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MASTER THESIS

CEO CHARACTERISTICS AND CAPITAL STRUCTURE OF FIRMS

A STUDY OF CEO'S DECISION-MAKING POWER

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"Frustration is a matter of expectation."

— Luis von Ahn

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"Frustration is a matter of expectation". This thesis represents the final product of a research project that has received most of my attention for the better part of seven months. Looking back, this thesis is the finalization, not only of my M.Sc. in Business Administration, but also the end of an amazing and interesting process characterized with hardship, learning and personal growth. Consistent focus and hard work are only part of the story and, truthfully, I would not have been able to deliver this thesis had it not been for the following people.

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ABSTRACT

This thesis examines the moderating effect of CEO power on the relationship between, on the one hand, the inherent CEO characteristics gender, age, and functional experience and, on the other hand, financial book and market leverage. This thesis extends the literature by documenting that different power dimensions can have opposite moderating effects for these inherent CEO characteristics. A total of 230 firms, corresponding to 418 unique CEOs, over 9 years (2007 - 2015) is extracted from the Orbis database, in addition to DEF-14a proxy filings, to conduct the analysis. This thesis utilizes various econometric estimation techniques to find the following results. First, a *negative* interaction between female CEOs and structural power which is *positive* when interacted with prestige power. Second strong support for the *positive* interaction between age and ownership power as well as the *negative* interaction between age and structural power. Lastly, some support is also found for the *negative* interaction between financial expertise and ownership power which is *positive* for financial expertise and structural power. The results are fairly robust against often cited problems of self-selection and endogenous-matching using a variety of econometric estimation techniques. The results in this thesis may be of interest to shareholders, and policy makers might leverage the findings to improve the performance of CEOs and their potential under-diversified influence in the top management team. Future research is needed to understand differences stemming from various power dimensions, independent of the preferences imposed through gender, age, and functional experience.

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ACRONYMS

CEO Chief Executive Officer

CFO Chief Financial Officer

US United States

TMT top-management team

EDGAR Electronic Data Gathering, Analysis, and Retrieval

OLS ordinary least squares

MLE maximum-likelihood estimation

FE fixed-effect estimation

RE random-effect estimation

SE standard error

PSM propensity score matching

DiD difference-in-difference

2SLS two-stage least squares

CPI consumer price index

GES gender equality score

VIF variance inflater factor

MBA Master of Business Administration

PCA principal component analysis

ROE return on equity

ROA return on assets

EBIT earnings before interest and taxes

GDP gross domestic product

SIC standard industrial classification

SEC Security Exchange Commission

1 INTRODUCTION

1.1 DEFINITION OF THE TOPIC AND BACKGROUND

The Dutch pioneered various financial innovations such as equity shares, exchanges (organized markets), and the first *"limited liability"* corporation (Petram, 2014). As early as the 1600s, the Dutch East India Company sold shares of stock on the Amsterdam Stock Exchange to share the financial risk of dangerous voyages in pursuit of exotic, valuable specimens. Each share of stock entitled the owner to a percentage of the trade proceeds, similar to the corporations in business today.

Interestingly, even back then, the Dutch East India Company was characterized by conflicts between non-managing shareholders, or "participants", and managing (controlling) shareholders, known as the "Lords Seventeen". Indeed, during this time, the first governance disputes and acts of shareholder activism were documented (Mueller, 2012). Those so-called "agency" problems are, as described in the literature, the logical consequence of separating ownership and control (Jensen & Meckling, 1976). Today, approximately 400 years later, little has changed considering the fact that managers still make decisions that are not always in the best interest of shareholders. Consider the unauthorized accounts scandal at Wells Fargo, for instance, or the monkey business at Volkswagen regarding the illegally installed emission reducing software, those scandals resulted in share price drops of 10% (Egan, 2016) and 23% (Kresge & Weiss, 2015), respectively.

A firm is essentially a nexus of contracts between participants, each of whom with a claim on the firm's assets (Jensen & Meckling, 1976). That is to say, the separation of ownership and control (i.e. limited liability corporation) causes 'business' and 'owners' to become separate entities where ownership is determined by an investor's equity share. This share resembles the investor's claim on the firm's assets. Various parties have a claim on these assets proportional to the capital supplied and relative to the priority of their claim[1]. The total configuration of capital supplied is also known as the capital structure which constitutes the relative quantities of different forms of financing (e.g.: equity, debt, lease contracts, trade credits and warrants) necessary to procure and maintain (cash-flow generating) assets. The two overarching groups under which each form of financing can be categorized are 'equity' and 'liabilities'. The sum of equity and liabilities, by definition, equates to the total amount of assets. A firm, therefore, can be conceptualized as a network of contractual relationships among various claimants (Jensen & Meckling, 1976).

It follows, then, that subject to a variety of different owners, misaligned interests can result in suboptimal financing decisions. Such misaligned interests are often contributed to classic economic assumptions about human tendencies such as rationality, being self-interested, risk-averse, and opportunistic (Eisenhardt, 1989). As a result, managers (i.e. agents) focus on maximizing their personal utility function rather than, as is expected by (naive) shareholders (i.e. principals), firm value.

1 That is to say, by law, when bankruptcy is declared in the United States (i.e. Chapter 7 is filed), the different parties are paid in accordance to the priority of their claim which depends on the amount of risk taken.

For instance, an owner-manager who, *ex ante*, owns all equity, bears all costs and benefits (e.g.: business and non-business related spending) associated with the decisions he or she makes. However, when additional finance for some investment project is required, the owner-manager may sell part of the equity to an outside investor which, *ex post*, creates an agency problem, assuming the outside investor is passive (i.e. does not have the resources or incentive to monitor the owner-manager). The costs and *business* benefits associated with the decisions made are now shared while the benefits from *non-business* spending are still, and only, enjoyed by the owner-manager. The owner-manager may build a "plushy" office or buy unnecessary expensive computers to play with, for instance. Unless the outside investor is able to monitor the owner-manager consistently, the owner-manager has latitude to satisfy personal incentives and, correspondingly, maximize his or her personal utility function rather than firm value. Granted, this is an oversimplistic example yet it offers intuitive exposition of how ownership and capital are potentially related.

1.2 IDENTIFYING THE RESEARCH GAP

The firm's capital structure is not a novel topic. Indeed, the subject has received interest from many scholars over the last sixty plus years. Over the years, many different theories have been developed yet a "sole theory" of capital structure is still missing. Firms and their capital structures are heterogeneous and, hence, some scholars argue that a sole theory does not exist (Myers, 2001). Depending on context and firm characteristics a particular theory can be more applicable than another.

The *main*[2] finance theories of capital structure are trade-off theory (advanced from Modigliani and Miller (1958)'s Irrelevance theorem), pecking order theory (spearheaded by Myers and Majluf (1984) and Myers (1984)), and the "theory of ownership structure" (Jensen & Meckling, 1976, p.305) which encompasses concepts of contracting, agency, and finance theory. Jensen and Meckling (1976) are among the first authors whom incorporated the behavior of agents and principals and related (misaligned) interests in the capital structure literature.

In contrast to trade-off theory and pecking order theory, the theory of ownership structure focuses on relative amounts of *ownership claims* by insiders (managers) and outsiders (non-managing investors), rather than relative quantities of various forms of financing. The illustration as to how firms are managed, described by the theoretical model of Jensen and Meckling (1976), does oversimplify reality. Most publicly traded firms are managed, not by a sole entrepreneur-manager, but a whole top-management team (TMT) (Haleblian & Finkelstein, 1993). The original theory of Jensen and Meckling (1976) may, therefore, fall short in providing relevant explanations in particular, arguably more realistic, contexts. That is to say, major corporate decisions can either be made by the Chief Executive Officer (CEO) or can be the product of consensus among the top executives (i.e. TMT) (Adams, Almeida, & Ferreira, 2005). A managerial theory that offers explanations, amongst others, as to how the capital structure is determined and that incorporates the whole TMT is the 'upper echelon theory' developed by Hambrick and Mason (1984).

2 Other theories related to capital structure yet cited less frequently include: market timing theory (Baker & Wurgler, 2002), signaling theory (Ross, 1977), stakeholder co-investment theory (Titman, 1984), corporate control theory (Harris & Raviv, 1988; Stulz, 1988), and game theory (Brander & Lewis, 1986).

Upper echelon theory argues that decisions made by the most powerful actors (i.e. top executives) in the firm resemble their personality traits, values and cognitive processes[3]. Indeed, especially non-programmable decisions with unpredictable outcomes tend to have a closer resemblance with top manager's cognitive bases than a well-calculated solution to value maximization or cost minimization problems (Hambrick & Mason, 1984). Older top managers, to take a case in point, may adopt particular financial policies because they value security over uncertainty, or might make decisions in accordance with their reduced physical and mental stamina.

However, if decisions are made by the whole TMT, the influence of those demographic indicators are most likely not evenly distributed among the top executives. Furthermore, there is increasing evidence that studying the whole TMT, collectively, causes scholars to overlook important individual-level effects (e.g.: Bertrand and Schoar, 2003), as well as asymmetries that can arise in the TMT (Carpenter, Geletkanycz, & Sanders, 2004). In response, scholars have started to examine individual characteristics, especially those of the CEO (e.g.: Huang and Kisgen, 2013; Custódio and Metzger, 2014; Serfling, 2014; Faccio, Marchica, and Mura, 2016). This essentially means that an *implicit* assumption is made regarding the asymmetry alluded to by Carpenter et al. (2004) where the CEO, as highest ranking executive, is most powerful and his or her characteristics are, therefore, more likely to affect corporate decision-making. However, power is a multi-dimensional construct (Finkelstein, 1992) that should not simply be dialed down to an implicit assumption based on rank. To illustrate my point, Bigley and Wiersema (2002) have found that heir apparents have different impacts on strategic refocusing for *different forms* of power. Therefore, *explicit* treatment of power in relation to inherent CEO characteristics might offer valuable new insights for asymmetries in the upper echelons.

To recap, all major corporate decisions are either made by the CEO or are the product of consensus in the TMT (Adams et al., 2005). Since the TMT is the information-processing center of the firm (Thompson, 1967), one could argue that firms have inefficient information-processing when the CEO is able to make all major decisions (Haleblian & Finkelstein, 1993). One of the constructs, as identified in the literature, that reduces information processing and, subsequently, increases the influence (i.e. asymmetries) of the CEO is decision-making power, or dominance[4]. An example of an asymmetry in corporate decision-making caused by power might be the following. Eisenhardt and Bourgeois (1988) argue that dominant CEOs could restrict the flow of information, which would nullify the contributions of the other top executives (Haleblian & Finkelstein, 1993) or proposed ideas that contrast with the objectives of the dominant CEO (Hambrick & D'Aveni, 1992). The severity of this problem is acknowledged by Adams and Ferreira (2007) who argue that CEOs with too much power can create a moral hazard when their preferred projects deviate from what shareholders find optimal.

Various studies have documented statistically significant relationships between CEO power and different corporate outcomes[5]. Veprauskaitė and Adams (2013) find that CEO power is negatively related to the firm's financial performance. Adams et al. (2005) find

3 It is common to observe a demographic indicator (e.g.: age, functional experience, ethnicity, gender) as proxy for those underlying processes.

4 CEO power, decision-making power and dominance are used interchangeably in the literature but refer to the same construct, the ability of the CEO to exert his or her will (Finkelstein, 1992).

5 Important to note is the difficulty inherent in the operationalization of "power" and that empirical studies employ different measures to proxy for this construct. Chapter 3 will further elaborate on the inherent problems associated with measuring the construct of power.

that stock returns are more volatile for firms run by powerful CEOs. Bebchuk, Cremers, and Peyer (2011) find that CEO power results in lower firm value, lower accounting profitability, lower quality of acquisition decisions, higher chance of opportunistically timed option grants, lower CEO turnover, and lower stock market returns. Jiraporn, Chintrakarn, and Liu (2012) find that the impact of changes in the capital structure on firm performance are more negative when the CEO is powerful. Chintrakarn, Jiraporn, and Singh (2014) and Li, Munir, and Karim (2017) document a non-linear relationship between CEO power and leverage.

While the relationship between CEO power and several corporate outcomes is apparent, the mentioned studies all neglect the underlying effect of *inherent* CEO characteristics put forth, for instance, in the upper echelon theory, as important determinants for corporate decision-making. That is to say, the observed relationships are all build on the idea that CEO power drives corporate outcomes, as power causes asymmetry in decision-making (Carpenter et al., 2004), where offered explanations are all grounded in the agency perspective, which mainly offers economic arguments for human behavior (e.g.: Veprauskaitė and Adams, 2013; Jiraporn et al., 2012).

However, building on the work of Hambrick and Mason (1984), it is plausible that the influence of inherent manager characteristics, which proxy for various traits, values, and cognitive processes, also become stronger when sufficient accumulated power causes the decision process to become asymmetric. Thus, while power serves as modifier for manager's ability to maximize personal utility by, for instance, lowering debt to increase free cash flow, prior studies have not adequately accounted for inherent manager characteristics as relevant drivers of utility (e.g.: Jiraporn et al., 2012; Li et al., 2017).

Granted, Li et al. (2017) do point out the fruitful potential of including gender, age, and the effects of functional experience. This is an interesting observations because Frank and Goyal (2007) and Graham, Harvey, and Puri (2013), amongst others, also argue that it has been well documented that especially age, gender, and functional experience are important inherent manager characteristics that influence the capital structure. In sum, integrating the (often employed) agency perspective and upper echelon perspective in context of inherent CEO characteristics and power may, therefore, provide complementary insights in the firm's capital structure.

In conclusion, while the importance of CEO power (Adams et al., 2005; Veprauskaitė & Adams, 2013) and the inherent manager characteristics gender, age, and functional experience (Bertrand & Schoar, 2003; Frank & Goyal, 2007; Serfling, 2014; Custódio & Metzger, 2014; Faccio et al., 2016) for the capital structure is evidenced in the literature, the *explicit* treatment of a potential modifying effect of power (Carpenter et al., 2004) has not yet been studied. As a result, it would be interesting to have further information on how CEO[6] power moderates the relationship between inherent CEO characteristics and capital structure outcomes. Since gender, age, and functional experience are well-documented and often cited characteristics (e.g.: Frank and Goyal, 2007), focus is specifically given to those characteristics in this thesis.

6 This thesis focuses solely on the CEO. Initially, I considered examining both the CEO and Chief Financial Officer (CFO) and examine how the relationship might differ, similar to the approach of Frank and Goyal (2007). Though, since the manager-specific data needed to be hand-collected one-by-one and the majority of power and manager characteristic studies focus on the CEO, I decided to also focus solely on the CEO. So too, based on the reviewed literature, I have not found a theoretical basis that supports the idea that CFO characteristics are influencing strategic decisions which are moderated by power.

1.3 RESEARCH QUESTION AND OBJECTIVES

Based on reviewed literature, it is unclear how CEO power affects the relationship between inherent manager characteristics (gender, age, and functional experience) and the capital structure. The aim of this thesis is to extent the current body of literature by examining the inclusion and moderating effect of CEO power in the relationship between inherent manager characteristics and capital structure outcomes. Accordingly, I propose the following research question:

Research question. "To what extent can CEO power affect the relationship between *inherent* CEO characteristics and firm's capital structure?"

To answer the research question, the following subquestions are proposed:

I What is the relation between CEO gender and leverage and how (if at all) is the relationship between CEO gender and leverage moderated by CEO power?
II What is the relation between CEO age and leverage and how (if at all) is the relationship between CEO age and leverage moderated by CEO power?
III What is the relation between CEO functional experience and leverage and how (if at all) is the relationship between CEO functional experience and leverage moderated by CEO power?

This thesis focuses on the United States (US) for various reasons. First, the Security Exchange Commission (SEC) maintains the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system which enables efficient search of Def-14a proxy fillings which is especially beneficial since CEO-related variables need to be hand-collected. Second, the US has a unique cultural context with emphasis on 'individualism' and 'mastery' of the social environment (Chui, Lloyd, & Kwok, 2002). Lastly, the US, as a market-oriented economy, is also characterized with high investor protection (Antonczyk & Salzmann, 2014), low creditor rights, and high quality of law enforcement (Antoniou, Guney, & Paudyal, 2008), which make it an interesting institutional setting for capital structure research.

To the best of the author's knowledge there are currently no published studies that examine how the inherent manager characteristics gender, age, and functional experience, in relation to the capital structure, are moderated by CEO power. To put it differently, no prior research estimates how power affects the direction (or strength) of this relationship. On a final note, of the existing published literature, this thesis is closest in spirit to Bigley and Wiersema (2002), Custódio and Metzger (2014), Serfling (2014), Faccio et al. (2016), Jiraporn et al. (2012), Chintrakarn et al. (2014), and Li et al. (2017).

1.4 CONTRIBUTIONS AND RELEVANCE

The results of this thesis contribute to the literature in the following ways. First, data used in previous studies on CEO power does not extent further than the year 2013 (e.g.: Jiraporn et al., 2012; Veprauskaitė and Adams, 2013; Chintrakarn et al., 2014; Li et al., 2017), this thesis uses a new, more current dataset extending to 2015. Second, this thesis enriches the stream of research papers on capital structure determinants (e.g.: Titman

and Wessels, 1988; Frank and Goyal, 2009; Faulkender and Petersen, 2006). Existing studies have explored conflicts of interest between various claimants (including managers) (e.g.: Jensen and Meckling, 1976; Berger, Ofek, and Yermack, 1997; Pindado and de La Torre, 2011), the problems of asymmetric information (e.g: Myers and Majluf, 1984; Baker and Wurgler, 2002), the effects of market competition (e.g.: Brander and Lewis, 1986), the effects of the nature of products (e.g.: Titman, 1984), and the effect of corporate control threats (e.g.: Stulz, 1988; Harris and Raviv, 1988). Yet, the personal values and cognitive bases of powerful actors in the firm have not been examined in relation to the capital structure to such extent. Third, this study adds to the stream of literature that examines the importance of managers and their characteristics (e.g.: Bertrand and Schoar, 2003; Frank and Goyal, 2007; Malmendier, Tate, and Yan, 2011; Serfling, 2014; Custódio and Metzger, 2014; Faccio et al., 2016). Fourth, this thesis builds on the works of Hambrick and Mason (1984) and the advancements of Carpenter et al. (2004) by examining the moderating effects of power in the relationship between manager characteristics and leverage. Lastly, this thesis provides new evidence for listed firms from the US.

The results of this thesis could be relevant for practitioners (e.g.: investors, analysts, and different claimants of the firm). For those individuals/parties it could be relevant to know what kind of influence manager characteristics have on capital structure outcomes, and how this varies with different levels of decision-making power. Information is valuable and knowing certain effects exist can help make governance practices more directed and effective. In essence, the findings could be used to inform policy development initiatives for balancing CEO's decision-making power as this thesis brings to light how power moderates the relationship between CEO characteristics and leverage.

1.5 OUTLINE OF STRUCTURE

The remainder of this thesis is as follows. Chapter 2 provides an extensive overview of the theoretical and empirical literature of capital structure, manager characteristics and power. The last part of the literature review introduces the hypotheses. Chapter 3 describes the methodology; empirical models and estimation methods that are applied. Then, to ensure validity and reliability of results, potential statistical problems such as heterogeneity, multicollinearity, autocorrelation and endogeneity are discussed. Lastly, a conceptualization and operationalization of the dependent, independent, moderating, and control variables is given. Chapter 4 describes the search criteria for the data including the data sources. Then, a description of the sample is given and potential modifications are discussed such as outliers and missing data values. Furthermore, Chapter 4 also discusses the descriptive statistics. Chapter 5 starts with describing the different empirical models and the corresponding implications of the results are discussed. Finally, Chapter 6 concludes with a brief summary followed by an answer to the research question and limitations of the thesis. Furthermore, some fruitful avenues for future research are suggested. Each chapter starts with a brief description of the various sections and associated content. On a final note, the appendices are divided in four chapters, one related to the literature review, one related to the methodology chapter, one to the data chapter, and one to the results chapter.

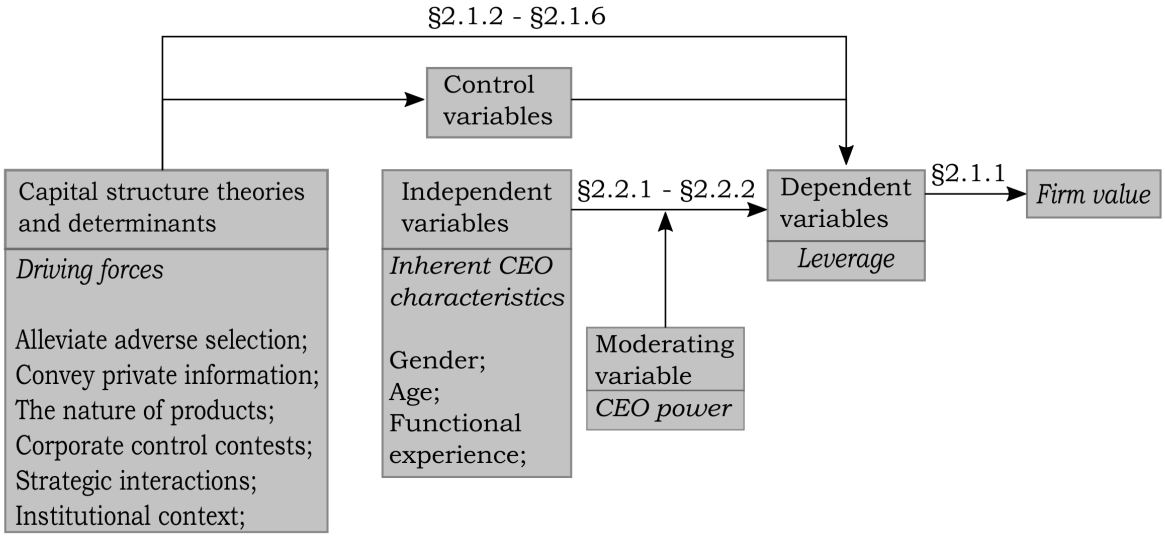
2 LITERATURE REVIEW

Figure 1 displays how the literature review is structured and where relevant information can be found. The first part (§2.1.1) elaborates on the theoretical and practical relevance of the capital structure literature (i.e. arrow between dependent variable and firm value). The next part (§2.1.2 through §2.1.6) introduces various driving forces from theoretical papers as well as the validation from empirical studies[1] (i.e. arrow between capital structure theories and determinants and dependent variable). This part is especially important for determining the control variables (see Chapter 3) since those should be based in relevant theory (Atinc, Simmering, & Kroll, 2012).

The second part of the literature review (§2.2.1 through §2.2.2) evaluates the theories relevant for the independent, and moderating variables (i.e. arrow between independent, moderating and dependent variable). The first part (§2.2.1) takes an agency approach and focuses on various conflicts of interest among groups with claims on the firm's assets (e.g.: managers and investors), (economic) incentives, and remedies that have been documented in the literature. The second part (§2.2.2) introduces the upper echelon theory of Hambrick and Mason (1984) and related theoretical and empirical studies.

Since §2.2.1 does not incorporate any manager-specific effects and corresponding decision-making rationale, it is complementary to §2.2.2 which specifically focuses on manager-specific effects (i.e. manager characteristics) and corresponding incentives. Those incentives are mostly driven by preference rather than economic incentives such as in the agency perspective. In the end, after extensively having reviewed the literature, hypotheses are developed in the last part of chapter 2.

Figure 1: Framework of the literature review.



1 As pointed out by Harris and Raviv (1991), results should be interpreted with caution as leverage and relevant independent variables can be measured in a variety of ways. For instance, a particular operationalization of leverage may include account payables, account receivables, and cash, whereas others may not. Moreover, some independent variables serve as proxy which are inherently difficult to interpret.

2.1 CAPITAL STRUCTURE

The capital structure constitutes the relative quantities of different forms of financing (e.g.: equity, debt, lease contracts, trade credits and warrants) necessary to produce and maintain (cash-flow generating) assets. This section (§2.1.1) first argues for the theoretical and practical relevance of the capital structure. The subsequent sections (§2.1.2 through §2.1.5) describe various theoretical models and corresponding empirical findings that illustrate driving forces behind firm's capital structure. To maintain focus, additional information regarding certain theoretical models or information less relevant for building the hypotheses, are included in Appendix A. The final section (§2.1.6) introduces the importance of considering the institutional context and illustrates why results cannot simply be generalized.

2.1.1 *The relevance of the capital structure*

The seminal paper of Modigliani and Miller (1958) shows that capital structure decisions are irrelevant for firm value under certain assumptions. Over the years, many academics have challenged these assumptions and have concluded that the capital structure is, in fact, relevant for firm value. As a result, various theoretical models and empirical determinants have been identified.

2.1.1.1 *The irrelevance theorem*

Over the years, a variety of theories has been developed to explain why capital structures differ between firms and vary over time. The beginnings of this stream of literature can be traced back to the 1950s. Motivated by a lack of adequate theory, Modigliani and Miller (1958) set out to develop a theory that would link the capital structure to a firm's market valuation.

Starting with a set of simplifying assumptions[2], necessary to grapple the complexity of the problem, Modigliani and Miller (1958) derived the famous capital structure *irrelevance theorem*. The irrelevance theorem states that the true value of any firm is independent of how it decides to finance its assets. In fact, even incorporating the existence of tax deductible interest payments and multiplicity of bonds and interest rates, does not alter this conclusion. Instead, firm value is derived from capitalizing the expected returns and is independent of how a firm decides to finance its activities.

Since the publication of the irrelevance theorem, various academics have scrutinized the 'simplistic' assumptions and, correspondingly, have extended and improved the initial model of Modigliani and Miller (1958, 1963)[3]. In the end, scrutiny of the irrelevance theorem led to a variety of theoretical models explaining how and by what force capital structure decisions are driven, as alluded to in the beginning of this chapter.

2 Modigliani and Miller (1958) made the following assumptions: (1) all physical assets are owned by firms, (2) firms can be divided in classes with equivalent returns and are homogeneous within each class, (3) markets are perfect, (4) all bonds are assumed to yield a constant income per unit of time, (5) income is certain, (6) there are no taxes and transaction costs, and (7) average profit is finite and represents a random variable subject to a probability distribution.

3 The 1963 paper corrects a mistake from the 1958 paper. In the 1958 paper, the authors stated that the market value of firms must be proportional to the expected returns, net of taxes and in equilibrium. However, as corrected in the 1963 paper, the market value must also be a function of the level of leverage.

2.1.1.2 *Debt and taxes*

In Modigliani and Miller (1958)'s originally proposed model, assuming away the costs of bankruptcy implied that firms should be fully leveraged because there are no detrimental consequences of being so, only the benefits of tax deductible interest payments. Dissatisfied with this implication, Scott Jr (1976) developed an improved model. Scott Jr (1976)'s model assumes that operating profits are independent of the level of secured debt and, hence, managers can always increase firm value by issuing debt, as long as the debt is secured[4]. Ultimately, the model predicts that debt is an increasing function of liquidation value, corporate tax rate, and firm size (i.e. the model predicts that liquidation value, corporate tax rate, and firm size are positively related to a firm's level of debt). Important to understand is that the model of Scott Jr (1976), like the other models in this section, are static one-period models. What follows are the empirical validations of Scott Jr (1976)'s proposed relevant firm characteristics.

An indicator for liquidation value is the number and representing value amount of tangible assets (Frank & Goyal, 2009). The underlying premise is that tangible assets, compared to intangible assets, can more accurately be measured (valued) and, therefore, have a higher liquidation value. Empirical support is found for this interpretation. Lemmon, Roberts, and Zender (2008) analyze a large sample of non-financial firms over the period 1965 to 2003 and find a statistically significant positive relation between tangibility, measured as net plant, property and equipment scaled by total assets (book value), and leverage. Likewise, Frank and Goyal (2009) study a large sample from 1950 to 2003 and observe similar results. In fact, Frank and Goyal (2009) even consider 'tangibility' to be one of the core determinants of capital structure.

Regarding the corporate tax rate, while tax deductible interest payments are often documented as an advantage of taking on debt, diverse results have been found empirically. Using a variety of models, Frank and Goyal (2009) find mixed results depending on the inclusion of other variables (e.g.: industry median leverage) which is likely caused by inter-variable correlation. Conversely, Li et al. (2017) do observe a statistically significant positive relation which supports the theoretical prediction of Scott Jr (1976). The fact that most empirical studies have found mixed results and that many studies do not even control for corporate tax rate (e.g.: Baker and Wurgler, 2002; Pindado and de La Torre, 2011) is understandable given the complexity of tax codes. These difficulties make it extremely challenging to accurately measure the construct of interest, the actual net tax benefit received from an additional dollar of debt.

Regarding firm size, Scott Jr (1976) is not explicit as to how firm size affects leverage. Empirically, though, papers provide the following explanations. First, larger firms are less likely to default, this prediction has received most empirical support. The rational is that smaller firms tend to be less diversified which increases their probability of default and, subsequently, decreases the ability to carry debt because, if interest obligations cannot be met, bankruptcy is the result (Titman & Wessels, 1988). A complementary explanation is that larger firms have lower issue cost and managers could, therefore, be more inclined to issue debt (Faulkender & Petersen, 2006). Empirically, Frank and Goyal (2009) find a statistically significant positive relation and conclude that firm size (natural logarithm of assets) is one of the core determinants of capital structure. To take another

4 The intuition is that secured debt requires some underlying collateral (usually fixed assets) which increases the firm's liquidation value.

case in point, Faulkender and Petersen (2006) study a large sample between 1986 and 2000 and also find a significant positive relation between firm size (natural logarithm of market assets) and leverage. Though, when 'debt rating' is included the effect of size changes and becomes negative which is likely due to inter-variable correlation.

While academics such as Scott Jr (1976) argue for the relevance of financing decisions and the existence of an optimal capital structure derived from equating marginal costs (e.g.: bankruptcy costs, agency costs) and marginal benefits (e.g.: tax deductible interest payments, agency benefits), Miller (1977) opposes this belief for the following reasons. First, the downsides of debt (i.e. the agency and bankruptcy costs) are disproportional to the value of tax shields. Second, when personal taxation and equilibrium conditions are included, investors should be indifferent between debt or equity financing (Miller, 1977). The foundation of the latter argument rests on the observation that differences in personal taxation have to be compensated for with before-tax returns to maintain an equilibrium. To put it differently, in equilibrium, when stocks have lower taxation, bonds should have higher before-tax returns, otherwise no *rational* investor would want to hold bonds. Then, considering personal tax rates and the equilibrium criteria, the irrelevance theorem still holds (Miller, 1977)[5].

In response, DeAngelo and Masulis (1980) illustrate how and why the arguments made by Miller (1977) are incomplete and sensitive to simple modifications in the corporate tax code. For instance, while Miller (1977) does consider the differences in personal tax rates, substitutes for tax deductible interest payments are not considered[6]. Examples of substitutes are 'tax investment credits' and 'depreciation reductions'. This "simple" modification overturns the conclusion of Miller (1977) and implies the existence of an unique optimal capital structure and, hence, its relevance for firm value.

Ultimately, the theoretical model of DeAngelo and Masulis (1980) makes the following predictions. First, firms select debt levels that are inversely related to the amount of tax shield substitutes. Second, capital structure decisions are relevant for firm value. Third, an increase in corporate tax rates lead firms to substitute debt for equity. Fourth, changes in corporate tax code that decrease tax shield substitutes will increase the amount of debt. Lastly, a decrease in marginal bankruptcy costs increases the use of debt. Empirically, mixed results have been documented for these variables.

Regarding non-debt tax shields, the results of Frank and Goyal (2009) show that non-debt tax shields such as investment tax credits and depreciation vary in significance depending on the other variables included in the model. In contrast, Berger et al. (1997) do observe statistically significant negative relations between non-debt tax shields and leverage. No statistically significant support for non-debt tax shields is found by Titman and Wessels (1988), who contribute this to their measurement and the inherent difficulty in accurately measuring non-debt tax shields. They argue that their non-debt tax shield measure represents tax deductions which are not net of the true economic depreciation and expenses.

5 Miller (1977) also coins the "*neutral mutation*" hypothesis. This hypothesis argues that firms pursue financing strategies with no material effect on firm value (i.e. as long as a particular financing strategy does not hurt, no one cares to change it).

6 Specifically, Miller (1977) only analyzes the present value of the marginal value of debt (present value of substituting debt for equity, given full utilization of the corporate tax deductions associated with the marginal unit of debt multiplied by the probability of full utilization). In contrast, DeAngelo and Masulis (1980) add the present value associated with the non-debt tax shields and, correspondingly, the associated loss of debt tax shields, multiplied by the appropriate probabilities.

Regarding bankruptcy costs, managers are believed to balance the costs of bankruptcy and the benefits of tax deductibles. Naturally, when the probability of bankruptcy is high, debt financing is not preferred because of covenant restrictions and, more importantly, the pressure and disciplinary force of debt obligations (Harris & Raviv, 1990). As proxy for bankruptcy, financial distress, or bankruptcy costs, empirical studies often use risk and volatility measures.

For instance, Frank and Goyal (2009) use the variance of stock returns to measure the relation between leverage and risk and find a statistically significant negative effect. Likewise, Faulkender and Petersen (2006) use volatility of equity multiplied by the equity-to-asset ratio, and Lemmon et al. (2008) use volatility of cash flows, and both find a statistically significant negative relation.

In conclusion, the previous part elaborated on the relevance of capital structure and various important determinants. The arguments made in this section allude to some sort of firm-specific trade-off in which firms balance various (marginal) costs and (marginal) benefits associated with debt, conditional on specific firm-specific characteristics such as size, tangibility of assets, and risk. It follows, that when managers are (unbounded) rational and behave in the best interest of shareholders (i.e. maximizing firm value), firms would hold an optimal capital structure where the marginal benefits equate to the marginal costs. This idea where firms are said to "trade off" costs and benefits is known as the (static) trade-off theory of capital structure. However, most firms plan their financing for the long term and, as a result, debt obligations often last longer than a single period. In response, scholars have modified the static trade-off theory into a dynamic trade-off theory which takes multiple time periods in consideration.

2.1.1.3 *Capital structure dynamics*

The previously discussed theoretical models are static one-period models that ignore time effects and potential transaction and restructuring costs associated with changing the capital structure. Yet, a firm's level of debt, or supposed long deviations from optimal, can also be the result of expensive recapitalization costs (Myers, 1984; Fischer, Heinkel, & Zechner, 1989). Accordingly, Fischer et al. (1989) develop a theoretical model that examines the dynamic aspects of the financing decisions (i.e. *dynamic* trade-off theory).

The model works according to the following recapitalization boundary conditions. On the one hand, when the value-to-debt ratio (i.e. the market value of un-levered assets to the face value of debt) increases, leverage drops and the firm forgoes a potential increase in tax shield. On the other hand, when this value-to-debt ratio decreases, leverage rises and the firm recapitalizes to avoid (potential) bankruptcy. Accordingly, rather than an optimal *target*, firms are believed to have an optimal *range* and recapitalization is only initiated when the boundaries are reached. Ultimately, the model makes the following predictions. Firms with a wide range of debt ratios have low effective corporate tax rates, high variance of asset values, a small asset base, and low bankruptcy costs.

While more profitable firms face lower expected costs of bankruptcy and can thus carry more debt (Frank & Goyal, 2009), Fischer et al. (1989) show that profitability can also be negatively related to leverage in transitory periods of recapitalization. Titman and Wessels (1988), Rajan and Zingales (1995), and Frank and Goyal (2009) all find a negative relationship which offers support for the negative relation between profitability and leverage in transitory periods.

2.1.2 *Alleviate adverse selection or convey private information*

The theoretical arguments put forth in the previous section allude to a theory of trade-offs between, on the one hand, tax deductible interest payments (i.e. tax shield) and, on the other hand, increased costs of financial distress and probability of default. Then, the optimal capital structure would entail equating the marginal costs of debt to the marginal benefits of the tax shield. In order to obtain understanding of the origins of different capital structure theories, I believe it is important to be explicit about the inadequacies of the trade-off theory.

First, the trade-off theory lacks explicitly specified boundaries. That is to say, in essence, every financial decision is a trade-off and, therefore, as commented by Graham and Leary (2011), a broad enough view of the trade-off theory would be impossible to reject. Second, the trade-off theory presumes managers act with (unbounded) rational and, correspondingly, optimize the capital structure to maximize firm value. However, theoretical predictions and empirical observations show that this is not the case (Jensen & Meckling, 1976; Frank & Goyal, 2007). Third, trade-off explanations cannot account for the persistent effect of market-to-book ratios which should only have temporary effects if an optimal target debt ratio exists (Baker & Wurgler, 2002). To put it differently, Baker and Wurgler (2002) find long-run persistent effects of market-to-book ratios on leverage yet trade-off theory (i.e. *optimal* leverage ratio) may only account for temporary deviations (Fischer et al., 1989). Lastly, the trade-off theory cannot convincingly explain the existence of hybrid securities such as 'preference shares' or 'convertible bonds' (Myers, 1984), which share characteristics of both debt and equity. Two theories that address some of these inadequacies are the 'pecking order theory' and 'market timing theory' which highlight the information asymmetry and over- and under-pricing of shares, respectively.

2.1.2.1 *Interaction of investment and capital structure*

Introduced by Myers (1984) and further developed by Myers and Majluf (1984) is the pecking order theory of financing. The pecking order preference of financing is build around the concept of information asymmetric costs associated with particular forms of financing. At the core of this perspective is the assumption that managers have more information than outside investors and that conveying this information is costly. In support of this assumption, Myers (1984) argues that the differences in issuing costs alone are not sufficient to explain firm's observed financing behavior.

