	-.001
RV	-.007	.028	-.035**	.044**	.007	-.009	.033**
AGE	.039	-.057	.021	-.048	-.006	.161***	.001
PREV	.130*	.159***	.080	.052	.081	.361***	.41***
INDU	.326***	.121***	.283***	.129***	.17***	.144***	.366***
Intercept	2.561*	-1.126*	3.612***	-1.33**	.057	-.072	-.884
N	706	1367	1388	715	3896	1771	1024
Adj R^2	.417	.210	.278	.357	.316	.198	.238
F-Stat	28.53***	34.01***	44.39***	32.74***	101.02***	24.72***	15.59***

TAN=Tangibility, M2B=Market-to-Book ratio, SIZE=Size, PRO=Profitability, LIQ=Liquidity, NDTS=Non-Debt Tax-Shield, EGRO=Economic Growth, INFL=Inflation, TS=Term Spread, CTR=Corporate Tax Rate, SMC=Stock Market Conditions, Z=Altman's Z-score (Probability of bankruptcy), DIV=Dividend Pay-out Ratio, RV=Revenue Volatility, AGE=Age, PREV=Previous Leverage Ratio, INDU=Industry Median Leverage

**** - Statistical significance at 1% level, ** - Statistical significance at 5% level, * - Statistical significance at 10% level*

After incorporating the Tier 2 explanatory variables, one may observe various changes in the Tier 1 variables relative to what was previously observed. For one, the coefficients of tangibility and liquidity have diminished in strength and significance. The significance of the market-to-book, however, has strongly increased for predicting the book value of debt-to-capital. Considering how the market-to-

book ratio may serve as a proxy for future growth opportunities, the new-found significance may therefore originate from the inclusion of other growth-related variables such as economic growth (EGRO) and stock market conditions (SMC). After including the Tier 2 variables, the Tier 1 variables size, profitability and non-debt tax shields underwent slight reductions in coefficients while the level of significance largely remain the same.

The macroeconomic explanatory variables are observed to provide results of varying degrees of significance. To begin with, there is no significant relationship observed between economic growth (EGRO) and the book value of debt-to-capital. However, this may be due to the book value of debt-to-capital not ideally reflecting economic growth, or how the inclusion of other growth-related variables such as stock market conditions (SMC) may distort economic growth's effects on capital structure. Furthermore, observing economic growth as a non-significant variable is not per empirical research and the theoretical framework, where the variable was primarily expected to be positively related to capital composition. Similarly, inflation (INFL) is observed to be a primarily insignificant determinant of capital compositions except for French firms. Here, inflation is positively related to leverage, where a one percentage point increase in inflation will increase debt levels relative to capital at an expected level of .04 points. This is in accordance with the market timing theory, as management may attempt to exploit the high inflation to collect comparatively cheap debt funding. On the other hand, term spread (TS) provides inconsistent results. While German firms decrease their debt levels when the term spread increases, British and Japanese firms choose to increase their leverage. A possible explanation could be how German firms are more risk-averse in their borrowing practices, they prefer lower levels of debt in economic downturns, the German debt market typically offers higher yields on long-term debt obligations, and how the regulatory environment leads to more conservative financial practices. British and Japanese firms, however, have quite good accessibility to debt, and the national respective banks incentivise firms to issue additional debt during periods of high spreads (Antoniou et al., 2002). Even though empirical research (Antoniou et al., 2002; Frank & Goyal, 2003; Antoniou et al., 2008; Frank & Goyal, 2009) primarily observes a negative relationship, the theoretical framework provides contradicting evidence as the market timing theory implies a negative relationship and the trade-off theory predict both positive and negative coefficients. It is also worth mentioning Antoniou et al. (2008) observed term spread to be negatively and significantly related to leverage across France, Japan, the United Kingdom and the United States, and positively related to debt levels in German firms. Next, the corporate tax rate (CTR) is negatively related to the book value of debt-to-capital at a significance level of 1%, thus contradicting the trade-off theory. The result is primarily in line with previous research (Antoniou et al., 2002; Antoniou et al., 2008; Frank & Goya, 2009). Canadian and German firms have coefficients of -.151 and -.164, implying a one percentage point increase in corporate income tax will decrease debt levels relative to capital by .00151 and .00164 respectively. On the other hand, Japanese firms are substantially less affected by shifts in corporate income tax. This could be

explained by government support of domestic firms through, amongst other reasons, tax breaks and low-interest loans, and the Japanese corporate culture of long-term orientation and social responsibility commitment, making them less likely to engage in tax optimisation and avoidance strategies. Lastly, stock market condition (SMC) is observed to be both positively and negatively related to the book value of debt-to-capital at a significance level of 5% and 10% for German and Japanese firms respectively. While the trade-off theory predicts a positive relationship, previous empirical research (Antoniou et al., 2002; Antoniou et al., 2008; Frank & Goyal, 2009) and the market timing theory forecasts a negative relationship. The negative coefficient observed in German firms may be explained by Germany's favourable regulatory environment and corporate governance, investor confidence, conservative financial policies and investor protection, whereas the Japanese firms' positive coefficient could be explained by factors such as economic uncertainty, limited access to capital markets, lack of shareholder activism, insider domination and comparatively weak corporate governance. Additionally, Antoniou et al. (2008) observed leverage to be significantly and negatively related to stock market conditions in France, Germany, and the United States, while positively related in Japan and the United Kingdom.

The estimation results suggest firm debt levels are negatively related to Altman's Z-score (Z) at a significance level of 1% across all countries. Seeing how the Z-score indicates a higher probability of bankruptcy at lower Z-scores, the coefficient Z can be interpreted as when the Z-score increase, thereby indicating a decreasing probability of bankruptcy, firms will decrease their debt levels. Specifically, when the Z-score increases by .1 units, Canadian and French firms will, on average, decrease their debt levels relative to equity by .0088 and .0114 units. While contradicting the trade-off theory, this is in line with the pecking order theory and the observations of Frank & Goyal (2003). One may observe Italian firms reduce their debt levels following lower probabilities of bankruptcy at a significantly higher level than their peers. This may result from Italy's institutional environment encouraging firms to reduce their debt levels when financially viable, cultural differences related to risk aversion and the avoidance of excessive debt, a slightly stricter insolvency environment, and reducing debt to appear more attractive to future investors and lenders, especially in light of Italy's poor economic stability during the analysed timeframe. Among the remaining countries, firms of more market-based economies like the United States, Canada and the United Kingdom are comparatively less affected by shifts in the Z-score. A possible explanation may be the increased financial flexibility through more developed and diversified capital markets, market expectations regarding optimal debt levels and how these are adjusted following shifts in the probability of financial distress, and management's experience from previous tough economic cycles. These arguments may also explain the coefficients of Japanese, German and French firms, considering the modern developments in their capital markets in comparison to Italy's and previous economic cycles.

Dividend pay-out ratios (DIV) are negatively associated with the book value of debt-to-capital and are significant at a 10% and 1% level for Germany and the United Kingdom respectively. The coefficients of -.018 and -.022 for German and British firms respectively, are associated with a decrease in debt levels relative to capital of .018 and .022 units per one percentage point increase in dividends relative to operating income. The inverse relation between dividends and leverage is supported by the information asymmetry theory, suggesting dividends signal future profitability, resulting in reduced information asymmetry and thereby more favourable conditions of equity financing. Dividend payments also indicate management's confidence in meeting future obligations using retained earnings, thus lowering the need for additional debt funding. Additionally, one may observe dividend pay-outs to be a stronger predictor in British firms than in German firms. This could be explained by factors such as differing corporate cultures and traditions of whether retained earnings are distributed to shareholders or reinvested, tax regimes and investor preferences. Lastly, Antoniou et al. (2008) and Frank & Goyal (2009) observed negative relationships between dividend pay-out and leverage among British and American firms. The estimated model may, therefore, not have captured the entire effect of dividend pay-out on capital structure decisions.

Consistent with Antoniou et al. (2002), revenue volatility (RV) affects capital structure differently depending on the country studied. While Italian and American firms' debt levels are observed to be positively affected by revenue volatility, German firms' leverage is impacted negatively. This difference may result from differing cultures of investments and reliance on debt, investor preferences and risk aversion, ease of access to debt relative to equity, and the difference in the degree of developed capital markets. Additionally, the Italian economy and capital markets are often characterised by high volatility and uncertainty (Koutmos et al., 1994), which decrease investor confidence, thus pressing Italian firms to more heavily rely on debt funding.

Contradicting the results of La Rocca et al. (2011), age (AGE) only appears to significantly affect the capital structure of British firms. The positive coefficient of .161 with a significance level of 1%, can be interpreted as a one per cent increase in age will increase debt levels relative to equity by .00161 units. This finding is per the trade-off theory, suggesting firms demonstrate financial stability as they mature and will consequently utilise cheap debt to benefit from interest tax shields.

Per the trade-off theory and previous empirical research (Antoniou et al., 2002; Antoniou et al., 2008; Frank & Goyal, 2009), I find evidence indicating the current debt-to-capital ratio is positively affected by the previous years' leverage (PREV), thereby supporting a dynamic trade-off theory. Interestingly, the coefficients are small compared to previous research. This may result from controlling for omitted variables. Keeping this caveat in mind, one may observe the coefficients of the United Kingdom and the United States to be higher than their peers. Considering these countries are often recognised for

utilising heavily market-based financial system structures, the difference in coefficients could be explained by capital market maturity and size, ease of access to debt due to the higher availability of credit rating agencies allowing for reductions in information asymmetry, and unique corporate cultures and a higher tolerance for leverage.