If managers possess more information than *new* investors, shares may be under- or over-valued by the market depending on the severity of information asymmetry. In fact, the under-pricing of shares can be so severe that positive net present value projects are rejected. It follows, that when a firm is able to issue securities that are less sensitive to information asymmetry, the probability of rejecting positive net present value projects can be reduced[7] (Myers & Majluf, 1984). Forms of financing that are less sensitive to under-pricing include 'retained earnings' (internal financing) and 'debt financing' (external financing). See §A.1 in Appendix A for a more detailed explanation of how the model of Myers and Majluf (1984) causes managers to forgo positive net present value projects.

7 The premise in Myers and Majluf (1984)'s paper is that managers act in the best interest of *existing* shareholders. Though no explicit argument is made why managers care about the *existing* shareholders.

According to Myers (1984), the pecking order theory argues for the following financing rational. First, firms prefer internal financing over external financing. Second, target dividend payout ratios are adapted to firm's investment opportunities. Third, if retained earnings prove to be insufficient, firms utilize cash holdings or marketable securities. If retained earnings proof to be more than sufficient, debt is paid off first or investments in marketable securities are made. In fact, only when the firm consistently has more than sufficient funds, the dividend target payout ratio is adjusted upwards. Lastly, when *external* finance is required, firms would, in decreasing order of preference, or increasing order of information asymmetry, start with debt, then hybrid securities, and use equity financing as a last resort. In essence, debt minimizes the information advantage of management more than equity, but not as much as internal financing.

In conclusion, firms have a preferred order of finance as a result of differences in information asymmetry[8] between the different financing possibilities. Furthermore, in an all pecking order world, there is no optimum target debt ratio (Myers, 1984) which highlights the difference between the trade-off and pecking order perspectives. While the trade-off theory argues for the existence of an optimal capital structure, the pecking order theory argues that the capital structure reflects the cumulative requirement for *external* financing. On a final note, a criticism of the pecking order theory is that it assumes managers act in the best interest of *existing* shareholders but fails to explain why managers should specifically care about those shareholders (i.e. managerial incentives are not incorporated) (Myers, 2001).

The pecking order theory and trade-off theory have some contradicting predictions regarding particular variables. First, in §2.1.1.2, firm size was argued to proxy for the inverse probability of default. However, if size is a proxy for the inverse probability of default it should be strongly related with leverage in countries where the cost of financial distress is low, which is not the case (Rajan & Zingales, 1995). Indeed, firm size could also proxy for the amount of information possessed by outside investors (Frank & Goyal, 2009). If this is the case, one would expect a negative relation between size and leverage because the information asymmetry is less which increases the preference for equity financing[9] (Frank & Goyal, 2009). Though, a negative relation between firm size and leverage is neither consistent with empirical findings, nor do larger firms issue more debt (Rajan & Zingales, 1995).

Second, the argument that risky firms should use lower levels of debt because of increased expected bankruptcy costs and subsequent probability of default, was put forth. However, as pointed out by Li et al. (2017), risky firms may also face more severe adverse selection costs and, consequently, use more debt, relative to equity financing. Though, empirical observations do not support this explanation.

Lastly, similar to the dynamic trade-off explanation, the pecking order theory also predicts a negative relation between profitability and leverage. Rather than the result of transitory recapitalization, the pecking order theory explains that more profitable firms have more internal financing opportunities which reduces the requirement for external financing (Frank & Goyal, 2009).

8 Note, the asymmetric information in these models represent asymmetric beliefs about value, not about risk (Myers & Majluf, 1984).

9 As highlighted by Rajan and Zingales (1995) and Harris and Raviv (1991), using proxy variables makes interpretation difficult. This is a good illustration of this problem. Firm size can proxy for information asymmetry but also for the inverse probability of default.

2.1.2.2 *Using debt as information signal*

The previous section described how asymmetric information influences the financing decision of investment opportunities. Another consequence of asymmetric information between firm insiders and outsiders is that managers configure the capital structure to signal information to (potential) investors about the (quality) "type" of the firm. Also known as "signaling theory".

The notion of 'signaling' in situations of asymmetric information is not new, research in labor economics has already benefited from job-signaling models where employees try to signal their quality to potential employers. These job signaling models started Ross (1977) to develop a theoretical model where managers use the capital structure to signal the quality of the firm to outside investors. The asymmetric information component incorporated in the model is that managers observe the quality of their firms but outside investors do not. The main assumptions of the model are that firms of low quality have higher expected bankruptcy costs, independent of the amount of debt, and that managers are compensated following an incentive schedule that can be considered common knowledge among investors. As a result, managers of low quality firms are not likely to imitate high quality firms by issuing more debt (Harris & Raviv, 1991). See §A.2 in Appendix A for a more detailed explanation of how the capital structure in Ross (1977) can be used as signaling mechanism.

In the end, the theoretical model of Ross (1977) describes how capital structures can be used to inform investors about the firm's quality type, information only possessed by insiders. Important to note, and different from the pecking order model, is that the signaling model described does not adhere to the preferred order of finance. Ultimately, the empirical implications of Ross (1977)'s model are that firm value, debt level, and probability of bankruptcy are positively related.

2.1.2.3 *Taking advantage of over- or under-pricing*

The previous section described how managers have a preferred order of financing because asymmetric information causes adverse effects and reduces share price when equity is issued. Thus, according to the pecking order theory, since internal financing is preferred over external financing, debt levels should reflect the firm's cumulative requirement for *external* financing. Though, as touched upon in Myers (1984), empirical observations indicate that managers actually try to time the market with their equity issuances. That is to say, conditional on requiring external finance, managers appear to issue equity rather than debt when share prices rise thereby exploiting temporary fluctuations in the cost of equity (Baker & Wurgler, 2002).

The market-to-book ratio can proxy for the extent of over- or under-valuation. Since book values represent the value of a firm's assets-in-place (e.g.: fixed assets and working capital) and market values represent the *belief* about the aggregate value of the firm's growth opportunities, intangible assets, and assets in place, the ratio allows examination of the growth potential.

On the one hand, according to the trade-off theory, firms have an optimal target debt ratio. As such, fluctuations in market-to-book ratios should only have temporary effects because, eventually, capital structures would traverse back to the optimum. This hypothesis, however, is inconsistent with the theoretical model and empirical observations of Baker and Wurgler (2002) who observe persistent effects of market-to-book ratios on the

capital structure. On the other hand, according to the pecking order theory, in times of high investment, firms push their debt level towards the limit (i.e. firm's debt capacity) for financing growth. Baker and Wurgler (2002) concede that this prediction is consistent with the proposed theoretical model but show that periods of high market-to-book ratios actually result in lower levels of debt.

Moreover, Baker and Wurgler (2002) put forth additional arguments that cannot be explained by the trade-off theory or pecking order theory. First, analyses of financing decisions show that equity, instead of debt, is issued when market value is high and managers tend to repurchase equity when market value is low. Second, analyses of long-run stock returns show that market timing is, in fact, successful. Third, equity is issued when investors become enthusiastic following earnings forecast and realization. Lastly, and most striking, managers actually admitted to time the market. In accordance with these observations, Baker and Wurgler (2002) explain the long-lasting effects of market-to-book fluctuations as managers' ability to time the market.

In sum, there are two possible explanations of equity market timing behavior with similar effects on the dynamics of the capital structure. First, if temporary fluctuations in market-to-book ratios measure changes in adverse selection, and the cost of deviation from target debt levels is *small*, compared to the costs of issuing equity, it is possible that past variations in market-to-book ratios have long lasting effects. Second, if there is no optimal capital structure and managers issue equity when market-to-book ratios are high, as observed by Baker and Wurgler (2002), then there is no need for managers to reverse their financing decisions conditional on the equity being valued correctly. Hence, the fluctuations in market-to-book ratios can have permanent effects on leverage. In conclusion, if managers take advantage of mis-pricing, then, capital structures are the cumulative outcome of manager's ability to time the equity market. Also known as "market timing theory".

If the firm's market-to-book ratio is an indication of growth possibilities, because it is the ratio between (potential) future value and current value, then, firms with high market-to-book ratios are relatively more over-valued and managers of those firms would issue equity rather than debt to take advantage of the mis-pricing. Empirically, Titman and Wessels (1988), Rajan and Zingales (1995), Baker and Wurgler (2002), and Frank and Goyal (2009) all document statistically significant negative relations between market-to-book ratios and leverage. On a finale note, Titman and Wessels (1988) explain that a positive relationship can also be found between *book* leverage and growth because growth increases the debt capacity but this is not yet reflected in the firm's book value.

2.1.3 *Capital structure and the nature of products*

While the trade-off theory describes how various firm characteristics such as tangibility of assets and firm size serve as determinants for the optimal capital structure, the nature of the products and production factors are not often considered. Also, while the pecking order theory highlights the importance of *existing* shareholders, other stakeholders such as employees or suppliers, are not considered. In response, Titman (1984) takes a novel approach in developing a theoretical model that incorporates various stakeholders (e.g.: suppliers, employees, customers) and a variety of products. The main understanding

is that an increased probability of liquidation decreases the price for durable goods[10] which is caused by an expected increase in maintenance costs. See §A.3 in Appendix A for an explanation as to how increased probability of liquidation increases prices.

Accordingly, Titman (1984) demonstrates the importance of liquidation value when writing contracts between the involved parties (shareholders, debtholders and other stakeholders such as employees and suppliers) is costly. Also known as "stakeholder co-investment theory". Specifically, a contract between debtholders and shareholders, on the one hand, is necessary to prevent the firm from continuation of operations when liquidation is optimal and, on the other hand, a contract between employees and shareholders is necessary to prevent the firm from liquidating for other reasons than the optimality argument. The upshot of all this is that specialized labor would find it more difficult to find a new job compared to labor with a more transferable skill-set. As pointed out by Titman (1984), drawing up contracts for such particular context-specific outcomes can be expensive to negotiate, administer, and enforce. Fortunately, under certain conditions, the contract between employees and shareholders can be substituted with a particular capital structure.

Indeed, a capital structure which includes both 'debt' and 'preferred shares' has a reduced number of states where liquidation is optimal (Titman, 1984). That is to say, a firm with debt and preferred shares in the capital structure is less likely to choose the liquidation strategy in similar situations because incentives are structured differently such that the residual value is reduced (Titman, 1984). The contribution of the model is the consideration of other stakeholders, whom are not often considered, and the nature of products. Incorporating these considerations and having established the importance of 'debt' and 'preferred shares' results in the following model predictions. Firms that impose *high* liquidation costs on their customers and other stakeholders should use less leverage (e.g.: computer or auto mobile industry). In contrast, firms that impose *low* liquidation costs on their stakeholders should have more leverage (e.g.: hotel and retail chains). Thus, leverage increases with the extent to which products or services have broad applicability without much specialist maintenance.

In §2.1.1.2 tangibility was argued to be relevant for liquidation value and, therefore, also for the capital structure decision. Titman (1984) shows that 'asset uniqueness' (or asset specificity) is another important variable related to liquidation value. Empirically, Titman and Wessels (1988) use two proxies to measure asset uniqueness; research and development scaled by sales; advertising expenses over sales, and find results consistent with Titman (1984)'s theoretical prediction. Likewise, Frank and Goyal (2009) find a statistically significant negative relation supporting the idea that firms, which impose high liquidation costs on their stakeholders, employ less debt.

2.1.4 *Influence the outcome of corporate control contests*

While the previous theoretical models have described various forces that drive capital structures, a more explicit treatment of managerial incentives regarding external forces has not been described. This section introduces corporate control contests as external driving force and illustrates how the capital structure can be used, by managers, to

10 Durable goods are goods that are not instantly consumed but have utility over time such as cars, kitchens, and computers. Since such goods can be used multiple times, firms usually offer maintenance services.

stay in control. The premise of the model is that managers whom are in control enjoy control benefits and, hence, have incentives to use the capital structure to defend their position. These theoretical models, where the capital structure is driven by corporate control threats, are sometimes categorized under 'corporate control theory'.

To put it bluntly, the threat of takeover attempts is ever present subsequently influencing manager's actions (Stulz, 1988) (i.e. capital structure decisions). Important for what follows is the understanding that equity carries voting rights while debt does not. The reviewed models from Harris and Raviv (1988) and Stulz (1988) depict the relation, after control is contested by a rival firm, between the fraction of voting shares held by owner-managers and firm value. The value of equity held is partly determined by the capital structure which influences firm value because of its role during the threat of a control contest.

The model of Harris and Raviv (1988) depicts how short-term capital structure changes can be explained by takeover attempts. The two takeover attempts highlighted are 'tender offers' and 'proxy contests'[11]. Long-term capital structure changes, associated with tax advantages and cost of financial distress (Harris & Raviv, 1988), are not included in the model. In essence, the model predicts that capital gains and control benefits result in different "resistance strategies" which, subsequently, influence the takeover method as well as the probability of success. Ultimately, the appearance of a rival is good for investors because share prices rise. That is to say, a contest for control increases the chance of better management (Harris & Raviv, 1988) and the more likely the takeover, the more share prices rise. See §A.4 in Appendix A for a description as to how the capital structure can be used to fend off control contests.

Interestingly, Stulz (1988) build on the model of Harris and Raviv (1988) by noticing that situations where managers increase debt to buy back shares from passive investors may not necessarily lower the chance of a hostile takeover. Specifically, an increase in debt does increase voting power but it also lowers the total value of equity making it less expensive for a rival firm to acquire control (Stulz, 1988). Though, the covenants[12] associated with increasing debt may substantially strengthen the bargaining position of the manager, potentially lowering the probability of a successful takeover. Ultimately, the model shows that premiums in tender offers are increasing with the fraction of voting rights held by the manager which lowers the probability of a successful takeover. As soon as the manager learns their firm is a takeover target, the fraction of voting shares is increased. The costs associated with increasing the fraction of voting rights remains constant whereas benefits increase (increase in the chance control benefits can be enjoyed) with the probability of a takeover (Stulz, 1988).

Ultimately, the model makes the following predictions. First, when firms issue more debt, the cost of financial distress and probability of bankruptcy also increase. As a result, when risk increases substantially, managers may lower the fraction of voting rights to balance marginal benefits and costs when deciding on the debt-equity ratio (Stulz, 1988). Second, there is a debt-equity ratio that maximizes firm value.

11 A tender offer is an offer made by the hostile firm to procure some, or all, of the shareholder's shares. A proxy fight arises when a group of shareholders are persuaded to work together in gathering enough votes to win the vote for a corporate takeover.

12 Debt covenants are formal debt agreements describing activities that cannot be carried out as a result of issued debt. Also not considered in the paper of Harris and Raviv (1988) are other potential defensive actions in capital structure decisions such as changes in corporate charter (Stulz, 1988).

2.1.5 *Capital structure and strategic interactions*

Similar to the models of Harris and Raviv (1988) and Stulz (1988), described in the previous section (§2.1.4), the model of Brander and Lewis (1986) also uses an external force that drives capital structure decisions. Specifically, the model of Brander and Lewis (1986) denotes situations where the firm's capital structure is a way of committing to specific output strategies and competing in the product market. That is to say, the level of competition within the industry is influencing the capital structure decisions. The origins of this driving force stem from industrial economics and the economic model is related to well-known Game Theory models such as Bertrand (price competition) and Cournot (quantity competition) games. See §A.5 in Appendix A for a brief description of the game in Brander and Lewis (1986).

Ultimately, according to the model of Brander and Lewis (1986), it appears that leverage increases with strategic interaction in product markets which, naturally, varies across type (e.g.: retail, chemicals) and structure (e.g.: oligopoly, monopoly, monopolistic competition). Some examples of industry characteristics that have different implications for capital structures are the price (Bertrand) and quantity (Cournot) competition, research and development races, and competition in advertising (Brander & Lewis, 1986).

The purpose of considering the industry is to account for similarity between firms within the same industry such as similar demand shocks, risk, disruptive innovation technologies, and (as illustrated) competition. Since firms within the same industry share characteristics, capital structures are also likely to be more similar compared to firms in different industries. For instance, managers could use industry debt ratios as benchmark for making financing decisions (Frank & Goyal, 2009).

Empirically, studies often include industry dummies and the industry median leverage to account for similarities. Studies that include industry median leverage mainly document a statistically significant positive relationships with leverage which is consistent with the idea that firms within the an industry are analogous (e.g.: Frank and Goyal, 2007, 2009; Lemmon et al., 2008).

2.1.6 *The institutional context and capital structure*

Important to note is that this thesis focuses on a single institutional context: the US. Other institutional contexts may differ in economic, legal, and cultural dimensions all of which have been found to influence the capital structure differently (e.g.: Rajan and Zingales, 1995; Antonczyk and Salzmann, 2014; Chui et al., 2002). Thus, since institutional factors influence a firm's capital structure, results of this thesis cannot simply be generalized to other institutional contexts.

To provide more insight in why and how institutional factors influence the capital structure, §A.6 in Appendix A offers a detailed treatment of various institutional factors (e.g.: bond market development, stock market development, a country's market- or bank-orientation, macroeconomic conditions, and cultural values) and how these affect capital structure behavior. Since the explicit treatment of these factors is not directly relevant for this thesis, and to maintain focus, they are included in the appendix.

2.2 MANAGERS AND THEIR CHARACTERISTICS

In the previous sections, capital structure is either examined without explicit treatment of manager's personal non-contractual incentives, or merely on the notion of an external stimulus. On the one hand, the models that build on the trade-off theory (e.g.: Scott Jr, 1976; DeAngelo and Masulis, 1980; Fischer et al., 1989; Titman, 1984) and the models that build on asymmetric information (e.g.: Myers, 1984; Myers and Majluf, 1984; Ross, 1977), do not account for manager's personal incentives. While, on the other hand, the theoretical models that build on market timing theory (e.g.: Baker and Wurgler, 2002), corporate control theory (e.g.: Stulz, 1988; Harris and Raviv, 1988), and strategic interaction in the product market (e.g.: Brander and Lewis, 1986), some of which do incorporate personal incentives (e.g.: Stulz, 1988), but the *main* driving force is always related to some external stimulus.

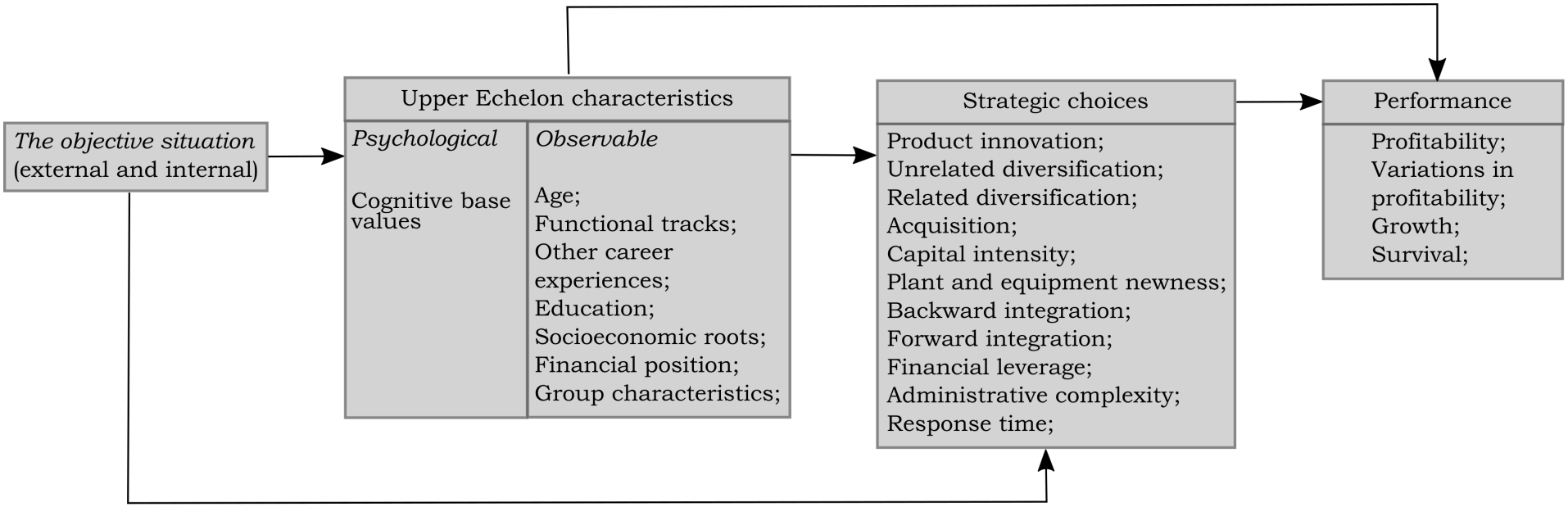
When personal incentives and internal stimulus are reviewed, the paper of Jensen and Meckling (1976), which builds on agency, contracting, and finance theory, and the paper of Hambrick and Mason (1984), which describes the upper echelon theory depicted in Figure 2, become of interest. Given all the driving forces highlighted in the previous sections, one might argue why, if at all, managers are important to consider as major driving force for the capital structure. Indeed, there has actually been a debate in the literature regarding the extent to which managers are important (e.g.: Bertrand and Schoar, 2003; Frank and Goyal, 2007; Jiraporn et al., 2012). To highlight the importance of managers and their relation to the capital structure, consider the following empirical studies.

Subject to the capital structure operationalization, the explanatory power of empirical models can increase from 4% up to 10% by accounting for management-fixed effects (Bertrand & Schoar, 2003). Along the same lines, Frank and Goyal (2007), studied 3,890 CEOs between 1993 and 2004 and observed that firm-fixed effects do not account for much more additional variation after CEO-fixed effects have been accounted for. In fact, the results indicate that it is not the CEO, but also the CFO that plays an important role in capital structure decisions. Unfortunately, most studies tend to focus on either the CEO or the whole TMT. The following studies are a mere example of the vast amount of studies: Jiraporn et al., 2012; Huang and Kisgen, 2013; Serfling, 2014; Custódio and Metzger, 2014; Faccio et al., 2016; Li et al., 2017, that highlight the importance of managers in capital structure research.

Interestingly, papers highlighting the importance of managers either use agency explanations for observed results or decompose managers into distinct characteristics and examine the relation between these characteristics and, for instance, the capital structure. When decomposing manager-specific effects, the following characteristics are often cited to be important for explaining the capital structure: age, gender[13], experience, and power (Carpenter et al., 2004; Frank & Goyal, 2007; Graham et al., 2013). The next sections are divided as follows. The first (§2.2.1) complements previous theoretical models of capital structure through explicit treatment of economic incentives from an agency perspective. The second (§2.2.2) focuses on managerial characteristics and associated (non-economic) incentives.

13 Gender is not included in the model of Hambrick and Mason (1984), nor is there any explicit reference to gender differences. Considering the fact that the number of female CEOs has been increasing but that the number is still only 4.8% (Fairchild, 2014), lack of explicit treatment is understandable given the time the paper was published.

Figure 2: Upper echelon model (from Hambrick and Mason, 1984)



2.2.1 *Personal incentives of the economic man*

Taking an economic model of man that treats humans as rational and opportunistic actors that aim to maximize personal utility, agency theorists argue that managers will maximize their personal utility function at the expense of shareholders (Jensen & Meckling, 1976). As a result, according to agency theorists, the most important duty of the board is to control managerial opportunism and ensure managers behave according to the best interest of shareholders (Fama & Jensen, 1983). This section illustrates how and why managers may deviate from what would be optimal for shareholders and the effect of potential balancing forces such as the capital structure (and closely related ownership structure), compensation structure, and board of directors.

2.2.1.1 *Separation of ownership and control: Agency problems*

In their seminal paper, Jensen and Meckling (1976) make the argument that firms have different debt-equity ratios because of contradicting interests between managers and shareholders. The incurred costs for mitigating the effect of agency problems between shareholders (principal) and managers (agent) encompass bonding costs by the agent, monitoring costs by the principal, and residual losses from reductions in wealth. The creation of agency conflicts might happen as follows. When a firm is owned and managed by a sole owner, he or she bears all costs and receives all benefits from business and non-business spending. The sole owner's optimal set of decisions, then, is where the marginal utility, derived from an additional dollar of expenditure for both business and non-business expenditures, is equal to the utility, derived from an additional dollar of wealth after tax (Jensen & Meckling, 1976). When the sole owners sells an equity stake in the firm, to finance an investment opportunity for instance, agency conflicts naturally arise between the owner-manager and the new outside investor because ownership (owner-manager and investor) and control (owner-manager) are separated. That is to say, *ex ante*, the sole owner wore all costs and benefits associated with the decisions he or she made, while, *ex post*, after the equity share is sold, the costs are shared while benefits of non-business spending (e.g.: "plushy" office) are still solely enjoyed by the owner-manager. The upshot of all this is that consumption of managerial perquisites increases the owner-manager's utility but lowers firm value. Consumption of managerial perquisites is not the only agency problem caused by the separation of ownership and control. Other agency conflicts that have been identified during the literature review are 'over-investment', 'failure to liquidate', and 'entrenchment'.

First, over-investment is a distinct agency problem that refers to situations where managers have substantial free cash flow which is not paid out to investors but used to pursue personal agendas or "build empires" (Jensen, 1986). The basic argument boils down to the observation that substantial free cash flow reinforces the self-interested opportunistic behavior of managers. In such circumstances, both dividend policies and debt obligations can discipline management and mitigate the problems associated with substantial free cash flow. The description of the consequences associated with high debt ratios is referred to as 'free cash flow theory[14]' (Jensen, 1986). Ultimately, the main implication of this theory is that debt increases efficiency and prevents managers from

14 Free cash flow theory is not a theory that explains how managers decide on financing but a theory that explains the consequences of a particular debt ratio.

wasting resources on low return projects that further their personal agendas rather than firm value per se. While debt raises the costs of financial distress, firm value may still rise when the resulting increase in efficiency is substantial (Myers, 2001).

Second, failure to liquidate when it would be optimal to do so is another agency problem. In the theoretical model of Jensen (1986) it was demonstrated that debt increases efficiency for firms with substantial free cash flow. Likewise, debt can also force managers into liquidation when managers are reluctant to liquidate (Harris & Raviv, 1990). Debt can force managers to liquidate because it generates information for outside investors to evaluate the major financial decisions such as the continuation of operations or liquidation (see §A.2 in Appendix A on how debt can be used to signal information regarding the quality of the firm). Debt signals the ability to make contractual payments and forces managers to informal negotiations with the debtholders when earnings are insufficient to fulfill the contractual payments. While creditors force managers to provide information, investors use debt to generate information about the firm's ability to make debt payments or costly investigation when bankruptcy occurs (Harris & Raviv, 1990). According to the model of Harris and Raviv (1990), the optimal debt level is a balance between the value of information and disciplining force, on the one hand, and the probability of incurring investigation costs, on the other hand.

Lastly, when managers fail to experience the disciplinary force of governance mechanisms they are said to be 'entrenched'. Entrenchment is another, often cited, agency problem which provides managers latitude over capital structure decisions (Berger et al., 1997). When managers feel less pressure from governance mechanisms, agency conflicts are exacerbated. That is to say, managers can focus even more on maximizing their personal utility rather than shareholder value (Zwiebel, 1996). Zwiebel (1996) develops a theoretical model that illustrates the entrenchment effect. In contrast to Jensen and Meckling (1976), Jensen (1986), and Harris and Raviv (1990), where debt serves as disciplinary force, the model of Zwiebel (1996) is build around a situation where managers act as their own disciplinary force (i.e. self-containment). Debt restricts the empire-building activities, on the one hand, while it offers (potential) defense against takeover attempts, on the other hand (see §A.4 in Appendix A on how managers can use the capital structure to fence off takeover attempts). Naturally, managers cannot endlessly pursue personal agendas but also need to have sufficient resources to maintain their entrenched position.

Regarding the entrenched manager, while the perspective changed from firm value maximization to manager's utility maximization, the benefits of debt remain similar, it constrains managers from inefficient investment projects (Jensen, 1986). Yet, the costs of debt, different from previous models, is that excessive debt reduces the manager's constrains. To put it differently, debt can *only* discipline managers when it also affects the probability of bankruptcy when bad projects are undertaken (Zwiebel, 1996). Otherwise, managers would prefer to have a big empire now, rather than later.

The model, ultimately, model predicts that better investment opportunities result in less debt. By extension, when better investment opportunities are present, less debt is required to avert a takeover attempt and, such firms, accordingly, are more profitable. Lastly, when bankruptcy costs increase, empire-building activities should decrease. Fortunately, their are certain mechanisms that can mitigate the effect of the aforementioned agency problems as will be explained in the next section

2.2.1.2 *Agency problems and remedies*

Instruments for mitigating agency problems are bonding activities by the managers (agents) and monitoring activities by the investors (principals) (Jensen & Meckling, 1976). Examples of such governance activities include: returning audits, formal control systems such as the board of directors, budget restrictions, and incentive compensation systems. Some of these remedies that have received special attention in the literature are briefly discussed in the subsequent sections.

When remedies for agency problems fail, managers obtain latitude to change debt levels to their liking (e.g.: de-leverage to free funds for empire building) and agency problems are exacerbated. The study of Lundstrum (2009) supports this prediction. Lundstrum (2009) analyses 74 equity issues and 37 debt issues between 1989 and 1993 and concludes, amongst other things, that entrenched managers show an increased activity of de-leveraging. While governance mechanisms balance manager's influence, there are also external forces such as the human capital market (Fama, 1980) and corporate control contests (Harris & Raviv, 1988; Stulz, 1988) that can have a neutralizing effect on the opportunistic behavior of managers. The following part will offer some insights in how the 'ownership structure', the 'board of directors', and 'managerial compensation' might be used to mitigate agency conflicts and their relation to the capital structure.

Ownership structure

There are three subtopics related to ownership structure: 'ownership concentration', 'ownership type', and 'managerial ownership'. First, *ownership concentration* refers to the number of shareholders that own a large percentage of the outstanding shares. Second, *ownership type* refers to the different types of ownership such as family-owned or government-owned. Lastly, *managerial ownership* is the percentage of shares that are owned by managers. Managers may have obtained an ownership stake as part of their remuneration package (John & John, 1993) or simply because the manager is one of the corporate founders.

First, Shleifer and Vishny (1986) argue that low concentration of ownership can influence manager's decision and can exacerbate free-riding problems of minority shareholders. When there are many small shareholders, it will be costly for them to be involved in 'decision control' (i.e. ratification and monitoring of decisions). When monitoring costs are high and monitoring activities are low, managers can adjust the level of debt to serve their own interest resulting in higher expected agency costs (Jensen, 1986). Empirically, ownership concentration is found to be positively related to leverage. Pindado and de La Torre (2011) consistently find statistically significant positive relations between the percentage of common shares held by shareholders owning more than 5% and the ratio of long-term debt. Likewise, Margaritis and Psillaki (2010), who study French firms from 2002 to 2005, find a statistically significant positive relation. These findings support the prediction that high ownership concentration increases monitoring and, consequently, increases debt to mitigate agency problems[15].

15 However, this does not imply that concentrated ownership is always better. Concentrated ownership can also cause large shareholders to exploit minority shareholders. In such cases, large shareholders may want to avoid the disciplinary role of debt to facilitate this expropriation. Pindado and de La Torre (2011) also test and find empirical support for this prediction.

Second, large shareholders are more likely to be incentivized to actively monitor management because the marginal benefit of monitoring (which is larger because of their larger ownership stake) exceeds the marginal cost (Fama & Jensen, 1983). Different types of large shareholders include families, government, or financial institutions (e.g.: insurance funds, mutual funds, banks). For example, Anderson and Reeb (2003) posit that founding families have their family wealth vested with the firm and, as a result, tend to focus on survivability by limiting risk. Therefore, family-owned firms predominantly use financing possibilities (e.g.: equity financing) with minor effects on the probability of default (Anderson & Reeb, 2003). While ownership *concentration* is found to have a statistically significant effect on leverage, ownership *type* has not received much empirical support (e.g.: Anderson and Reeb, 2003; Margaritis and Psillaki, 2010).

Lastly, as argued by Jensen and Meckling (1976), the problem of misalignment between shareholders and managers could be mitigated by offering manager's an ownership stake in the firm. Also, as described in §2.1.4, when managerial ownership is large, a manager may issue debt to repurchase shares from passive investors to protect themselves against corporate takeovers (Stulz, 1988; Harris & Raviv, 1988). As a result, depending on the share of ownership held by management, capital structure decisions may differ. Empirically, Pindado and de La Torre (2011) observe that when managers become entrenched a statistically significant negative relation between leverage and managerial ownership is observed. While Pindado and de La Torre (2011) document a negative relation, Lundstrum (2009) find that managerial ownership has no statistically significant effect on the choice of debt or equity issuances. The market, nonetheless, does evaluate managerial ownership negatively (Lundstrum, 2009) which might be due to increased latitude in decision-making.

Managerial compensation

The theory developed in Jensen and Meckling (1976) encompasses concepts of contracting, agency, and finance theory. If a firm is a nexus of contractual relationships, it is preferable to write contracts in a way that maximizes the value of shareholders. However, such *complete* contracts are not only impossible to write but would also be impossible to enforce. Part of the agency problem is caused by the inability to write complete contracts.

Fortunately, it is possible to structure managerial compensation contracts in a way that, at the very least, improves alignment between the manager and shareholder incentives. Referring back to the "nexus of contractual relationships", one particular contract is with debtholders. When a compensation contract is structured that only focuses on aligning shareholder and manager incentives, debtholders may negatively be impacted by risk-shifting tendencies of managers (e.g.: asset substitution (Jensen & Meckling, 1976)). Since prospective debtholders rationally anticipate such effects by observing the compensation contract, assuming the compensation contract is common knowledge, the interest rates are adjusted appropriately. Thus, while agency problems between managers and shareholders can be mitigated by structuring the compensation contract in a way that aligns incentives, the problem between shareholders and debt holders is exacerbated. John and John (1993) develop a theoretical model that further illustrates the importance of managerial contracts (see §A.7 in Appendix A for an exposition of the theoretical model of John and John (1993)).

Ultimately, John and John (1993)'s model has the following implications. First, for firms with risky debt, the pay-performance ratio should be smaller. Second, the more manager's incentives are aligned with those of shareholders the larger the risk-shifting behavior, causing debtholders to demand higher risk-premiums. Lastly, when the firm is in financial distress, the firm should have high leverage and low pay-performance ratios. The underlying premise of the compensation model of John and John (1993) is that higher pay-performance sensitivity should increase manager's incentive to increase firm value. The prediction that the pay-performance ratio should be smaller for firms with risky debt is supported by empirical studies. For instance, Frank and Goyal (2007) studied 2,248 firms between 1993 and 2004 and document a statistically significant negative relation between pay-performance sensitivity (measured as the change in manager's firm specific wealth (options and stocks) for every one thousand dollar increase in shareholder wealth) and leverage.

Board of directors

While the ownership structure serves as an indirect control mechanism, the board is a more direct (internal) monitoring mechanism (Fama & Jensen, 1983). The board of directors has the power to hire, fire, and compensate management through a variety of different avenues (e.g.: remuneration committee). Since the board of directors serves as direct monitoring mechanism it reduces the latitude managers have in adjusting the capital structure to serve personal interest rather than the interest of shareholders. On a side note, as argued by Jensen (1993), the effectiveness of the board of directors depends on factors such as board culture, information asymmetry, board size, board composition[16] and whether or not the CEO holds a chair at the board (CEO-chair duality). For instance, Jensen (1993) argues that an effective board should not be larger than seven or eight directors (insiders and outsiders). A mixture of insiders and outsiders is important because a board that only consists of insiders could collude at the expense of shareholders by securing full control of the board.

2.2.2 *A closer look in the upper echelons of the firm*

A closer look in the upper echelons leads to the seminal work of Hambrick and Mason (1984) who build on the earlier work of Child (1972). Starting in the early 1970s, Child (1972) first directed attention towards the "dominant coalition" within the firm. Then, Hambrick and Mason (1984) formally incorporated the dominant coalition (i.e. the TMT[17]) in a managerial theory, emphasizing the importance and influence of top managers' values, traits, and cognitive processes.

The upper echelon theory argues that the psychological part of decision-making in the upper echelons is based on cognitive base values which can be measured through observable demographic characteristics such as age, functional background, career experience, education, socioeconomic roots, financial position and group characteristics (Hambrick & Mason, 1984). These cognitive base values are, correspondingly, reflected

16 Jensen (1993) argues that it is important to offer proper incentives to outside board directors in order to enhance their effectiveness.

17 Child (1972) explicitly states that the dominant coalition does not necessarily refer to the individuals with formal authority. Yet, upper echelon theory presumes that top management is the dominant coalition.

in strategic choices (e.g.: innovation, diversification, financial leverage) that affect firm performance (e.g.: profitability, growth, survival). In the end, in order to understand corporate behavior, biases and dispositions of the most powerful actors must be considered (Hambrick & Mason, 1984). To put it differently, faced with decision challenges due to information overload, ambiguous cues, and competing goals and objectives, top managers' perceptions of stimuli are filtered and interpreted through cognitive bases and values (Carpenter et al., 2004).

Unfortunately, the operationalization of values, traits, and cognitive processes is a daunting task and it is, therefore, that easily accessible and observable demographic indicators are often utilized. Indeed, psychological factors are hardly observable (Hambrick & Mason, 1984) and demographic indicators serve as efficient and reliable proxies (Carpenter et al., 2004). Importantly, however, Cannella and Monroe (1997) point out that proxies may understate the true psychological and social processes. The set of demographic indicators described in the original paper of Hambrick and Mason (1984) are described in §2.2.2.1. Special attention is given to the demographic indicators gender, age, and functional experience that have often been cited to impact financial leverage (e.g.: Frank and Goyal, 2007). Some other characteristics that are not directly of interest for this thesis are briefly described in §A.8 in Appendix A.

2.2.2.1 *Manager characteristics in the upper echelons*

Gender

The first demographic indicator is CEO gender which is often cited to be an important characteristic for financial leverage (e.g.: Frank and Goyal, 2007). While psychology studies focus more in-depth on societal differences in gender, the management and finance literature mainly examine whether gender has a material impact on corporate decision-making or, as in this paper, leverage. In short, the differences between males and females can, amongst others, be contributed to variation in the level of testosterone hormone (Sapienza, Zingales, & Maestripieri, 2009). Even more so, taking risks is often perceived as a masculine trait[18] (Byrnes et al., 1999). These biological and societal influences have, arguably, created a wedge between males and females resulting in different levels of risk tolerance and confidence. For instance, women are currently far less likely to choose a risky career in finance (Sapienza et al., 2009).

As a result, based on the reviewed literature, it appears that gender is mainly a proxy for the level of confidence and risk-aversion (e.g.: Huang and Kisgen, 2013; Faccio et al., 2016). Specifically, it is argued that males are overconfident and risk-tolerant while females, vice versa, are more conservative and risk-averse (Huang & Kisgen, 2013). For instance, Huang and Kisgen (2013) find that earnings forecasts of firms managed by male CEOs have narrower bands (i.e. more confident about future earnings) and that males wait longer to exercise options from compensation packages, both findings consistent with the notion that males are more overconfident.

In general, overconfidence is defined as the expectation of a "better-than-average" effect (Huang & Kisgen, 2013). According to Malmendier et al. (2011), when external finance is required, overconfident managers perceive equity to be more mis-priced than

18 Byrnes, Miller, and Schafer (1999) offer an extensive overview of different theories and expectations regarding gender differences in risk taking behavior.

risky debt. Since males are more overconfident than females, female executives undertake fewer projects and it also implies that decisions made by female executives should be evaluated positively by the market (Huang & Kisgen, 2013). As alluded to in the beginning of this section, another trait associated with gender differences is the level of risk-aversion. Female executives are more risk averse which is apparent from the observation that less investments are made in risky assets (Agnew, Balduzzi, & Sunden, 2003). In further support, Faccio et al. (2016) document that female CEOs tend to associate with less risky firms which are less leveraged, have less volatile earnings, and are more likely to survive. Moreover, their time-series analysis shows that male-to-female transitions are associated with a significant decrease in corporate risk-taking. These findings provide further support for the notion that females are more risk-averse. While the problem of overconfidence is described as being "unrealistically" optimistic about future returns, for instance, risk-aversion also has negative consequences. Female CEOs managing growth firms might be to risk averse to make the appropriate investment in growth assets to provide sustained growth (Faccio et al., 2016), for instance.

Female CEOs have also been described as more conservative (e.g.: Frank and Goyal, 2007) which corresponds to equity financing rather than debt financing. Empirically, Faccio et al. (2016) analyzed 21 countries between 1999 and 2009 and find a statistically significant relation between their dummy variable (CEO is female) and leverage. Furthermore, firms run by female CEOs are also characterized by less volatile earnings and higher survivability. Along the same lines, Huang and Kisgen (2013) analyzed CEOs between 1993 and 2005 and find a statistically significant negative relation between gender (being female) and leverage, asset growth, and acquisitions. A statistically significant relation is also found between female CEOs and equity issuances. So too, Graham et al. (2013) surveyed 1,180 CEOs and find that female CEOs use less debt relative to their male counterparts. Lastly, Frank and Goyal (2007) did not find gender to be statistically significant. Thus, there is substantial empirical support for the prediction that women are more risk averse, or conservative and, therefore, use less debt financing while men are more confident and risk tolerant resulting in more debt financing (Malmendier et al., 2011).

Age

The second demographic indicator is age. Age is a complex demographic indicator because it can proxy for various things such as early life experiences (Malmendier et al., 2011) and overconfidence (Serfling, 2014), for instance. Since age can proxy for various underlying values, traits, and cognitive processes, it is not surprising that strong empirical support, predicting financial leverage is lacking. In fact, age has been argued to affect financial leverage both positively and negatively.

First, arguments supporting the prediction that age *negatively* affects financial leverage go as follows. Young managers, on the one hand, are often associated with new ideas and the acceptance of risk while older managers, on the other hand, tend to have less physical and mental stamina, are more risk averse, and attached to the "status-quo" (Hambrick & Mason, 1984). The former indicates higher levels of debt whereas the latter indicates lower levels of debt. To put it differently, younger managers make more, bolder, and riskier financing decisions (Serfling, 2014), and are, therefore, more inclined to pursue risky strategies such as increased financial leverage or unrelated diversification (Ham-

brick & Mason, 1984). This prediction coincides with the findings of Graham et al. (2013) who document that younger CEOs are risk-loving while older CEOs are not. Furthermore, Prendergast and Stole (1996) developed a model to understand how individuals change their behavior where individuals, over time, differ in their responses. When individuals are younger, there is an overreaction to new information but, over time, this willingness to respond becomes less and makes individuals more conservative. That is to say, the arguments rests on 'cognitive dissonance reduction' which considers individuals as rationalizing beings rather than rational beings (Prendergast & Stole, 1996) which means older people tend to rationalize past decisions more, resulting in lower responsiveness and more conservative behavior.

On the other hand, arguments supporting the prediction that age is *positively* related to leverage are as follows. Younger managers, *ceteris paribus*, have a shorter track-record, less achievements, are more scrutinized by the labor market, and are more concerned with their career (i.e. want to limit the negative effects of current decisions on future career opportunities) than older managers which can lead to conservative behavior in the financing decision (Hirshleifer & Thakor, 1992). Supporting the worries of younger managers, the model of Zwiebel (1995) indeed shows that career opportunities affect investment decisions. Furthermore, the model of Prendergast and Stole (1996) shows that conservatism and exaggeration both influence reputation but that exaggeration may be more prominent early in the manager's tenure, whom, mostly, are younger managers. Along the same lines, Zwiebel (1996) argues that managers at the end of their tenure are more likely to use additional leverage to finance their "legacy building" activities.

Both Serfling (2014), who studied 4,493 unique CEOs between 1992 and 2010, and Frank and Goyal (2007), did not find a statistically significant relationship between CEO age and leverage even though different measures were used, a continuous variable and dummy variable. Frank and Goyal (2007) used a dummy variable that takes the value of 1 if the CEO is older than 55 years whereas Serfling (2014) used the natural logarithm of age as measure. In contrast, Bertrand and Schoar (2003) find that CEOs from older generations choose lower levels of financial leverage. However, as pointed out by Hambrick and Mason (1984), demographic indicators are *not* representative of the true traits, values, and cognitive processes. Correspondingly, another perspective on age is used by Malmendier et al. (2011). Malmendier et al. (2011) examine the effect of military service (e.g.: serving in World War II) and the effect of being born during the 'Great Depression', which are natural products of age, on leverage. Their hypotheses posit that military service and exposure to combat increase risky behavior (i.e. more debt) whereas having experienced the Great Depression is associated with conservative behavior (i.e. less debt). They find statistically significant support for these hypotheses.

Functional background

The functional background, or functional experience, characteristic is closely related to the internalization of information. That is to say, as information processing center, managers may process information via a "top-down" or "bottom-up" approach (Bowman & Daniels, 1995). In the first approach, managers utilize prior (functional) experience to process information while the second approach is driven by available data. The top-down approach mainly constitutes the use of experience and is most dominant, amongst others, in situations where the manager is familiar with the issue, there is time pressure,

and in highly specialized organizations (Bowman & Daniels, 1995). Note that relatively little empirical work has focused on functional experience (Geletkanycz & Black, 2001) let alone on the relationship between functional experience and financial leverage.

Functional experience arises in strategic decision-making in the following way. When firms set out their strategy[19], a conflict of interest may arise when the manager perceives the strategy to be conflicting with his or her past functional experience (Bowman & Daniels, 1995). For instance, a manager may feel that cost reduction is of paramount importance because of his or her experience in production yet the TMT may decide to focus on a strong marketing presence because the TMT's experiences are skewed towards marketing.

Another important aspect is that increased exposure to one's functional area results in goal orientations and time frames that align with that particular discipline (Geletkanycz & Black, 2001). Thus, over time, managers become more attached to the paradigm of their discipline. In the end, superior performance can be expected once managers functional experience is congruent with an associated strategy (e.g.: a manager with research and development experience steers innovation differentiation) (Beal & Yasai-Ardekani, 2000). The effectiveness of functional experience is, thus, related to a firm's overall strategy.

Following the division of Hambrick and Mason (1984), functional backgrounds can be categorized in 'output', 'throughput' and 'peripheral' functions. Output functions constitute functions such as sales or marketing with an outward focus, emphasizing growth (Hambrick & Mason, 1984). Managers with those functional experiences are likely to have closer contact with customers and more awareness of the competition (Bowman & Daniels, 1995). In contrast, throughput functions, emphasizing efficiency (Hambrick & Mason, 1984), such as production and operations are less likely to be in contact with, for instance, customers and are more concerned with cost reduction and efficiency (Hambrick & Mason, 1984; Bowman & Daniels, 1995). The peripheral functions refer to functions that emphasize bureaucracy and risk management such as accountants and financial experts. The professional training and experience of those managers is probably related to objectivity, caution and future stability (Bowman & Daniels, 1995), or risk management (Hambrick & Mason, 1984). While no empirical evidence could be found, if peripheral functions indeed emphasize risk management (Hambrick & Mason, 1984), one could expect financial expert CEOs to use less leverage because this would lower risk. However, this implication is not certain as leverage can be used while simultaneously managing risk. In essence, functional experience provides managers the opportunity to develop skills and competences in accordance with that discipline, as well as the unique associated analytical framework (Geletkanycz & Black, 2001). Thus, it appears that there is a certain 'functional bias' in perceived priorities for decision-making (Bowman & Daniels, 1995).

Other predictions for managers with finance experience include the following. Managers with a background in finance may have, during their careers, been more exposed to finance theory relative to non-finance managers. For instance, Graham and Harvey (2001) argue that CEOs with a background in finance often use project-specific valuation methods whereas non-finance managers are more likely to employ a firm-wide approach. This distinction is important because when risk is not adequately adjusted it could result in value-destroying projects (Krüger, Landier, & Thesmar, 2015). Furthermore, CEOs with

19 Bowman and Daniels (1995) refer to Porter's generic strategies of cost leadership and differentiation.

a background in finance may be better in their communications with outside investors when external funding is needed because financial expert CEOs are often affiliated with various financial institutions (Güner, Malmendier, & Tate, 2008). Empirically, Custódio and Metzger (2014) analyzed a large sample of 4,277 unique CEOs between 1993 and 2007 and find that non-financial firms headed by CEOs with a background in finance hold less cash, are more levered, and have higher probability of paying out dividends. Likewise, Graham et al. (2013) also document that CEOs with past experiences in finance related functions (e.g.: finance and accounting) are usually managing firms with statistically significantly more debt.

Education

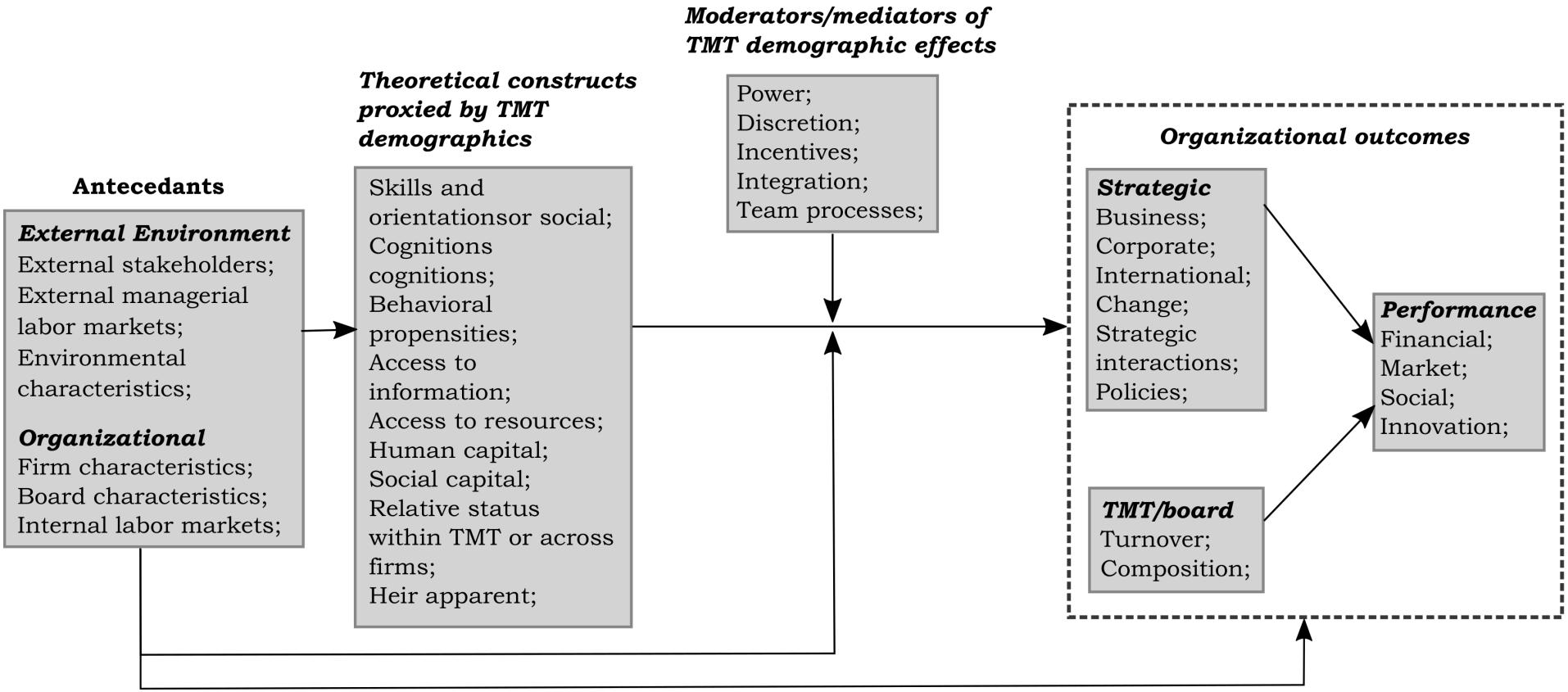
The last demographic indicator directly relevant for this thesis is education. An individual's educational experience represents, to some extent, assuming individuals pick their education seriously, the values and cognitive processes (Hambrick & Mason, 1984). Hambrick and Mason (1984) make three predictions regarding the education of top managers. First, top managers with more formal education are more likely to follow strategies that focus on innovation. Second, the amount of formal management education will not affect profitability, but may increase profit variability for firms where managers only have had a few years of formal management education. Lastly, firms operated by executives with more formal management education show higher degrees of administrative complexity (e.g.: budgeting details and thoroughness). Some other documented observations regarding education include the following. Malmendier and Tate (2008) show that CEOs with an education in technical fields are more sensitive to the cash flows from investments compared to CEOs with general education. In fact, CEOs with an education in finance related topics show even lower levels of sensitivity.

Empirically, Custódio and Metzger (2014) document very weak results regarding education which, according to them, suggests that functional experience is more relevant than educational experience. Bertrand and Schoar (2003) find that managers with a Master of Business Administration (MBA) degree appear to employ more aggressive financing strategies. That is to say, MBA graduates invest more, are more responsive to changes in Tobin's Q and less to cash flow availability when deciding on capital expenditures. Furthermore, CEOs with a MBA degree appear to follow "textbook guidelines" when making investment decisions. Though, Bertrand and Schoar (2003) did not find any statistically significant evidence that having a MBA degree causes particular changes in leverage or cash holdings.

2.2.2.2 *Moderator of top-management team demographic effects: Power*

Figure 3 displays the updated upper echelon model. Relevant for this thesis is the moderating variable power. As pointed out by Carpenter et al. (2004), advancements in the upper echelon literature have identified various moderating and mediating variables to further the knowledge on the processes by which managers affect important organizational outcomes. Both the academic literature and popular press share the belief that the CEO is the most powerful actor in the firm, able to determine the overall direction (Daily & Johnson, 1997).

Figure 3: Updated upper echelon model (from Carpenter et al., 2004)



The concept of power

In general, power can be derived from societal, organizational, interpersonal and individual levels of influence (Ragins & Sundstrom, 1989). Yet, most of the management and finance literature focuses on organizational levels of influence and define power as the capacity of individual actors to exert their will (e.g.: Hickson, Hinings, Lee, Schneck, and Pennings, 1971; Hambrick and Fukutomi, 1991; Finkelstein, 1992; Shen, 2003; Adams et al., 2005; Jiraporn et al., 2012; Li et al., 2017), which is pivotal in strategic decision-making (Child, 1972). Thus, a powerful CEO would be able to control decisions made by the TMT which, essentially, undermines a diversified decision-making process based on consensus among the top executives. Power is obtained from situations that are characterized as highly uncertain (Finkelstein, 1992). That is to say, situations with a lack of information regarding the outcome (i.e. unpredictability).

It is not necessarily the unpredictability but the degree to which individuals are able to cope with this uncertainty that grants power (Hickson et al., 1971). In fact, 'centrality' and 'substitutability' are, together with the ability to 'cope with uncertainty', the main determinants influencing the control of strategic contingencies that grant power (Hickson et al., 1971; Shen, 2003). In short, centrality refers to individuals within the firm whom operate central positions (i.e. multiple actors are dependent on the task fulfillment of a 'central' operating individual) and substitutability refers to actors in the firm whom obtain power through their non-substitutable set of skills.

In sum, power in the management literature is defined as the ability to cope with uncertainty and, correspondingly, the ability to exert one's will (Finkelstein, 1992), or control decisions (Pathan, 2009). One of the important papers that conceptualized and validated various dimensions of power is the seminal paper of Finkelstein (1992).

Sources of power

The main (supposed) balancing force of the CEO is the board of directors. The board of directors, in theory, is more powerful than the CEO because it has the ability to hire, fire, and compensate all executives. However, when CEOs reach a certain level of power, this relation may be compromised (Daily & Johnson, 1997). Finkelstein (1992) identified four sources of power: 'structural power', 'ownership power', 'expert power', and 'prestige power'.

First, structural power is derived from organizational authority, or hierarchical structure, and allows CEOs to manage uncertainty by controlling and delegating tasks to subordinates. That is to say, the CEO has power because he or she holds the position of most senior executive officer. Title is, therefore, an important (structural) power indicator. Furthermore, an additional indicator of structural power is the amount of compensation (Finkelstein, 1992; Daily & Johnson, 1997; Bebchuk et al., 2011). The power indicator of compensation is closely related to the board's ability to keep the CEO under control because it is the board that determines the remuneration packages (usually through remuneration committees). A powerful CEO could, in a variety of manners, influence the board of directors and persuade them for larger compensation packages. Therefore, when the CEO receives substantial more pay, relative to the other top executives, he or she can be considered powerful (Bebchuk et al., 2011).

Second, ownership power is derived from ownership (e.g.: family shares) and allows CEOs to control, for instance, the board of directors as the CEO represents both managers

and owners (Finkelstein, 1992). That is to say, CEOs who are founder, or those who are related to the founder (i.e.: family), may obtain power through increased interactions and relationships with important actors in the firm (Finkelstein, 1992). Important to note[20] is that ownership, as power measure, can directly influence leverage through the entrenchment effect. That is to say, closely related to power is the concept of an entrenchment. A CEO is said to be entrenched once he or she fails to experience the disciplinary force of, for instance, the board of directors (Berger et al., 1997).

Third, expert power refers to the ability of controlling and reducing uncertainty from contingent environments, contingent on particular expert knowledge (Finkelstein, 1992). For instance, a former lawyer may have expert power in situations of regulatory overhaul. So too, CEOs with experience in multiple functional areas have had the opportunity to, not only, develop more knowledge and a broader set of skills, but have also established more contacts within and outside the firm related to those functional areas (Daily & Johnson, 1997). It follows, that such knowledge, skills, and contacts help manage uncertainty in contingent situations. Taking a step back, Fama and Jensen (1983) point out that one of the functions of the board of directors is offering advice and suggestions to, amongst others, the CEO. However, when the CEO has expert power, the CEO could simply bypass the board for advice (Daily & Johnson, 1997). Thus, the dependency on the board decreases while CEO power increases.

Lastly, prestige power is power derived from elevated symbolic statuses and thereto belonging powerful friends, having studied at an elite university, for instance (Finkelstein, 1992). The underlying premise is that prestige provides connections with other prestigious individuals (Daily & Johnson, 1997). Potential indicators of a CEO's prestige is whether or not he or she is serving on the board of directors[21] or having graduated from an elite educational institution.

Empirically, Jiraporn et al. (2012) studied 1,264 firms between 1992 and 2004 and find a statistically significant negative relation between CEO power and leverage. These findings offer support for the prediction that CEOs prefer lower levels of leverage to, for instance, engage in empire building or relieve pressure from fixed interest payments. Furthermore, their results also suggest that CEOs appear to harm firm value by making more adverse changes in leverage[22]. Note, Jiraporn et al. (2012) used fixed-effect estimation and, therefore, cannot draw conclusions regarding differences *between* firms. Instead, the conclusions represent the relationship *within* firms (i.e. when CEOs acquire more power, they reduce leverage).

Building on the work of Jiraporn et al. (2012), Chintrakarn et al. (2014) advance the simple linear relationship by ascertaining the possibility of a non-linear relationship. Their results are statistically significant. Specifically, the marginal change in debt ratio from CEO power is equal to a positive constant *less* the predicted slope parameter times the amount of power. Similarly, Li et al. (2017), whom study 327 small- and medium enterprises in China between 2009 and 2013, find a similar hump-shaped (non-monotonic) relationship between CEO power and leverage.

20 I would like to thank Dr. Huang for pointing out that, while ownership can be used to measure power, it is also closely related to leverage through the entrenchment effect.

21 Daily and Johnson (1997) further add that serving at the board of directors allows the CEO to access and interact with other prestigious individuals.

22 These results were found by regressing, amongst other variables, an interaction effect between CEO power and change in leverage on firm performance.

Life-cycle of power

While Finkelstein (1992) highlights the various sources of power, Hambrick and Fukutomi (1991) describe the life-cycle of CEO power. Hambrick and Fukutomi (1991) argue that the power of CEOs increase with the passage of time (i.e. tenure). For instance, over time, the CEO is more able to configure the board of directors to his or her preference which allows further institutionalization of the CEO's power (Hambrick & Fukutomi, 1991; Shen, 2003). In addition, when CEOs are offered stock (options), influence increases over the years because their ownership stake also increases (Hambrick & Fukutomi, 1991). The life-cycle of power, as described by Hambrick and Fukutomi (1991), is as follows.

When a new CEO first arrives he or she responds to the basic tasks and responsibilities. That is to say, the CEO focuses on building a track record, legitimacy, and a political foothold. This early stage is important because it shows the CEO understands what is expected. It shows whether or not the CEO is the right person for the job through early efficacy. As a result, this early stage is characterized by moderately strong commitment to the *existing* paradigm, low but rapidly increasing knowledge on the set of tasks that is expected, large information diversity from many *unfiltered* sources, high interest in the different tasks, and low but increasing power. The next stage of the cycle is symbolized by experimentation[23]. This stage is characterized by, depending on the CEO, strong or weak commitment to the existing paradigm, moderate and somewhat increasing knowledge on the set of tasks, (still) many sources of information but filtered to a larger degree, (still) high task interest, and moderate but still increasing power.

The third stage is the stage where the overall direction is determined, or "selection of an enduring theme" (Hambrick & Fukutomi, 1991, p.730). In this stage, the CEO reflects on the first two stages and (subconsciously) decides on the aspects he or she wants to keep. As a result, this stage is characterized by moderately strong commitment to the *chosen* paradigm, high and slightly increasing knowledge on the different tasks, (even) fewer information sources with more filtering, moderately high task interest, and moderate but a continued increase in power.

After having established the general direction, the CEO begins to converge and make decisions that support the chosen directions such as the process, structure, and staffing decisions. As a result, the commitment to the direction is strong and increasing, the knowledge of tasks is high and slightly increasing, only a few sources of information (i.e. high filtering), moderately high but diminishing task interest and strong but still increasing power.

Lastly, at a certain point, the marginal benefit of having a powerful CEO out-weights the marginal cost and the firm enters a period of 'dysfunction'. The period of dysfunction is characterized by very strong commitment to the direction, high and slightly increasing task knowledge, *very* few sources of information, moderately low and diminishing task interest, and very strong and power keeps increasing.

In conclusion, the upper echelon theory argues that the managers in the upper echelons affect corporate outcomes, and firms are reflections of top manager's mental constructs (Hambrick & Mason, 1984). Demographic factors serve as proxies for mental

23 Hambrick and Fukutomi (1991) explain that it is possible for the CEO to "skip" this stage if convinced of the pre-existing paradigm. That is to say, if the CEO is of opinion that the current strategic paradigm is correct, no or only minor experimentation will take place.

constructs driving the human propensities and firm outcomes. Furthermore, the potential influence of these manager characteristics is moderated by power (Carpenter et al., 2004). While the upper echelon theory offers explanations as to how manager characteristics result in particular corporate outcomes, an explicit treatment of the incentives is lacking. A complementary theory for the upper echelon theory, therefore, is agency theory which is described in the previous section. Or, to put it in the words of Colbert, Barrick, and Bradley (2014, p.772) (brackets added):

> *"It is through the integration of theories that are concerned with executive behaviors and choice that the UE [Upper Echelon] perspective may provide its richest predictions."*

2.3 HYPOTHESES DEVELOPMENT

The hypotheses focus on the moderating effect of power in the relationship between various manager characteristics and leverage. What follows are the hypotheses that will be tested in this thesis. Figure 4 at the end of this chapter provides a graphical overview of the dependent, independent and moderating variables.

2.3.1 *Gender differences, power, and leverage*

Based on the reviewed literature, it appears that gender is mainly a proxy for the level of confidence and risk-aversion (e.g.: Berger, Rosenholtz, and Zelditch Jr, 1980; Huang and Kisgen, 2013; Faccio et al., 2016). Similar to prior studies, this thesis argues that additional explanations for the capital structure outcomes may include differences in *overconfidence* and levels of *risk aversion* in the upper echelons.

Specifically, it is argued that males are overconfident and risk-tolerant while females, vice versa, are more conservative and risk-averse (Berger et al., 1980; Huang & Kisgen, 2013; Faccio et al., 2016). Important to understand is that overconfidence causes overestimation of average returns and, consequently, a mis-perception of the cost of external finance (Malmendier et al., 2011). The discrepancy in opinion between the overconfident CEO and investors/debtholders regarding returns are different. On the one hand, when the overconfident CEO uses debt financing, the differences in opinion only matter when the believed returns are not adequate to make debt obligations. On the other hand, when the overconfident CEO uses equity financing, the differences in opinion matter regardless of the return, since investors wealth is directly proportional to the level of return[24]. In sum, when the CEO is male, he is associated with overconfidence which means he expects better-than-average effects (Malmendier & Tate, 2005) and that deviation from those estimates is expected to be small (Huang & Kisgen, 2013).

Since male CEOs are believed to be more overconfident, they are more likely to believe that equity is under-valued (Berger et al., 1980; Malmendier et al., 2011) which causes them to use debt rather than equity financing since, as explained, discrepancy in expected returns are less important. Overconfidence also implies that male CEOs undertake

24 Malmendier et al. (2011) explain that it is possible for an overconfident CEO to perceive debt relative to equity as more costly. However, the number of situations where this occurs is so small that it is unlikely to be empirically relevant.

more projects and, because over-opportunistic estimates cause the inclusion of some negative net present value projects, markets react more negatively (Huang & Kisgen, 2013). Vice versa, female CEOs undertake fewer projects and make fewer significant decisions because return estimates, for instance, tend to be less opportunistic compared to those of male CEOs (Huang & Kisgen, 2013).

To sum up, relevant for leverage, overconfidence implies debt financing is preferred because differences in opinion about future estimates are not relevant and, since male CEOs tend to be more overconfident (Ragins & Sundstrom, 1989; Huang & Kisgen, 2013; Faccio et al., 2016), it is expected that male CEOs use more debt financing (i.e. less mispricing) relative to female CEOs who are more conservative. Important to realize is that relatively overconfident male CEOs make worse decisions for the firm (Huang & Kisgen, 2013).

Overconfidence, however, is not the only behavioral bias. Another important difference between the genders is the degree of risk aversion. Risk aversion, a trait inherent in women, implies, for instance, that women invest less in risky assets in their investment portfolio (Agnew et al., 2003). According to Faccio et al. (2016), when a woman becomes CEO, corporate risk-taking might be reduced to fit her personal preferences, because females are inherently more risk-averse (Ragins & Sundstrom, 1989). If corporate risk-taking is driven by female CEOs imposing their preference through the capital structure, the *efficiency* of the capital allocation process could be undermined (Faccio et al., 2016). For instance, when female CEOs are inherently more risk averse and manage growth firms, positive net present value projects might not be accepted when additional debt financing is required because one has to commit to additional (risky) debt obligations.

In sum, relevant for leverage, risk-aversion implies debt financing is not preferred because one commits to fixed interest payments resulting in bankruptcy in case of insolvency. Since female CEOs tend to be more risk-averse (Ragins & Sundstrom, 1989; Huang & Kisgen, 2013; Faccio et al., 2016), it is expected that female CEOs prefer not to use debt financing. Similar as with overconfidence, important to realize is that relatively risk-averse female CEOs also make worse decisions for firms (Huang & Kisgen, 2013).

Empirically, studies show that firms run by female CEOs are less leveraged, have less volatile earnings, and have higher survivability than similar firms run by male CEOs (Faccio et al., 2016). Likewise, Huang and Kisgen (2013) document statistically significant lower levels of debt in firms run by female CEOs compared to firms managed by male CEOs. Graham et al. (2013) find that firms managed by male CEOs have more debt. Thus, based on the previous arguments and empirical findings, if male CEOs and female CEOs impose their preferences related to overconfidence and risk-aversion through the capital structure, I expect that male CEOs steer towards debt financing, when external financing is required, while female CEOs are more inclined to use equity financing.

Important to note is that the underlying values, traits, and cognitive processes of a single CEO are not necessarily imposed on the capital structure. Indeed, large corporations have various governance mechanisms in place to prevent the influence of a single top manager. Notwithstanding the fact that it is not necessarily only the CEO who makes decisions but the whole TMT is, in fact, involved in the decision-making process (Hambrick & Mason, 1984). However, when a CEO is powerful, asymmetries in the decision-making process arise and, consequently, the underlying preferences of a single CEO are more imposed through the capital structure. To put it differently, the CEO is able to exert his or her will which makes the decision process less diversified and lowers the neutralizing

effect of governance mechanisms (Adams et al., 2005; Bebchuk et al., 2011). In addition, dominant CEOs can restrict information flow thereby nullifying the contributions of other executives (Haleblian & Finkelstein, 1993). When a single CEO is able to impose his or her preferences, a moral hazard may be the result (Adams & Ferreira, 2007) since gender-related preferences may deviate from what shareholders find optimal.

Predictions about a CEO's use of power require an understanding of the CEO's gender-related preferences toward his or her degree of leverage, because power is simply the ability to bring about a preferred or intended effect (Bigley & Wiersema, 2002). It is, therefore, that regardless of the power dimension (e.g.: structural, ownership, expert, prestige), the effect is expected to be the same. On the other hand, hypothesized associations between a CEO gender and financial leverage presuppose that the CEO has sufficient power to impose preferred effects. As a result, it is reasonable to assume that CEO power and gender interact to affect financial leverage.

Thus, based on the above-described hypothetical relationship, the first hypothesis follows corresponding theoretical arguments and predicts that CEO power strengthens the relationship between CEO gender (i.e being female) and leverage because power causes asymmetry in the TMT which allows CEO characteristics to be more imposed on the capital structure. When the CEO accumulates power, he or she will be more able to impose preferences because asymmetry is further increased. In sum, the first hypothesis predicts a moderating relationship between CEO power, gender and leverage where power results in a stronger imposition of risk-aversion (less debt), in case of female CEOs, and overconfidence (more debt), in case of male CEOs (Figure 4 provides a graphical representation of this hypothesis, and the other two hypotheses, and the predicted relationships). Similar to Bigley and Wiersema (2002), I do not propose a main effect for either CEO gender or CEO power because, as stated before, the strength (i.e. CEO power) and the direction (i.e. CEO gender) of effects should be considered in combination. Using a similar formulation as Bigley and Wiersema (2002), the first hypothesis states:

Hypothesis 1. CEO's accumulated power strengthen the imposed effects of overconfidence and risk-aversion such that a female CEO will be associated with less financial leverage as her power increases.

2.3.2 *Young versus old, power and leverage*

Prior theoretical and empirical studies document conflicting predictions as to how age affects risk-taking behavior and leverage (Serfling, 2014). One strand of literature argues that younger managers use more leverage whereas the other strand of literature argues the opposite to be true.

On the one hand, younger managers, everything else equal, have a shorter track-record, less achievements, are more scrutinized by the labor market, and are more concerned with their career (i.e. want to limit the negative effects on future career opportunities), than older managers, which results in conservative, or risk-averse, tendencies in the financing decision (Hirshleifer & Thakor, 1992). Thus, the first stream argues that younger CEOs are more conservative compared to older CEOs. The model of Zwiebel (1995) provides further support by showing that *future* career opportunities affect *current* investment decisions. Furthermore, Zwiebel (1996) argues that managers at the end of

their tenure whom, *ceteris paribus*, are older, are more likely to increase debt to fund their "legacy building" activities.

On the other hand, it has been argued that younger managers, early in their career, make more, bolder, and riskier financing decisions compared to older managers (Serfling, 2014) (i.e. more risk-tolerant). The model of Prendergast and Stole (1996) further supports this prediction and shows that 'conservatism' and 'exaggeration' both influence reputation but that exaggeration may be more prominent early in the manager's tenure while conservatism is more present later in a manager's tenure. Hambrick and Mason (1984) posit three additional explanations for why *younger* managers are more risk-taking and why older managers are more conservative. First, older managers have less physical and mental stamina and are less able to grasp new ideas. Second, older managers are more committed to the status-quo and, consequently, prefer not to take risks by exploring new areas. Lastly, older managers may be at a point in their career where financial and career security are more important. On a final note, Graham et al. (2013) argue that older CEOs might be more tolerant towards risk because, similar to the argument made by Ragins and Sundstrom (1989) regarding the average woman in the population, older CEOs may, in general, not be comparable on a one-to-one basis with older men. Thus, the second line of argumentation argues that older managers are more conservative and risk-averse whereas younger managers are risk-loving.

Based on the theoretical arguments it is not conclusive as to how age may affect leverage. Empirically, Serfling (2014) shows that CEO age is negatively related to firm's stock return volatility which supports the argument/prediction that older managers take on less risk. Then, having examined the channels through which the CEO influences risk Serfling (2014) concludes that older (younger) CEOs reduce (increase) firm risk through less (more) risky investment policies. Furthermore, Frank and Goyal (2007) and Bertrand and Schoar (2003) also argue that older managers are associated with conservative behavior and, consequently, avoid debt financing but do not find statistically significant evidence to support their argument.

Similar as with CEO gender, predictions about CEO's use of power require an understanding of the CEO's age-related preferences of conservatism or risk-tolerant toward the degree of leverage. Moreover, the influence of the CEO's age can be diminished and may not by strongly imposed in the capital structure once other executives in the TMT are from other age categories. However, when the CEO is powerful, he or she is able to exert his or her will and, as a result, asymmetries in the decision-making process causes age preferences to be imposed in the capital structure (Daily & Johnson, 1997; Carpenter et al., 2004). Naturally, the decision process has become less diversified. Even with inconclusive theoretical predictions, the argument can still be made that power wielded by the CEO strengthens the imposition of age preferences in the capital structure. Furthermore, similar as the previous hypothesis, regardless of the power dimension (e.g.: structural, ownership, expert, prestige), the effect is expected to be the same since the effect stems from the unobserved imposed preferences. Again, I do not propose a main effect for either CEO age or CEO power because, as stated before, the strength (i.e. CEO power) and the direction (i.e. CEO age) of effects should be considered in combination.

Thus, while it is a priori not evident how age affects leverage, is it reasonable that power strengthens the effect which, in this case, can be either positive or negative. In sum, based on the above-described arguments, the second hypothesis posits that power moderates the relationship but contradicting predictions are made regarding age, simi-

lar to Serfling (2014). Thus, the following dueling hypotheses are proposed (see Figure 4):

Hypothesis 2a. CEO's accumulated power will strengthen the imposed effects of conservatism and risk-aversion such that a younger CEO will be associated with less financial leverage as power increases.

Hypothesis 2b. CEO's accumulated power will strengthen the imposed effects of exaggeration and risk-tolerance such that a younger CEO will be associated with more financial leverage as power increases.

2.3.3 *Differences in functional experience, power, and leverage*

As stated before, CEO's functional experience is closely related to how the CEO processes and determines priority of incoming information (Bowman & Daniels, 1995). While functional experience is important for corporate decisions (Hambrick & Mason, 1984; Graham & Harvey, 2001; Bertrand & Schoar, 2003; Güner et al., 2008; Custódio & Metzger, 2014; Krüger et al., 2015), specific theoretical predictions and arguments for how and why it affects the financing decision are lacking.