Lastly, the median leverage is positively related to the book value debt-to-capital in firms across all G7 members with significance levels of 1%. These observations support the trade-off theory, arguing median industry leverage may act as a benchmark following leverage adjustments, and the market timing theory, which suggests a positive association given the valuations between firms in their respective industries are correlated and in the absence of industry-wide asymmetric mispricing. I also find German, Canadian, and American firms' capital structures to be more affected by shifts in the industry median leverage. This could be due to the comparative ease of access to financing and adjustment of capital structure, high levels of competition leading to firms seeking additional funding to maintain their competitive edge, and relatively stable economies. Such arguments also help understand why firms in the remaining G7 countries are less affected by industry median leverage.

Table 11 presents the results of using the market value of debt-to-capital as the dependent variable, as well as using the Tier 1 and Tier 2 explanatory variables. The estimated models have modest explanatory, with an adjusted R^2 ranging from .312 to .463. Furthermore, the F-statistics are statistically significant with a minimum value of 6.66. In comparison to the regression models presented in *Table 10*, the models using market values have the overall highest explanatory power despite the drop in F-statistics.

Table 11 - Regression Results for Tier 1 + Tier 2 Variables (Market Value)

	Debt-to-Capital (Market Value)						
	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Tier 1							
Firm-level Factors							
TAN	.296**	.313**	.151*	.255**	.121*	.279***	.103
M2B	-.082**	-.071*	-.059*	-.081***	-.005	-.023	-.028
SIZE	.084***	.075***	.07***	.122***	.043*	.015	.071***
PRO	-.129	-.321*	-.216**	-.459*	-.376**	-.026	-.089
LIQ	-.008	-.026*	-.01**	-.025**	-.027***	-.015*	-.009
NDTS	.958*	.348	.423*	.003	.814*	.282	-.003
Tier 2							
Country-level Factors							
EGRO	.054	-.018***	-.01***	-.001	-.003	-.062	.01
INFL	-.055	.048***	.023*	.008	-.001	-.026	.021**
TS	.003	.031***	-.006	.011	.114***	.046	.023***
CTR	-.104*	.006	-.162***	.002	.005***	.007	.001
SMC	.00094	.0009**	.00003	.00029	.00036***	.00081	-.00041
Firm-level Factors							
Z	-.045**	-.077***	-.084***	-.114***	-.104***	-.074**	-.075***
DIV	-.011	-.005	-.019**	-.008	-.002	-.024***	-.023*
RV	.005	.058*	-.028*	.039*	-.010	.008	.064***
AGE	.037	<.001	-.007	-.017	-.055	.211***	.004
PREV	0.01	.02	.221*	.023	.234**	.02	.135
INDU	.259***	.003	.232***	.051	.098*	.12***	.189***
Intercept	1.616	-1.635**	3.682***	-1.786***	.036	-.699	-1.188**
N	706	1367	1388	715	3896	1771	1024
Adj R^2	.419	.312	.382	.463	.436	.345	.378
F-Stat	6.66***	10.63***	14.35***	50.99***	22.97***	16.07***	9.702***

TAN=Tangibility, M2B=Market-to-Book ratio, SIZE=Size, PRO=Profitability, LIQ=Liquidity, NDTS=Non-Debt Tax-Shield, EGRO=Economic Growth, INFL=Inflation, TS=Term Spread, CTR=Corporate Tax Rate, SMC=Stock Market Conditions, Z=Altman's Z-score (Probability of bankruptcy), DIV=Dividend Pay-out Ratio, RV=Revenue Volatility, AGE=Age, PREV=Previous Leverage Ratio, INDU=Industry Median Leverage

**** - Statistical significance at 1% level, ** - Statistical significance at 5% level, * - Statistical significance at 10% level*

As observed in *Table 11*, the Tier 1 variables remain relatively similar to the model in *Table 10* (Book value of leverage and Tier 1 + Tier 2 variables). Size and liquidity remained fairly similar in coefficients and significance, whereas the market-to-book, non-debt tax shields and profitability now infer lower significance. On the other hand, tangibility generally has higher levels of significance while

the coefficients remain reasonably consistent. Furthermore, when compared to *Table 9* (Market value of leverage and Tier 1 Variables), one will observe the significance of nearly all Tier 1 variables drop. This is likely due to the Tier 2 variables more accurately capturing the determining effects of capital structure that would otherwise be misplaced and expressed through the Tier 1 variables.

Interestingly, economic growth appears to negatively affect the market value of debt-to-capital at a significance level of 1% among German and French firms. The coefficients of -.018 and -.01 indicate a one-percentage-point increase in economic growth is associated with a decrease in debt levels relative to the market value of equity of .018 and .01 units for French and German firms respectively. The differing coefficients could be explained by German and French firms' highly dissimilar corporate cultures. The coefficients' polarity conflicts with those previously observed by de Jong et al. (2008) and Frank & Goyal (2009), as well as contradict the trade-off theory. However, the results are in line with both the market timing theory, arguing that firm management is incentivised to collect additional funding through issuing equity, and the pecking order theory, suggesting firms would utilise the retained earnings originating from the economic growth to finance new investments rather than issue debt.

Next, the coefficients of term spread and inflation remain fundamentally the same but are slightly more significant when utilising the market value of debt-to-capital. Particularly, French firms' capital composition is observed to be more sensitive to shifts in expected inflation than German firms, which is likely due to different corporate cultures. Secondly, I also find French and American firms to be positively affected by increases in term spread. Similarly, Canadian and German firms' association with changes in corporate tax rates remain consistent, whereas the coefficient of the Japanese firms has switched polarity. The trade-off theory suggests this indicates Japanese firms increase their debt levels to fully benefit from interest tax shields. However, as previously discussed, the coefficient remains comparatively small due to the government support of domestic firms and the Japanese corporate culture emphasising long-term orientation and social responsibility, consequentially making Japanese firms less likely to engage in tax optimisation strategies. Thirdly, while the model fails to recapture the stock market conditions' effect on German firms' capital structure, find a positive association between stock market conditions and the market value of debt-to-capital in French firms. The coefficient of .0009 with a significance level of 5% can be interpreted as per one percentage point increase in the French MSCI index's annual performance, the French firms will, on average, increase their debt levels by .0009 units relative to the market value of equity. Furthermore, the previously observed relationship between Japanese firms and stock market conditions has remained consistent both in coefficient and significance,

An interesting finding is how Altman's Z-score remain a significantly important determinant of capital structure despite the noteworthy change in coefficients when using the market value of debt-to-capital as the dependent variable. This may be explained by how the market value of assets is subject to significant fluctuations, the true value of the assets may not be reflected in their market value, and how the market value is affected by non-financial factors not represented in the book value. Furthermore, the dividend pay-out ratio appears to better explain the capital structures when market values are utilised. The previously noted pattern of debt in market-based economies being negatively related to dividends at a higher degree remains, and further significant evidence of the inference is presented as American firms will, on average, decrease their debt levels relative to the market value of equity at a level of .023 units when the dividends paid increase by one per cent relative to the operating income.

Consistent with the previous observations, revenue volatility remains positively related to firm leverage. However, it is observed to be a stronger determinant of debt levels when market values are utilised. This could be explained by how equity investors are commonly hesitant towards investments with uncertain or volatile returns. The market value of the firm may therefore fall below its intrinsic value as investors include potential consequences of high revenue volatility in their equity valuations.

Age's effect on capital structure decisions is found to remain mostly alike to when the book value of leverage was utilised. On the other hand, lagged leverage, while remaining positively related to debt levels, is only significant among German and Japanese firms. Furthermore, the coefficients are quite similar, possibly due to Germany and Japan's similar corporate cultures on financial longevity and ease of access to debt. Lastly, the variable industry median leverage has seen a decrease in both significance and coefficient. This shift could be explained by how firms favour utilising book values to analyse their leverage relative to competitors due to better representing specific financial values of interest.

To summarise, the Tier 1 variables remain moderately consistent in effectualness and significance after introducing the Tier 2 variables. Specifically, tangibility, size and non-debt tax shields positively affect debt levels, while the market-to-book ratio, profitability and liquidity negatively impact leverage. Regardless of the leverage measure utilised, these results are reasonably significant. Among the Tier 2 variables, Altman's Z-score and corporate tax rate negatively impact firm leverage, whereas previous leverage ratios and industry median leverage positively affect firm debt levels at reasonable significance levels independent of the leverage measure used. Interestingly, while remaining significant, revenue volatility and term spread are observed to impact capital structure either positively or negatively depending on the firm's nationality. Lastly, the regression results signify economic growth, inflation levels, stock market conditions, dividend pay-out ratio and firm age do not consistently impact debt levels in firms across the G7 members.

7 Conclusion

To enhance our understanding of why and how firms select their financing composition, it is crucial to analyse the determining factors of capital structure in different institutional, legal and economic environments. Hence, the main objective of this dissertation is to investigate the key factors influencing capital structure decisions in firms across the G7 countries. To do so, a data sample containing 1722 publicly traded firms across the G7 members between the years 2012 and 2019 was compiled.

Using the book value of debt-to-capital as the measure of leverage, the regression results indicate *tangibility* (+), *market-to-book ratio* (-), *size* (+), *profitability* (-), *liquidity* (-), *Altman's Z-score* or probability of bankruptcy (-), and *industry median leverage* (+) to be the most reliable determinants of debt levels independent of the firms' nationality. Additionally, *non-debt tax shields* (+), *term spread* (+/-), *corporate taxation rate* (-), *revenue volatility* (+/-), and *lagged leverage* (+) appear to be reasonable predictors of capital structure despite varying levels of significance between countries. These findings are also observed to be reasonably robust using the market value of leverage and are in accordance with previous empirical research. Furthermore, I find the determinants to deviate in effectualness between countries, suggesting capital structure decisions is reliant on country-level factors. I argue, based on a combination of previous research on capital structure and institutional differences, the cross-country differences in factor effectiveness likely originate from differences in corporate culture, regulatory standards and insolvency laws, the level of development and exposure to capital markets and the banking sectors, and previous and current economic stability.

The empirical evidence also shows that no singular presented capital structure theory could perfectly forecast how all discussed variables would affect capital composition. Nevertheless, each theory provides predictions of reasonable accuracy and complements one other by offering more comprehensive predictions where the others fall short. Hence, the combined theoretical framework exhibits high applicability, thereby suggesting the theories to not be applied uniformly.

8 Limitations and Future Research

This dissertation, as with most empirical research, is no exception to limitations. For instance, long-term and short-term debt were not separately used as dependent variables in this analysis. Additionally, market values of debt were not used when measuring the market value of leverage. Consequentially, the results may therefore provide an unholistic representation of how particular variables affect capital structure decisions. Another limitation, perhaps one of the more conspicuous ones, is the varying number of firm-year observations across the G7 countries. For instance, while the sample contains 3896 Japanese firm observations across the analysed time period, it only contains 715 Italian firm observations. Furthermore, the sample only contains observations from 2012 to 2019, thereby limiting the ability to observe how capital structure decisions and their determinants vary over longer time intervals. Another major limitation is how some variables may be sub-optimally measured. Particularly, revenue volatility is measured as the difference in a firm's revenue in the year *i* and the mean value of revenue over the entire sample period, as well as how the measurement of taxation is greatly simplified. Lastly, there are also limitations related to the lack of comparable previous empirical research. While there are multiple studies performed on country-specific samples, to my knowledge, there is relatively little empirical research studying and explaining cross-country differences in determinants of capital structure.

In the interest of expanding the knowledge of capital structure determinants, I have a number of suggestions. Firstly, analysing alternative measures of the variables utilised in this study provides a test of robustness and may deliver new insights as to how specific factors affect capital structure decisions. Furthermore, investigating additional components such as the speed of adjustment to the target capital structure, thereby testing for a dynamic trade-off theory, as well as a more thorough investigation of the effect of tax policies would provide valuable insights. Secondly, I suggest increasing the yearly observations and the overall sampling period. Consequentially, one would be able to better rely upon the estimation results' significance, as well as more easily observe how capital structure determinants develop over time as they react to legal, economic, and political shifts.

9 Bibliography

Acharya, V. V., Sundaram, R. K., & John, K. (2011). Cross-country variations in capital structures: The role of bankruptcy codes. *Journal of Financial Intermediation*, *20*(1), 25–54. https://doi.org/10.1016/j.jfi.2010.02.001

Adam, T. & Goyal. V. K. (2008). The investment opportunity set and its proxy variables. *Journal of Financial Research, 31*(1), 41-63. https://doi.org/10.1111/j.1475-6803.2008.00231.x

Allen, F., & Carletti, E. (2012). The Roles of Banks in Financial Systems. The Oxford Handbook of Banking by Oxford, 24-29. Oxford University Press.

Allen, F., & Gale, D. (2001). *Comparing financial systems*. MIT Press.

Altman, E. I. (1968). Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. *Journal of Finance*, *23*(4), 189-209. https://doi.org/10.1111/j.1540-6261.1968.tb00843.x

Altman, E. I. (2000). *Predicting financial distress of companies: Revisiting the z-score and zeta models*. https://pages.stern.nyu.edu/~ealtman/Zscores.pdf

Alves, P. F., & Ferreira, M. A. (2011). Capital Structure and law around the World. *Journal of Multinational Financial Management*, *21*(3), 119–150. https://doi.org/10.1016/j.mulfin.2011.02.001

Andersen, R. (2008). *Modern Methods for Robust Regression.* SAGE.

Antoniou, A., Guney, Y., & Paudyal, K. (2002). Determinants of Corporate Capital Structure: Evidence from European Countries. *Social Science Research Network*. https://shorturl.at/dkzMS

Antoniou, A., Guney, Y., & Paudyal, K. (2008). The Determinants of Capital Structure: Capital Market-Oriented versus Bank-Oriented Institutions. *Journal of Financial and Quantitative Analysis*, *43*(1), 59–92. https://doi.org/10.1017/s0022109000002751

Baker, H. K., & Martin, G. S. (2011). *Capital Structure and Corporate Financing Decisions: Theory, Evidence, and Practice*. John Wiley & Sons.

Baker, M., & Wurgler, J. (2002). Market Timing and Capital Structure. *Journal of Finance*, *57*(1), 1–32. https://doi.org/10.1111/1540-6261.00414

Bancel, F., & Mittoo, U. R. (2004). Cross-Country Determinants of Capital Structure Choice: A Survey of European Firms. *Financial Management*, *33*(4), 103–132. https://EconPapers.repec.org/RePEc:fma:fmanag:bancelmittoo04

Barclay, M. J., Smith, Jr. C. W., & Morrelec, E. (2006). On the Debt Capacity of Growth Options. *The Journal of Business, 79*(1), 37-60. https://doi.org/10.1086/497404

Beck, T. (2015). Does Europe need a Capital Market Union [Powerpoint slides]. Department of Economics, Cass Business School (Currently Bayes Business School). http://www.slideshare.net/F-B-F/the-new-financial-architecture-in-the-eurozone

Berger, A. N., & Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *Journal of Business, 68*(3), 351-381. https://www.jstor.org/stable/2353332

Berk, J.D., & DeMarzo, P. (2019). *Corporate Finance, Global Edition* (Fifth edition). Pearson Education Limited.

Berle, A., & Means, G. (1932). *The Modern Corporation and Private Property*. Commerce Clearing House.

Bevan, A. A., & Danbolt, J. (2000). Capital Structure and its Determinants in the UK - A Decompositional Analysis. *Social Science Research Network*. https://doi.org/10.2139/ssrn.233550

Blavy, R., & Allard, J. (2011). Market phoenixes and banking ducks are recoveries faster in market-based financial systems? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1923527

Box, G. E. (1979). All models are wrong, but some are useful. *Robustness in Statistics*, *202*(1979), 549.

Bradley, M., Jarrell, G. A., & Kim, E. H. (1984). On the existence of an optimal capital structure: theory and evidence. *Journal of Finance, 39*(3), 857-878. https://doi.org/10.2307/2327950

Brailsford, T., Oliver, B., & Pua, S. L. H. (2002). On the relation between ownership structure and capital structure. *Accounting and Finance*, *42*(1), 1–26. https://doi.org/10.1111/1467-629x.00001

Brealey, R. A., Myers, S. C., & Allen, F. (2011). *Principles of Corporate Finance* (10th edition). McGraw-Hill/Irwin.

Brys, B., Matthews, S., & Jeffrey, O. (2011). Tax reform trends in OECD countries. *OECD Taxation Working Papers*. https://doi.org/10.1787/22235558

Cihák, M., Demirgüç-Kunt, A., Feyen, E., & Levine, R. (2012). Benchmarking financial systems around the world. *Policy Research Working Papers*. https://doi.org/10.1596/1813-9450-6175

Cohen, D. F. W., Prophet, C., & Gernter, T. [Gowling WLG (Canada) LLP]. (2019, December 1st). *Restructuring and insolvency in Canada: Overview*. Thomson Reuters Practical Law. https://ca.practicallaw.thomsonreuters.com/3-502-1736

De Jong, A., Kabir, R., & Nguyen, T. D. (2008). Capital structure around the world: The roles of firm- and country-specific determinants. *Journal of Banking and Finance, 32*(9), 1954–1969. https://doi.org/10.1016/j.jbankfin.2007.12.034

DeAngelo, H., & Masulis, R. (1980). Optimal Capital Structure under Corporate and Personal Taxation. *Journal of Financial Economics, 8*(1), 3-29. https://doi.org/10.1016/0304-405X(80)90019-7

Demirguc-Kunt, A., & Levine, R. L. (1999). Bank-based and market-based financial systems – cross-country comparison. *Policy Research Working Papers (for Worldbank)*, 2143. https://doi.org/10.1596/1813-9450-2143.

Diamond, D. W. (1991). Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy, 99*(4), 689-721. https://doi.org/10.1086/261775

Donaldson, G. (2000). *Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity*. Beard Books.

Dunne, D. F., & Gerard Uzzi [Milbank LLP]. (2023, January 1st). *Restructuring and Insolvency in the United States: Overview*. Thomson Reuters Practical Law. https://uk.practicallaw.thomsonreuters.com/7-501-6870

Faccio, M., & Xu, J. (2015). Taxes and Capital Structure. *Journal of Financial and Quantitative Analysis, 50*(3), 277-300. https://doi.org/10.1017/S0022109015000174

Fischer, E. O., Heinkel, R., & Zechner Josef. (1989). Dynamic capital structure choice: theory and tests. *Journal of Finance, 44*(1), 19-40. https://doi.org/10.2307/2328273

Fisher, J. M. (2014). Fairer shores: Tax havens, tax avoidance, and corporate social responsibility. *BUL Rev 94*, 337-365.

Frank, M. Z., & Goyal, V. K. (2003). Capital Structure Decisions. *SSRN*. https://dx.doi.org/10.2139/ssrn.396020

Frank, M. Z., & Goyal, V. K. (2009). Capital Structure Decisions: Which Factors Are Reliably Important? *Financial Management*, *38*(1), 1–37. https://doi.org/10.1111/j.1755-053x.2009.01026.x

Franks, J. R., Nyborg, K. G., & Torous, W. N. (1996). A comparison of US, UK, and German Insolvency Codes. *Financial Management*, *25*(3), 86-101. https://doi.org/10.2307/3665810

Gambacorta, L., Yang, J., & Tsatsaronis, K. (2014). Financial Structure and Growth. BIS Quarterly Review, 17(4), 1–37. https://doi.org/10.1093/oxrep/17.4.467

Gillan, S. L., & Starks, L. T. (2003). Corporate Governance, Corporate Ownership, and the Role of Institutional Investors: A Global Perspective. *Social Science Research Network*. https://doi.org/10.2139/ssrn.439500

Goergen, M. (2012). *International Corporate Governance*. Pearson Education Limited.