For financial leverage, especially managers with experience in the peripheral functions, which focus on risk management, are of interest based on the reviewed literature (e.g.: Custódio and Metzger, 2014). Experience of those managers is (probably) related to objectivity, caution and future stability (Bowman & Daniels, 1995), or risk management (Hambrick & Mason, 1984). While no empirical evidence could be found, if peripheral functions indeed emphasize risk management (Hambrick & Mason, 1984), one could expect financial expert CEOs to use less leverage because this would lower risk. However, this implication is not certain since debt financing and managing risk are not mutually exclusive (i.e. can happen simultaneously). In essence, a CEO's functional experience causes certain functional biases in perceived priorities during the decision-making process in the TMT (Bowman & Daniels, 1995).

Some documented observations regarding experience include the following. First, financial expert CEOs are more likely to have project-specific discount rates rather than company-wide discount rates (Graham & Harvey, 2001). Second, Güner et al. (2008) document that a board of directors with financial experts have better access to the capital market. For instance, investment bankers on the board of directors are associated with larger bond issues and worse acquisitions (Güner et al., 2008). The increased amount of external financing, though, is mostly for firms with good credit and poor investment opportunities. Further observations can be found in the succession of CFOs. Custódio and Metzger (2014) find that newly hired financial expert CEOs are more likely to replace an incumbent CFO within the first year of employment because of their involvement with firm's financial policies.

Custódio and Metzger (2014) investigate these observations and conclude the following. First, financial expert CEOs are more financially sophisticated and, therefore, are more likely to follow finance theory. Second, financial expert CEOs are able to increase cash holdings and the level of debt in periods when it would be difficult to do so because of a high probability of default, for instance. Fourth, firms ran by financial expert CEOs are less sensitive to the riskiness of internal cash flows when investments have to be made. Thus, while Custódio and Metzger (2014) document a statistically positive

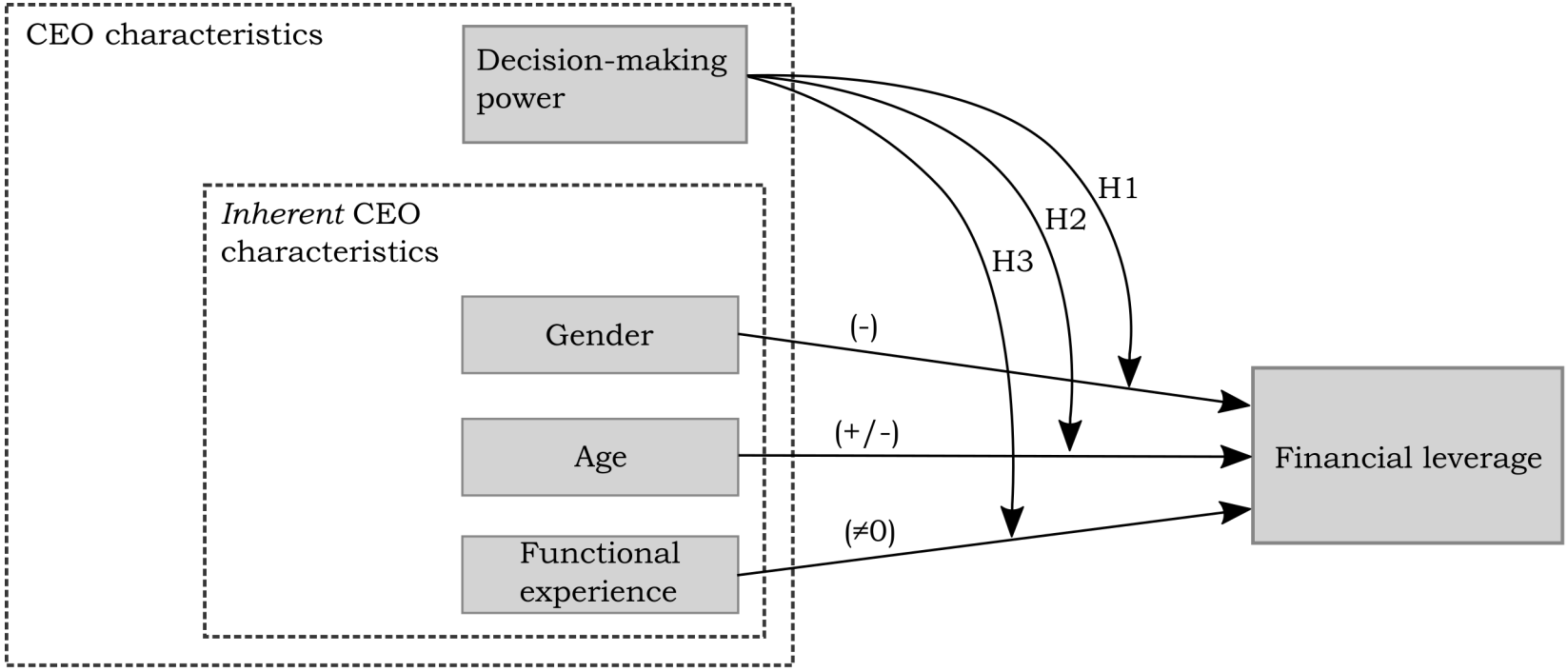
relationship between the CEO's background experience in finance and leverage, a clear theoretical argumentation as to how or why it affects leverage is lacking. The main conclusion states that previous work experience of the CEO affects the financial policies of the firm (i.e. leverage).

Again, I do not propose a main effect for either CEO age or CEO power because, as stated before, the strength (i.e. CEO power) and the significance (i.e. CEO functional experience) of effects should be considered in combination. In sum, similar to the previous hypotheses, it is expected that a powerful CEO is more able to reflect his or her functional bias and impose related preferences. Similar as the previous hypothesis, regardless of the power dimension, the effect is expected to be the same since the effect stems from the unobserved imposed preferences associated with the information processing stemming from CEO's functional experience.

In sum, the relationship between functional experience and financial leverage is not well determined by theory. CEO power, nonetheless, is still believed to strengthen the relationship between functional experience experience and leverage. Based on the above-described arguments, the last hypothesis posits that power moderates the relationship but the specific relationship is not specified which is reasonable when the direction is not well determined by theory (Wooldridge, 2015). Thus, the following hypothesis is proposed (see Figure 4):

Hypothesis 3. CEO's accumulated power will strengthen the imposed effects from CEO's functional bias such that a financial expert CEO will be associated with significantly different financial leverage as power increases.

Figure 4: Research model and proposed hypotheses



Note: This figure illustrates the research model for this thesis. The inherent CEO characteristics in relation to financial leverage have been studied before (e.g.: Huang and Kisgen, 2013; Serfling, 2014; Custódio and Metzger, 2014; Faccio et al., 2016). Inherent refers to time-invariance whereas decision-making power can change over time. The objective of this thesis is to study the moderating effect of decision-making power on those previously examined relationships. The results contribute to the study of Figure 3. The symbols in brackets refer to the expected relationship where (+) is a positive relation, (−) is a negative relation, (≠ 0) is a relationship that is not zero.

3 METHODOLOGY

This chapter explains the research methodology used in this thesis. The first section describes the empirical models and estimation techniques (§3.1). This part also elaborates on various issues of endogeneity such as self-selection, unobserved heterogeneity, and potential omitted time-varying variables. The next section encompasses the regression diagnostics (§3.2). This section evaluates and offers solutions to potential problems that violate the ordinary least squares (OLS) assumptions (see Appendix §B.1). The last section (§3.3) specifies the dependent, independent, moderating, and control variables. A full list of the variable specifications can be found in Table 1 at the end of this chapter. Figure 5 on the last page displays the research model with the variables used in the empirical models.

3.1 EMPIRICAL MODELS AND ESTIMATION

The first part of this chapter introduces the empirical models and associated estimation techniques. While I concede that there are multiple types of quantitative methods (e.g.: Gelman and Hill, 2006; Rabe-Hesketh and Skrondal, 2012) reviewing all of them would be unnecessary given the research objective and earlier published studies. The main estimation technique, accordingly, is OLS which aims to minimize the sum of squared residuals. Furthermore, the models are specified as multivariate linear regression models.

Alternative estimation techniques have been considered but are not chosen for some of the following reasons. First, maximum-likelihood estimation (MLE), for instance, requires knowledge on the distribution of the stochastic error which is unknown to the me. Another estimation technique, one that has received increased attention (Kruschke, Aguinis, & Joo, 2012), is Bayesian estimation. The main difference between these methods lies in the statistical inference and the underlying assumptions (Gill, 2014). Nonetheless, it has been argued that Bayesian regression analysis has various advantages over OLS and MLE[1] (e.g.: Kruschke et al., 2012; Gill, 2014).

For the purposes of this thesis, the goal is to build on previous literature and it is, therefore, appropriate to use a similar method in order to contrast the findings. Thus, OLS is used as main estimation method since a full Bayesian analysis would make results hard to contrast and the distribution of the stochastic error is unknown which, essentially, precludes the use of MLE.

1 Hierarchical Bayesian models, for instance, have the ability to improve the precision by averaging over uncertainty which minimizes the effect of small sample sizes (Gelman et al., 2014). In addition, such models can provide complete distributional estimation rather than a point estimate which is the case for pooled, fixed-effect estimation (FE) and random-effect estimation (RE) (Gelman & Hill, 2006). Some disadvantages include the specification of prior distributions for all parameters which is based on presumed prior knowledge (Gelman et al., 2014) something that makes Bayesian analysis inherently subjective. Yet, that is not to say that pooled OLS, FE and RE are fully objective. For instance, the specification of an arbitrary cut-off for statistical significance, amongst others, can also be considered subjective (Gill, 2014). Gelman (2008) and Gill (2014) offer interesting arguments against and in favor of Bayesian analysis.

3.1.1 *Empirical model*

The main estimation method is pooled OLS. The empirical models are specified below. The subscripts correspond to firm "i" in year "t".

$$y_{it} = \beta_0 + \sum_{k=1}^{3} \beta_k x_{kit} + \eta_1 Z_{pit} + \sum_{m=1}^{3} \lambda_m x_{kit} Z_{pit} + \sum_{c=1}^{10} \gamma_c C_{cit} + \tau_j + d_t + \epsilon_{it} \quad (1)$$

The dependent variable y_{it} is leverage. The x_{kit} are the $k = 3$ independent variables: gender, age, and functional experience. The Z_{pit} is the moderating variable CEO power, where p refers to the number of components extracted from the principal component analysis (PCA). The next part in model 1 represent the two-way interaction effects where λ_m is the coefficient and x_{kit} and Z_{pit} are specified as before. The C_{cit} are a set of 10 control variables. The τ_j and d_t are industry- and year-fixed effects that capture the industry latent attributes shared by firms operating in the same industry and temporal latent attributes associated with the various years, respectively. Lastly, ϵ_{it} is a stochastic error term.

Since I do not propose a main effect for either the CEO characteristics (i.e. gender, age, and functional experience) or CEO power it is, therefore, that the λ_m in empirical model (1) is of most interest[2]. For hypothesis 1, related to gender, I expect the two-way interaction between gender and CEO power to be negative. When the coefficient λ_m is negative it implies that female CEOs, when power increases, use lower levels of financial leverage compared to male CEOs and female CEOs with less power. For hypothesis 2, related to age, the sign on the λ_m coefficient for the two-way interaction between age and CEO power is expected to either be positive or negative. Lastly, for hypothesis 3 no specific direction is expected yet the two-way interaction between functional experience and CEO power is expected to be significant.

While pooled OLS is an often applied technique, there is a pressing concern. Pooling the data presumes that each observation is independent which, since there are firms with multiple firm-year observations, is not the case. The observations are not independent but are *conditionally* independent, conditional on their cluster (i.e. the firm) (Rabe-Hesketh & Skrondal, 2012).

When observations are conditionally independent it suggests that the error terms are autocorrelated, also known as serial correlation, which biases the estimated errors (Wooldridge, 2015). For instance, positive autocorrelation in the error term biases the standard error (SE) downwards, inflates the t-statistic and, as a result, makes statistical inference using those statistics problematic (Wooldridge, 2015). Therefore, the SEs need to be adjusted for clustering at firm-level. The next section is a brief introduction to the examination of potential nonlinear effects, as suggested by Dawson (2014).

2 Following convention of published papers, 1% ($p < 0.01$), 5% ($p < 0.05$), and 10% ($p < 0.1$) significance levels are specified in the results. When the results are statistically significant it indicates that the relationship between the dependent and independent variable is caused by something other than random chance and, thus, offers empirical evidence against the null hypothesis (Wooldridge, 2015). Important to remember is that these cut-offs are (somewhat) arbitrarily chosen and are treated as categorical (e.g.: strongly significant (1%), significant (5%), weakly significant (10%), not significant (>10%)) while being continuous (Gill, 2014).

3.1.1.1 *Nonlinear effects*

So far, the previously described model only ascertains a straightforward linear regression. That is to say, the dependent variable (y_{it}) is continuous and its relationship with the independent variables (x_{kit}) is linear for all values of the moderating variable (Z_{pit}). However, previous research on CEO power has documented a non-linear effect on leverage (e.g.: Chintrakarn et al., 2014; Li et al., 2017). The underlying argument is that firms run by CEOs with low power use more debt to reduce agency costs but when the CEO becomes powerful, he or she is able to exert his or her will and, consequently, reduces leverage to further personal interests (Li et al., 2017). Also, as suggested by Dawson (2014), even when non-linearity is not explicitly hypothesized, it can be worth checking curvilinearity of the moderating variable. Whether the moderator has a curvilinear effect is determined by the significance of the coefficient that interacts the squared moderator with the CEO characteristics. Model (2) displays the empirical model for testing nonlinearity. All variables are specified as before. The only difference is the inclusion of the squared power variable and squared two-way interaction effect.

$$y_{it} = \beta_0 + \sum_{k=1}^{3} \beta_k x_{kit} + \eta_1 Z_{pit} + \eta_2 Z_{pit}^2 + \sum_{w=1}^{3} \lambda_w x_{kit} Z_{pit} + \sum_{m=1}^{3} \lambda_m x_{kit} Z_{pit}^2 + \sum_{c=1}^{10} \gamma_c C_{cit} + \tau_j + d_t + \epsilon_{it} \quad (2)$$

3.1.2 *Self-selection bias between CEOs and firms*

The previously specified method does not rule out that results are driven by self-selection bias. That is to say, CEOs and firms are not randomly matched, a problem often and well-documented in the literature (e.g.: Huang and Kisgen, 2013; Serfling, 2014; Custódio and Metzger, 2014; Faccio et al., 2016), which may cause unobserved discriminatory preferences to drive the results rather than the CEO characteristics. For instance, female CEOs may self-select into particular firms because of certain firm-specific characteristics. Likewise, the board of directors may discriminate based on gender which causes the same characteristics associated with this discriminatory behavior to be associated with leverage (Faccio et al., 2016). Moreover, Huang and Kisgen (2013) stipulate that female executives are more often managing consumer product firms which, if consumer products have particular target leverage ratios, could cause spurious inference. So too, Custódio and Metzger (2014) conjecture that the demand for financial expert CEOs may be related to the life-cycle of the firm (e.g.: mature firms tend to select financial expert CEOs) and Serfling (2014) entertains the possibility that particular firms prefer (older) younger CEOs. In order to isolate the effect of CEO characteristics from those unobserved effects, a variety of solutions are suggested.

This thesis follows previous studies (e.g.: Huang and Kisgen, 2013; Serfling, 2014; Faccio et al., 2016) and utilizes a modest approach of treatment-effects estimation using propensity score matching (PSM). PSM allows me to estimate the average treatment-effect on the treated from observational data using a propensity score matched sample (StataCorp, 2017). A propensity score matched sample allows me to study the difference between two samples where the only *observable* difference is the specified CEO characteristic (i.e. gender, age, or functional experience) (Rosenbaum & Rubin, 1983). In order

to implement this methodology, the propensity score (i.e. the probability that a firm is managed by a CEO with a particular characteristic) needs to be calculated.

Using a Probit model, I individually regress the CEO characteristics on various firm- and CEO-specific variables to estimate the propensity score which represents the probability that a firm is managed by a CEO with one of the particular characteristics. The firm characteristics include as many of the control variables as described in §3.3. Having calculated the propensity score, statistical inference on the results can show whether there are significant differences in the average treatment-effect. A downside of this method is that exact matches might be hard to find when the sample size is small. As a result, significant difference might be the result of improper matching rather than a difference caused by the isolated effect of the independent variables.

Since exact matching requires a rather large sample size, an alternative method for determining significant differences is the difference-in-difference (DiD) approach. The DiD estimates treatment effects of a given outcome variable accounting for included control variables (StataCorp, 2017). Following Huang and Kisgen (2013), this method involves creating a dummy variable that takes the value of 1 for the year, and the years after, the 'treatment' started (i.e. the year a transition occurred that changed the CEO characteristic of interest, male-to-female for instance). Next, a dummy variable is created that takes the value of 1 to indicate whether a firm is exposed to the treatment. After the specification of these dummies, the DiD treatment effect is estimated which allows identification of self-selection bias. When there are significant differences, unobserved discriminatory preferences, for instance, might be a concern.

Though, DiD also has limitations. Ideally, the treatment group would include firms exposed to the transition of interest but also with subsequent years for the CEO to establish a foothold and become powerful. For example, if a transition occurs in 2014, the CEO most likely has not been able to establish presence and influence corporate decision-making (Hambrick & Fukutomi, 1991; Huang & Kisgen, 2013) when the data sample ends in 2015. Therefore, it would be better to only include firms in the treatment group where there are sufficient years that follow-up the transition. Huang and Kisgen (2013) require the availability of three years after transitions occur, for instance. However, due to sample size limitations this approach is not feasible and all firms exposed to the transition of interest are examined.

3.1.3 *Unobserved time-invariant heterogeneity*

While the treatment-effect estimation using PSM and DiD are useful to *identify* significant differences in financial leverage by establishing a "natural experiment" that compares the treatment and control group, after accounting for various firm-specific characteristics, the documented correlation between the CEO characteristics and leverage may simply be the result of some (not included) *unobservable* characteristics that might influence both leverage or one of the CEO characteristics (Faccio et al., 2016). To put it differently, these methods rely on included *observable* controls. Since I cannot control for unobservable characteristics, correlation with such variables may cause me to incorrectly contribute the differences to the CEO characteristics. To take a case in point, if the PSM finds significant differences for gender it suggests that similar firms managed by similar CEOs, except from their gender, use different levels of leverage. Key to understand here is that the similarity is only based on the included *observable* characteristics. Therefore, while

this study includes a variety of firm- and CEO-specific characteristics, there may still be concerns of other omitted variables.

In order to control for some of the unobserved *time-invariant* characteristics, I utilize the panel structure of the data and employ FE. Including firm fixed-effects removes any cross-sectional correlation between the CEO characteristics (e.g.: age, gender, functional experience) and leverage, which reduces the influence of potential confounding variables[3] (Rabe-Hesketh & Skrondal, 2012). For FE, I make two sub-samples. The first sample is the full sample while the second, following Faccio et al. (2016), is a reduced sample that only includes firms experiencing transitions from male-to-female, female-to-male, young-to-old, old-to-young, financial-expert-to-non-financial expert, and non-financial-expert-to-financial expert. The reason behind using a subsample is that only those firms, experiencing the relevant transition, contribute to the identification of the endogeneity problem (Faccio et al., 2016).

On a final note, the results can also be driven by the fact that CEOs may have enjoyed different education programs which, if not controlled for, could be an unobserved driver. Fortunately, having hand-collected the data, specific information on education is also obtained. Including education allows me to further isolate the effect of gender, age, and functional experience. When included no specific expectation is made as to how education affects leverage since this is not of interest.

Fixed-effect models (Appendix §B.1.2 describes the assumptions) include a separate firm-specific intercept for each firm that captures the unobserved *time-invariant*[4] heterogeneity. Important to note is that fixed-effect models estimate within-firm effects and, therefore, cannot be used to infer effects for the entire population of clusters (i.e. the firms) (Rabe-Hesketh & Skrondal, 2012). The model for FE is displayed in model (3).

$$y_{it} = \alpha_i + \sum_{k=1}^{3} \beta_k x_{kit} + \eta_1 Z_{pit} + \sum_{m=1}^{3} \lambda_m x_{kit} Z_{pit} + \sum_{c=1}^{10} \gamma_c C_{cit} + d_t + \epsilon_{it} \tag{3}$$

All variables are specified as before. The only differences are as follows. First, 4 education control variables are included. Second, α_i is included which is a firm-specific intercept (i.e. firm fixed-effect). Lastly, the industry latent attributes are excluded because those time-invariant variables would be perfectly collinear with the α_i.

3.1.4 *Unobserved time-variant variables*

Even after having accounted for self-selection and unobserved time-invariant heterogeneity, it is still possible that time-variant omitted variables are driving the effect of CEO characteristics on leverage. In order to address this issue, I employ a modest instrumental variable approach. Specifically, I employ a pooled two-stage least squares (2SLS) (Appendix §B.1.3 describes the assumptions) estimation model. After 2SLS is used, the F-score and partial R^2 are examined to determine the quality/validity of the instrument. For instance, low F-scores may indicate low quality instruments (Bound, Jaeger, & Baker, 1995).

3 Another solutions is pooled CEO with first-differencing which, essentially, differs out the intercept and firm-specific unobserved effects (Wooldridge, 2015).

4 Intuitively, since the firm-specific intercept captures the time-invariant heterogeneity, all variables that do not change over time are excluded due to perfect collinearity with the intercepts.

If the described regression models only included age, gender, or functional experience, I could simply select an appropriate instrument for those CEO characteristics and run the 2SLS. However, since the regressions include gender interacted with power, age interacted with power, and functional experience interacted with power, there are three potentially endogenous variables all of which require an instrument. Note, it is *not* correct to view the CEO characteristics as endogenous, use an instrument to obtain predicted values in the first stage, and interact those predicted values with power in the second stage, also known as the "forbidden regression" (Wooldridge, 1995). Specifically, Berger and Bouwman (2013, p.166) explains (brackets with Variable 1 are added): "*it is not correct to view [Variable 1] as the endogenous right-hand-side variable, create a predicted value of [Variable 1] in the first stage, and then interact it...*". Thus, a first stage regression is run for the main effect and for all two-way interaction terms.

Finding a valid instrument is a non-trivial matter. A valid instrumental variable must be exogenous and relevant (Wooldridge, 2015). It is, thus, quite challenging to find a good instrument that is based in economic theory which correlates with the CEO characteristics (i.e. age, gender, and functional experience) but not leverage. In addition to the difficulty of finding a good instrument, access to the variables for the specific firms is also required. Nonetheless, after having reviewed the literature, instrumental variables have been identified for gender and age which are also accessible.

Following Serfling (2014) and Cline and Yore (2016), I use the consumer price index (CPI) in the year the CEO was born as an instrument. The CPI is a measure of change in the price levels of a market basked of products purchased by households in the economy. This variable is highly correlated with CEO age but the CPI in the year the CEO was born is unlikely to predict leverage other than through its effect of age. The CPIs are obtained from InflationData.com database[5].

So too, following prior studies (e.g.: Huang and Kisgen, 2013), the instrument for the CEO being female is the state's gender equality score (GES), based on Sugarman and Straus (1988). The underlying premise for this instrument is that states that score higher on gender equality are more favorable towards female executives which should positively correlate with the CEO being female. The gender equality index of Sugarman and Straus (1988) consists of economic (e.g.: percent of women who are managers, percent of 16 years and older females who are in the labor force), legal (e.g.: sex discrimination in the area of housing, education, financing, or public accommodation), and political (e.g.: percent of congress, senate, house, judges, mayors that are women) measures.

The GES is determined based on the state in which the firm has established its headquarters. Similar as before, while this variable is positively correlated with the CEO being female, it is unlikely that a state's GES influences a firm's leverage other than through the CEO being female (Huang & Kisgen, 2013). Unfortunately, no appropriate instrument is found for functional experience and, therefore, I cannot formally rule out that time-varying omitted variables are driving the results of the regression models for functional experience. To put it differently, establishing a true casual relationship between functional experience, moderated by CEO power, and financial leverage will, unfortunately, not be possible.

5 *Source:* https://inflationdata.com/Inflation/Consumer_Price_Index/HistoricalCPI.aspx?reloaded=true. This website provides data on CPIs data from 1913 up till the present. Data are extracted to Excel and further processed using Stata.

Using a similar approach as Berger and Bouwman (2013) and Carlin and Mayer (2003), I regress gender on all the exogenous variables used in previously described regressions[6] plus the instruments (GES and GES interacted with Z_{pit}, where p corresponds to the number of components obtained after the PCA). Likewise, I regress gender interacted with power on all the exogenous variables from previous regressions plus the instruments (GES and GES interacted with Z_{pit}). Then, in the second-stage, the predicted values/instrumented variables of the first stage are used. The models are presented below (Model (4) and (5)) where x_{it} refers to gender, GES and GES $\times$ Z_{pit} are the instruments, and the rest correspond, as before, to the set of exogenous control variables. ϵ_{it} is the stochastic error term.

First-stage:

$$x_{it} = \beta_0 + \gamma_1 GES_i + \gamma_2 GES_i \times Z_{pit} + \sum_{c=1}^{12} \gamma_c C_{cit} + \tau_j + d_t + \epsilon_{it} \tag{4}$$

Second-stage:

$$y_{it} = \beta_0 + \beta_1 Instr(GNDR_i) + \beta_2 Instr(GNDR_i) \times Z_{pit} + \sum_{c=1}^{12} \gamma_c C_{cit} + \tau_j + d_t + \epsilon_{it} \tag{5}$$

Similar as with gender, for age I regress age on all the exogenous variables used in previously described regressions plus the instruments (CPI and CPI interacted with Z_{pit}). Likewise, I regress age interacted with power on all the exogenous variables from previous regressions plus the instruments (CPI and CPI interacted with Z_{pit}, where k corresponds to the number of components after the PCA). Then, in the second-stage, the predicted values of the first stage are used. The models are presented below (Model (6) and (7)) where x_{it} refers to age, CPI and CPI $\times$ Z_{pit} are the instruments, and the rest correspond, as before, to the set of exogenous control variables. ϵ_{it} is the stochastic error term. Specifically, I estimate the following 2SLS model:

First-stage:

$$x_{it} = \beta_0 + \gamma_1 CPI_i + \gamma_2 CPI_i \times Z_{pit} + \sum_{c=1}^{12} \gamma_c C_{cit} + \tau_j + d_t + \epsilon_{it} \tag{6}$$

Second-stage:

$$y_{it} = \beta_0 + \beta_1 Instr(Age_i) + \beta_2 Instr(Age_i) \times Z_{pit} + \sum_{c=1}^{12} \gamma_c C_{cit} + \tau_j + d_t + \epsilon_{it} \tag{7}$$

On a final note, the Wu-Hausman test is utilized to determine whether the endogenous variables are, in fact, endogenous. For both tests, if the test statistic is significant, the variables tested are endogenous.

6 Similar to the 2SLS approaches of Huang and Kisgen (2013), Serfling (2014), and Cline and Yore (2016), all of whom regress all exogenous variables (i.e. mostly their control variables) on the endogenous variables to obtain predicted values.

3.2 REGRESSION DIAGNOSTICS

As is described in Appendix §B.1 unbiased and consistent estimators are important to ensure validity of the statistical inference. An estimator is *unbiased* if it hits the true parameter, on average. An estimator is *consistent* if it converges to the true value of the parameter when sample size increases (to infinity). This section will explore how well the data meet the required assumptions for the OLS regressions. Specifically, the following assumptions and concerns are evaluated: influential data points, independence of stochastic error, multicollinearity, homoscedasticity, and identically normally distributed stochastic errors. Where possible the assumptions are checked via tests and graphical representations.

3.2.1 *Influential observations*

Influential observations are data points that have a substantial impact on the results of the regression analysis. If those observations exist, it is paramount to conduct further investigation because including such observations in linear regression models can present a distorted and misleading picture (Cook, 1977). A first approach for identifying outliers is examining studentized residuals. This approach allows me to detect outliers (i.e. observations with large residuals). To put it differently, observations with large studentized residuals are unusual given their value of financial leverage. When those residuals exceed positive (negative) 2, further analysis is warranted (Wooldridge, 2015). A second approach is examining how far an observation deviates from the mean and the third approach focuses on Cook's distance (Cook's D)[7]. The higher Cook's D the more influential the point. Influential observations are those observations that substantially change coefficient estimates once removed. All regression models are run with and without inclusion of the influential observations.

3.2.2 *Independence of stochastic error*

The assumption of independent stochastic errors is also known as serial correlation, or autocorrelation (see Appendix §B.1.1). Serial correlation is present when the stochastic errors are correlated, conditional on the independent variables (Rabe-Hesketh & Skrondal, 2012). For instance, it is likely that yearly observations closer to each other (e.g.: 2007 and 2008) are more correlated than observations farther from each other (e.g.: 2007 and 2014). Another way this assumption can be violated is when observations within one firm are more correlated than between firms (Wooldridge, 2015).

Autocorrelation is tested via the Breusch-Godfrey test. An alternative test for testing autocorrelation is the Durbin-Watson test. Difference being that the Durbin-Watson test relies on the assumption of normally distributed residuals and the Breusch-Godfrey test is less sensitive to that assumption (Wooldridge, 2015). The null hypothesis for both tests is no autocorrelation. When the tests are significant the SE are adjusted accordingly using *clustered* Sandwich estimators (Wooldridge, 2015; StataCorp, 2017).

7 In short, studentized residuals exceeding plus/minus 2 are considered outliers. When the leverage measure exceeds $(2k+2)/n$ it is set to be an outlier. When Cook's distance exceeds $4/n$ it is said to be an outlier.

3.2.3 *Multicollinearity*

The problem of multicollinearity does not violate any of the assumptions as long as the collinearity is not *perfect*. However, substantial multicollinearity can significantly increase the SE which, subsequently, influences the statistical inference (Wooldridge, 2015). To identify potential multicollinearity problems, the variance inflater factor (VIF) is examined. VIF scores larger than 10 are, by convention, deemed problematic though this cut-off is arbitrary (Wooldridge, 2015). A potential solution for multicollinearity, especially when dealing with moderating variables, is mean-centering which has the additional benefit of making the results directly interpretable because the mean becomes zero (Dawson, 2014). In sum, multicollinearity is expected to be larger than usual due to the inclusion of interaction variables and squared interaction variables yet the problem might be mitigated once variables are mean-centered.

3.2.4 *Homoscedasticity*

The assumption of homoscedasticity requires the error variances, conditional on the other independent variables, to be constant: $Var(\epsilon_{it}|X_i) = \sigma^2$ for $t = 1, ..., T$ (see Assumption §B.1.1). If an error is not constant the stochastic error changes with the variance of an independent variable. As a result, the SE are biased and the t-statistics can no longer be used for reliable inference (Wooldridge, 2015).

If the model is well-fitted, plotting the residuals against the fitted values should not show any noticeable pattern otherwise the data is said to be heteroscedastic. In addition to such plots, heteroscedasticity can also be tested using the Breusch-Pagan test. For this test the null hypothesis is homoscedasticity (Wooldridge, 2015). Thus, small p-values suggest the null should be rejected in favor of the alternative hypothesis (i.e. variance is not homogeneous). If the tests are significant the SE are adjusted using appropriate Sandwich estimators (Wooldridge, 2015; StataCorp, 2017).

3.2.5 *Normality of residuals*

Another assumption for multivariate OLS regression is normally distributed residuals (see Appendix §B.1.1). That is to say, the stochastic errors are independent and identically distributed normal random variables. Important to note is that this assumption is only important for testing the hypotheses because it ensures a normal distribution such that the t and F statistics have exact distributions. Thus, it is not required for unbiasedness, for instance (Wooldridge, 2015).

In order to check normality, a histogram of the residuals is provided[8]. In addition to a histogram of residuals, probability-probability plots and quantile-quantile plots are also provided. Both of those graphics allow investigation of skewness of distributions. When the residuals are approximately normally distributed the graphs should show a linear plot but when the residuals are not normally distributed the plots deviate substantially from the linear line (also presented in the graph).

8 The stochastic error is not observed only estimated and, hence, a histogram is provided of the residuals which is the *expected* stochastic error (Wooldridge, 2015).

3.3 VARIABLE SPECIFICATION

The following sections describe the dependent, independent, moderating, and control variables that are included in the various empirical models. Each section offers a conceptualization and operationalization of the respective variables (Table 1 displays a full list of the variables). Moreover, the section that introduces the control variables also provides theoretical predictions and implications regarding the relationship expectations as suggested by Atinc et al. (2012).

The control variables are also evaluated after each regression. Yet, if control variables remain similar in sign, the same explanation is not repeated but a simple reference is made that the control variables remained similar in sign. So too, results that are not significant are explicitly noted but not elaborated on. On a final note, figure 5 at the end of this section displays the conceptual model visualizing the research model and proposed hypotheses including the variables.

3.3.1 *Leverage*

The dependent variable (leverage), can be operationalized in various ways. Earlier studies, for instance, have included both debt and liabilities to operationalize leverage. However, it has been argued that the inclusion of liabilities may overstate the real amount of debt because line items, such as accounts payables and other non-debt related items, are also included (Rajan & Zingales, 1995). This thesis, therefore, focuses only on total debt and not liabilities. Another difference in measures that can be observed in the literature is scaling using market or book values.

On the one hand, book values are backward looking, can result in negative values, and are argued to be less relevant for management (Frank & Goyal, 2009). On the other hand, Miller (1977) argues that managers focus, in particular, on book values because those provide better suggestive support for assets-in-place. In addition, market values tend to be noisy as a result of price fluctuations (Frank & Goyal, 2009). Because of those reasons, both book (total book value of assets) and market values (book value of liabilities and market value of common equity) are used. For ease of interpretation, when a variable ends with -BV (-MV) it implies the respective variable is scaled by book values (market values), and will be referred to as 'book leverage' or 'market leverage'. Thus, following previous studies (e.g.: Frank and Goyal, 2009; Li et al., 2017), this thesis uses a book and market value scaled version of leverage.

A further distinction can be made regarding the type of debt (i.e. long versus short term debt). Some firms may prefer short-term financing while others long-term financing. In order to examine these different preferences, in addition to total debt, short- and long-term debt could also be examined individually. Though, the literature primarily uses long-term or total debt. Most empirical studies (e.g.: Frank and Goyal, 2009; Pindado and de La Torre, 2011) focus on either long term debt, total debt, or both. Short term debt is generally not examined which might be due to short term debt being, economically, less relevant than long term debt, something which will become apparent in Chapter 4. Since short term debt has only little economic significance and total debt is the sum of long and short term debt, this thesis follows prior research (e.g.: Serfling, 2014; Faccio et al., 2016; Li et al., 2017) and only focuses on total debt which is the sum of long term debt and debt in current liabilities. The variables are defined in Table 1.

3.3.2 *Inherent CEO characteristics*

The independent variables are the CEO characteristics age, gender, and functional experience. CEO gender (GNDR) is a dummy variable that takes the value of 1 if the CEO is female, and 0 otherwise. CEO age (AGE) is measured by subtracting the year of birth from the years included in the data (2007 through 2015). CEO functional experience (FUNXP) is a dummy variable that takes the value of 1 if the CEO has previously worked as CFO, treasurer, accountant, or in other finance related professions, and 0 otherwise.

Custódio and Metzger (2014) extend this measure by also including situations where the CEO has worked in finance-related firms such as banks or insurances. I concede that it would be interesting to employ such a measure as alternative, to see whether estimates differ. However, as a result of data limitations, this is not possible[9]. Moreover, I would also ague that having worked in a bank or insurance firm does not necessarily suggest that financial experience has been obtained.

As explained in §3.1.3, in order to isolate the effect of functional experience, Custódio and Metzger (2014) suggest to control for education because education may otherwise mask the true effect of functional experience. The different educations are categorized in either one of the following categories: economy-related subjects (ECON), law-related subjects (LAW), business-related subjects (BUSS), and engineering-related subjects (ENGR). The categorization of the various studies can be found in §C.1 in Appendix C. Hambrick and Mason (1984) argue that managers with MBA degrees are educated to focus on short-term, rather than long-term, performance and that MBA graduates are associated with moderation (i.e. avoiding big losses).

Some other documented observations regarding education include the following. Malmendier and Tate (2008) show that CEOs with an education in technical fields are more sensitive to cash-flows from investments compared to CEOs with "general" education. In fact, CEOs with an education in finance related topics show even lower levels of sensitivity. Other studies document that having a MBA or other finance related education are associated with the management style of CEOs and affect firm policies (Bertrand & Schoar, 2003; Malmendier & Tate, 2005). Empirically, Custódio and Metzger (2014) document weak results regarding education which implies that functional experience is more important. In this thesis, the education dummies are included similar to year- and industry dummies. That is to say, the exact estimates are not presented since those are not of interest in this thesis.

3.3.3 *Decision-making power*

Measuring CEO power is a non-trivial task. At best, a variable can be constructed that captures most of the power dimensions as illustrated by Finkelstein (1992). Finkelstein (1992) set out to develop, measure, and validate various power dimensions noting, initially, that objective power indicators provide mere secondhand information. Perceptual measures provide firsthand information yet are inherently subjective and require in-field information on the working within organizations (Finkelstein, 1992).

9 Custódio and Metzger (2014) have access to ExecuComp and BoardEx both of which are not accessible for students at the University of Twente.

In the reviewed empirical literature, power is often operationalized using Finkelstein (1992)'s objective power indicators. Those studies measure power either through single indicators such as CEO's tenure (e.g.: Adams et al., 2005) or through the use of a composite/index variable (e.g.: Jiraporn et al., 2012; Veprauskaitė and Adams, 2013; Li et al., 2017). I follow previous literature and construct CEO power composite variables using multiple indicators that stem from organizational and interpersonal levels of power as defined by Ragins and Sundstrom (1989) corresponding to the three (out of four) validated power dimensions of Finkelstein (1992): 'structural power', 'organizational power', and 'prestige power'. Expert power is not included for two reasons. In fact, not all indicators of the other three dimensions were used either (e.g.: percent of top managers with higher titles or number of outside boards) because the sample size precluded the use of a larger number of CEO power predictors. Notwithstanding, the power indicators used, have been used extensively in previous empirical work.

The first power indicator is the CEO's relative compensation which, presumably, readily conveys information about the power differentials in the TMT (Finkelstein, 1992). This power indicator is closely related to the most commonly cited type of power: structural power (Finkelstein, 1992) and is power that stems from an organizational level (Ragins & Sundstrom, 1989). Moreover, large compensation packages received by the CEO may signal strong power over the board of directors (Westphal & Zajac, 1995). For this thesis, the CEO's relative pay slice (CPRS) represents the percentage of total compensation (salary, bonus, stock awards, non-equity incentive plan compensation, other compensation) received by the CEO as a fraction of the total compensation received by the other top five executives. The CEO pay slice, or compensation, is a good indicator as it is likely the product of many observable and unobservable factors, controls for firm-specific characteristics that affect compensation, and is continuous (Bebchuk et al., 2011).

The second CEO power indicator is (stock) ownership which has often been identified as a source of power and influence (Finkelstein, 1992; Westphal & Zajac, 1995). In fact, ownership is, in part, grounded in the agent-principal conflicts, described by Jensen and Meckling (1976), established among top managers, the board of directors, and shareholders on the basis of corporate bylaws (Bigley & Wiersema, 2002). Important for ownership is that, usually, the top managers need to account for their actions to the board of directors which serve as direct control mechanisms on behave of the shareholders (Fama & Jensen, 1983). However, when the CEO, for instance, is also a major shareholder (i.e. owns a substantial amount of the voting shares), the distinction between management and owners becomes blurry (Bigley & Wiersema, 2002). This power indicator is closely related to the ownership power dimensions as conceptualized by Finkelstein (1992). The second (objective) power indicator, accordingly, is a dummy variable that takes the value of 1 if the CEO owns 3% or more of the outstanding shares, and 0 otherwise. CEOs with large ownership stakes are more aligned with shareholders but are also more likely to control the board of directors resulting in more influence (Finkelstein, 1992). 3% was chosen because Def-14a fillings require explicit mentioning of those principal owners.

The third CEO power indicator stems from a CEO's status as one of the founders and is also an indication of Finkelstein (1992)'s ownership power dimension and is derived from an organizational level (Ragins & Sundstrom, 1989). CEOs whom enjoy "founder-status" are considered more powerful and influential because "*managers who are founders of a firm or related to founders may gain power through their often long-term interaction with the board, as they translate their unique positions to implicit control over board members.*" (Finkel-

stein, 1992, p.509). This CEO power indicator is a dummy variable that takes the value of 1 if the CEO is one of the firm's founders (FNDR), and 0 otherwise.

The fourth CEO power indicator stems from top manager's standing or status accorded because of prestigious associations (Bigley & Wiersema, 2002). This power indicator is part of the prestige power dimension of Finkelstein (1992) and is at an interpersonal as well as organizational level (Ragins & Sundstrom, 1989). The fourth CEO power measure is a dummy variable that takes the value of 1 if the CEO has studied at an elite university (ELITE), and 0 otherwise. The premise of focusing on elite universities is that prestige from such institutions is often transferred to the CEO in the form of status (Bigley & Wiersema, 2002). Furthermore, Finkelstein (1992) points out that prestige increases power because it facilitates the absorption of uncertainty informationally and symbolically and provides power through the perception of having powerful friends. §C.1 in Appendix C provides an overview of prestigious universities, as identified by Finkelstein (1992).

The last CEO power indicator is the CEO's tenure (TENR) which represents the number of years a CEO holds his or her position as CEO. This power indicator is not included by Finkelstein (1992), yet remains an often cited indicator of power (e.g.: Hambrick and Fukutomi, 1991; Adams et al., 2005). The increase in power, when tenure increases, can come from a variety of sources, aided by the passage of time. For instance, over time, as a CEO's tenure increases, the CEO has the opportunity to reconfigure the board of directors and even create a patriarchal aura of unquestioning defense and loyalty, making his or her power even more institutionalized (Hambrick & Fukutomi, 1991). This power indicator is not explicitly categorized by Finkelstein (1992) since it strengthens the other power dimensions by capturing the passage of time while the CEO is in power (Hambrick & Fukutomi, 1991). CEO tenure is measured by subtracting the year the CEO goes into office from the years of observation in the data (2007 through 2015).

In order to combine these multiple indicators this thesis follows prior studies and employs PCA to construct a CEO power index. Similar to Veprauskaitė and Adams (2013), all components with eigenvalues that exceed 1 are used. To put it differently, unless a factor extracts as much as the equivalent of the original variable, it is not used. This decision-criterion is also known as the Kaiser criterion. The goal of PCA is to reduce the correlated CEO power indicators to a reduced number of independent (uncorrelated) composite variable(s). In contrast to averaging the five variables, PCA seeks a linear combination of the five CEO power indicator variables in such a way that extracts the maximum variance from the variables. Then, multiplying the five factors with their respective coefficient and adding them results in a single composite variables. Applying standard PCA, however, can be problematic because it assumes that variables are continuous and normally distributed. Since the CEO variables are both categorical and quantitative, using standard PCA would bias the measurement (Kolenikov, 2004). To mitigate this problem, as suggested by Kolenikov (2004), discrete PCA is employed using Polychoric correlation.

Similar to the inclusion of education variables, the results for CEO power might be driven by good (bad) corporate governance mechanisms. Unfortunately, due to data limitations, good proxies for corporate governance mechanisms are hard to come by. Following Veprauskaitė and Adams (2013), I use a modest proxy for governance effectiveness. The proxy is the number of interactions (BMET) (i.e. board meetings) within the year of observation. The underlying premise is that the number of meetings proxy for the information flow and analysis (Eisenhardt, 1989), which might be reduced when the CEO is powerful (Finkelstein, 1992). Variables are as defined in Table 1.

3.3.4 *Control variables*

The last set of variables are the control variables included to isolate the (causal) effect of the variables of interest (Wooldridge, 2015). The decision for control variables is based on similar prior studies and the availability of data. Furthermore, the operationalization of the control variables is similar, and based on, previous studies. Also, following suggestions of Atinc et al. (2012), the expectations regarding control variables are described.

The first control variable controls for firm's financial distress (FIND). Following Li et al. (2017), Altman's Z-score is employed to measure the firm's distance to bankruptcy which is used as proxy for financial distress because it can be used to predict the distance to bankruptcy (Altman, 1968). The premise is that firms closer to bankruptcy face higher costs of financial distress because these firms are more likely to go bankrupt. The sign is expected to be negative which has been well-documented in the theoretical (e.g.: Scott Jr, 1976; Miller, 1977; DeAngelo and Masulis, 1980) and empirical (e.g.: Titman and Wessels, 1988; Frank and Goyal, 2009) literature.

The second control variable is growth opportunities (GROW). Following Frank and Goyal (2009), growth opportunities are measured using the market-to-book ratio (i.e. the market value of assets plus total debt scaled by the book value of assets). The sign is expected to be negative because firm growth increases the cost of financial distress and reduces the free cash flow problem which should reduce debt financing for firms (Jensen, 1986; Frank & Goyal, 2009).

The third control variable is tangibility of assets (TANG), closely related to liquidation value (Scott Jr, 1976). Tangibility is measured as the ratio between net plant, property, and equipment scaled by the book value of total assets. The sign is expected to be positive. Specifically, firms with tangible assets are easier to value, have more collateral and, hence, those firms can carry more debt (Scott Jr, 1976; Frank & Goyal, 2009).

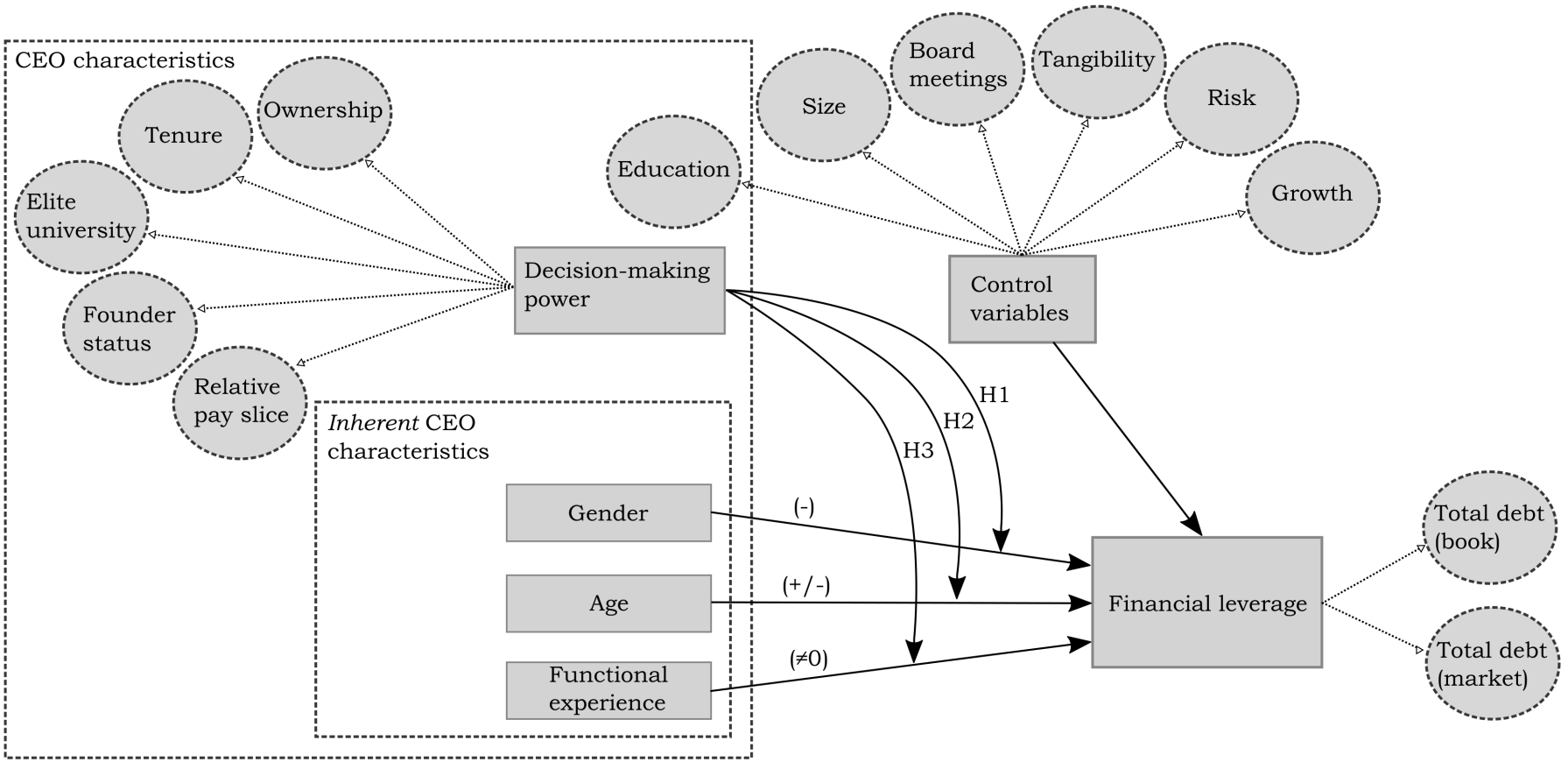
The fourth control variable is profitability. Fortunately, because of available data, profitability can be operationalized in two ways which enables the investigation of robustness. First, profitability is operationalized as return on equity (ROE) and return on assets (ROA) (i.e. asset turnover). ROE is net income scaled by total assets whereas asset turnover is earnings before interest and taxes (EBIT) and assets. For both variables the signs are expected to be negative which implies that more profitable firms use less external financing. This expectation is well-documented in the pecking order literature where the implication is made that more profitable firms use less debt because those firms can rely on internal financing (Myers & Majluf, 1984).

The last control variable is firm size. Firm size is measured as the natural logarithm[10] of the total dollar amount of assets (ASSET). An alternative measure of firm size is the natural logarithm of the total dollar amount of sales (SALES). Following Frank and Goyal (2009), the assets and sales are deflated to 2010 dollars using the gross domestic product (GDP) deflater provided by the World Bank[11]. The underlying premise and expectation is that larger firms are less likely to default and can, therefore, carry more debt (Frank & Goyal, 2009).

10 Natural logarithm is used to make the data *more* normally distributed and to reduce the influence of extreme values. The natural logarithm of a variable is indicated by (Ln-) in front of the variable. In contrast to other variables, the proxies for firm size are not scaled and, therefore, extreme values can become more influential.

11 *Source*: http://data.worldbank.org/indicator/NY.GDP.DEFL.ZS?locations=US

Figure 5: Research framework



Note: This figure illustrates the research model including the variables used in this thesis. The inherent CEO characteristics refer to characteristics that are time-invariant whereas decision-making power can change over time. In contrast to Figure 4 this figure includes the variables that will be used. The squares represent the concepts of interest and the circles show the variables that are used for operationalization of the respective concepts. The symbols in brackets refer to the expected relationship where (+) is a positive relation, (−) is a negative relation, ($\neq 0$) is a relationship that is not zero.

Table 1: Description of variables

Variable	Abbr.	Definition
Panel A. Leverage		
Book leverage	TDBV	Ratio of total debt (long term debt plus short term debt) to book value of total assets.
Market leverage	TDMV	Ratio of total debt (long term debt plus short term debt) to total liabilities and market value of common equity.
Panel B. Inherent CEO characteristics		
Gender	GNDR	Dummy variable that takes the value of 1 if the CEO is female, and 0 otherwise.
Age	AGE	Age of the CEO measured by subtracting the year of birth from the year of observation in the data.
Functional experience	FUNXP	Dummy variable that takes the value of 1 if the CEO has experience in a finance function (worked as CFO, treasurer, accountant, or an other finance-related function), and 0 otherwise.
Economy education	ECON	Dummy variable that takes the value of 1 if the CEO has enjoyed an economic-related education (accounting, finance, economics, and government and economics), and 0 otherwise.
Law education	LAW	Dummy variable that takes the value of 1 if the CEO has enjoyed an law-related education, and 0 otherwise.
Business education	BUSS	Dummy variable that takes the value of 1 if the CEO has enjoyed an business-related education, and 0 otherwise. A full list of economic-related subjects can be found in Appendix C.1.
Engineer education	ENGR	Dummy variable that takes the value of 1 if the CEO has enjoyed an Engineer-related education, and 0 otherwise. A full list of economic-related subjects can be found in Appendix C.1.
Panel C. CEO power indicators		
Founder	FNDR	Dummy variable that takes the value of 1 if the CEO is one of the founders, and 0 otherwise.
Ownership	OWNS	Dummy variable that takes the value of 1 if the CEO owns more than 3% of the outstanding shares, and 0 otherwise.
Pay slice	CPRS	Fraction of total compensation (salary, bonus, stock awards, non-equity incentive plan compensation, other compensation) received by top five executives that is earned by the CEO.
Tenure	TENR	Tenure of the CEO measured by subtracting the year of observation in the data from the year the CEO took office.
Elite university	ELITE	Dummy variable that takes the value of 1 if the CEO has enjoyed education at an prestigious education. A full list of the prestigious universities can be found in Appendix C.1.
Panel D. Firm-specific control variables		
Total assets	ASSET	Total dollar value (in millions ($) of assets (fixed plus current assets) deflated to 2010 dollars.
Total sales	SALES	Total dollar value (in millions ($) of sales deflated to 2010 dollars.
Tangibility	TANG	Net plant, property, and equipment scaled by total assets (fixed plus current assets).
Return on equity	ROE	Net income scaled by book value of equity. Book value of equity is measured as total assets minus total liabilities.

Continued on next page

Table 1 – *Continued from previous page*

Variable	Abbr.	Definition
Return on assets	ROA	EBIT scaled by total assets (fixed plus current assets).
Growth opportunities	GROW	Market capitalization (share price multiplied by the number of shares outstanding) scaled by total assets (fixed plus current assets) plus total debt (short plus long term debt).
Financial distress	FIND	Altman's original Z-score from Altman (1968): $Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$ where X_1 is working capital scaled by total assets, X_2 is retained earnings scaled by total assets, X_3 is EBIT scaled by total assets, X_4 is market capitalization scaled by book value of total debt, and X_5 is sales scaled by total assets. Total assets are the sum of fixed and current assets.
Board meetings	BMET	Number of board interactions/meetings during the year of observation. This number includes all forms of interaction during the year.

4

DATA

This chapter describes the data used for testing the hypothesis. The first section (§4.1) elaborates on the sample selection process, some sample characteristics, and corresponding search criteria. The next section (§4.2) provides descriptive statistics on the variables as defined in Table 1 in Chapter 3. Various distributional figures are included in Appendix C. Section §4.3 introduces PCA and describes the CEO composite power variables. The last section (§4.4) offers an overview of differences between CEO characteristics and firm-specific variables using two-sample t-tests.

4.1 SAMPLE SELECTION

This thesis examines listed firms from the US which enables the analysis of a distinct number of large corporations. The sample extracted from the Orbis database (developed by Bureau van Dijk) is in accordance with the following search criteria. First, all firms have an "active" status in the database. Second, all firms are headquartered and operating in the United States. Third, using the standard industrial classification (SIC), firms categorized in finance-related industries (i.e. SIC 60-67) are excluded because those firms comply to different rules and regulations. So too, firms that are not categorized (i.e. SIC 99) are excluded. Lastly, all firms are publicly listed. The final sample comprises 2,671 firms over 9 years (2007 through 2015) from which 230[1] firms are further analyzed corresponding to 418 unique CEOs.

The CEO-specific data is not maintained by Bureau van Dijk in the Orbis database and, consequently, all CEO-specific data is hand-collected. All observations are obtained by utilizing the EDGAR system, maintained by the SEC, using the following process. First, the firm's market tickers (obtained from Orbis) are used to identify the correct firms in the EDGAR system. Having identified the correct firm, the DEF-14a proxy statements[2] are examined and scanned to retrieve the required data on CEO ownership, compensation, tenure, and number of board meetings. If a proxy statement is not included in EDGAR, the corporate website of that particular firm is further analyzed to obtain the relevant data. However, if, after an additional search, the data cannot be found, corresponding observations are documented as missing. The final step entails examining the various Bloomberg executive profiles and LinkedIn pages to obtain the CEO's age, education, and functional experience. Similar as before, when data is not found after additional searches, it is documented as missing.

1 To offer some perspective, a total of 15 variables had to be hand-collected using either the proxy statements, Bloomberg executive profiles or LinkedIn pages. Depending on which CEO characteristic, there is a difference in difficulty in finding the variables. For instance, while gender is relatively easy, the number of board meetings requires considerable more time. Given a total of 2,079 observations and 15 variables a total of 31,185 data values are hand-collected. Thus, while I would have preferred more than 230 firms, a substantial amount of time was required to obtain just those 230.

2 Def-14a proxy statements include information about various aspects such as, amongst others, director nominees, executive compensation, beneficial ownership, leadership structure, and number of meetings.

All observations with missing values are excluded because I have no reason to belief that this data is missing in any systematic manner. When data are not missing in a systematic manner they can safely be excluded (Gelman & Hill, 2006). To reduce the influence of extreme values, I follow previous studies (e.g.: Veprauskaitė and Adams, 2013), and limit the influence of some (quasi-) continuous variables by winsorizing the top and bottom 1% of values to the 99th and 1st percentile, respectively. Winsorizing mitigates the influence of extreme values that may bias the results.

4.2 DESCRIPTIVE STATISTICS

Table 2 reports the descriptive statistics. In panel A, the CEO-specific variables are reported. On average, the CEOs in the sample are 56 years old (see Appendix C for a graphical representation). This age is comparable to previous studies such as Custódio and Metzger (2014) and Serfling (2014) both of whom observe an average of 55.

Table 2: Descriptive statistics.

	Obs.	Mean	St. dev.	Distribution				
	N			Min.	25th	50th	75th	Max.
Panel A: CEO-specific variables								
AGE	1,998	55.997	6.727	41	52	56	60	74
GNDR	2,002	0.047	0.213	0	0	0	0	1
FUNXP	2,004	0.318	0.466	0	0	0	1	1
ECON	1,677	0.291	0.454	0	0	0	1	1
LAW	1,677	0.107	0.310	0	0	0	0	1
BUSS	1,677	0.537	0.499	0	0	1	1	1
ENGR	1,677	0.321	0.467	0	0	1	1	1
ELITE	1,790	0.427	0.495	0	0	0	1	1
FNDR	2,001	0.068	0.253	0	0	0	0	1
OWNS	1,993	0.105	0.306	0	0	0	0	1
TENR	1,979	6.423	6.423	0	2	5	9	31
CPRS	1,989	0.397	0.113	0.063	0.339	0.415	0.470	0.616
Panel B: Firm-specific variables								
TDBV	2,059	0.249	0.157	0.000	0.130	0.231	0.345	0.648
TDMV	1,958	0.233	0.186	0.000	0.091	0.184	0.344	0.751
FIND	1,957	3.170	1.983	0.240	1.765	2.881	4.036	10.054
GROW	1,958	1.502	0.972	0.425	0.827	1.195	1.839	4.825
TANG	2,057	0.290	0.217	0.016	0.106	0.228	0.455	0.774
ROE	2,052	0.157	0.281	-0.999	0.092	0.159	0.240	1.004
ROA	2,060	0.103	0.081	-0.136	0.058	0.097	0.146	0.311
BMET	1,911	8.169	3.389	3	6	7	10	45
ASSET[a]	2,070	32,535	43,271	149	6,918	17,487	38,294	215,635
SALES[a]	2,070	25,168	30,850	100	8,113	13,774	26,812	147,152

Note: [a]ASSET and SALES are in millions of dollars. The statistics are calculated after the data is winsorized at the 1% in the top and bottom of the distributions. ASSET and SALES are in millions of US dollars. The variables are as defined in Table 1.

Furthermore, approximately 4.7% of the observations are firm-years managed by a female CEO (see Appendix C for a graphical representation). This 4.7%, however, is concerning all observations yet the total number of female CEOs is 23 which, since their are 418 unique CEOs, corresponds to 5.5%. These numbers are lower than comparable studies such as Huang and Kisgen (2013) and Faccio et al. (2016) who document 6.2% and 9.4%, respectively. Though, an article published in the Fortune states that only 4.8% of the Fortune 500 firms were managed by female CEOs in 2014. Thus, the 4.7% is realistic but may cause problems during the analysis since it is such a small percentage of the total number of observations.

Regarding the functional experience of CEOs, it appears that 31.8% of the observations are characterized by a CEO with financial expertise (see Appendix C). The 31.8% of observations correspond to 31.3% of the total CEOs (i.e. 131 out of 418 CEOs has is a financial expert). This average, unfortunately, is not directly comparable to prior studies because Custódio and Metzger (2014), for instance, also include CEOs that have experience working in the banking and investment industry which results, in their study, in an average of 44.1%. Though, it is reasonable that, had the measure been extended as in Custódio and Metzger (2014), it would increase and become more comparable.

Regarding the education variables, note that a single CEO might have enjoyed two or more studies. Having mentioned that, the education distribution is as follows: 29.1% has studied economic related subjects, 10.7% received a degree in law, 53.7% graduated in a business related subject, and 32.1% became an engineer. These numbers are comparable to Custódio and Metzger (2014) who document an average of 32.7% in economic-related subjects, 16.3% in law-related subjects, and 37.1% of CEOs with a MBA degree. The percentage of MBA degrees is lower but the definition in this thesis is broader.

With regard to the CEO power indicators, panel A shows that 42.7% has graduated from a prestigious university which corresponds to 36.4% of the total CEOs (i.e. 152 out of 418). When a CEO has not enjoyed education in the US, he or she is documented as 'other' regardless of the university he or she attended. Roughly 5.2% of CEOs has not studied in the US (Appendix §C provides a list including those universities). Second, 6.8% of the CEOs in the sample is also one of the corporate founders. This average is slightly lower than the 9.0% documented by Adams et al. (2005) and much lower than the 14.4% from Bebchuk et al. (2011). Though, the sample used in Bebchuk et al. (2011) starts in 1993 which increases the likelihood one of the initial founders is still active as CEO.

Third, around 10.5% of the observations are characterized by a CEO who owns more than 3% of the voting shares. This 10.5% corresponds to 39 unique CEOs, which is 9.3% of all CEOs. Unfortunately, this average is not easily comparable. For instance, Li et al. (2017) take a cut-off point of 10.0% rather than 3.0%. Similarly, Adams et al. (2005) do not use a dummy variable but instead examine shares owned by the CEO after adjusting for the stock splits scaled by the number of shares outstanding. Nonetheless, given that firms in the sample are large, the 10.5% appears plausible. Fourth, the average tenure of CEOs in the sample is 6 years. This finding is comparable to other studies. Adams et al. (2005) observe an average tenure of 6 years and Bebchuk et al. (2011) document an average of approximately 8 years. Lastly, on average, 39.7% of the total compensation received by the top five executives is going to the CEO. This statistic is slightly higher but comparable to other studies such as the 35.7% in Bebchuk et al. (2011).

Figure 6: Book leverage distribution and decomposition.

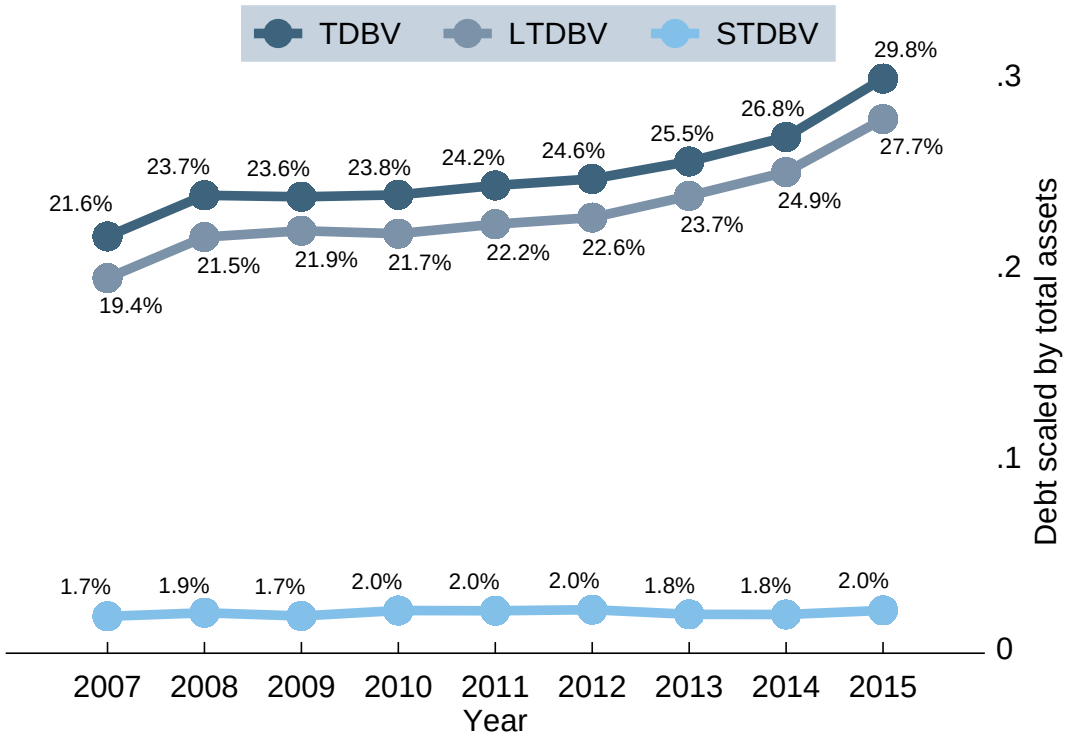
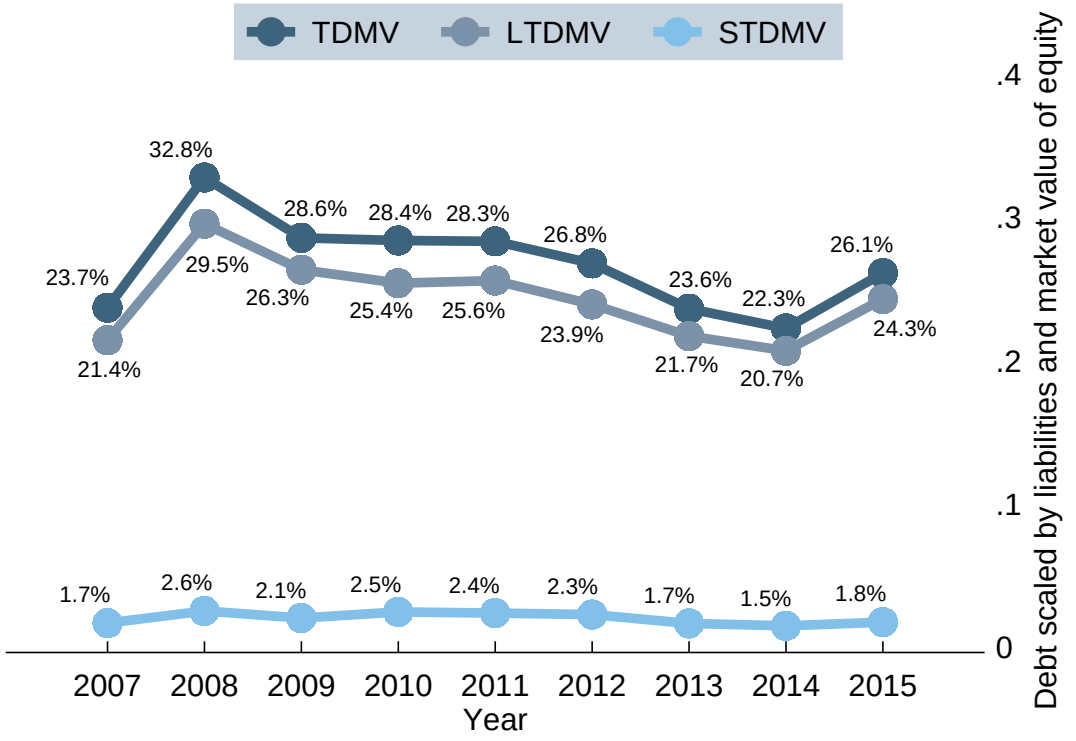


Figure 7: Market leverage distribution and decomposition.



Panel B shows the descriptive statistics for firm-specific variables. Total book leverage (TDBV) is 24.9%. The book leverage is comparable to the 24.7% documented by Berger et al. (1997), the 29.0% observed by Frank and Goyal (2009), and the 23.2% observed by Jiraporn et al. (2012). The total market leverage (TDMV) is 23.3%. This value is also comparable. Frank and Goyal (2009) observe a total debt scaled by market value of assets of 28.0% and Berger et al. (1997) of 26.5%. Most firms in the sample use long-term financing which is apparent from the fact that the average of short term debt is 1.8% (market measure) and 1.9% (book measure), both not documented. Figure 6 and Figure 7 displays a deconstruction of total book and market leverage over time which also shows the substantial difference in short versus long term debt financing.

The last part of panel B displays the summary statistics for the control variables. First, the average Altman Z-score is 3.170 which suggests that, on average, firms in the sample are not likely to go bankrupt (Altman, 1968). In fact, the data is slightly skewed to the right, which implies that only a small percentage of firms is close to bankruptcy. Second, the market-to-book ratio is 1.502 which suggests that the market value of assets is, on average, 1.5 times larger than the book value of assets plus total debt. Other studies report market-to-book ratios around the 1.83 (Frank & Goyal, 2007) and 1.76 (Frank & Goyal, 2009). Third, the asset tangibility is 0.290 which implies that 29.0% of the assets is tangible. This finding is also consistent with other studies such as Jiraporn et al. (2012) who observe that 31.1% of the assets is tangible but lower than Frank and Goyal (2009) who observe 34.0% of tangibility. Fourth, the ROE is 0.157 or 15.7% while the ROA is 0.103 or 10.3%. This 10.3% is slightly higher than the 8.6% documented by Chintrakarn et al. (2014) and a lot higher than the 2.0% of Frank and Goyal (2009). Though, the sample of Frank and Goyal (2009) is older and also constitutes a greater variety of firms. Fifth, the board of directors held, on average, 8.169 meetings. This is comparable to the average 8.738 documented by Veprauskaitė and Adams (2013). Lastly, the average size of firms measured by assets and sales (in millions of dollars), deflated to 2010 dollars, is $32,535 million and $25,168 million, respectively. Taking the natural logarithm results in 9.476 and 9.594 for sales and assets, respectively. These numbers are slightly lower than the 12.704 and 13.272 documented by Veprauskaitė and Adams (2013) but comparable to the 10.313 of Faccio et al. (2016). On a finale note, Appendix C includes the correlation matrix and industry distribution.

4.3 DISCRETE PRINCIPAL COMPONENT ANALYSIS

As mentioned in the previous chapter, this thesis utilizes discrete PCA to develop a CEO power index. Table 3 displays these measures. Panel A represents the polychoric correlation matrix. Some of the correlations are relatively low which suggests that these variables capture different aspects of CEO power (Veprauskaitė & Adams, 2013), which is in line with the different power dimensions as are explained by Finkelstein (1992). Panel B displays the components and weights for the power indexes PWRX1, PWRX2, and PWRX3 (see Appendix C for the corresponding scree plot and loading plot). Following, Veprauskaitė and Adams (2013), I only retain factors with eigenvalues greater than 1. Thus, unless a factor extracts as much as the equivalent of the original variable, it is not used. Note, during the development of the hypotheses, no distinction was made between the different power dimensions. Power, instead, is believed to strengthen the relation between the CEO characteristic and leverage, regardless of dimension.

The first power index (PWRX1) is mainly characterized by CEO tenure, ownership and founder-status, as their absolute weights/loadings exceed 0.5 which corresponds to a 44.5% of variation explanation. Similar to prior research (e.g.: Adams et al., 2005; Veprauskaitė and Adams, 2013), I expect that tenure, ownership and founder-status imply strong ability to exert one's will. The grouping of these variables is not surprising because they closely resemble the dimension of '*ownership power*' (Finkelstein, 1992). This dimension illustrates the strength of a CEO's position relative the shareholders. Furthermore, CEOs with ownership power have the ability to gain control over the board of directors (Finkelstein, 1992). The signs on the components are consistent with this prediction and, therefore, a positive (negative) PWRX1 implies high (low) CEO power.

Table 3: CEO power: principle component analysis (polychoric correlation).

	CPRS	TENR	OWNS	FNDR	ELITE
Panel A: Polychoric correlation matrix					
CPRS	1				
TENR	0.090	1			
OWNS	-0.225	0.500	1		
FNDR	-0.299	0.495	0.807	1	
ELITE	-0.030	0.001	0.211	-0.163	1
Panel B: Weights/loadings					
PWRX1	-0.040	0.553	0.590	0.587	-0.000
PWRX2	0.885	0.403	-0.120	-0.199	-0.004
PWRX3	-0.005	-0.016	0.210	-0.196	0.958

Panel C: CEO power descriptive statistics

	Mean	St. dev.	Distribution				
			Min.	25th	50th	75th	Max.
PWRX1	0.154	0.310	-0.040	0.010	0.057	0.128	1.719
PWRX2	0.597	0.207	-0.323	0.494	0.627	0.728	1.165
PWRX3	0.406	0.483	-0.214	-0.005	-0.002	0.952	1.168

Notes: This table represents the discrete PCA using polychoric correlations. Panel A shows the polychoric correlation matrix for the CEO power indicators. Panel B shows the weights/loadings of the components. Panel C represents the descriptive statistics derived from the discrete PCA using polychoric correlations. The principal components are rotated using orthogonal rotation and PWRX1 explains 44.5%, PWRX2 explains 22.6%, and PWRX3 explains 21.6% corresponding to a total of 88.7%. Figure 19 and Figure 20 in Appendix C shows the scree plot and loading plot. The description of the power indicators can be found in Table 1.

The second power index (PWRX2) is strongly characterized by CEO's relative pay slice with a value far exceeding the 0.5 threshold which corresponds to a 22.6% of variation explanation. This grouping corresponds to the '*structural power*' dimension of Finkelstein (1992). The implication of this dimension is that CEOs with high structural power might "pull ranks" during disputes based on their formal position. Consistent with theoretical predictions and empirical findings (e.g.: Bebchuk et al., 2011), when the CEO receives substantial more remuneration, relative to the other executives, it indicates a high level of CEO power. The signs of these weights are also consistent with this prediction and, hence, a positive PWRX2 implies high CEO power, and vice versa.

The third, and final, power index (PWRX3) is mainly characterized by the prestige of having graduated from a prestigious university. This index explains 21.6% of the variation. The weights on this index closely relate to the *'prestige power'* dimension of Finkelstein (1992). CEO's reputation in the institutional environment influences other's perceptions of their influence and firm legitimacy depends on the prestige of its managers (Finkelstein, 1992). Consistent with the theoretical prediction that having studied at an elite university carries an "aura of prominence in the business elite" (Finkelstein, 1992, p.516) is what gives the CEO its (prestige) power. The signs on these loadings are also consistent and, thus, a positive PWRX3 implies high CEO power, and vice versa for negative PWRX3.