Hagtvedt, D. (2018). *Capital Structure in the Petroleum Industry* [Master's Thesis, Norwegian School of Economics]. NHH Brage. http://hdl.handle.net/11250/2561182

Harris, M., & Raviv, A. (1991). The Theory of Capital Structure. *Journal of Finance*, *46*(1), 297–355. https://doi.org/10.1111/j.1540-6261.1991.tb03753.x

Hellwig, M. F. (2005). Market discipline, information processing, and corporate governance. *MPI Collective Goods Preprint*, (2005/19). https://ssrn.com/abstract=873431

Hennessy, C. & Whited, T. M. (2005). Debt Dynamics. *Journal of Finance, 60*(3), pp. 1129-1165. https://doi.org/10.1111/j.1540-6261.2005.00758.x

Hoechle, D. (2007). Robust standard errors for panel regression with cross-sectional dependence. *The Stata Journal, 7*(3), 281-312.

IASplus. (2005). *Evolving Japanese GAAP – High Quality Accounting Standards* [Pdf]. https://www.iasplus.com/en/binary/resource/0404japanequivalence.pdf

IFRS. (n.d). *Who uses IFRS Accounting Standards*. https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/ [Accessed 27/4/2023]

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405x(76)90026-x

Johannessen, A., Tufte, P. A., & Christoffersen, L. (2010). *Introduksjon til samfunnsvitenskapelig metode*. Vol 4. Abstrakt.

Kieschnick, R. L., & Moussawi, R. (2018). Firm age, corporate governance, and capital structure choices. *Journal of Corporate Finance, 48*, 597–614. https://doi.org/10.1016/j.jcorpfin.2017.12.011

Koutmos. G., Lee. U., & Theodossiu. P. (1994). Time-varying betas and volatility persistence in international stock markets. *Journal of Economics and Business, 46*(2), 101-112. https://doi.org/10.1016/0148-6195(94)90004-3

Kraus, A., & Litzenberger, R. H. (1973). A State-Preference Model of Optimal Financial Leverage. *Journal of Finance*, *28*(4), 911. https://doi.org/10.2307/2978343

La Porta, R., Lopez-De-Silanes, F., & Shleifer, A. (1999). Corporate Ownership Around the World. *Journal of Finance*, *54*(2), 471–517. https://doi.org/10.1111/0022-1082.00115

La Porta, R., Lopez-De-Silanes, F., Shleifer, A., & Vishny, R. W. (2012). Legal Determinants of External Finance. *Journal of Finance, 52*(3), 1121-1150. https://doi.org/10.1111/j.1540-6261.1997.tb02727.x

La Rocca, M., La Rocca, T., & Cariola, A. (2011). Capital Structure Decisions During a Firm's Life Cycle. *Small Business Economics*, *37*(1), 107–130. https://doi.org/10.1007/s11187-009-9229-z

Lanfield, S., & Pagano, M. (2016). Bank bias in Europe: effects on systematic risk and growth. *Economic Policy, 31*(85), 51-106. https://doi.org/10.1093/epolic/eiv019

Leary, M. T., & Roberts, M. R. (2005). Do firms rebalance their capital structure? *Journal of Finance, 60*(6), 2575-2619. https://doi.org/10.1111/j.1540-6261.2005.00811.x

Lenzo, S., Wang, O., & Acharya. V., (2021). *Zombie lending and policy traps*. CEPR. https://cepr.org/voxeu/columns/zombie-lending-and-policy-traps

Lepore, L., Paolone, F., Pisano, S., & Alvino, F. (2017). A cross-country comparison of the relationship between ownership concentration and firm performance: does judicial system efficiency matter? *Corporate Governance*, *17*(2), 321–340. https://doi.org/10.1108/cg-03-2016-0049

Levine, R. (2002). Bank-based or market-based financial systems: Which is better? *Journal of Financial Intermediation, 11(4),* 392-428. https://doi.org/10.2139/ssrn.307096

Lin, L., & Flannery, M. J. (2013). Do personal taxes affect capital structure? Evidence from the 2003 tax cut. *Journal of Financial Economics, 109*(2), 549-565. https://doi.org/10.1016/j.jfineco.2013.03.010

López-Gracia, J., & Sogorb-Mira, F. (2008). Testing trade-off and pecking order theories financing SMEs. *Small Business Economics*, *31*(2), 117–136. https://doi.org/10.1007/s11187-007-9088-4

Mallows, C. L. (1986). Augmented Partial Residuals. *Technometrics, 28*(4), 313-319.

Margaritis, D., & Psillaki, M. (2010). Capital structure, equity ownership and firm performance. *Journal of Banking and Finance*, *34*(3), 621–632. https://doi.org/10.1016/j.jbankfin.2009.08.023

Markle, K. S., & Shackelford, D. A. (2012). Cross-Country Comparisons of the Effects of Leverage, Intangible Assets, and Tax Havens on Corporate Income Taxes. *Tax Law Review*, *65*(3), 415-433. https://ssrn.com/abstract=2161939

Mason, C. H., & Perreault, W. D. (1991). Collinearity, power, and interpretation of multiple regression analysis. *Journal of Marketing Research*, *28*(3), 268-280. https://doi.org/10.2307/3172863

Mendeley, E. (2001). Asset liquidity, capital structure, and secured debt. *Journal of Financial Economics, 61*(2), 173-206). https://doi.org/10.1016/S0304-405X(01)00059-9

Miller, M. H. (1977). Debt and Taxes. *Journal of Finance*, *32*(2), 261-275. https://doi.org/10.2307/2326758

Mitchell, B. R., & Hicks, J. (1970). A theory of economic history. *The Economic Journal*, *80*(318), 350. https://doi.org/10.2307/2230128

Modigliani, F. & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review, 48*(3), 261–297. https://www.jstor.org/stable/1809766

Modigliani, F. & Miller, M. H. (1963). CORPORATE INCOME TAXES AND THE COST OF CAPITAL: A CORRECTION. *The American Economic Review, 53*(3), 433–443. https://www.jstor.org/stable/1809167

Myers, S. C. (1984). The Capital Structure Puzzle. *Journal of Finance, 39*(3), 574–592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*(2), 187–221. https://doi.org/10.1016/0304-405x(84)90023-0

Nihei, Z., & Fujita, M [Anderson Mori & Tomotsune]. (2022, January 1st). *Restructuring and Insolvency in Japan: Overview*. Thomson Reuters Practical Law. https://uk.practicallaw.thomsonreuters.com/8-502-0188

Nobes, C. (2012). The survival of international differences under IFRS: towards a research agenda. Accounting and Business Research, *36*(3), 233-245. https://doi.org/10.1080/00014788.2006.9730023

Öztekin, Ö. (2015). Capital structure decisions around the world. Which factors are reliably important? *Journal of Financial and Quantitative Analysis, 50*(3), 301-323. https://doi.org/10.1017/S0022109014000660

Parker, D. & Schularick, M. (2021, November 24th). *The Term Spread as a Predictor of Financial Stability*. Liberty Street Economics, Federal Reserve Bank of New York. https://libertystreeteconomics.newyorkfed.org/2021/11/the-term-spread-as-a-predictor-of-financial-instability/

Passalacqua, M. [BonelliErede]. (2022, January 1st). *Restructuring and Insolvency in Italy: Overview*. Thomson Reuters Practical Law. https://uk.practicallaw.thomsonreuters.com/8-501-9255

Petersen, M., & Rajan, R. (1994). The benefits of lending relationships: Evidence from small business data. *Journal of Finance, 49*(1), 3-37. https://doi.org/10.1111/j.1540-6261.1994.tb04418.x

PwC. (2020). *About the IFRS and US GAAP: Similarities and differences guide & FULL guide* [Pdf]. https://shorturl.at/wzKL7

PwC. (2023a). *About the IFRS and US GAAP: Similarities and differences guide & FULL guide* [Pdf]. https://viewpoint.pwc.com/dt/us/en/pwc/accounting_guides/ifrs_and_us_gaap_sim/ifrs_and_us_gaap_sim_US/About-this-guide.html

Scott, J. H. (1977). Bankruptcy, secured debt, and Optimal Capital Structure. *The Journal of Finance*, *32*(1), 1–19. https://doi.org/10.1111/j.1540-6261.1977.tb03237.x

Shleifer, A., & Vishny, R. W. (1986). Large Shareholders and Corporate Control. *Journal of Political Economy*, *94*(3, Part 1), 461–488. https://doi.org/10.1086/261385

Short, H. (1994). Ownership, control, financial structure and the performance of firms. *Journal of Economic Surveys*, *8*(3), 203–249. https://doi.org/10.1111/j.1467-6419.1994.tb00102.x

Stock, J. H., & Watson, M. W. (2019). *Introduction to Econometrics, Global Edition*. Pearson Education Limited.

Streit, G., & Bürk, F. [Heuking Kühn Lüer Wojtek]. (2022, May 1st). *Restructuring and Insolvency in Germany: Overview*. Thomson Reuters Practical Law. https://uk.practicallaw.thomsonreuters.com/2-501-6976

Stulz, R. M., & Williamson, R. (2003). Culture, openness, and finance. *Journal of Financial Economics, 70(3),* 313-349. https://doi.org/10.1016/S0304-405X(03)00173-9

Taggart Jr, R. A. (1985). Secular Patterns in the Financing of US Corporations. *Corporate Capital Structures in the United States*, 13-80. University Chicago Press.