4.4 MEAN-COMPARISON BY CEO CHARACTERISTICS

Table 4 displays mean-comparison. In short, firms ran by female CEOs are, more risky, larger, endowed with more tangible assets, and more profitable. Regarding age, young CEOs manage, smaller firms with less debt, less risk, more growth opportunities, and less tangible assets. Lastly, financial expert CEOs manage larger, less profitable firms with more debt, more risk, and less growth opportunities.

Table 4: Differences between CEO characteristics and firm-specific variables.

	Female	Male	Diff. (SE)	Young	Old	Diff. (SE)	Fin. Exp.	Other	Diff. (SE)
TDBV	0.245	0.245	-0.000	0.224	0.266	0.041***	0.273	0.231	-0.041***
			(0.014)			(0.011)			(0.007)
TDMV	0.245	0.230	-0.014	0.212	0.238	0.026**	0.253	0.221	-0.032***
			(0.019)			(0.013)			(0.009)
RISK	2.684	3.203	0.520***	3.387	3.133	-0.254*	2.717	3.386	0.669***
			(0.191)			(0.136)			(0.088)
GROW	1.481	1.510	0.029	1.613	1.459	-0.154**	1.391	1.564	0.173***
			(0.102)			(0.066)			(0.045)
ASSET	10.222	9.587	-0635***	9.390	9.567	0.177*	9.820	9.524	-0.296***
			(0.134)			(0.093)			(0.070)
SALES	9.670	9.484	-0.186	9.332	9.397	0.065	9.615	9.436	-0.179***
			(0.170)			(0.082)			(0.067)
BMET	2.297	2.020	-0.277***	2.029	2.014	-0.015	2.041	2.030	-0.011
			(0.037)			(0.024)			(0.018)
ROE	0.256	0.155	-0.101***	0.141	0.143	0.002	0.167	0.157	-0.010
			(0.029)			(0.018)			(0.014)
ROA	0.104	0.105	0.001	0.105	0.097	-0.008	0.098	0.109	0.011***
			(0.009)			(0.005)			(0.004)
TANG	0.229	0.292	0.064***	0.252	0.323	0.071***	0.346	0.263	-0.083***
			(0.019)			(0.014)			(0.011)

Note: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The distinction between young and old is based on the lower 25th percentile and upper 75th percentile, respectively. The variables are as defined in Table 1.

5 RESULTS

This chapter describes and discusses the results of the regression models and corresponding implications. To maintain focus, tables and figures not directly relevant for supporting the main hypotheses are included in the appendices. The first section (§5.1) focuses on hypothesis 1 related to gender where I hypothesized that female CEOs are more risk-averse and conservative and, as a result, employ lower levels of debt once sufficient decision-making power had been accumulated to impose preferences. The second section (§5.2) focuses on the results of age where I hypothesized that it was a priori not evident as to whether older (younger) CEOs preferred more or less leverage once sufficient power had been accumulated. Lastly, §5.3 introduces the results relevant for the third hypothesis where no particular direction was specified. Furthermore, for all hypotheses, the main findings are displayed in figures to ease the difficulty of interpreting coefficients. Regression diagnostics for the *pooled* OLS models are presented in Appendix D. While regression diagnostics have always been checked, explicit presentation is only to illustrate the process of checking the diagnostics.

All sections, if specified in Chapter 3, includes a pooled OLS to estimate the two-way interaction effects, PSM and DiD to identify potential self-selection biases, FE to control for unobserved time-invariant heterogeneity, 2SLS to control for time-varying omitted variables, and various robustness checks of nonlinearity and inclusion of control variables that are measured differently. On a final note, Appendix D provides a table that displays de "deconstruction of the explanatory power" which shows how much the adjusted R^2 increases, or decreases, for inclusion of the inherent CEO characteristics, control variables, and CEO power.

5.1 GENDER DIFFERENCES, POWER, AND PREFERRED LEVERAGE

This section puts forth various tests for hypothesis 1. The final conclusion as to whether hypothesis 1 is supported is postponed till the end of this section so that all robust findings can be integrated into one conclusion. To identify potential influential observations, the studentized residuals, leverage points, and Cook's Distances are examined (Appendix D provides detailed information on the influential observations). In order to test for heteroscedasticity I plot the residuals against the fitted values and I employ the Breusch-Pagan test (see Appendix D for further information). Moreover, to examine potential serial correlation, I employ the Breusch-Godfrey test and Durbin-Watson test (see Appendix D for further information regarding serial correlation).

If heteroscedasticity or autocorrelation, or both, are a concern, SEs are adjusted appropriately. The VIF scores indicate that multicollinearity is not a concern in any of the models (see Appendix D for further information regarding multicollinearity). All regression models have been run with and without the identified influential observations and the main results are not altered in any significant way. Only the results without influential observations are presented.

Table 5: Multivariate linear regression (pooled OLS): Gender.

	Book leverage			Market leverage		
	(1)	(2)	(3)	(4)	(5)	(6)
GNDR	-0.051	-0.060	-0.051	0.054	0.047	0.046
	(0.054)	(0.055)	(0.055)	(0.065)	(0.060)	(0.062)
AGE_c	-0.001	-0.001	-0.000	-0.000	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FUNXP	0.015*	0.010	-0.002	0.005	-0.003	-0.015
	(0.009)	(0.009)	(0.009)	(0.011)	(0.011)	(0.011)
$PWRX1_c$	-0.010	-0.000	-0.000	0.017	0.010	0.012
	(0.019)	(0.018)	(0.021)	(0.021)	(0.021)	(0.021)
$PWRX2_c$	0.020	0.022	0.024	0.007	0.006	0.015
	(0.019)	(0.019)	(0.019)	(0.022)	(0.020)	(0.020)
$PWRX3_c$	-0.022**	-0.017*	-0.016*	-0.045***	-0.040***	-0.034***
	(0.009)	(0.009)	(0.009)	(0.012)	(0.011)	(0.010)
$GNDR \times PWRX1_c$	-0.133	-0.187	-0.148	0.320	0.296	0.259
	(0.341)	(0.349)	(0.351)	(0.400)	(0.399)	(0.419)
$GNDR \times PWRX2_c$	-0.149***	-0.145***	-0.209***	-0.099**	-0.102***	-0.116***
	(0.051)	(0.051)	(0.063)	(0.041)	(0.037)	(0.040)
$GNDR \times PWRX3_c$	0.143***	0.149***	0.156***	0.109***	0.133***	0.131***
	(0.036)	(0.038)	(0.039)	(0.029)	(0.031)	(0.032)
TANG	0.055	0.076**	0.038	0.063	0.072	0.046
	(0.037)	(0.038)	(0.040)	(0.044)	(0.048)	(0.050)
ASSET	-0.014***	-0.012***	-0.017***	-0.016***	-0.019***	-0.021***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
GROW	0.066***	0.074***	0.077***	-0.024**	-0.006	-0.005
	(0.009)	(0.008)	(0.009)	(0.009)	(0.008)	(0.008)
FIND	-0.071***	-0.074***	-0.078***	-0.042***	-0.051***	-0.051***
	(0.006)	(0.008)	(0.006)	(0.007)	(0.007)	(0.006)
ROA	0.226***	0.215***	0.264***	-0.290***	-0.268***	-0.247***
	(0.069)	(0.066)	(0.065)	(0.077)	(0.083)	(0.076)
BMET		0.005	0.011		0.021	0.018
		(0.011)	(0.011)		(0.014)	(0.014)
Education dummies	No	No	Yes	No	No	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,598	1,520	1,429	1,608	1,536	1,436
Adjusted R^2	67.90%	67.66%	69.96%	67.94%	68.62%	70.54%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for heteroscedasticity and clustering at firm level when required. Variables with subscript "c" are mean centered and are as defined in Table 1.

Model (1) through Model (6) in Table 5 show various regression models related to hypothesis 1. The models differ based on the inclusion of board interactions (BMET) and education dummies (regression diagnostics are presented in Appendix D). The model explains slightly more of the variation in market leverage than book leverage, and increases in explanatory power once the education dummies are included.

Concerning the main effects, gender (GNDR), ownership power ($PWRX1_c$), and structural power ($PWRX2_c$) are not statistically significant in either one of the six models. However, the main effect of prestige power ($PWRX3_c$) is negative and statistically significant across all models ranging from 5% and 10% for book leverage to 1% for market leverage. This suggests that managers, holding all other variables fixed, with status and standing in the organization use lower levels of financial leverage. Prestige power, as pointed out by Finkelstein (1992), facilitates the absorption of uncertainty and provides power through a perceived believe of having powerful friends. If, as explained in §2.3, power is used for the same purposes regardless of dimension, the results are in line with the findings of Jiraporn et al. (2012) who argue that powerful CEOs use lower levels of leverage to avoid the disciplinary force of fixed interest payments. Another reason might be that powerful CEOs, able to impose their preferences, prefer to use less leverage to increase free cash flow and, subsequently, engage in empire building activities (Jensen, 1986). However, this variable should not be interpreted in isolation since the two-way interaction between gender (GNDR) and prestige power ($PWRX3_c$) is also statistically significant at the 1%, for all models.

Prestige power ($PWRX3_c$) is mainly characterized by whether or not the CEO attended a prestigious university. This result implies, holding all other variables fixed. that female CEOs with (above-average) prestige power use higher levels of debt, relative to female CEOs with (below-average) prestige power and male CEOs. It appears as if female CEOs with prestige power do not act conservative nor do they appear to be risk-averse. A potential explanation for this finding might go as follows.

Having attended prestigious institutions provides executives with an aura of prominence in the business elite (Finkelstein, 1992) which, if the executive is female, may result in more confidence and risk tolerance (i.e. similar to men) than those who have not attended education at a prestigious university. Indeed, managerial prestige facilitates the absorption of uncertainty from the institutional environment (Finkelstein, 1992) which, subsequently, may cause confidence levels to increase. This would also explain why female CEOs *may* not be a good representation of the average female population (Ragins & Sundstrom, 1989). Female managers in the upper echelons who enjoy prestige and status might have become more risk tolerant and confident, creating a wedge between those CEOs and the average female population. Alternatively, females are often placed lower in the social hierarchy (Ragins & Sundstrom, 1989; Magee & Galinsky, 2008) which may cause the need to overcompensate by proving oneself which, having obtained sufficient (prestige) power, becomes possible because power causes asymmetries in the decision-making (Carpenter et al., 2004), which enables the powerful female CEO to impose her preferences. Vice versa, due to men's prominent place in the social hierarchy (Magee & Galinsky, 2008), male CEOs might feel less pressure to proof themselves.

Furthermore, the interaction between gender (GNDR) and structural power ($PWRX2_c$) is statistically significant at the 1% for all models, except model (5) where the two-way interaction is statistically significant at the 5%. As noted earlier, structural power ($PWRX2_c$) is mainly characterized by CEO's relative pay slice. These results imply, holding all other

variables fixed, that female CEOs have higher levels of book leverage compared to male CEOs but once sufficient power is obtained, leverage is decreased whereas the effect for male CEOs is not statistically, nor economically, significant.

To put it differently, female CEOs are inherently conservative and risk-averse and, as a result, prefer to use less debt financing (Huang & Kisgen, 2013; Faccio et al., 2016). However, a female CEO with low power is not able to impose preferences and is, therefore, not able to (freely) adjust leverage. Since the female CEO is not able to adjust leverage, debt might be high to, for instance, reduce empire building tendencies (Jensen, 1986). Once the female CEO has established a foothold and increased her structural power by capturing a bigger slice of the total compensation going to the top five executives, for instance, she is more able to influence corporate decision-making and, subsequently, leverage is decreased which is in line with the believe that female CEOs impose preferences of conservatism and risk-aversion. In sum, female CEOs who, on average, have the legislative right to exert influence (i.e. structural power), by managing uncertainty, lower financial leverage conform their inherent female attributes that are imposed on the capital structure as a result of the asymmetries caused by power (Carpenter et al., 2004).

An interesting observation is that different power dimensions have a different effect on gender (i.e. CEO being female). That is to say, the results make apparent that the proposed hypotheses are too simplistic in nature and that the assumption of how CEOs use power to impose their preferences depends on the type of power obtained. Moreover, in contrast to previous studies (e.g.: Huang and Kisgen, 2013; Faccio et al., 2016) that documented lower levels of financial leverage for firms managed by female CEOs, this study finds that this effects is only present once the female CEO has obtained above-average (i.e. the variables are mean-centered) structural power. Only powerful female CEOs have lower levels of financial leverage. If this is true, the observations presented in Table 5 imply that prior studies examined CEOs whom, on average, were more powerful.

With respect to the control variables, Model (1) through (6) show that firm size (ASSET) is statistically significant at the 1%. Interestingly, the sign is not as expected but consistent in all models. Instead, the sign lends support to an alternative explanation. It suggests that firm size is a proxy for the extent of information asymmetry. Larger firms are better known and are, consequently, faced with less information asymmetry. If so, equity financing becomes less expensive because of decreased adverse selection costs, which reduces the use of debt financing (Myers & Majluf, 1984; Frank & Goyal, 2009).

Second, growth opportunities (GROW) are statistically significant at the 1% for book leverage (Model (1)-(3)). The signs in the book leverage models support the prediction grounded in pecking order theory whereas the sign for market leverage (Model (4)) supports the prediction that firm growth increases the cost of financial distress, mitigates the free cash flow problem, and lowers the need for debt (Jensen, 1986; Frank & Goyal, 2009). Interestingly, the strong correlation between book leverage (TDBV) and market leverage (TDMV) suggests them to be close substitutes yet the difference between the book leverage models ((1)-(3)) and market leverage model (4) might be the result of the stronger negative correlation between growth opportunities (GROW) and market leverage (TDMV). The signs offer support for predictions made by the pecking order theory. The pecking order theory suggests that firms with growth opportunities (i.e. more investments) should accumulate debt (holding profitability fixed) (Frank & Goyal, 2009).

Third, financial distress (FIND), as expected, is negatively related to leverage (statistically significant at the 1% for Models (1) through (6)). This finding supports the prediction that firms closer to bankruptcy face higher costs of financial distress because these firms are more likely to go bankrupt (Miller, 1977; Titman & Wessels, 1988; Frank & Goyal, 2009) and, hence, such firms should not commit to further debt obligations.

Lastly, profitability (ROA) is positive and statistically significant at the 1% for book leverage yet negative and statistically significant at the 1% for market leverage. On the one hand, for book leverage, the sign is consistent with the expectation that more profitable firms have lower expected costs of financial distress and can benefit from taking on more debt through the use of tax shields (Frank & Goyal, 2009). Furthermore, Jensen (1986) argues that, especially for profitable firms, debt can be a valuable disciplinary mechanism. On the other hand, for market leverage, the results suggest that more profitable firms require less external financing because they can rely, to a greater degree, on retained earnings, for instance (i.e. internal financing) (Myers & Majluf, 1984).

On a final note, tangibility (TANG) is only statistically significant, at the 5%, in model (2) which supports the idea that tangible assets provide more collateral which causes such firms to increase firm value by taking on debt (Scott Jr, 1976). Also, functional experience is statistically significant at the 10% in model (1) but this becomes insignificant once controlled for CEO's education.

5.1.1 *Self-selection bias for CEO gender*

The results might be driven by (endogenous) self-selection. That is, the effect of gender might be driven by an unobserved but correlated variable such as discriminatory preferences by the board of directors. If so, the effect does not stem from gender but from the underlying discriminatory preferences (Faccio et al., 2016).

To investigate whether female CEOs self-select into particular types of firms, or whether particular firms specifically select female CEOs, I estimate the average treatment effect on the treated using PSM and DiD. Unfortunately, due to the relative small sample size, matches could only be found in a 5% radius[1] controlling for CEO age, functional experience, relative amount of firm's tangible assets, firm size (asset based), firm's growth opportunities, distance to bankruptcy, and profitability (return on assets). The 5% is large compared to other studies (e.g.: Faccio et al. (2016)), with larger sample sizes, whom were able to find matches within 0.1%. Though, Serfling (2014) also have a radius of 5%. The matched firms, nonetheless, are not as similar as preferred.

Panel A in Table 6 reveals that comparable firms, where gender is the only observable difference, do not have statistically significant different levels of book leverage. For market leverage, female CEOs manage firms with slightly more debt (i.e. relative to book value of liabilities and market value of common equity, female CEOs manage firms with 0.8% more debt), however, after having controlled for firm- and CEO-specific characteristics, this difference is not statistically significant. Therefore, based on PSM, support is not found for the assertion that female CEOs self-select particular firms, or vice versa.

Panel B in Table 6 displays the DiD and, similar as PSM, reveals that there is no statistically significant difference between firms transitioning from male-to-female (treatment group) versus male-to-male (control group). Note, however, the number of observations

1 The radius specifies the maximum distance for which two observations are alike (StataCorp, 2017).

is small. Also, due to the small sample size I could not specify the requirement that a CEO is in power for a significant time period (e.g.: Huang and Kisgen, 2013).

Notwithstanding the limitations caused by the small sample size, both PSM and DiD suggest that self-selection is not a concern. In fact, considering the simple two-sample t-tests presented at the end of Chapter 4 provides further support. Even without controlling for firm- or CEO-specific variables, there appears to be no significant difference between the mean book leverage for firms run by female CEOs and firms run by male CEOs (also similar for market leverage). Important to realize is that this conclusion is only based on the included *observable* characteristics.

Table 6: Self-selection identification: Gender.

	Obs.	Mean.	Diff. (Female - Male)	P-value of diff. controlled for firm- and CEO-characteristics
Panel A: Propensity score matched sample approach				
Book leverage				
Female CEOs	95	0.245	0.000	0.832
Male CEOs	1,902	0.245		
Market leverage				
Female CEOs	91	0.264	-0.008	0.947
Male CEOs	1,895	0.256		

	Obs.	TDBV	Diff. (Treated - Control)	Obs.	TDMV	Diff. (Treated - Control)
Panel B: Difference-in-difference approach						
Before						
Treatment group	100	0.295	0.028*	100	0.533	0.016
Control group	1,356	0.267	(0.015)	1,356	0.517	(0.019)
After						
Treatment group	7	0.234	-0.022	7	0.578	0.055
Control group	76	0.255	(0.033)	72	0.523	(0.085)
Diff-in-Diff			-0.050			0.040
			(0.037)			(0.088)

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for clustering at firm level when required. Variables are defined in Table 1.

That is to say, while the findings appear not to support a self-selection bias, there may still be unobserved time-invariant variables that drive the results. Therefore, the next section uses the panel structure of the data and employs FE to control for this unobserved heterogeneity. Since only firms that experience transitions from male-to-female or female-to-male contribute to the identification of the problem, a reduced sample with those transitions is compiled (Faccio et al., 2016).

5.1.2 *Gender and unobserved time-invariant heterogeneity*

In order to control for unobserved heterogeneity, I use the panel structure of the data and employ FE which includes a firm-specific intercept in the model that controls for the unobserved heterogeneity (Rabe-Hesketh & Skrondal, 2012). Following Faccio et al. (2016), firms that experience CEO turnovers (i.e. transitions) from male-to-female or female-to-male are given special attention (i.e. reduced sample) since those contribute to the identification of the endogeneity problem. Similar as before, the SEs are presented in parentheses and are adjusted for heteroscedasticity and clustered at firm level when appropriate.

Model (1) through (4) in Table 7 display the fixed-effect regressions for the reduced sample consisting of firms that experience the before-mentioned CEO transitions. Note first that FE is appropriate since all Hausman tests are statistically significant at the 1% thereby justifying the use of FE over RE. Second, all models (1) through (6) explain less from the variation in book and market leverage than the pooled OLS used in previous section. This suggests that accounting for time-invariant firm-specific characteristics does not offer any significant contribution in explaining the dependent variable since the adjusted R^2 penalizes variables that offer no contribution (Wooldridge, 2015). It follows, then, that accounting for unobserved time-invariant heterogeneity offers no significant contribution to the model.

Nonetheless, the results are consistent with the findings of the pooled OLS. Different from pooled OLS, the main effect of gender (GNDR) has become negative and statistically significant at the 10% in model (5) which suggests that female executives use lower levels of market leverage. Furthermore, in almost all models, the main effect of ownership power ($PWRX1_c$) is positive and statistically significant at the 5% and 1% for book leverage and 10% and 1% for market leverage. This suggests that executives, *within the same firm*, with ownership power use more financial leverage. However, if, within the same firm, a male CEO leaves office while being replaced by a female CEO, financial leverage is reduced as is indicated by the negative two-way interaction variable between gender (GNDR) and structural power ($PWRX2_c$), statistically significant at the 1% in models (1) through (4). These findings are not significant for the full sample but the adjusted R^2 is also much lower. In sum, these findings provide further support for the believe that, holding other variables fixed, female CEOs are inherently conservative and risk-averse which, once powerful enough to impose preferences, causes them to lower financial leverage.

Furthermore, within the same firm, financial leverage is increased when more prestige power ($PWRX3_c$) is obtained by a female CEO. This is indicated by the positive and statistically significant two-way interaction variable between gender (GNDR) and prestige power ($PWRX3_c$), statistically significant in all models, except model (3), providing further support and robustness to the pooled OLS findings. Interestingly, the two-way interaction between ownership power ($PWRX1_c$) and gender (GNDR) has become statistically significant at the 5% yet this model has worse fit and is not significant in other models. Thus, similar as before, the two-way interaction with prestige power remains consistent after controlling for unobserved heterogeneity and other factors found to influence financial leverage. The significant control variables remain similar in sign and, therefore, also in interpretation.

Table 7: Multivariate linear regression (fixed-effect): Gender.

	Reduced sample				Full sample	
	TDBV (1)	TDBV (2)	TDMV (3)	TDMV (4)	TDBV (5)	TDMV (6)
GNDR	-0.119	0.004	-0.292**	-0.068	0.022	0.061*
	(0.087)	(0.089)	(0.116)	(0.107)	(0.053)	(0.035)
AGE_c	0.002	0.001	0.003	0.002	-0.001	-0.002*
	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)
FUNXP	0.017	-0.016	0.000	-0.039	0.009	-0.008
	(0.011)	(0.016)	(0.021)	(0.029)	(0.007)	(0.011)
$PWRX1_c$	0.075*	0.115***	0.145*	0.227***	0.019	0.055
	(0.041)	(0.035)	(0.077)	(0.064)	(0.015)	(0.039)
$PWRX2_c$	0.011	0.049*	0.048	0.132***	0.003	-0.009
	(0.024)	(0.027)	(0.032)	(0.045)	(0.011)	(0.015)
$PWRX3_c$	-0.018	-0.046**	0.002	-0.065	-0.007	-0.012
	(0.018)	(0.019)	(0.032)	(0.040)	(0.008)	(0.011)
$GNDR \times PWRX1_c$	-0.871	-0.241	-2.067**	-0.880	0.008	0.130
	(0.592)	(0.521)	(0.134)	(0.648)	(0.357)	(0.229)
$GNDR \times PWRX2_c$	-0.370***	-0.350***	-0.428***	-0.422***	-0.139	-0.203
	(0.070)	(0.071)	(0.134)	(0.129)	(0.092)	(0.132)
$GNDR \times PWRX3_c$	0.061*	0.108***	0.074	0.217***	0.051*	0.108**
	(0.031)	(0.033)	(0.054)	(0.060)	(0.030)	(0.042)
TANG	0.208	0.149	0.202	0.146	-0.100*	-0.027
	(0.200)	(0.250)	(0.331)	(0.432)	(0.056)	(0.073)
ASSET	0.025	0.021	0.056	0.053	0.005	0.020
	(0.043)	(0.045)	(0.067)	(0.063)	(0.013)	(0.017)
GROW	0.105***	0.098**	-0.050	-0.049	0.057***	-0.017
	(0.037)	(0.042)	(0.047)	(0.055)	(0.009)	(0.011)
FIND	-0.074***	-0.071***	0.003	0.003	-0.062***	-0.027***
	(0.017)	(0.019)	(0.029)	(0.027)	(0.007)	(0.009)
ROA	0.019	0.030	-0.657*	-0.592	0.046	-0.448***
	(0.167)	(0.179)	(0.332)	(0.348)	(0.055)	(0.083)
BMET	0.008	0.010	-0.029	-0.012	0.001	-0.015
	(0.016)	(0.013)	(0.020)	(0.017)	(0.006)	(0.012)
Education dummies	No	Yes	No	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	124	111	124	111	1,369	1,369
Adjusted R^2	57.25%	62.36%	39.77%	53.70%	45.79%	36.12%
Hausman χ^2	55.84***	40.93***	38.55***	32.81***	70.83***	43.97***

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for heteroscedasticity and clustering at firm level when required. Variables with subscript "c" are mean centered and are as defined in Table 1.

5.1.3 *Gender and time-varying omitted variables*

While the previous analysis has handled some potential endogeneity concerns by controlling for unobserved time-invariant omitted variables, there might still be time-variant omitted variables that affect the estimations. An instrumental variable approach is a method for investigating this problem. As explained in Chapter 3, state's GES is used as instrument for gender, and state's GES interacted with the power dimensions as instrument for the two-way interactions.

Unfortunately, the F-score and (Shea's) partial R^2's suggest that the instruments are not of a good enough quality which would bias the estimates and, hence, state's GES is not a good instrument (Bound et al., 1995) and should not be used. While GES was an appropriate instrument for the study of Huang and Kisgen (2013), the variation in my sample is most likely too small (i.e. too little variation since most firms are headquartered in the same state) for the variable to be a valid instrument. To put it differently, when one of the three interactions is the endogenous variable (in the first-stage regression) the interaction with GES is not statistically significant (results not reported) and, as a result, it is not a good instrument (Bound et al., 1995). Nonetheless, the Durbin-Wu Hausman test fails to reject the null hypothesis of exogeneity $[F(4, 194) = 1.904, p(0.111)]$ at the 10%. Thus, while I am not able to control for time-varying omitted variables, it appears that the variables are not even endogenous to begin with.

5.1.4 *Robustness and nonlinearity: Gender*

Table 8 displays gender regression models examining potential nonlinearity. Chintrakarn et al. (2014) and Li et al. (2017), for instance, both document a nonlinear relationship between CEO power and financial leverage. First, when appropriate, SEs are adjusted for heteroscedasticity and clustering at firm level. Second, "control variables" in Table 8 refer to the inclusion of all previously used control variables. These are not explicitly stated to reduce the table's size. Though, the variables, when significant, did not change in any marketable way. Third, previously documented significant two-way interactions between gender (GNDR) and structural power ($PWRX2_c$) and gender (GNDR) and prestige power ($PWRX3_c$) remain statistically significant in most of the models. Lastly, all control variables, when significant, remain similar in sign and, therefore, in interpretation.

Specifically focused on nonlinearity, it appears that only gender (GNDR) interacted with squared structural power ($PWRX2_c^2$) has a non-monotonic relation with book leverage. In fact, not only is the interaction between gender (GNDR) and structural power ($PWRX2_c$) statistically significant at the 1%, so too is the interaction between gender (GNDR) and squared structural power ($PWRX2_c^2$), at the 10%. These results imply that rather than a simple one-to-one decrease in leverage, when structural power increases, leverage decreases faster (i.e. as a function of power) the more power is obtained.

Furthermore, Appendix D includes a table that displays various pooled OLS regression models using different measures for profitability and firm size. 'Dummies', in these models, refer to the inclusion of industry, year, and education dummies. Most important is that the interaction between gender (GNDR) and structural power ($PWRX2_c$) and gender (GNDR) and prestige power ($PWRX3_c$) remain similar in sign and significance and, therefore, also in interpretation. To finalize this section on gender, a brief summary and general conclusion regarding the support of hypothesis 1 is formed.

Table 8: Multivariate linear regression (non-linearity): Gender.

	TDBV (1)	TDBV (2)	TDBV (3)	TDMV (4)	TDMV (5)	TDMV (6)
GNDR	-0.060	0.005	0.867	-0.022	0.086	-3.343
	(0.131)	(0.049)	(1.890)	(0.118)	(0.065)	(2.095)
AGE_c	-0.000	-0.000	-0.001	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FUNXP	-0.004	-0.004	-0.007	-0.001	-0.002	-0.003
	(0.009)	(0.009)	(0.009)	(0.015)	(0.015)	(0.015)
$PWRX1_c$	-0.021	0.014	0.023	0.037	0.001	0.010
	(0.033)	(0.020)	(0.021)	(0.050)	(0.038)	(0.031)
$PWRX2_c$	0.027	0.004	0.023	-0.005	-0.011	-0.001
	(0.019)	(0.019)	(0.017)	(0.026)	(0.029)	(0.025)
$PWRX3_c$	-0.016*	-0.016*	0.025**	-0.035**	-0.034**	-0.008
	(0.009)	(0.009)	(0.012)	(0.014)	(0.014)	(0.026)
$GNDR \times PWRX1_c$	-0.865	0.187	0.157	-1.084	0.561	0.629
	(2.111)	(0.300)	(0.287)	(2.000)	(0.443)	(0.381)
$GNDR \times PWRX2_c$	-0.240***	-0.275***	-0.239***	-0.163**	-0.208**	-0.124*
	(0.066)	(0.078)	(0.064)	(0.071)	(0.095)	(0.068)
$GNDR \times PWRX3_c$	0.156***	0.162***	0.688	0.156***	0.154***	-1.973
	(0.038)	(0.038)	(1.173)	(0.042)	(0.043)	1.301)
$PWRX1_c^2$	0.025			-0.043		
	(0.034)			(0.047)		
$GNDR \times PWRX1_c^2$	-4.536			-6.467		
	(8.103)			(8.280)		
$PWRX2_c^2$		-0.125**			-0.066	
		(0.060)			(0.103)	
$GNDR \times PWRX2_c^2$		-0.424*			-0.443	
		(0.231)			(0.379)	
$PWRX3_c^2$			-0.286***			-0.184
			(0.060)			(0.151)
$GNDR \times PWRX3_c^2$			-3.911			15.270
			(8.400)			(9.395)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Education dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,432	1,432	1,432	1,434	1.437	1.435
Adjusted R^2	69.80%	70.15%	70.55%	58.97%	58.97%	59.10%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for heteroscedasticity and clustering at firm level when required. Controls variables are as previously used. Variables with subscript "c" are mean centered and are as defined in Table 1.

The first main important finding is that different power dimensions interact differently with gender something not initially hypothesized. My original premise was that power creates asymmetry in the decision making process (Carpenter et al., 2004) such that the powerful CEO is able to impose his/her preferences through the capital structure. However, it appears that those preferences are different for gender as well as power. Accordingly, power is a much more complex construct that stated by Bigley and Wiersema (2002).

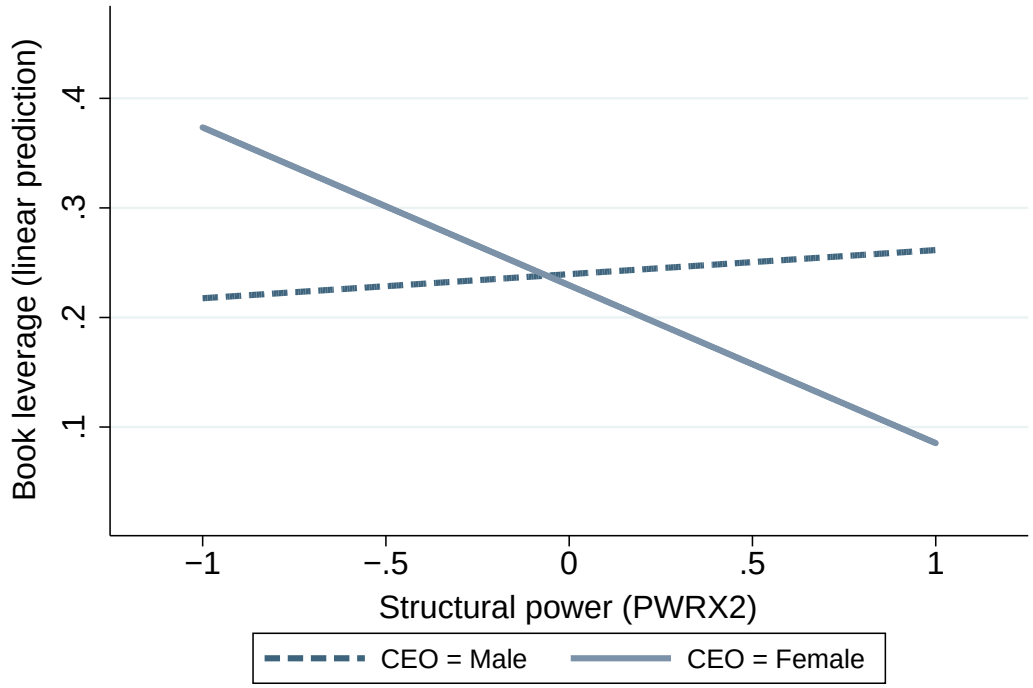
The opposite effects for the power dimensions may explain why previous scholars (e.g.: Ragins and Sundstrom, 1989) have argued that female CEO may not be a good representation of the average female population. To put it differently, having attended prestigious institutions may have provided female executives with an aura of prominence in the business elite (Finkelstein, 1992) which may have caused increased confidence and risk tolerance (i.e. more similar to men), compared to those female CEOs that did not have comparable levels of status within the organization. Alternatively, females are often placed lower in the social hierarchy (Ragins & Sundstrom, 1989; Magee & Galinsky, 2008) which may cause the need to overcompensate by proving oneself which, having obtained sufficient (prestige) power, becomes possible.

With respect to structural power, female CEOs employ lower levels of financial leverage once more structural power is obtained. These results imply (holding all other variables fixed) that female CEOs have higher levels of book leverage compared to male CEOs but once sufficient power has been accumulated, preferences are imposed and leverage is decreased whereas male CEOs would increase leverage when more power is obtained (see Figure 8a), though not statistically significant. Moreover, the interaction variable also has the expected sign which, therefore, offers support for hypothesis 1. To put it differently, female CEOs are inherently conservative and risk-averse and, as a result, prefer to use less debt financing (Huang & Kisgen, 2013; Faccio et al., 2016) which becomes possible once decision-making is asymmetric in favor of the female CEO able to impose her preference. However, a female CEO with low power is not able to fully exert her will and is, therefore, not able to (freely) adjust leverage. Since the female CEO is not able to adjust leverage, debt might be high to, for instance, reduce empire building tendencies (Jensen, 1986). Once the female CEO has established a foothold and increased her structural power by capturing a bigger slice of the total compensation going to the top five executives, she is more able to influence corporate decision-making and, as can be observed in Figure 8a. In sum, female CEOs who have the legislative right to exert influence (i.e. structural power) by managing uncertainty manage firms with lower financial leverage which is conform inherent female attributes such as conservatism and risk-aversion.

Importantly, the findings are, based on the applied methods, robust against self-selection biases, unobserved time-invariant heterogeneity, alternative measures of control variables, and nonlinearity. Furthermore, the Wu-Hausman tests implies that gender, and related two-way interactions, are not endogenous. Though due to data limitations, the self-selection bias could not fully be ruled out via using, arguably better, and more accurate specifications (e.g.: smaller radius), similar to Huang and Kisgen (2013) or Faccio et al. (2016). Nonetheless, while significant effects have been found for prestige power, the observed effect does not lend support for hypothesis 1. In contrast, the observed effects for structural power do offer support for hypothesis 1.

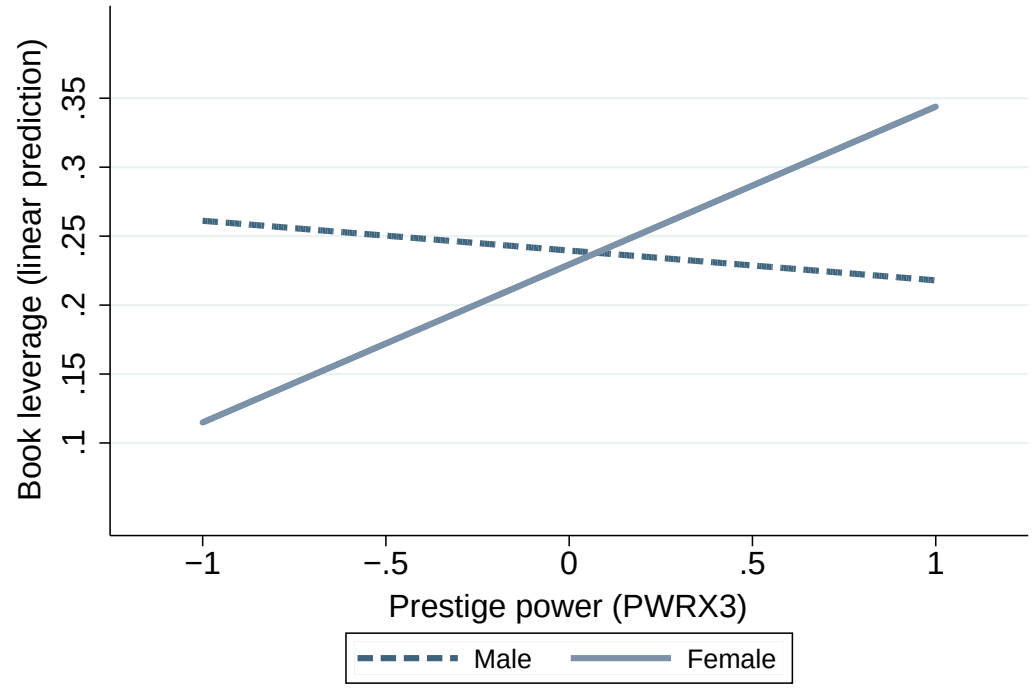
Figure 8: Predictive margin plot: Gender.

(a) Two-way interaction effects: Gender and structural power.



Note: Power is mean centered.

(b) Two-way interaction effects: Gender and prestige power.



Note: Power is mean centered.

5.2 OLD VERSUS YOUNG, POWER, AND PREFERRED LEVERAGE

This section puts forth various tests for hypothesis 2a and 2b. The final conclusion as to which direction in this dueling hypothesis is supported is postponed till the end of this section so that all robust findings can be integrated into one conclusion. To identify potential influential observations, the studentized residuals, leverage points, and Cook's Distances are examined (Appendix D provides detailed information on the influential observations). In order to test for heteroscedasticity I plot the residuals against the fitted values and I employ the Breusch-Pagan test (see Appendix D for further information).

Moreover, to examine potential serial correlation, I employ the Breusch-Godfrey test and Durbin-Watson test (see Appendix D for further information regarding serial correlation). If heteroscedasticity or autocorrelation, or both, are a concern, SEs are adjusted appropriately. The VIF scores indicate that multicollinearity is not a concern in any of the models (see Appendix D for further information regarding multicollinearity). All regressions models have been run with and without the identified influential observations and the main results are not altered in any significant way. Only the results without influential observations are presented.

Model (1) through Model (6) in Table 9 show various regression models related to hypothesis 2a and 2b. The models differ with their inclusion of board interactions (BMET) and education dummies (regression diagnostics are presented in Appendix D). For Model (1) through (3) the two-way interaction between age (AGE_c) and ownership power ($PWRX1_c$) are positive and statistically significant at the 1%. Ownership power is mainly characterized by tenure, founder-status, and ownership of stock. Holding all other variables fixed, CEOs below-average-of-age, with low ownership power, are imposing their preferences in the capital structure by using less financial leverage. This finding corresponds to the theoretical prediction that younger CEO have shorter track-records, less achievements, are more scrutinized by the labor market, and are more concerned with their career which causes them to be risk-averse. In contrast, older CEOs increase leverage once powerful, which is in line with the theoretical prediction that older CEO are less concerned with career opportunities resulting in more risky investments (Zwiebel, 1995) and may even result in "legacy building" (Zwiebel, 1996). The results, for market leverage, are not statistically significant.

Furthermore, Model (1) through (3) also show that that the interaction between age (AGE_c) and structural power ($PWRX2_C$) are negative and statistically significant at the 1%. Note that the different power dimensions, similar as with gender, have opposite implications once interacted. While increasing ownership power causes younger managers to lower leverage, increasing structural power causes younger managers to increase leverage.

The results provide support for the prediction that younger CEOs are bolder and use riskier financing compared to older CEOs which is consistent with the predictions of Prendergast and Stole (1996) and Serfling (2014). Furthermore, the results also support the prediction of Hambrick and Mason (1984) that older managers have less physical and mental stamina and, therefore, value financial security and stability by reducing leverage. Interestingly, for market leverage Model (4) through (6), the results of age (AGE_c) interacted with structural power ($PWRX2_c$) are not as strong in significance as for book leverage.

Table 9: Multivariate linear regression (pooled OLS): Age.

	Book leverage			Market leverage		
	(1)	(2)	(3)	(4)	(5)	(6)
AGE_c	-0.001	-0.001	-0.001	-0.000	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GNDR	-0.010	-0.013	-0.023	0.036	0.039	0.039
	(0.021)	(0.022)	(0.022)	(0.028)	(0.027)	(0.028)
FUNXP	0.020**	0.012	0.000	0.006	0.000	-0.013
	(0.010)	(0.010)	(0.009)	(0.011)	(0.011)	(0.011)
$PWRX1_c$	-0.013	-0.009	-0.006	0.006	0.003	0.018
	(0.016)	(0.016)	(0.015)	(0.022)	(0.022)	(0.021)
$PWRX2_c$	0.007	0.002	0.011	-0.018	-0.008	-0.002
	(0.017)	(0.017)	(0.016)	(0.020)	(0.018)	(0.018)
$PWRX3_c$	-0.012	-0.004	-0.003	-0.035***	-0.031***	-0.024**
	(0.009)	(0.010)	(0.016)	(0.011)	(0.011)	(0.010)
$AGE_c \times PWRX1_c$	0.004***	0.004***	0.006***	0.003	0.002	0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
$AGE_c \times PWRX2_c$	-0.005**	-0.006***	-0.005***	-0.001	-0.005*	-0.005*
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
$AGE_c \times PWRX3_c$	0.000	0.001	0.001	0.001	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
TANG	0.046	0.063	0.027	0.062	0.069	0.043
	(0.038)	(0.039)	(0.041)	(0.045)	(0.048)	(0.049)
ASSET	-0.011***	-0.011***	-0.015***	-0.021***	-0.019***	-0.020***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
GROW	0.067***	0.076***	0.079***	-0.014*	-0.007	-0.006
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
FIND	-0.070***	-0.074***	-0.076***	-0.048***	-0.049***	-0.050***
	(0.006)	(0.006)	(0.005)	(0.007)	(0.007)	(0.006)
ROA	0.200***	0.183**	0.190***	-0.272***	-0.298***	-0.256***
	(0.071)	(0.072)	(0.067)	(0.084)	(0.084)	(0.079)
BMET		0.003	0.012		0.016	0.017
		(0.011)	(0.011)		(0.014)	(0.014)
Education dummies	No	No	Yes	No	No	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,606	1,528	1,425	1.583	1,516	1,418
Adjusted R^2	67.70%	67.42%	70.11%	67.05%	67.32%	68.79%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for heteroscedasticity and clustering at firm level when required. Variables with subscript "c" are mean centered and are as defined in Table 1.

The control variables, if significant, remained similar in sign and, therefore, also interpretation. Similar as with gender, older (younger) CEOs may self-select into a particular type of firm, or particular firms may select, specifically, older (younger) CEOs. Similar as with gender, the next section uses PSM and DiD to investigate this assertion.

5.2.1 *Self-selection bias for CEO age*

As alluded to, the results might be driven by (endogenous) self-selection. To put it differently, the effect of age might be driven by an unobserved but correlated variable such as preferences by the board of directors to hire a young CEO. If so, the measured effect does not stem from age but from the underlying discriminatory preferences.

Table 10: Self-selection identification: Age.

	Obs.	Mean.	Diff. (Young - Old)	P-value of diff. controlled for firm- and CEO-characteristics
Panel A: Propensity score matched sample approach				
Book leverage				
Young CEOs	506	0.266	0.042*	0.076
Old CEOs	488	0.224		
Market leverage				
Young CEOs	506	0.308	0.071*	0.092
Old CEOs	485	0.237		

	Obs.	TDBV	Diff. (Treated - Control)	Obs.	TDMV	Diff. (Treated - Control)
Panel B: Difference-in-difference approach						
Before						
Treatment group	263	0.258	0.-0.022	259	0.524	-0.001
Control group	856	0.280	(0.017)	854	0.525	(0.020)
After						
Treatment group	187	0.276	0.020	233	0.499	0.024
Control group	233	0.256	(0.028)	233	0.499	(0.031)
Diff-in-Diff			0.042			0.025
			(0.027)			(0.030)

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for clustering at firm level when required. Variables are defined in Table 1.

To investigate whether older (younger) CEOs self-select into particular types of firms, or whether particular firms select CEOs of specific age-groups, I estimate the average treatment effect on the treated using PSM and DiD. Since age is continuous, I followed Serfling (2014), and divided age in three categories: young, middle-aged, and old, based on the 25th and 75th percentiles, respectively. Next, I remove all observations where the CEO is middle-aged, allowing me to compare old versus young where, most likely,

the self-selection is most visible (Serfling, 2014). Unfortunately, due to a relatively small sample, matches could only be found in a 7.5% radius, controlling for CEO gender, functional experience, relative amount of firm's tangible assets, firm size (asset based), firm's growth opportunities, distance to bankruptcy, and profitability (return on assets). The 7.5% is similar to the 5% of Serfling (2014), however a smaller radius is more preferable.

Panel A in Table 10 reveals that comparable firms, where CEO age is the only observable difference, do have significantly different levels of book leverage and market leverage, statistically significant at the 10%. Therefore, based on PSM, support is found for the assertion that younger (older) CEOs self-select particular firms, or vice versa. However, Panel B in Table 6 displays the DiD and, in contrast to PSM, reveals that there is no statistically significant difference between firms transitioning from old-to-young (treatment group) versus old-to-old or young-to-young (control group). Nonetheless, PSM and DiD show contradicting findings regarding self-selection. Thus, there is some minor evidence to suggest old (young) CEO self-select or are selected into particular firms. Since the unobserved correlated driver might be time-invariant, I employ FE in the next section to formally rule out this possibility

5.2.2 *Age and unobserved time-invariant heterogeneity*

In order to control for unobserved heterogeneity, I use the panel structure of the data and employ FE which includes firm fixed-effects that control for the unobserved heterogeneity (Rabe-Hesketh & Skrondal, 2012). Similar as before, only firms that experience CEO turnovers (i.e. transitions) from young-to-old or old-to-young are included since those contribute to the identification of the endogeneity problem. Furthermore, the SEs are presented in parentheses and are adjusted for heteroscedasticity and clustering at firm level when appropriate.

Model (1) through (4) in Table 11 display the fixed-effect regressions for the reduced sample consisting of firms that experience the before-mentioned CEO transitions. Note first that FE is appropriate since all Hausman tests are statistically significant at the 1% thereby justifying the use of FE over RE. Second, all models (1) through (6) explain less from the variation in book and market leverage than the pooled OLS used in previous section. These results suggest that accounting for time-invariant firm-specific characteristics does not offer any significant contribution in explaining the dependent variable since the adjusted R^2 penalizes variables that offer no contribution (Wooldridge, 2015).

Interestingly, in both the reduced and the full sample, interactions between age (AGE_c) and the various power dimensions (i.e. $PWRX1_c$ and $PWRX2_c$) are no longer statistically significant which, in the models for the reduced sample, may be due to the small sample size. Yet, for the full samples results are also not statistically significant. Only Model (4) shows some significant two-way interaction results. For ownership power ($PWRX1_c$), at the 10%, and prestige power ($PWRX3_c$) at the 5%. Yet, these results are not robust considering their lack of significance in the other models. It appears that controlling for unobserved heterogeneity causes the two-way interaction variables no longer to be significant. This may be the result of "over-controlling" (Wooldridge, 2015) since the adjusted R^2's are also substantially lower. Regarding the control variables, the significant ones remain similar in sign and, therefore, also in interpretation.

Table 11: Multivariate linear regression (fixed-effect): Age.

	Reduced sample				Full sample	
	TDBV (1)	TDBV (2)	TDMV (3)	TDMV (4)	TDBV (5)	TDMV (6)
AGE_c	-0.001	-0.001	-0.001	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
GNDR	0.015	-0.012	0.117*	0.022	0.028	0.049
	(0.036)	(0.029)	(0.057)	(0.021)	(0.018)	(0.030)
FUNXP	0.012	0.020	0.011	0.022	0.007	-0.013
	(0.012)	(0.012)	(0.017)	(0.021)	(0.008)	(0.011)
$PWRX1_c$	0.062**	0.054*	0.088	0.053	0.012	0.021
	(0.025)	(0.028)	(0.052)	(0.051)	(0.019)	(0.027)
$PWRX2_c$	-0.001	-0.006	-0.016	-0.011	-0.001	-0.006
	(0.032)	(0.033)	(0.051)	(0.050)	(0.010)	(0.015)
$PWRX3_c$	-0.001	0.011	-0.008	0.014	-0.008	-0.003
	(0.017)	(0.014)	(0.024)	(0.018)	(0.007)	(0.011)
$AGE_c \times PWRX1_c$	0.001	0.003	0.012	0.019*	-0.000	0.002
	(0.006)	(0.007)	(0.009)	(0.010)	(0.002)	(0.002)
$AGE_c \times PWRX2_c$	-0.001	-0.002	0.006	0.005	-0.001	0.002
	(0.003)	(0.003)	(0.005)	(0.004)	(0.001)	(0.002)
$AGE_c \times PWRX3_c$	-0.002	-0.001	0.004	0.004**	-0.001	-0.001
	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)	(0.002)
TANG	0.022	0.072	0.138	0.239	-0.103	-0.006
	(0.259)	(0.234)	(0.295)	(0.233)	(0.060)	(0.073)
ASSET	0.076*	0.082**	0.153**	0.150**	0.007	0.025
	(0.039)	(0.039)	(0.070)	(0.066)	(0.014)	(0.018)
GROW	0.060**	0.075***	-0.025	0.016	0.055***	-0.017
	(0.023)	(0.020)	(0.027)	(0.030)	(0.010)	(0.011)
FIND	-0.059***	-0.063***	-0.004	-0.017	-0.062***	-0.026***
	(0.008)	(0.007)	(0.015)	(0.016)	(0.007)	(0.009)
ROA	0.093	0.151	-0.507*	-0.352	0.049	-0.403***
	(0.141)	(0.136)	(0.250)	(0.235)	(0.057)	(0.084)
BMET	-0.006	-0.009	-0.045	-0.054*	0.001	-0.010
	(0.015)	(0.015)	(0.029)	(0.030)	(0.006)	(0.010)
Education dummies	No	Yes	No	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	141	141	141	141	1,291	1.291
Adjusted R^2	53.26%	54.75%	45.68%	49.50%	46.49%	34.44%
Hausman χ^2	74.84***	67.31***	56.47***	47.70***	68.01***	59.64***

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for heteroscedasticity and clustering at firm level when required. Variables with subscript "c" are mean centered and are as defined in Table 1.

5.2.3 *Age and time-varying omitted variables*

To further investigate whether unobserved variables are driving the results, this section uses 2SLS to see whether age is, in fact, endogenous. Table 12 displays the 2SLS estimation, as described four first-stage models are specified to obtain predicted values for the four endogenous variables, similar to the approach of Berger and Bouwman (2013) and Carlin and Mayer (2003). Importantly, the Wu-Hausman test shows that the variables are not endogenous. For both book and market leverage, the test fails to reject the null of exogeneity. Specifically, for book leverage: $[F(4, 171) = 1.769, p(0.137)]$ while for market leverage: $[F(4, 171) = 0.505, p(0.732)]$. On a final note, 'Dummies' refers to the inclusion of: year-, industry-, and education dummies.

Importantly, when the endogenous variables are the dependent variable in the first-stage regressions, the coefficient on the corresponding instruments are highly significant, statistically significant at the 1% in all first-stage models. Furthermore, as described by Berger and Bouwman (2013), if the instruments are weak, the estimates may be biased and thus, first-stage F-statistics of excluded instruments should be examined. These F-statistics, with low p-values, suggest I do not have a weak instrument problem (Berger & Bouwman, 2013). The second-stage regressions in Table 12 show, for book leverage, similar results as the pooled OLS. Namely, a statistically significant positive two-way interaction between age (AGE_c) and ownership power ($PWRX1_c$), statistically significant at the 1%, and a statistically significant negative two-way interaction between age (AGE_c) and structural power ($PWRX2_c$), statistically significant at the 1%. Difference being that the results of age, interacted with those dimensions of power, are not driven by some omitted yet correlated variables. On a final note, the models presented in Table 12 explain more of the variation than from the FE.

5.2.4 *Robustness and nonlinearity: Age*

Table 13 displays the age regression models that examine nonlinearity. When appropriate SEs are adjusted for heteroscedasticity and clustering at firm level. Note first that, for book leverage, the two-way interactions between age (AGE_c) and ownership power($PWRX1_c$) and age (AGE_c) and structural power ($PWRX2_c$), remain statistically significant. Specifically focused on nonlinearity, it appears that structural power ($PWRX2_c$) and prestige power ($PWRX3_c$) also have a non-monotonic relation with book leverage. In fact, not only is the interaction between age (AGE_c) and structural power ($PWRX2_c$) statistically significant at the 1%, so too is the interaction between age (AGE_c) and structural power squared ($PWRX2_c^2$), at 5%, respectively. These results imply that rather than a simple one-to-one decrease in leverage, when structural power increases, leverage decreases faster (i.e. as a function of structural power/age) the more power is obtained, or when age increases. Furthermore, the interaction between age (AGE_c) and prestige power ($PWRX3_c$) is also significant in the normal interaction and the squared interaction, statistically significant at the 1% in both cases. This is an interesting finding because prestige power and age have not yet been found statistically significant in the models from previous sections suggesting that nonlinearity may be an important aspect in the relationship with book leverage. These results imply that leverage initially increases with age but decreases, as a function of prestige power, the more power is obtained.

Table 12: Two-stage least square estimation: Age.

	First-stage				Second-stage	
	AGE_c	$AGE_c PWRX1_c$	$AGE_c PWRX2_c$	$AGE_c PWRX3_c$	TDBV	TDMV
CPI	-1.357***	-0.005	0.010	0.014		
	(0.082)	(0.013)	(0.007)	(0.037)		
$CPI \times PWRX1_c$	-0.064	-1.267***	0.047**	-0.084		
	(0.114)	(0.069)	(0.023)	(0.056)		
$CPI \times PWRX2_c$	0.154	0.084	-1.295***	-0.036		
	(0.150)	(0.051)	(0.061)	(0.055)		
$CPI \times PWRX3_c$	0.131	-0.013	0.003	-1.222***		
	(0.166)	(0.025)	(0.015)	(0.074)		
GNDR	1.007	-0.102	-0.041	0.408	0.017	0.044*
	(0.754)	(0.190)	(0.077)	(0.409)	(0.022)	(0.025)
FUNXP	-0.185	-0.153*	-0.002	0.161	0.006	-0.016
	(0.251)	(0.087)	(0.052)	(0.139)	(0.010)	(0.010)
$PWRX1_c$	1.635	33.777***	-1.072*	1.433	-0.018	0.022
	(2.892)	(1.708)	(0.574)	(1.421)	(0.016)	(0.022)
$PWRX2_c$	-1.956	-2.381*	34.516***	1.108	0.014	0.008
	(4.225)	(1.419)	(1.617)	(1.566)	(0.017)	(0.019)
$PWRX3_c$	-4.152	0.131	-0.136	32.832***	-0.008	-0.023**
	(4.518)	(0.686)	(0.415)	(2.035)	(0.009)	(0.011)
AGE_c					-0.000	-0.000
					(0.001)	(0.001)
$AGE_c \times PWRX1_c$					0.008***	0.003
					(0.002)	(0.002)
$AGE_c \times PWRX2_c$					-0.008***	-0.005
					(0.002)	(0.003)
$AGE_c \times PWRX3_c$					0.001	0.003
					(0.002)	(0.002)
TANG	0.428	-0.017	-0.408*	0.715	0.017	0.048
	(0.973)	(0.283)	(0.215)	(0.568)	(0.046)	(0.051)
ASSET	0.103	-0.042	-0.028	0.009	-0.022***	-0.019***
	(0.120)	(0.053)	(0.021)	(0.058)	(0.004)	(0.005)
GROW	0.171	-0.154	0.014	-0.210*	0.061***	-0.020***
	(0.197)	(0.094)	(0.044)	(0.124)	(0.007)	(0.007)
FIND	0.046	0.025	-0.024	0.052	-0.063***	-0.036***
	(0.147)	(0.036)	(0.025)	(0.068)	(0.005)	(0.005)
ROA	-1.054	0.641	0.891**	-0.107	0.220***	-0.372***
	(2.065)	(0.705)	(0.418)	(1.136)	(0.067)	(0.082)
BMET	0.408	-0.201**	0.017	0.167	-0.001	0.009
	(0.313)	(0.082)	(0.021)	(0.197)	(0.012)	(0.014)
All dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,291	1,291	1,291	1,291	1,291	1,291
Adjusted R^2	89.17%	91.73%	83.85%	79.45%	65.19%	68.47%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The standard errors are in parentheses and are adjusted for heteroscedasticity and clustering at firm level. The variables are as defined in Table 1.

Table 13: Multivariate linear regression (non-linearity): Age.

	TDBV (1)	TDBV (2)	TDBV (3)	TDMV (4)	TDMV (5)	TDMV (6)
AGE_c	-0.002**	0.000	0.005**	-0.002	0.001	0.013***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.004)
GNDR	0.001	0.002	-0.004	0.043	0.043	0.038
	(0.024)	(0.024)	(0.023)	(0.029)	(0.031)	(0.030)
FUNXP	0.002	0.001	-0.001	0.002	-0.000	-0.001
	(0.010)	(0.010)	(0.009)	(0.015)	(0.016)	(0.015)
$PWRX1_c$	0.018	-0.001	0.008	0.072	-0.002	-0.004
	(0.036)	(0.015)	(0.014)	(0.050)	(0.041)	(0.034)
$PWRX2_c$	0.004	0.000	0.012	-0.023	-0.015	0.002
	(0.017)	(0.018)	(0.015)	(0.025)	(0.027)	(0.022)
$PWRX3_c$	-0.006	-0.003	0.026**	-0.026*	-0.025*	-0.016
	(0.009)	(0.009)	(0.012)	(0.014)	(0.014)	(0.023)
$AGE_c \times PWRX1_c$	-0.005	0.007***	0.006***	0.000	0.004	0.006***
	(0.004)	(0.002)	(0.001)	(0.007)	(0.003)	(0.002)
$AGE_c \times PWRX2_c$	-0.004**	-0.007***	-0.003*	-0.004	-0.005	-0.000
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
$AGE_c \times PWRX3_c$	-0.001	0.002	0.005***	0.002	0.002	0.010**
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.004)
$PWRX1_c^2$	-0.034			-0.087		
	(0.030)			(0.054)		
$AGE_c \times PWRX1_c^2$	0.009***			0.004		
	(0.003)			(0.007)		
$PWRX2_c^2$		-0.077			-0.043	
		(0.059)			(0.102)	
$AGE_c \times PWRX2_c^2$		-0.012**			-0.007	
		(0.006)			(0.009)	
$PWRX3_c^2$			-0.221***			-0.086
			(0.058)			(0.116)
$AGE_c \times PWRX3_c^2$			-0.026***			-0.056***
			(0.010)			(0.020)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Education dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,424	1,428	1,427	1,427	1,434	1,437
Adjusted R^2	69.85%	69.90%	70.64%	58.91%	58.79%	59.68%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The standard errors are in parentheses and are adjusted for heteroscedasticity and clustering at firm level. The variables are as defined in Table 1.

Lastly, the pooled OLS regression models using different measures for profitability and firm size are presented in Appendix D. The dummies included are industry, year, and education dummies. Most important is that the interaction between age (AGE_c) and ownership power ($PWRX1_c$) and age (AGE_c) and structural power ($PWRX2_c$) remain similar in sign and significance for book leverage and, therefore, also in interpretation.

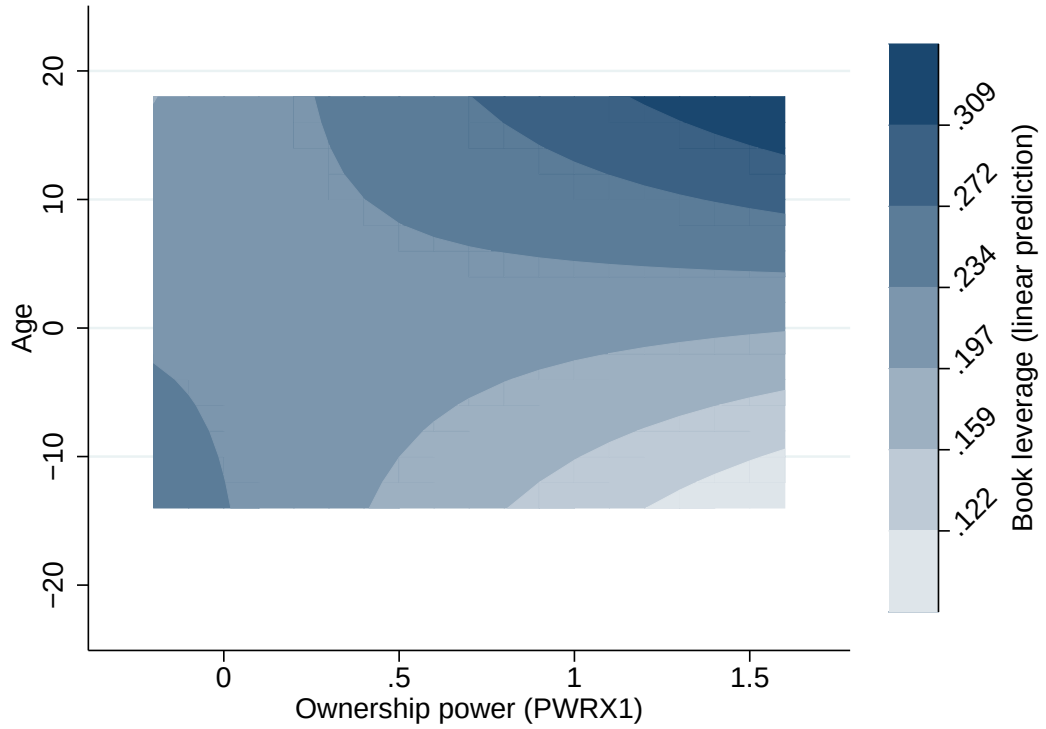
In conclusion, then, the first main and robust finding is the two-way interaction between age (AGE_c) and ownership power ($PWRX1_c$) which is positive for book leverage. This result implies that book leverage is a function of age and ownership power as is indicated by the contour plot of the predictive margins in Figure 9a. To put it differently, holding all other variables fixed, managers below the average age with low ownership power are managing firms with more financial leverage compared to older CEOs with similar levels of power. Then, once sufficient ownership power is accumulated, the decision-making process becomes asymmetric (Carpenter et al., 2004) and younger managers impose their preferences in the capital structure by lower the level of financial leverage whereas older managers, with the same amount of ownership power, increase leverage. Younger managers, all else equal, have shorter track-records, less achievements, are more scrutinized by the labor market, and are more concerned with their career (Hirshleifer & Thakor, 1992). Thus, if true, a young CEO would prefer lower levels of financial leverage compared to an older CEO. When a young CEO becomes powerful and becomes able to impose preferences, financial leverage is reduced to protect future career prospects which, based on the color scale in Figure 9a, is an explanation supported by the results. Second, the results also support the idea that older managers engage in legacy building at the end of their tenure (Zwiebel, 1996) since older CEOs, often closer to retirement, use more financial leverage once more powerful. That is to say, if older managers want to engage in legacy building they will not be able to do so with low power since the decision making process is diversified towards (Finkelstein, 1992). However, once ample power is accumulated, financial leverage is increased and older CEOs can engage in legacy building.

The two-way interactions between age (AGE_c) and structural power ($PWRX2_c$) are negative and statistically significant at the 1%. The results in Figure 9b are able to support the prediction that younger CEOs are bolder and use riskier financing compared to older CEOs which is consistent with the predictions of Prendergast and Stole (1996) and Serfling (2014). Furthermore, the results in Figure 9b also support the prediction of Hambrick and Mason (1984) that older managers have less physical and mental stamina and, therefore, prefer financial security and stability. However, an old CEO is only able to impose such preferences (i.e. lower leverage), once powerful, as is suggested by the lighter color in the top right. Specifically, not only do older managers have lower financial leverage, financial leverage is further reduced once more ownership power is obtained, more than for younger managers.

In sum, since the power dimensions have different effects, both hypothesis 2a (ownership power) and 2b (structural power) are supported. These results are robust against alternative measures for control variables, inclusion of nonlinear effects, and time-varying omitted variables using an instrumental approach. Different from the gender regressions, age appears to have multiple significant nonlinear interaction variables which hint towards a more difficult relationship than a simple linear one, which was the main focus throughout this analysis.

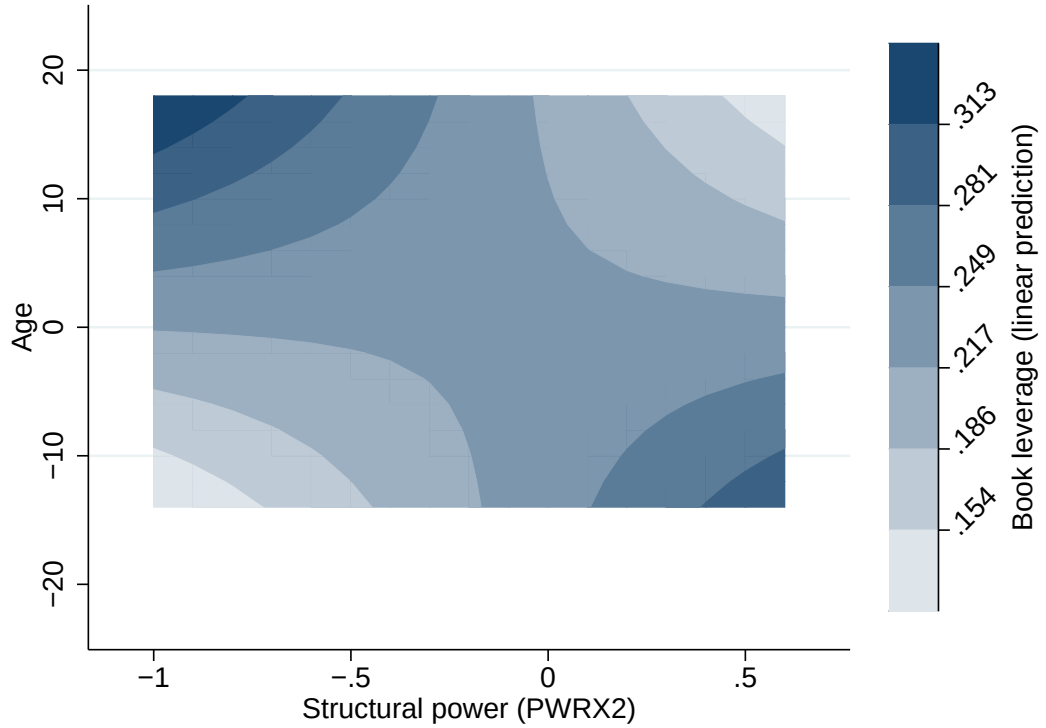
Figure 9: Predictive margin plot: Age.

(a) Two-way interaction effects: Age and ownership power.



Note: Age and power variable are mean centered

(b) Two-way interaction effects: Age and structural power.



Note: Age and power variable are mean centered

5.3 FINANCIAL EXPERTS, POWER, AND PREFERRED LEVERAGE

This section puts forth various tests for the final hypothesis, hypothesis 3. To identify potential influential observations, the studentized residuals, leverage points, and Cook's Distances are examined (Appendix D provides detailed information on the influential observations). In order to test for heteroscedasticity I plot the residuals against the fitted values and I employ the Breusch-Pagan test (see Appendix D for further information).

Moreover, to examine potential serial correlation, I employ the Breusch-Godfrey test and Durbin-Watson test (see Appendix D for further information regarding serial correlation). If heteroscedasticity or autocorrelation, or both, are a concern, SEs are adjusted appropriately. The VIF scores indicate that multicollinearity is not a concern in any of the models (see Appendix D for further information regarding multicollinearity). All regressions models have been run with and without the identified influential observations and the main results are not altered in any significant way. Only the results without influential observations are presented.

Model (1) through (3) in Table 14 show that functional experience (FUNXP) interacted with ownership power ($PWRX1_c$) is negative and statistically significant across all three models, statistically significant at the 5%. This estimate implies that functional experts lower financial leverage once ownership power increases. Furthermore, functional experience (FUNXP) interacted with prestige power ($PWRX3_c$) is negative and statistically significant in Model (1) and (2) yet once CEO education is controlled for this variable is no longer statistically significant which suggests results may have been driven by correlation between education and functional experience. Furthermore, for market leverage, functional experience (FUNXP) and structural power ($PWRX2_c$) are positive and statistically significant across all models. When financial expert CEOs obtain more structural power, financial leverage is increased. All control variables remain, when significant, similar in sigh and, therefore, interpretation.

5.3.1 *Self-selection bias for CEO functional experience*

As alluded to in Chapter 3, the results might be driven by (endogenous) self-selection. To put it differently, the effect of functional experience might be driven by an unobserved but correlated variable such as preferences by the board of directors to hire a financial expert CEO. If so, the measured effect does not stem from financial experience but from the underlying discriminatory preferences.

To investigate whether financial expert CEOs self-select into particular types of firms, or whether particular firms select CEOs of with specific experience, I estimate the average treatment effect on the treated using PSM and DiD. Unfortunately, due to the relative small sample size, matches could only be found in a 7.5% radius, controlling for CEO gender, age, the relative amount of firm's tangible assets, firm size (asset based), firm's growth opportunities, distance to bankruptcy, and profitability (return on assets).

Panel A in Table 15 reveals that comparable firms, where CEO experience is the only observable difference, do not have significantly different levels of book leverage and market leverage. Therefore, based on PSM, support is not found for the assertion that financial expert CEOs self-select particular firms, or vice versa.

Table 14: Multivariate linear regression (pooled OLS): Functional experience.

	Book leverage			Market leverage		
	(1)	(2)	(3)	(4)	(5)	(6)
FUNXP	0.013	0.004	-0.004	0.010	-0.006	-0.012
	(0.010)	(0.010)	(0.009)	(0.011)	(0.011)	(0.011)
GNDR	-0.022	-0.031	-0.032	0.033	0.031	0.035
	(0.022)	(0.023)	(0.012)	(0.028)	(0.027)	(0.027)
AGE_c	-0.001	-0.001	-0.000	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$PWRX1_c$	0.008	0.008	0.015	0.019	0.014	0.016
	(0.020)	(0.020)	(0.024)	(0.023)	(0.022)	(0.024)
$PWRX2_c$	-0.002	-0.011	-0.002	-0.027	-0.047*	-0.038
	(0.024)	(0.024)	(0.024)	(0.027)	(0.025)	(0.026)
$PWRX3_c$	-0.001	0.005	-0.001	-0.030**	-0.019	-0.015
	(0.011)	(0.011)	(0.011)	(0.014)	(0.013)	(0.012)
$FUNXP \times PWRX1_c$	-0.078**	-0.078**	-0.090**	0.011	-0.046	-0.029
	(0.032)	(0.031)	(0.035)	(0.044)	(0.035)	(0.035)
$FUNXP \times PWRX2_c$	0.025	0.038	0.032	0.077*	0.120***	0.127***
	(0.039)	(0.037)	(0.035)	(0.042)	(0.042)	(0.046)
$FUNXP \times PWRX3_c$	-0.039*	-0.041**	-0.028	-0.036	-0.037	-0.032
	(0.020)	(0.020)	(0.020)	(0.024)	(0.024)	(0.025)
TANG	0.058	0.093**	0.067*	0.066	0.094*	0.069
	(0.038)	(0.038)	(0.040)	(0.045)	(0.049)	(0.052)
ASSET	-0.011***	-0.012***	-0.015***	-0.016***	-0.021***	-0.021***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
GROW	0.070***	0.077***	0.080***	-0.022**	-0.001	-0.003
	(0.008)	(0.008)	(0.008)	(0.010)	(0.008)	(0.008)
FIND	-0.071***	-0.075***	-0.079***	-0.044***	-0.052***	-0.050***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
ROA	0.176**	0.157**	0.222***	-0.253***	-0.320***	-0.293***
	(0.072)	(0.078)	(0.069)	(0.083)	(0.082)	(0.080)
BMET		0.001	0.007		0.017	0.018
		(0.011)	(0.012)		(0.015)	(0.015)
Education dummies	No	No	Yes	No	No	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,607	1,517	1,414	1,606	1,514	1,418
Adjusted R^2	67.28%	67.39%	69.09%	66.96%	67.48%	68.88%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for heteroscedasticity and clustering at firm level when required. Variables with subscript "c" are mean centered and are as defined in Table 1.

Table 15: Self-selection identification: Functional experience.

	Obs.	Mean	Diff. (F - N)	P-value of diff.
Panel A: Propensity score matched sample approach				
Book leverage				
Financial expert CEOs	637	0.273	0.041	0.231
Non financial expert CEOs	1,358	0.273		
Market leverage				
Financial expert CEOs	636	0.301	0.065	0.227
Non financial expert CEOs	1,348	0.236		

	Obs.	TDBV	Diff. (F - N)	Obs.	TDMV	Diff. (F - N)
Panel B: Difference-in-difference approach						
Before						
Control group	764	0.272	-0.007	760	0.519	-0.001
Treated group	236	0.265	(0.018)	236	0.518	(0.021)
After						
Control group	314	0.269	-0.009	312	0.527	-0.022
Treated group	225	0.260	(0.025)	225	0.505	(0.030)
Diff-in-Diff			-0.002			-0.021
			(0.026)			(0.031)

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for clustering at firm level when required. Variables are as defined in Table 1.

Likewise, Panel B in Table 15 displays the DiD and, similar to PSM, reveals that there is no statistically significant difference between firms transitioning from non-financial expert to financial expert (treatment group) versus non-financial expert to non-financial expert (control group). Therefore, based on the PSM and DiD, results are not showing any presence of self-selecting behavior. In order to further investigate and isolate the effect of functional experience, FE is employed to control for unobserved (time-invariant) variables in a reduced sample similar as before.

5.3.2 *Functional experience and unobserved time-invariant heterogeneity*

In order to control for unobserved heterogeneity, I use the panel structure of the data and employ FE which includes firm fixed-effects that control for the unobserved heterogeneity (Rabe-Hesketh & Skrondal, 2012). Similar as before, firms that experience CEO turnovers (i.e. transitions) from non-financial expert to financial expert or financial expert to non-financial expert are included in the reduced sample since those contribute to the identification of the endogeneity problem. The SEs are presented in parentheses and are adjusted for heteroscedasticity and clustered at firm level when appropriate.

Table 16: Multivariate linear regression (Fixed-effect): Functional experience.