Talbourdet, P., & Gumpelson, J. [De Pardieu Brocas Maffei A.A.R.P.I]. (2022, May 1st). *Restructuring and Insolvency in France: Overview*. Thomson Reuters Practical Law. https://uk.practicallaw.thomsonreuters.com/1-501-6905

Terry, J., Bannister, T., Simmonds, E., & Pflueger Lauren [Akin Gump LLP]. (2022, October 1st). *Restructuring and Insolvency in the UK (England & Wales): Overview*. Thomson Reuters Practical Law. https://uk.practicallaw.thomsonreuters.com/9-501-6812

Titman, S., & Wessels, R. E. (1988). The Determinants of Capital Structure Choice. *Journal of Finance*, *43*(1), 1–19. https://doi.org/10.1111/j.1540-6261.1988.tb02585.x

Van-Horne, J. C. (2001). *Financial Management and Policy* (12th edition). Pearson Education Limited.

Warner, J. B. (1977). Bankruptcy costs: Some evidence. *The Journal of Finance*, *32*(2), 337. https://doi.org/10.2307/2326766

Welch, I. (2004). Capital Structure and Stock Returns. *Journal of Political Economy, 112*(1), 106-131. https://doi.org/10.1086/379939

Wooldridge, J. M. (2019). *Introductory Econometrics: A Modern Approach*. Cengage Learning.

Zee, H. H. (2005). Personal Income Tax Reform: Concepts, Issues, and Comparative Country Developments. *IMF Working Paper 05/87*. https://ssrn.com/abstract=888133

Zwiebel, J. (1996). Dynamic Capital Structure under Managerial Entrenchment. *The American Economic Review*, *86*(5), 1197–1215. https://EconPapers.repec.org/RePEc:aea:aecrev:v:86:y:1996:i:5:p:1197-1215.

10 Appendices

10.1 Comparison of Accounting Standards

Table 12 - Comparison of the IFRS, Japanese GAAP, and US GAAP

Accounting Standards	Items	IFRS	Japanese GAAP	US GAAP
Financial Instruments	Measurement of securities	Fair value or amortised costs depending on the category	Fair value or amortised costs depending on the category	
	Estimating potential credit losses/impairment	Discounted future cash flows	Discounted future cash flows	Discounted future cash flows
	Derecognition of financial assets	Legal insolation is not required (Risk & reward approach	Legal isolation required (Financial-components approach)	Legal isolation required (Financial-components approach)
	Measurement of derivatives	Fair value	Fair value	Fair value
	Hedge accounting	When hedging criteria are met	When hedging criteria are met	When hedging criteria are met
Business Combinations	Basic method	Purchase method	Purchase method	Purchase method
	Pooling of interests method	Purchase method only	Purchase method when strict criteria are met	Purchase method only
	Goodwill	Not amortised, impairment only	Strictly amortised with impairment	Not amortised, impairment only
	Handling of Inventory	FIFO	FIFO, or rarely LIFO	FIFO and LIFO
Impairment of Assets	Grouping	Lowest level for which cash flows are largely independent of cash flows of other assets	Lowest level for which cash flows are largely independent of cash flows of other assets	Lowest level for which cash flows are largely independent of cash flows of other assets
	Indication of impairement	Assessed	Assessed	Assessed
	Recognition test	Recoverable amount	Undiscounted cash flow	Undiscounted cash flow
	Measurement	Recoverable amount	Recoverable amount	Fair value
	Reversal of impairment loss	Reversed (excluding goodwill)	Prohibited	Prohibited
Retirement Benefits	Recognition of liability	Retirement benefit obligation adjusted for unrecognised actuarial gains/losses and past service cost, minus plan assets	Retirement benefit obligation adjusted for unrecognised actuarial gains/losses and past service cost, minus plan assets	Retirement benefit obligation adjusted for unrecognised actuarial gains/losses and past service cost, minus plan assets
	Actuarial gains/losses	Corridor amortisation	Strictly amortised without corridor	Corridor amortisation
	Recognition of additional minimum liabilities	Not recognised	Not recognised	Unfunded accumulated benefit obligation
Income Taxes	Basic method	Asset liability method	Asset liability method	Asset liability method
	Recording of deferred tax assets	Based on recoverability/realisability	Based on recoverability/realisability	Based on recoverability/realisability
Research & Development	Development costs	Capitalised	Expensed when incurred	Expensed when incurred
Consilidated Financial Statements	Scope of subsidiaries	Based on control	Based on control	Based on majority voting interest
	Presentation of minority interests	Equity	Between liability and equity	Between liability and equity
Investment Property	Measurement	Fair value or Cost	Cost	Cost

Source: IASplus (2005) and updated utilising PwC (2020;2023)

10.2 Industry Distribution

Table 13 - Industry Distribution per Country

GICS Industry Name	Canada	France	Germany	Italy	Japan	United States	United Kingdom
Aerospace & Defense	1,7%	1,5%	0,5%	0,8%	0,2%	1,7%	2,6%
Air Freight & Logistics	1,7%	1,0%	0,9%	0,0%	1,2%	0,6%	0,3%
Airlines	1,7%	0,0%	0,0%	0,0%	0,0%	0,6%	0,3%
Auto Components	1,7%	1,5%	3,7%	2,4%	5,0%	1,2%	1,0%
Biotechnology	0,8%	3,9%	1,8%	0,0%	0,2%	3,5%	0,7%
Building Products	0,8%	1,5%	1,8%	2,4%	2,4%	3,5%	2,0%
Chemicals	4,2%	2,9%	3,2%	0,0%	8,9%	2,9%	3,6%
Commercial Services & Supplies	3,3%	3,4%	3,2%	4,7%	2,3%	6,9%	4,6%
Communications Equipment	1,7%	3,4%	1,4%	0,0%	0,2%	1,2%	0,7%
Construction & Engineering	2,5%	0,5%	1,4%	3,9%	7,0%	1,7%	3,0%
Containers & Packaging	3,3%	1,9%	0,0%	0,8%	0,5%	1,2%	0,7%
Distributors	0,8%	0,5%	0,5%	0,0%	0,5%	0,0%	1,0%
Diversified Consumer Services	0,8%	0,0%	0,0%	0,0%	0,2%	1,2%	0,3%
Electrical Equipment	1,7%	1,5%	3,7%	3,1%	3,3%	0,6%	1,3%
Electronic Equipment, Instruments & Components	1,7%	4,4%	5,1%	6,3%	9,0%	4,0%	3,0%
Energy Equipment & Services	9,2%	0,5%	0,5%	0,0%	0,3%	4,6%	1,3%
Entertainment	1,7%	1,9%	1,8%	3,9%	0,7%	0,6%	2,6%
Food & Staples Retailing	1,7%	1,9%	0,9%	1,6%	3,1%	1,7%	0,3%
Food Products	3,3%	4,9%	0,0%	2,4%	4,3%	1,2%	4,3%
Gas Utilities	0,8%	0,0%	0,0%	1,6%	0,5%	0,0%	0,0%
Health Care Providers & Services	2,5%	1,9%	2,8%	1,6%	1,2%	4,0%	1,0%
Hotels, Restaurants & Leisure	6,7%	3,9%	1,4%	0,8%	3,3%	2,9%	4,9%
Household Durables	0,8%	3,4%	2,3%	6,3%	1,2%	1,7%	3,6%
IT Services	1,7%	3,9%	5,1%	3,1%	1,2%	0,6%	4,3%
Independent Power and Renewable Electricity Producers	0,8%	0,5%	0,5%	2,4%	0,5%	0,6%	0,3%
Interactive Media & Services	0,8%	0,0%	0,9%	0,0%	0,7%	1,7%	0,3%
Machinery	5,0%	3,4%	14,3%	7,9%	10,4%	8,7%	4,3%
Marine	0,8%	0,0%	0,0%	0,0%	1,0%	0,0%	0,0%
Media	5,0%	5,8%	1,4%	7,9%	1,9%	3,5%	4,6%
Metals & Mining	6,7%	0,0%	0,0%	0,8%	2,8%	2,3%	3,9%
Paper & Forest Products	5,0%	1,0%	0,5%	0,8%	0,7%	0,6%	0,0%
Personal Products	1,7%	0,0%	0,0%	0,8%	0,7%	0,6%	1,6%
Pharmaceuticals	5,8%	1,5%	0,0%	0,0%	1,7%	2,9%	1,3%
Road & Rail	0,8%	0,5%	0,9%	0,8%	1,2%	1,7%	1,3%
Software	3,3%	5,3%	6,9%	1,6%	0,5%	4,6%	7,6%
Speciality Retail	4,2%	4,4%	1,4%	0,8%	2,4%	3,5%	3,0%
Trading Companies & Distributors	2,5%	1,9%	2,8%	0,0%	4,0%	3,5%	3,0%
Transportation Infrastructure	0,8%	1,0%	1,4%	1,6%	0,3%	0,0%	1,0%
Beverages	0,0%	2,4%	2,3%	1,6%	0,2%	0,0%	0,3%
Construction Materials	0,0%	0,5%	0,5%	0,8%	1,0%	0,0%	1,6%
Electric Utilities	0,0%	0,5%	0,0%	0,0%	0,0%	0,0%	0,3%

Equity Real Estate Investment Trusts (REITs)	0,0%	1,5%	0,0%	1,6%	0,0%	0,0%	0,0%
Health Care Equipment & Supplies	0,0%	1,9%	2,8%	0,8%	0,9%	4,6%	1,6%
Health Care Technology	0,0%	1,5%	1,4%	0,8%	0,2%	1,2%	0,0%
Industrial Conglomerates	0,0%	0,5%	1,4%	1,6%	0,5%	0,0%	0,3%
Internet & Direct Marketing Retail	0,0%	1,5%	0,9%	0,8%	0,9%	1,7%	1,0%
Leisure Products	0,0%	2,4%	0,5%	0,8%	1,0%	1,7%	1,0%
Life Sciences Tools & Services	0,0%	0,5%	0,0%	0,0%	0,3%	0,0%	0,3%
Oil, Gas & Consumable Fuels	0,0%	1,0%	0,5%	1,6%	1,0%	0,0%	2,3%
Professional Services	0,0%	1,9%	0,9%	2,4%	2,4%	1,2%	5,6%
Real Estate Management & Development	0,0%	5,3%	8,8%	3,9%	0,0%	0,0%	2,0%
Semiconductors & Semiconductor Equipment	0,0%	0,5%	2,8%	0,8%	2,1%	1,2%	0,7%
Technology Hardware, Storage & Peripherals	0,0%	1,5%	0,5%	1,6%	0,9%	0,6%	0,3%
Textiles, Apparel & Luxury Goods	0,0%	1,5%	2,3%	7,1%	1,6%	1,7%	0,7%
Diversified Telecommunication Services	0,0%	0,0%	0,9%	0,8%	0,2%	1,2%	1,0%
Multi-Utilities	0,0%	0,0%	0,5%	0,0%	0,0%	0,0%	0,3%
Multiline Retail	0,0%	0,0%	0,5%	0,0%	0,7%	0,6%	0,0%
Automobiles	0,0%	0,0%	0,0%	2,4%	0,0%	0,0%	0,3%
Household Products	0,0%	0,0%	0,0%	0,0%	0,2%	0,0%	0,7%
Tobacco	0,0%	0,0%	0,0%	0,0%	0,0%	1,2%	0,0%
Wireless Telecommunication Services	0,0%	0,0%	0,0%	0,0%	0,0%	1,2%	0,0%

10.3 Variable Overview

Table 14 - Overview of Variables, Calculation, and Data Source

Variable	Abbreviation	Variable explanation	Main Data Source
Debt-to-Capital (Book value)	D2C (B)	$\frac{Total\ Debt_t}{Total\ Debt_t + Book\ value\ of\ Total\ Equity_T}$	Refinitiv Eikon
Debt-to-Capital (Market value)	D2C (M)	$\frac{Total\ Debt_t}{Total\ Debt_t + Market\ value\ of\ Total\ Equity_T}$	Refinitiv Eikon
Tangibility	TAN	$\frac{Net\ Property,Plant\ \&\ Equipment\ (PP\&E)_t}{Total\ Assets\ (Book\ Value)_t}$	Refinitiv Eikon
Market-to-Book Ratio	M2B	$\frac{Market\ Value\ of\ Total\ Equity_t + Total\ Liabilities_t}{Book\ Value\ of\ Total\ Equity_t + Total\ Liabilities_t}$	Refinitiv Eikon
Profitability	PRO	$\frac{EBITDA_t}{Book\ Value\ of\ Equity_t + Total\ Liabilities_t}$	Refinitiv Eikon
Liquidity	LIQ	$\frac{Total\ Current\ Assets(Book\ Value)_t}{Total\ Current\ Liabilities_t}$	Refinitiv Eikon
Non-debt Tax Shield	NDTS	$\frac{Depreciation\ \&\ Amortization_t}{Total\ Assets(Book\ Value)_t}$	Refinitiv Eikon
Size	SIZE	$Log(Book\ value\ of\ Total\ Assets_t)$	Refinitiv Eikon
Economic Growth	EGRO	$Real\ GDP\ growth_t$*100	World Bank Open Data
Expected Inflation Rate	INFL	$Expected\ Inflation_t$*100	World Bank Open Data
Term Spread	TS	$(10\ Year\ Government\ Bond_{t-1} - 3\ Month\ Government\ Bond_{t-1}) * 100$	Refinitiv Eikon
Corporate Tax Rate	CTR	$(Statutory\ Corporate\ Income\ Tax_t) * 100$	PwC
Stock Market Condition	SMC	$Local\ MSCI\ Index\ Annual\ Performance_t * 100$	Refinitiv Eikon
Profitability of Bankruptcy (Altman's Z-score)	Z	$1{,}2 * \frac{Working\ Capital_t}{Total\ Assets_t} + 1{,}4 * \frac{Retained\ Earnings_t}{Total\ Assets_t} + 3{,}3 * \frac{EBIT_t}{Total\ Assets_t} + 0{,}6 * \frac{Market\ Capitalization_t}{Total\ Assets_t} + 0{,}999 * \frac{Revenue_t}{Total\ Assets_t}$	Refinitiv Eikon
Revenue Volatility	RV	$ABS(Log(Revenue_t) - mean(Log(Revenue))$	Refinitiv Eikon
Age	AGE	$Log(Age_t)$	Refinitiv Eikon
Dividend	DIV	$\frac{Dividends_t}{Operating\ Income_t}$	Refinitiv Eikon
Lagged Leverage	PREV	$D2C\ (B)_{t-1}$	Refinitiv Eikon
Industry Mean Leverage	INDU	$median_{by\ Year\ and\ Industry}(D2C\ (B)_t)$	Refinitiv Eikon

10.4 MLR Assumptions

Appendix *10.4* present an overview of the six classical linear model assumptions when using an MLR model, and an additional assumption for when time series are utilised. Under the first five classical assumptions, the estimators are considered to be the best linear unbiased estimators, or BLUE (Wooldridge, 2019).

Assumption 1 - Linearity

The first assumption requires linearity between the unknown parameters β_0, β_1, …, β_k and the dependent variable *y* (Wooldridge, 2019). Subsequently, the population of the model can be formulated as

$$y = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k + u \tag{35}$$

Assumption 2 – Random Sampling

Following the first assumption, the assumption of random sampling entails the dataset containing random observations *n*, $\{(x_{i1}, x_{i2}, \dots, x_{ik}, y_i): i = 1, \dots, n\}$ (Wooldridge, 2019).

Assumption 3 – No Perfect Collinearity

Thirdly, the assumption of no perfect collinearity implies no perfectly linear relationship between any independent variables (Wooldridge, 2019). However, the assumption allow for moderate correlation between variables and only restrict independent variables from being strongly or perfectly correlated. Otherwise, the model would be subject to problems of multicollinearity.

Assumption 4 – Zero Conditional Mean

Next, the assumption of zero conditional states the error term *u* must have an expected value of zero independent of the values of the explanatory variables (Wooldridge, 2019). In other words,

$$E(u|\mathrm{x}_1, x_2, \dots, x_k) = 0 \tag{36}$$

Assumption 5 - Homoscedasticity

The fifth assumption implies the error term *u* must hold a constant variance across all independent variables, regardless of the variables' values (Wooldridge, 2019). This can be written as

$$Var(u|\mathrm{x}_1, x_2, \dots, x_k) = \sigma^2 \tag{37}$$

Assumption 6 - Normality

The following assumption of Normality states the population of error term *u* must, independently from explanatory variables $x_1, x_2, \dots, x_k$, be normally distributed with a mean-variance, σ^2, of zero (Wooldridge, 2019). In other words,

$$u \sim Normal(0, \sigma^2) \tag{38}$$

Assumption 7 – No Autocorrelation

Lastly, the seventh assumption requires the error terms of time period *s* and *t*, u_s and u_t, to be uncorrelated independently of the value of the explanatory variables (Wooldridge, 2019). If the error terms of multiple time periods are correlated, the errors suffer from serial correlation or autocorrelation. The assumption can be formulated as

$$Corr(u_t, u_s | x_1, x_2, \dots, x_k) = 0 \text{ for all } t \neq s \tag{39}$$

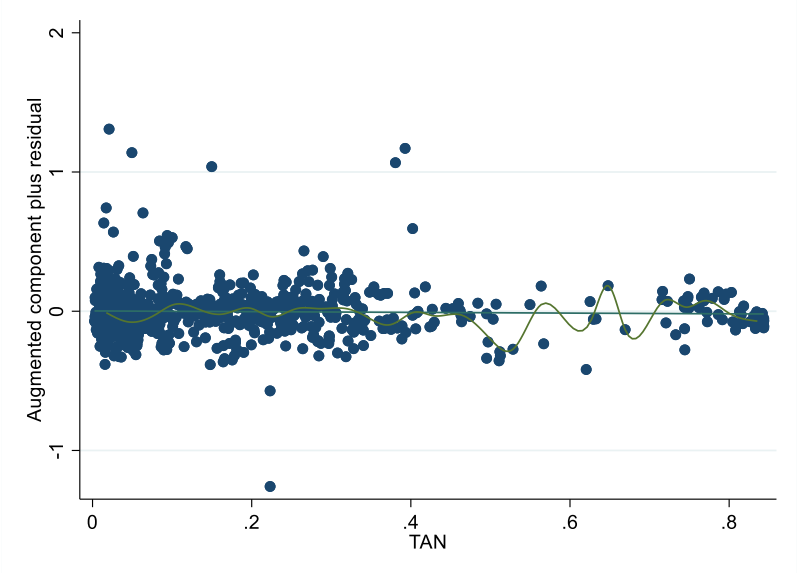
10.5 Testing MLR Assumptions

Appendix *10.5* presents relevant test results and affiliated discussions for the MLR estimation model from *Chapter 5.2.* Additionally, throughout the testing of the MLR assumptions, the tests have been performed separately for each country despite the test results of only Canada being exhibited. Similarly, despite *Tangibility* being the main variable used in illustrating graphs, all variables have been tested. I have chosen to abstain from including graphs and tables from each country and variable to prevent potential confusion and disorder related to simply having too many tables and graphs. In certain cases, however, the test results from all countries are included if easily illustratable. One should also take notice of how the test results are calculated using the models containing all explanatory variables to establish a more holistic image.

Assumption 1 - Linearity

The first assumption is tested by utilising augmented component-plus-residual plots to observe the degree of linearity between independent and dependent variables. The green line in *Figure 8* displays the true relationship between the explanatory variable *Tangibility* and the dependent variable *Debt-to-Capital (Book value)*, whereas the blue line illustrates the linear relationship. One can immediately observe how the two lines are approximately equivalent at lower levels of *Tangibility* but begin to fluctuate as the *Tangibility* levels increase before stabilising at the highest levels. Hence, the linearity assumption between *Tangibility* and *Debt-to-Capital (Book value)* among Canadian firms narrowly holds. Furthermore, as all explanatory variables have been tested against both dependent variables for all seven countries, *Figure 8* represents an outlier of the test as it remains among the more 'extreme' or unusual figures observed.

Figure 8 - Linearity between Tangibility and Debt-to-Capital (Book value) (Canada)



Assumption 3 – No Perfect Collinearity

To test whether high or perfect collinearity is present between the explanatory variables, a VIF test and a correlation matrix have been utilised. As outlined in Chapter *5.2 Testing MLR assumptions*, the VIF test suggests harmful multicollinearity when a VIF-value is greater than 10 (Mason & Perrault, 1991). Hence, the VIF test provided in *Table 15* suggests no problems regarding multicollinearity across all countries. Similarly, the correlation matrix provided in *Table 16* implies no sign of harmful multicollinearity as there is no evidence of a high correlation [>0,7] between explanatory variables. This is also the case for the correlation matrices for France, Germany, Italy, Japan, the United Kingdom, and the United States, which are not exhibited.

Table 15 - VIF-test results using Debt-to-Capital

	VIF						
	Canada	France	Germany	Italy	Japan	United Kingdom	United States
AGE	1,29	1,28	1,13	1,16	1,23	1,11	1,20
CTR	1,73	3,74	3,54	1,94	8,37	4,27	6,66
DIV	1,21	1,09	1,25	1,12	1,88	1,18	1,08
EGRO	7,65	4,05	1,97	3,84	1,84	8,41	3,30
RV	1,01	1,00	1,00	1,02	1,00	1,02	1,01
INDU	1,46	1,34	1,27	1,23	1,47	1,02	1,35
INFL	9,39	2,48	3,52	2,79	1,20	4,64	1,75
LIQ	1,44	1,36	1,22	1,44	1,94	1,20	1,19
M2B	1,49	1,49	1,90	1,58	1,65	1,53	1,30
NDTS	1,33	1,40	1,29	1,67	1,27	1,40	1,56
PREV	1,49	1,17	1,13	1,07	1,59	1,02	1,28
PRO	1,92	2,62	1,59	2,50	1,91	2,14	2,95
SIZE	1,32	1,33	1,30	1,23	1,39	1,49	1,44
SMC	8,33	1,99	1,55	2,09	1,69	4,56	2,98
TAN	1,23	1,27	1,21	1,21	1,49	1,22	1,52
TS	1,47	2,44	2,53	6,11	6,82	9,54	5,54
Z	2,23	2,76	2,72	3,15	2,10	2,42	2,56
Mean VIF	2,70	1,93	1,77	2,07	2,29	2,83	2,27

Table 16 - Correlation matrix (Canada)

Variables	D2C (B)	D2C (M)	TAN	M2B	SIZE	PRO	LIQ	NDTS	EGRO	INFL	TS	CTR	SMC	Z	DIV	EV	AGE	PREV	INDU
D2C (B)	1.000																		
D2C (M)	0.766***	1.000																	
TAN	0.175***	0.247***	1.000																
M2B	-0.058***	-0.382***	-0.183***	1.000															
SIZE	0.187***	0.294***	0.197***	-0.285***	1.000														
PRO	-0.073***	-0.138***	0.109***	0.175***	0.084***	1.000													
LIQ	-0.402***	-0.372***	-0.123***	0.093***	-0.129***	-0.049***	1.000												
NDTS	0.111***	0.023**	0.074***	0.138***	-0.271***	0.129***	-0.150***	1.000											
EGRO	0.021**	-0.071***	-0.013	0.147***	-0.086***	0.021**	0.011	0.073***	1.000										
INFL	0.055***	-0.044***	-0.062***	0.183***	-0.184***	0.052***	0.006	0.209***	0.159***	1.000									
TS	0.170***	0.145***	-0.117***	0.065***	-0.166***	-0.043***	-0.104***	0.190***	-0.046***	0.174***	1.000								
CTR	-0.002	0.117***	0.060***	-0.223***	0.251***	-0.062***	0.047***	-0.174***	-0.231***	-0.432***	-0.063***	1.000							
SMC	0.027***	0.053***	0.002	-0.042***	0.040***	-0.011	0.006	0.002	0.020**	-0.013	-0.064***	0.117***	1.000						
Z	-0.360***	-0.430***	-0.125***	0.340***	0.016*	0.612***	0.188***	-0.143***	-0.026***	-0.031***	-0.154***	0.021**	-0.024***	1.000					
DIV	-0.050***	-0.097***	0.012	0.137***	-0.020**	0.148***	0.102***	-0.044***	0.053***	0.076***	0.013	-0.128***	-0.021**	0.023**	1.000				
RV	-0.008	-0.002	-0.001	-0.005	0.000	0.002	0.004	-0.001	0.042***	0.000	-0.009	0.006	0.009	0.001	-0.003	1.000			
AGE	-0.050***	0.065***	0.112***	-0.255***	0.322***	0.028***	-0.039***	-0.214***	-0.178***	-0.262***	-0.154***	0.233***	0.001	0.081***	-0.083***	0.001	1.000		
PREV	0.153***	0.114***	0.034***	-0.024***	0.041***	-0.015*	-0.064***	0.013	0.010	0.002	0.049***	-0.010	-0.013	-0.058***	-0.001	0.004	-0.017*	1.000	
INDU	0.325***	0.199***	0.079***	-0.057***	0.047***	-0.035***	-0.106***	0.052***	0.022**	0.045***	0.120***	-0.001	0.020**	-0.068***	0.008	0.003	-0.016*	0.091***	1.000

**** - Statistical significance at 1% level, ** - Statistical significance at 5% level, * - Statistical significance at 10% level*

Note: Assumption 3 – No Perfect Collinearity allows for correlation between dependent variables, as these are not utilised simultaneously in an estimation model

Assumption 5 - Homoscedasticity

As outlined in Chapter *5.2* Testing MLR Assumptions, a multitude of methods are utilised to test for homoscedasticity. First, *Figure 9* illustrates the residual plot for the explanatory variable Tangibility, in which there is a pattern of heteroscedasticity. In other words, at each value of Tangibility, the y-value appear to slightly decrease. Additionally, both the Breusch-pagan Lagrange multiplier test and White's test, presented in *Table 17* and *Table 18* respectively, complement this conclusion of heteroscedasticity by rejecting the null hypothesis of homoskedasticity, ultimately violating the fifth MLR assumption. Similar results are observed among the other G7 countries.

Figure 9 - Residual plot for Tangibility (Canada)

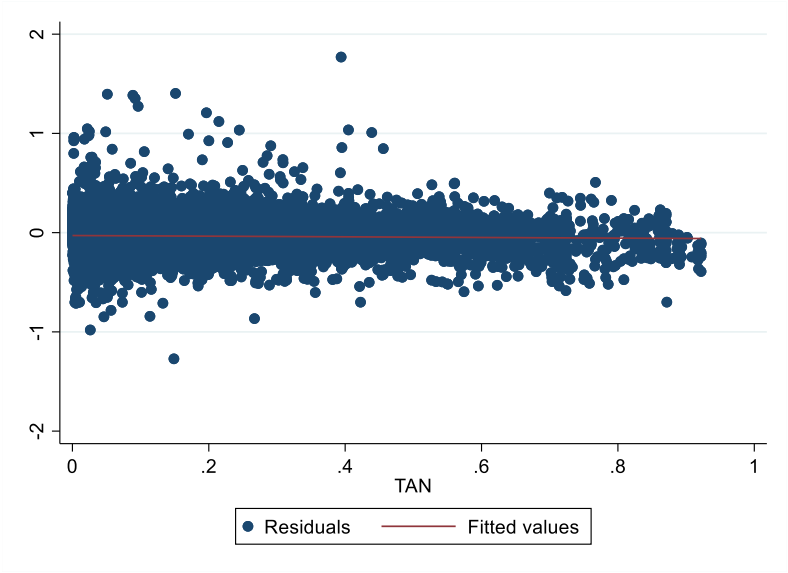


Table 17 – Breusch-Pagan Lagrange multiplier test (Canada)

Model	Chi^2	$Prob>Chi^2$
Debt-to-Capital (Book value)	115,43	0,00
Debt-to-Capital (Market value)	89,65	0,00

Table 18 - White's test (Canada)

	Book value			*Market value*		
Source	Chi^2	$Prob>Chi^2$	*df*	Chi^2	$Prob>Chi^2$	*df*
Heteroskedasticity	414,37	0,000	157	233,19	0,000	157
Skewness	66,50	0,000	17	30,70	0,022	17
Kurtosis	3,54	0,059	1	3,76	0,053	1
Total	484,41	0	175	267,66	0,000	175

Assumption 6 - Normality

The Normality assumption has been tested by first utilising a Kernel Density distribution illustrated in *Figure 10*. As the red and blue lines represent the normal distribution and the distribution of residuals respectively, one can observe how the residuals are close to normal distribution. This observation is complemented by plotting the quantiles of the regression model again the quantiles of normal distribution, illustrated in *Figure 11*, and using a standardised normal probability plot, seen in *Figure 12*. In both figures, the solid line represents the normal distribution, of which the dots representing the sample closely resembles. Additionally, a test for skewness and kurtosis has been utilised to further complement the previous conclusions. The test results observed in *Table 19* lead to the acceptance of the test`s alternative hypothesis of the residuals being normally distributed. Lastly, Wooldridge (2019) specifies the central limit theorem states that "*the average from a random sample for any population, when standardised, has an asymptotic standard normal distribution*" (p.724). In other words, with a large enough sample, the population distribution will equate to an asymptotic normal distribution. Hence, a sample size comprising a minimum of 800 observations per country should be satisfactory to consider the distribution an asymptotic normal distribution. Conclusively, all tests indicate the fulfilment of the normality assumption. This conclusion is also the case for the other G7 countries.

Figure 10 - Kernel Density distribution (Canada)

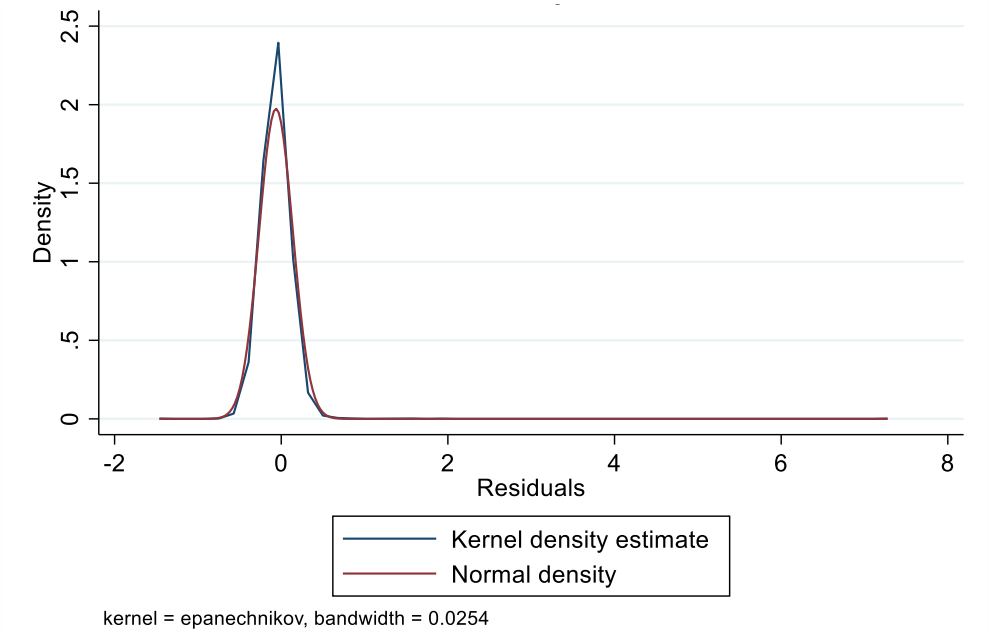


Figure 11 - Q-Q plot of the residuals from the estimation model against normal distribution (Canada)

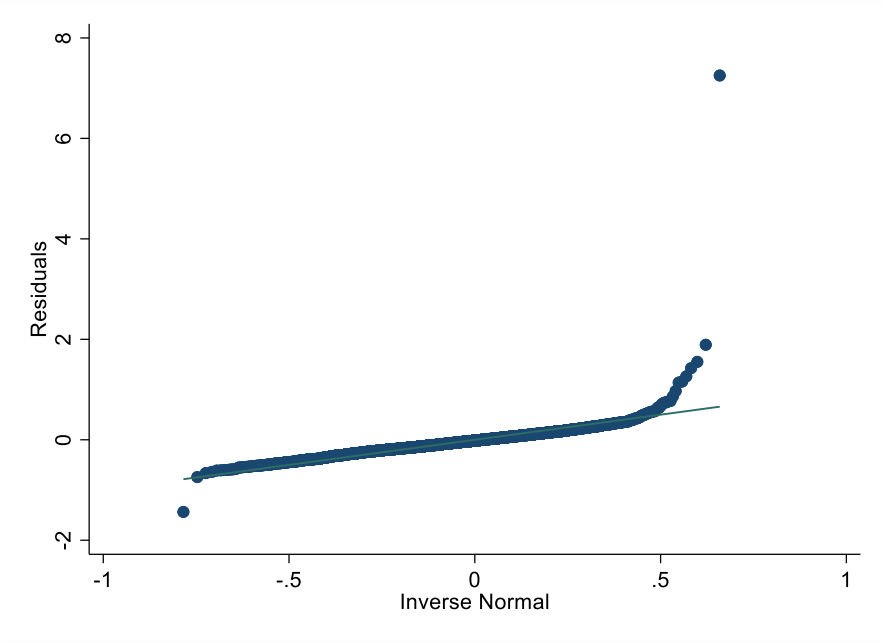


Figure 12 - Standardised normal probability plot (Canada)

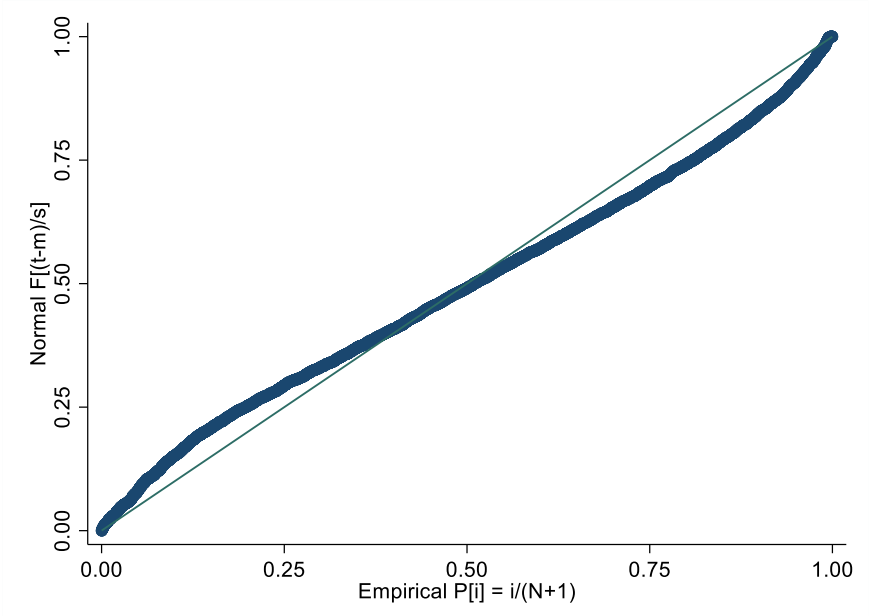


Table 19 – Skewness and Kurtosis test results (Canada)

Model	Obs	Pr(Skewness)	Pr(Kurtosis)	Adj. Chi^2	Prob>Chi^2
Debt-to-Capital (Book value)	800	0,000	0,018	30,28	0,000
Debt-to-Capital (Market Value)	811	0,000	0,035	117,33	0,000

Assumption 7 – No Autocorrelation

Lastly, to test for autocorrelation, the standard Wooldridge test has been utilised. Based on the test results provided in *Table 20*, the null hypothesis of zero autocorrelation in the estimation model is rejected for all countries. Hence, the assumption of zero autocorrelation appearing in the panel data is violated.

Table 20 - Wooldridge Test Results for Serial Correlation (Autocorrelation)

Country	Model	F	Prob>F
Canada	D2C (B)	76,564	0
	D2C (M)	39,507	0
France	D2C (B)	4,557	0,034
	D2C (M)	44,227	0
Germany	D2C (B)	57,969	0
	D2C (M)	65,851	0
Italy	D2C (B)	52.964	0
	D2C (M)	30,943	0
Japan	D2C (B)	42,245	0
	D2C (M)	57,222	0
United Kingdom	D2C (B)	73,572	0
	D2C (M)	65,096	0
United States	D2C (B)	96,139	0
	D2C (M)	39,99	0

10.6 Summary of Significant Regression Findings

Table 21 - Summary of Main Findings

	Debt-to-Capital		Is the H_1 accepted?		Theory	
	Book Value	Market Value	Book Value	Market Value	Book Value	Market Value
Tier 1						
Firm-level Factors						
TAN	+	+	Yes	Yes	TT	TT
M2B	-	-	. /Yes	Yes	All Three	All Three
SIZE	+	+	Yes	Yes	TT	TT
PRO	-	-	Yes	Yes	IAT	IAT
LIQ	-	-	Yes	Yes	IAT	IAT
NDTS	+	+	No	No	.	.
Tier 2						
Country-level Factors						
EGRO	.	-	No	No	.	IAT, MTT
INFL	+	+	Yes	Yes	TT, MTT	TT, MTT
TS	-/+	-/+	Yes/No	Yes/No	TT, MTT / TT	TT, MTT / TT
CTR	-	-	Yes	Yes	TT	TT
SMC	-/+	+	Yes/No	No	MTT / TT	TT
Firm-level Factors						
Z	-	-	Yes	Yes	IAT	IAT
DIV	-	-	Yes	Yes	IAT	IAT
RV	-/+	+	Yes/No	No	TT, IAT	IAT
AGE	+	+	Yes	No	TT	TT
PREV	-/+	+	No/Yes	Yes	. / TT	TT
INDU	+	+	Yes	Yes	TT, MTT	TT, MTT
Most accurate theory					TT	TT

Note: TT = Trade-off Theory, IAT = Information Asymmetry Theory (Pecking Order Theory), MTT = Market Timing Theory.