	Reduced sample				Full sample	
	TDBV (1)	TDBV (2)	TDMV (3)	TDMV (4)	TDBV (5)	TDMV (6)
FUNXP	0.022**	0.017	0.015	0.007	0.002	-0.020*
	(0.010)	(0.011)	(0.014)	(0.015)	(0.008)	(0.011)
GNDR	0.030**	0.033***	0.046*	0.037	0.022	0.046*
	(0.012)	(0.011)	(0.023)	().025)	(0.014)	(0.027)
AGE_c	0.000	0.000	-0.001	-0.001	-0.000	0.014
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.029)
$PWRX1_c$	-0.103	-0.097	-0.275***	-0.237**	0.013	0.014
	(0.062)	(0.069)	(0.099)	(0.100)	(0.017)	(0.029)
$PWRX2_c$	0.011	0.009	0.032	0.037	-0.016	-0.022
	(0.021)	(0.021)	(0.029)	(0.028)	(0.013)	(0.020)
$PWRX3_c$	-0.025***	-0.027**	-0.019	-0.018	-0.013	-0.010
	(0.012)	(0.011)	(0.020)	(0.019)	(0.008)	(0.013)
$FUNXP \times PWRX1_c$	0.120	0.104	0.263**	0.192	-0.041	-0.050
	(0.087)	(0.097)	(0.121)	(0.122)	(0.042)	(0.046)
$FUNXP \times PWRX2_c$	0.042	0.047	0.042	0.054	0.052**	0.052
	(0.035)	(0.038)	(0.049)	(0.052)	(0.023)	(0.033)
$FUNXP \times PWRX3_c$	0.040	0.041*	0.037	0.030	-0.007	0.019
	(0.024)	(0.022)	(0.034)	(0.033)	(0.019)	(0.023)
TANG	-0.032	-0.031	0.149	0.152	-0.103*	0.002
	(0.105)	(0.106)	(0.143)	(0.140)	(0.060)	(0.075)
ASSET	0.027	0.027	0.026	0.018	0.001	0.018
	(0.033)	(0.036)	(0.043)	(0.046)	(0.014)	(0.018)
GROW	0.050**	0.050**	-0.056**	-0.047*	0.057***	-0.018
	(0.019)	(0.020)	(0.024)	(0.026)	(0.010)	(0.011)
FIND	-0.061***	-0.061***	-0.030*	-0.034**	-0.063***	-0.027***
	(0.006)	(0.006)	(0.017)	(0.017)	(0.007)	(0.009)
ROA	0.014	0.021	-0.367***	-0.337**	0.059	-0.389***
	(0.073)	(0.078)	(0.135)	(0.137)	(0.056)	(0.084)
BMET	0.001	-0.000	-0.017	-0.017	0.003	-0.010
	(0.010)	(0.010)	(0.018)	(0.018)	(0.006)	(0.010)
Education dummies	No	Yes	No	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	403	388	403	388	1,289	1,289
Adjusted R^2	48.85%	51.27%	43.40%	43.22%	45.23%	33.04%
Hausman χ^2	22.66	49.04***	39.30**	47.90***	44.76**	49.01***

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for heteroscedasticity and clustering at firm level when required. Variables with subscript "c" are mean centered and are as defined in Table 1.

Model (1) through (4) in Table 16 display the fixed-effect regressions for the reduced sample consisting of firms that experience the before-mentioned CEO transitions. Note first that FE is appropriate since all Hausman tests but model (1)[2] are statistically significant at the 1% or 5% thereby justifying the use of FE over RE. Second, all models (1) through (6) explain less from the variation in book and market leverage than the pooled OLS used in previous section. These results suggest that accounting for time-invariant firm-specific characteristics does not offer any significant contribution in explaining the dependent variable since the adjusted R^2 penalizes variables that offer no contribution (Wooldridge, 2015). It follows, then, that accounting for unobserved time-invariant heterogeneity offers no significant contribution to the model.

Regarding the main effects, within the same firm, financial expert CEOs appear to use more financial leverage, statistically significant at the 5%, when the firm experienced a transition from financial expert to non-financial expert while, for the full sample, financial expert CEOs use less financial leverage, statistically significant at the 10%/

Table 16 shows some significant interactions yet they do not appear to be very robust. In fact, the interaction between functional experience and prestige power in Model (2) has become positive and statistically significant at the 10%. Thus, in contrast to previous findings, financial expert CEOs within the same firm start to use more leverage once power increases. For model (3) financial expert CEOs within the same firm use more leverage when ownership power increases, statistically significant at the 5%, and in contrast to the estimates from previous section. Lastly, the interaction between functional experience and structural power in model (5) is statistically significant at the 5%. This implies that, within the same firm, CEOs with a background in finance use more leverage once their structural power increases. Yet, all these estimates stem from different models and statistically significance is not very consistent throughout. Regarding the control variables, the significant ones remain similar in sign and, therefore, also in interpretation.

5.3.3 *Robustness and nonlinearity: Functional experience*

Table 17 displays functional experience regression models examining potential nonlinearity. When appropriate SEs are adjusted for heteroscedasticity and clustering at firm level. Second, controls variables in Table 17 refers to the inclusion of all previously used control variables. These are not explicitly stated again to reduce space since those variables are not of main interest here.

Specifically focused on nonlinearity, it appears that all power dimensions show statistical significant interactions with squared the power dimensions. First, the interaction between functional experience (FUNXP) and squared ownership power ($PWRX1_c^2$) in Model (1) is statistically significant at the 5%. This finding implies that financial expert CEOs use even lower levels of leverage once ownership power increases (i.e. leverage is reduces faster than a one-to-one basis which would be the case for a linear relation). Second, the interaction between functional experience (FUNXP) and squared structural power ($PWRX2_c^2$) in Model (2) is statistically significant at the 1%, and 5% for market leverage, as well as the interaction between functional experience (FUNXP) and structural power ($PWRX2_c$).

2 The variables of greatest interest are not significantly different when RE is used (results not reported).

Table 17: Multivariate linear regression (non-linearity): Functional experience.

	TDBV (1)	TDBV (2)	TDBV (3)	TDMV (4)	TDMV (5)	TDMV (6)
FUNXP	0.009	-0.019*	-0..075**	0.009	-0.021	-0.072
	(0.012)	(0.011)	(0.036)	(0.023)	(0.017)	(0.098)
GNDR	-0.017	-0.017	-0.019	0.019	0.021	0.017
	(0.024)	(0.024)	(0.023)	(0.029)	(0.028)	(0.028)
AGE_c	-0.001	-0.000	-0.001	0.000	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$PWRX1_c$	-0.038	0.040	0.052**	0.013	0.013	0.015
	(0.042)	(0.026)	(0.023)	(0.062)	(0.036)	(0.031)
$PWRX2_c$	0.017	-0.019	0.007	-0.036	-0.067**	-0.037
	(0.023)	(0.023)	(0.021)	(0.029)	(0.032)	(0.029)
$PWRX3_c$	-0.001	-0.003	0.053***	-0.012	-0.011	0.027
	(0.011)	(0.011)	(0.016)	(0.016)	(0.016)	(0.028)
$FUNXP \times PWRX1_c$	0.045	-0.122***	-0.117***	0.074	-0.047	-0.009
	(0.072)	(0.036)	(0.037)	(0.011)	(0.080)	(0.056)
$FUNXP \times PWRX2_c$	-0.001	0.066*	0.027	0.083	0.181***	0.103**
	(0.034)	(0.038)	(0.032)	(0.054)	(0.059)	(0.048)
$FUNXP \times PWRX3_c$	-0.024	-0.028	-0.072***	-0.052*	-0.058*	-0.101**
	(0.021)	(0.020)	(0.024)	(0.029)	(0.030)	(0.050)
$PWRX1_c^2$	0.066			-0.018		
	(0.044)			(0.051)		
$FUNXP \times PWRX1_c^2$	-0.156**			-0.075		
	(0.073)			(0.132)		
$PWRX2_c^2$		-0.191**			-0.218**	
		(0.083)			(0.105)	
$FUNXP \times PWRX2_c^2$		0.275***			0.497**	
		(0.103)			(0.223)	
$PWRX3_c^2$			-0.367***			-0.253
			(0.080)			(0.156)
$FUNXP \times PWRX3_c^2$			0.288**			0.312
			(0.146)			(0.392)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Education dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1.427	1,419	1,435	434	1,431	1,426
Adjusted R^2	69.44%	69.64%	70.15%	58.74%	59.20%	59.68%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The standard errors are in parentheses and are adjusted for heteroscedasticity and clustering at firm level. The variables are as defined in Table 1.

This result implies that financial expert CEOs further impose their preference for less leverage once more power is obtained. Lastly, the interaction between functional experience (FUNXP) and squared prestige power ($PWRX3_c^2$) is statistically significant at the 5%. The interaction between functional experience and prestige power is negative and statistically significant at the 1%. Thus, initially, financial expert CEOs reduce leverage when power increases but, eventually, once a power threshold has been reached, leverage is increased as a function of prestige power. All in all, these results hint towards various potential nonlinear relationships between power and functional experience.

Lastly, Table 23 shows pooled OLS regression models using different measures for profitability and firm size. The dummies included are industry, year, and education dummies. Most important is that the interaction between functional experience (FUNXP) and ownership power ($PWRX1_c$) and functional experience (FUNXP) and structural power ($PWRX2_c$) remain similar in sign and significance for book and market leverage, respectively. That is to say, similar to the regressions for nonlinearity and the initial pooled OLS.

For book leverage, though, the two-way interaction effects between functional experience and ownership power (PWRX1) and prestige power is often statistically significant even after controlling for CEO education. Different from book leverage, for market leverage, the two-way interaction between functional experience and structural power (PWRX2) is mostly statistically significant, with and without inclusion of education controls. Implications are illustrated in Figure 10 and Figure 10a

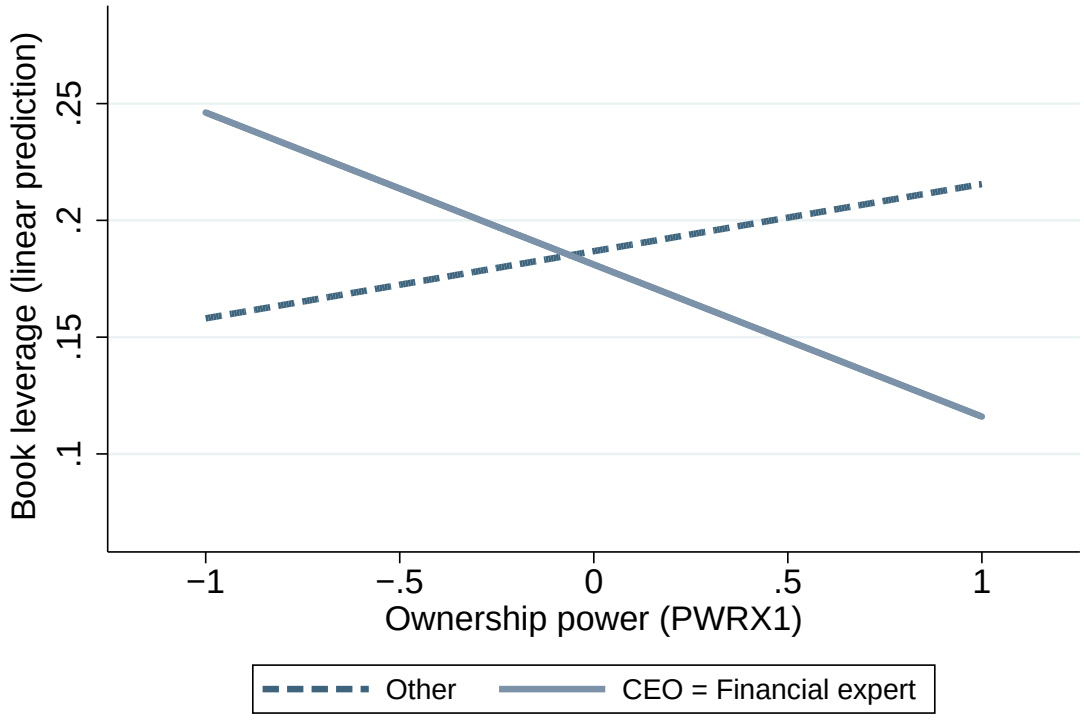
Figure 10 shows the significant interaction between functional experience and ownership power and functional experience and structural power on book and market leverage, respectively. These results suggest that financial expert CEOs lower book leverage once more ownership power is obtained, as this allows CEOs to impose preferences as a result of asymmetries that arise in the decision-making process in the upper echelons. Likewise, for market leverage, financial expert CEOs increase market leverage once more structural power is obtained.

These findings are consistent with Custódio and Metzger (2014) who argue that financial expertise is important for capital structure decisions but, as explained in Chapter 2, do not offer arguments for why it may lead to more or less leverage. A potential explanation suggests that CEOs with financial experience have better access to external finance through their network (Güner et al., 2008). However, if so, it is still not evident why more structural power would increase leverage. Nonetheless, conditional on having accumulated sufficient structural power, there is a significant difference in leverage for firms managed by CEOs with experience in finance compared to firms managed by CEOs without experience in finance.

In sum, while there is some support for hypothesis 3 in that various power dimensions interact significantly with functional experience. The results are not truly robust and consistent nor have I been able to control for potentially omitted time-varying variables. In fact, once I controlled for time-invariant heterogeneity, most interaction effects became not statistically significant. Though, the model also had less explanatory power than previous models (i.e. previous models had a better fit to explaining the variation in the data).

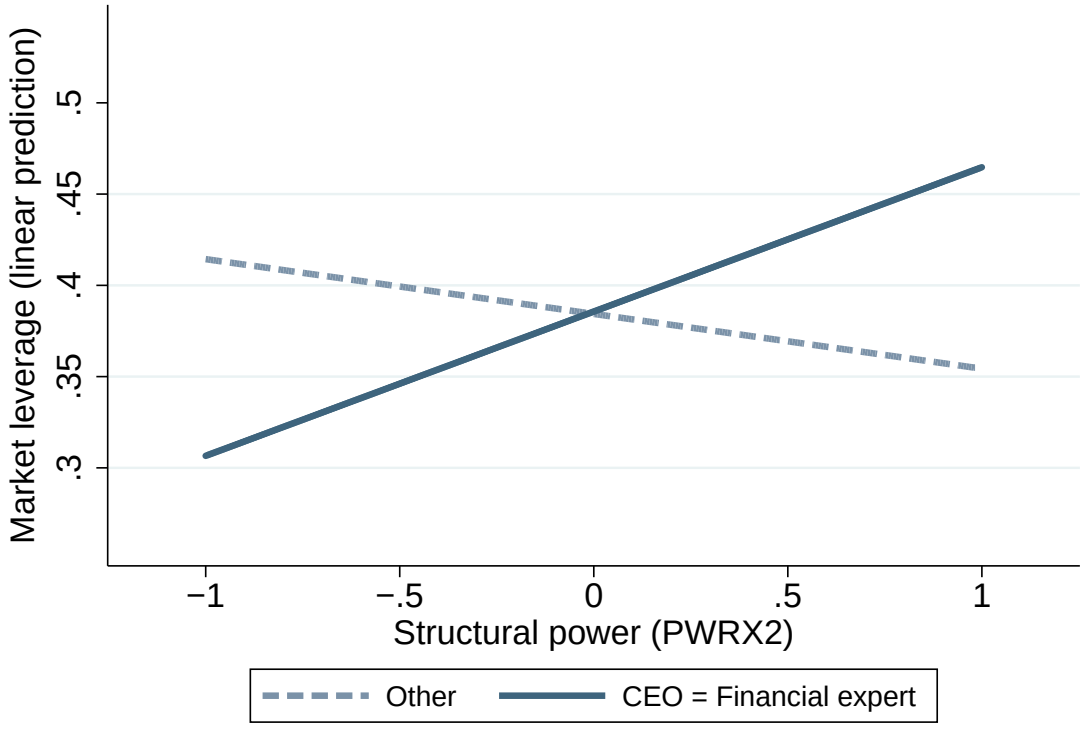
Figure 10: Predictive margin plot: Functional experience.

(a) Two-way interaction effects: Functional experience and ownership power.



Note: Power is mean centered.

(b) Two-way interaction effects: Functional experience and structural power.



Note: Power is mean centered.

6 CONCLUSION

This chapter answers the main research question (§6.1), as introduced in the first chapter. Moreover, §6.1 will also provide specific answers to each of the subquestions. The subsequent section (§6.2) will elaborate on some limitations of this thesis and §6.3 describes some fruitful avenues for future research. What follows after this chapter is a list of references used in this thesis as well as the part covering all the appendices.

6.1 ANSWER TO THE RESEARCH QUESTION

The analysis in this thesis has focused on the moderating role of power for firm's capital structure. The three CEO characteristics examined include gender, age, and functional experience, all of which are often cited as important CEO characteristics for corporate decisions (Frank & Goyal, 2007; Li et al., 2017).

The underlying theory comes from Hambrick and Mason (1984) who argue that characteristics such as gender proxy for manager's personality traits, values, and cognitive processes. While studies on CEO characteristics and leverage (e.g.: Serfling, 2014; Custódio and Metzger, 2014; Faccio et al., 2016) have not focused on the potential moderating effect of power (Carpenter et al., 2004), studies on CEO decision-making power (e.g.: Jiraporn et al., 2012; Veprauskaitė and Adams, 2013; Li et al., 2017)) have not included inherent CEO characteristics and, hence, explained behavior solely through agency theory.

Therefore, the goal of this thesis was to extent the current body of literature by examining the inclusion and moderating effect of CEO power in the relationship between inherent manager characteristic, each of which relates to different leverage preferences, and capital structure outcomes. The main research question was as follows:

Research question. "To what extent can CEO power affect the relationship between *inherent* CEO characteristics and firm's capital structure?"

Subquestions:

I What is the relation between CEO gender and leverage and how (if at all) is the relationship between CEO gender and leverage moderated by CEO power?
II What is the relation between CEO age and leverage and how (if at all) is the relationship between CEO age and leverage moderated by CEO power?
III What is the relation between CEO functional experience and leverage and how (if at all) is the relationship between CEO functional experience and leverage moderated by CEO power?

6.1.1 *CEO gender, leverage, and the moderating impact of power*

The first subquestion was concerned with the relationship between gender and leverage and the (potential) moderating effect of decision-making power. Male CEOs are generally thought of to be more confident compared to female CEOs (Huang & Kisgen, 2013; Faccio et al., 2016). Overconfident managers overestimate returns and misperceive costs of external financing (Malmendier et al., 2011). Consequently, since male CEOs are more confident, they are expected to use more debt financing because overconfident managers perceive equity to be more mis-priced than risky debt. Vice versa, women are inherently more risk-averse which implies, for instance, that women invest less in risky assets in their investment portfolios (Agnew et al., 2003). Important to realize is that male/female CEOs are not able to adjust financial leverage without sufficient decision-making power in the upper echelons (Finkelstein, 1992). Therefore, I hypothesized that, conditional on having accumulated ample power, female CEOs, start to impose their preferences of risk-aversion and conservatism on the capital structure once power increases.

The results consistently show that female CEOs with sufficient (structural) power use lower levels of financial leverage. However, interestingly and unexpected, different power dimensions have different moderating effects on the relationship between gender and leverage. While structural power causes female CEOs to lower financial leverage, substantial prestige power causes female CEOs to increase financial leverage. This consistently observed effect suggests that female CEOs who attended prestigious universities and, consequently, gain status and power as a result of the symbolic nature associated with those institutions, have become more confident and risk tolerant. This might also explain why female CEOs *may* not be a good representation of the average female population (Ragins & Sundstrom, 1989). Moreover, while proposing the hypotheses, the premise was that the power dimensions simply cause a similar effects (i.e. strengthening of imposed preferences) yet it appears that the power dimensions relate differently to leverage and gender. In sum, hypothesis 1 is partly supported by the findings for structural power but not for prestige power. A priori it was not evident that different power dimensions interacted with gender affected financial leverage differently, which is an interesting complementary finding.

These observations are robust against a modest approach that identified no self-selection biases. Furthermore, the results remained consistent for the FE and during other specifications of some control variables as well as nonlinearity. Unfortunately, I am not able to formally rule out that time-varying omitted variables are driving the results.

6.1.2 *CEO age, leverage, and the moderating impact of power*

The second subquestion was concerned with the relationship between CEO age, leverage, and the potential moderating effect of power. A priori, it was not evident as to whether older (younger) CEOs preferred more or less financing. Specifically, on the one hand, younger managers may act more conservative and risk-averse because of their shorter track-record, smaller number of achievements, and the fact that they are more scrutinized by the labor market compared to older CEOs (Hirshleifer & Thakor, 1992). These conservative tendencies would cause younger CEOs to use lower levels of debt. However, on the other hand, it has also been argued (e.g.: Prendergast and Stole, 1996; Serfling, 2014) that older CEOs value financial security whereas younger CEOs, early in their ca-

reers, make more, bolder, and risker financing decisions (i.e. more leverage). Similar as with gender, since decisions are made by the whole TMT (Hambrick & Mason, 1984), a young/old CEO with low influence is not able to influence leverage in such a way that conforms his/her preferences. As a result, since the direction was a priori not evident, I developed two dueling hypotheses such that, conditional on having accumulated sufficient power, older CEOs, compared to younger CEOs, manage firms with higher (lower) levels of leverage.

The results for age again show contradicting effects depending on the power dimension. On the one hand, ownership power is positive when interacted with age while, on the other hand, structural power interacted with age is negative. Regarding ownership power, these results support the prediction that powerful young managers are able to impose their conservative preferences since they might be more scrutinized for risks taken by the labor market, for instance. So too, the results also provide support for the theoretical prediction that older managers engage in "legacy building" increasing debt to engage in more bad projects (Zwiebel, 1996). Regarding structural power, the results support the prediction that younger CEOs are bolder and willing to take risks (Serfling, 2014) as well as Hambrick and Mason (1984)'s argument of old CEOs favoring stability and security (i.e. lower leverage for old CEOs). In sum, hypothesis 2a and 2b are both supported. That is to say, the findings for ownership power support the prediction that, CEO's accumulated power will strengthen the imposed effects of conservatism and risk-aversion such that a younger CEO will be associated with less financial leverage as power increases (hypothesis 2a). In contrast, the findings of structural power support the prediction that, CEO's accumulated power will strengthen the imposed effects of exaggeration and risk-tolerance such that a younger CEO will be associated with more financial leverage as power increases.

These observations are robust against a modest approach that identified endogenous self-selection using PSM. Yet, the DiD did not find any significant differences. Furthermore, the results are insignificant for the FE but significant for the instrument variable approach (2SLS) approach that uses appropriate instruments to deal with endogeneity issues.

6.1.3 *Financial expert CEOs, leverage, and the moderating impact of power*

The third subquestion was concerned with the relationship between functional experience in finance and how this affects leverage when moderated by power. The basic argument was as follows. Functional experience has been found to be important for financing decisions (e.g.: Frank and Goyal, 2007; Custódio and Metzger, 2014), however directional predictions are lacking in the literature. As a result, I hypothesized that functional experience is significant without specifying a direction which is reasonable when a direction is not well determined by theory (Wooldridge, 2015). Thus, in short, conditional on having accumulated decision-making power, there will be a significant difference in leverage for firms managed by CEOs with experience in finance compared to firms managed by CEOs without experience in finance.

As suggested by Custódio and Metzger (2014), the results show that controlling for education is important to establish some form of causal effect between functional experience and leverage moderated by power. First, there is some statistical support for the negative interaction between ownership power and financial expertise. Second, there is

some statistical support for the positive interaction between structural power and functional experience. Yet, due to a lack of economic theory, it is unclear why these effect are negative and positive, respectively. Similar to gender, based on the PSM and DiD approaches, the effect of functional experience does not appear to be caused by self-selection endogeneity. Though, the FE for the reduced sample is not consistent in its results. Similar as with gender and age, the FE all result in models with lower explanatory power, implying that accounting for unobserved heterogeneity does not add significant additional explanatory power to the models (Wooldridge, 2015). In sum, the results offer minor support for the interaction between functional experience and structural power which, therefore, provides minor support for hypothesis 3. Yet, similar as with gender, I cannot formally rule out that the results are driven by unobserved time-varying variables. Arguably, more theoretical work is required to understand the motives of financial expert CEOs and their financial leverage preferences.

In conclusion, CEO power appears to be an important moderator for the relationship between various inherent CEO US. In fact, CEO power appears to be more complex than initially presumed based on the different, sometimes contrasting, effects among the various power dimensions. Indeed, more theoretical and empirical research is needed to further investigate the different effects for the power dimensions and to understand their implications. Following previous research (e.g.: Veprauskaitė and Adams, 2013) this study used loadings with eigenvalues greater than 1 which allowed investigation of the different dimensions. These differences imply that previous studies that only maintained 1 component (e.g.: Li et al., 2017) may have missed important aspects of decision-making power. While there are some interesting findings presented in this thesis, there are also some limitations and shortcomings.

6.2 LIMITATIONS

First, the sample size in this study is fairly small compared to other studies (e.g.: Frank and Goyal, 2007; Huang and Kisgen, 2013; Custódio and Metzger, 2014; Faccio et al., 2016) of CEO characteristics which often have over 15,000 observations. Having to hand-collect all CEO-specific information simply reduced the feasibility of acquiring a larger sample size. Second, as alluded to in the Chapter 1, the US is an interesting cultural and institutional context yet it is only a single context. To put it differently, while results may be generalized to a broader group of large listed firms from the United States, predictions can certainly not be made for other countries due to differences in both cultural and institutional contexts. Third, by solely focusing on the CEO I made an implicit assumption regarding the power distribution in the upper echelons. Yet, various authors (e.g.: Frank and Goyal, 2007) have argued that the CFO might also be important, especially for the financial decisions. Fourth, this study focuses solely on capital structure outcomes. That is to say, the actual finance decision (e.g.: debt or equity issuances) is not further investigated[1]. Fourth, most empirical studies on CEO power focus on structural power and ignore the other dimensions put forth by Finkelstein (1992). The different effects of the power dimensions does, therefore, not have strong theoretical arguments. Furthermore, while I modestly used multiple power dimensions, it would have been better if more

1 Dr. Huang suggested it would be interesting to also look at the financing such as debt/equity issuances yet, having studied the Orbis database, not much data was available on the issuances.

indicators per dimensions could have been found. For instance, while prestige power is mainly characterized by attendance at elite universities, other prestige power indicators such as the number of corporate board participation, the amount of nonprofit boards, and average board rating (Finkelstein, 1992). More of those indicators would more accurately represented the prestige power dimension described in Finkelstein (1992). Fifth, Adams et al. (2005) single power indicators such as founder-status, Bebchuk et al. (2011) and Chintrakarn et al. (2014) use a single indicator (i.e. CEO's relative pay slice) and argue that this continuous variable proxies for various CEO power indicators, Li et al. (2017) transforms all indicators to dichotomous variables and then uses an average as power indicators, and Veprauskaitė and Adams (2013), Li et al. (2017), and this thesis use principal component analysis to combine the power indicators into an index. These inconsistent ways to operationalize power make comparing and contrasting results more problematic. Lastly, this thesis was only able to control for effective governance in a modest way and not for other TMT characteristics. Thus, the results may not have been driven by inherent CEO characteristics being imposed on the capital structure by using power, but simply a skewed presence of that particular inherent CEO characteristic in the TMT.

6.3 FRUITFUL AVENUES FOR FUTURE RESEARCH

Lastly, some directions for future research. First, future research may examine preferences of financial expert CEOs and whether those preferences are, in fact, statistically different from non-financial expert CEOs. Likewise, future research could put more focus on the other power dimensions (i.e. prestige, ownership, and expert power) and develop stronger economic theory as to how these dimensions are similar or different in corporate decision-making. Specifically, more research should focus on uncovering why different power dimensions result in different leverage effect. Are the imposed preferences not only related to specific inherent characteristics but do power dimensions also cause motives and preferences for changing the capital structure? Second, this study can be extended to other cultural and institutional settings to see how the relations found in this study differ between countries. This may be especially interesting since power and culture are, arguably, closely related and handled differently within the established cultural values and norms. This study could also be repeated in the US with a larger sample size to find out whether the results remain in the 95% confidence interval presented in this study. Third, future research may take a closer look at the interplay between various governance mechanisms in relation to the accumulation/decrease of CEO power. Lastly, research at actual firms may uncover to what extent decision-making power causes asymmetry and the imposition of CEO's preferences. For instance, due to data limitations I could not control for other TMT inherent characteristics, thus the results may simply reflect a TMT mainly staffed by female executives, which would wrongly be contributed to the CEO using her power.

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APPENDICES

A

LITERATURE REVIEW

A.1 WHY FIRMS MAY FORGO POSITIVE NET PRESENT VALUE PROJECTS

To illustrate why firms may forgo positive net present value projects, consider the following *simplified* example based on Myers and Majluf (1984). Consider a three-period model ($t = 1, 2, 3$). At time $t = 1$ and $t = 3$ all information between managers and outside investors is common knowledge[1]. At $t = 2$ management receives information on the value of the firm's assets-in-place (a) and the net present value of the investment opportunity (b). Then, the firm's value (V) at $t = 1$ is the sum of internal funds (S) and the *expected* value of assets-in-place ($E(a)$). Also, the firm has some internal funds but insufficient to fully fund the new investment opportunity, i.e. $0 \leqslant S < I$.

If the project is accepted, depending on the amount of internal funds[2], an amount of equity (E) has to be issued. The amount that has to be issued is equal to the investment requirement less the current internal funds ($I - S$). When equity is issued and the project receives the investment, the new market value is V^*. As a result, according to the model of Myers and Majluf (1984), current shareholders will only issue equity, make the investment decisions, and benefit when: $E/(V^* + E)(S + a) \leqslant V^*/(V^* + E)(E + b)$. In words, the share of existing assets and financial slack going to new investors should be less or equal to the share of increment to firm value obtained by the *existing* shareholders (Myers & Majluf, 1984).

Ultimately, the main implication of the model is that equity issues reduce the share price. Specifically, the value of the firm (V), before the issue-invest decision, is equal to the internal funds (S) and the expected value of the assets-in-place ($E(a)$), which only becomes common knowledge at $t = 3$. Observing the inequality makes evident that certain value expectations do not fall in the region that results in the issue-invest decision. That is, realizations where the value of assets-in-place exceed the new market value minus internal funds ($a > V^* - S$). In fact, $E(a)$ must exceed $V^* - S$ because $E(a) = V - S$ hence $V - S > V^* - S$ and $V > V^*$ in order for $V > V^*$ share price must fall.

A.2 HOW THE CAPITAL STRUCTURE CAN BE USED AS SIGNALING MECHANISM

What follows is a simple illustration of Ross (1977)'s model which depicts how the capital structure can be used as signaling mechanism. Consider a world with two types of firms: high quality firms (H) and low quality firms (L), with high returns (h) and low returns (l), respectively. Assume that a firm is of high quality with probability p and of low quality with probability $1 - p$. Furthermore, the returns are such that high quality firms have higher returns than low quality firms, i.e. $h > l$. If investors cannot distinguish between

1 Formally, a particular fact is said to be common knowledge between different individuals if each individual knows the fact, each individual knows that the others know the fact, each individual knows that every other individual knows that each individual knows the fact, and so on.

2 Myers and Majluf (1984) refer to this as "financial slack", internal funds set aside for potential investment opportunities

type H and L firms, then, value at the beginning of the period (V_0) is simply the sum of the probabilities times the returns discounted at an appropriate discount rate (r). Thus, investors derive an aggregate value, depreciating the value of high quality firms and appreciating the value of low quality firms. In order to break out the type of quality, Ross (1977) introduces the face value of debt (D) and a corresponding bankruptcy penalty (L). Furthermore, in order to entice managers to signal the quality of the firm, Ross (1977) uses a manager-payoff model that rewards managers when the level of debt is less or equal than the value of the firm, and punishes managers with a penalty (L) when debt exceeds firm value.

Next, let D^* be the critical level of financing such that $l \leqslant D^* < h$. Accordingly, when $D > D^*$ the market extrapolates that the firm is of high quality and when $D \leqslant D^*$ the market perceives the firm to be of low quality. Then, the value of a high quality firm and a low quality firm are $V_0(D^H) = h/(1+r)$ and $V_0(D^L) = l/(1+r)$, respectively. Now that the basic model is explained, two scenarios can be described for the high and low quality firm, each. First, the high quality firm sets D^H larger than D^* but lower than h ($D^* \leqslant D^H < h$), or, the high quality firm sets $D^H \leqslant D^*$. Conversely, for the low quality firms, the two options are to set D^L larger than D^* or set D^L lower than l and D^*. As a result, depending on the decision, the managers have the following payoffs.

On the one hand, since $h > l$ it is clear that the manager of a high quality firm maximizes his/her payoff by setting $D^H > D^*$ and $D^H < h$. This decision is strictly better and will, therefore, be played by a *rational* manager. Thus, the managers of high quality firms will signal that the firm is of high quality as there is an incentive to do so. On the other hand, for managers of low quality firms it is different. The managers of low quality firms will signal that the firm is of low quality when the marginal payoff of sending a false signal is less than the incurred bankruptcy penalty at $t = 1$. The more elaborate model by Ross (1977) weights these payoffs and penalties and, hence, explains that there are multiple equilibrium for low quality firms.

A.3 WHY INCREASED PROBABILITY OF LIQUIDATION DECREASES PRICES

With respect to the model of Titman (1984), consider a situation where someone wants to buy a personalized sports car from car manufacturer ABC which, based on historical data and thorough analysis, appears to be on the verge of bankruptcy (i.e. there is a high probability of liquidation). Because the purchased car is 'specialized', spare parts are rare and expensive to procure from other manufacturers. The premise in this example is that the maintenance of specialized cars is expensive but since manufacturer ABC has economies of scale, (maintenance) services can be supplied relatively inexpensively. However, since customers observe the high probability of liquidation before the procurement of the car, prices will drop since rational customers would demand lower prices to compensate for the expected increase in maintenance cost in case of liquidation.

A.4 HOW THE CAPITAL STRUCTURE IS USED TO FEND OFF CONTROL CONTESTS

What follows is a simplification of Harris and Raviv (1988)'s model. Consider an all-equity financed firm, managed by an owner-manager (who enjoys benefits from being in control) and other *passive* shareholders. That is, shareholders who are not interested

in initiating a control contest. Furthermore, there is a rival firm contesting control. The amount of value the owner-manager or, if the takeover is successful, the rival can create, depends on their *unobservable* abilities which are either high or low. Note, it is common knowledge that one has high ability and the other low ability. When the rival first appears, the owner-manager changes the relative fraction of voting shares by adjusting the capital structure[3]. Next, the rival buys shares from the passive shareholders, requiring a majority to win the takeover attempt.

Having described the workings of the model, three outcomes can be described. First, the manager has low ability but a large fraction of the voting shares and, hence, the tender offer is *unsuccessful*. Second, the manager's fraction of voting shares is so small that even rivals with low ability are able to take over the firm. Lastly, the manager's fraction of voting shares are intermediate and a proxy contest starts in which the best candidate, the one with the highest ability, wins. Thus, the value of the firm is determined by the fraction of voting shares held by the owner-manager because it effects which of these cases prevails (Harris & Raviv, 1991).

A.5 Illustration of capital structure as game theory model

The strategic game underlying the model specifies two stages. In the first stage firms make capital structure decisions, followed by decisions regarding the output strategy (i.e. how much to produce conditional on the capital structure chosen in stage one). A random event, representing uncertainty in the environment, depicts the (mis-)fortune of the firms[4]. The model, then, has two main outcomes. First, when debt levels change, the returns to shareholders also change resulting in distinct output strategies. In particular, states of misfortune become irrelevant and shareholders would want to produce as much as possible because debtholders are now the residual claimants (i.e. "all-or-nothing" strategy). The second outcome is described as the "strategic bankruptcy effect" (i.e. predatory use of debt, where firms drive rivals in state of bankruptcy by using debt to "out-produce" the competition).

A.6 Detailed treatment of institutional context

What follows are various institutional factors that illustrate why the results of a single institutional context cannot simply be generalized to other institutional contexts.

Bond market development

The development of the bond market differs across countries and can influence capital structure decisions in various ways. For instance, a bond market that is less developed may constrain firms that require external financing leading those firms to use equity instead. Conversely, developed bond markets may provide avenues for a variety of dif-

3 The idea is that owner-managers could issue debt to buy back equity from the passive investors.

4 The game is specified as a Cournot game, hence, profits are a function of firm i's produced quantity, firm j's produced quantity and the random variable z (the (mis-)fortune) for firm i. The z causes firms to be in either one of two states. State one is a state where producing more results in greater profit variance. State two is a state where producing more lowers risk but firms financed with debt reduce output because bankruptcy can be declared in this state.

ferent bond instruments which stimulates the use of debt financing. Thus, bond market development can be considered a relevant determinant for explaining why financing decisions differ across countries (Rajan & Zingales, 1995).

Faulkender and Petersen (2006) use credit ratings as proxy for bond market accessibility and find a statistically significant positive relation between a firm's credit rating and the level of debt. Furthermore, Frank and Goyal (2009) argue that firms with credit ratings undergo thorough analysis to determine credit worthiness and, as a result, face less adverse selection problems. Accordingly, such firms should use less debt and more equity (Myers & Majluf, 1984).

Furthermore, De Jong, Kabir, and Nguyen (2008) analyze 11,845 firms over 42 countries between 1997 and 2001 and also find consistent evidence in support of the positive relation between bond market development and leverage. Their measure of bond market development entails the total bond market capitalization over gross domestic product, averaged through 1997 to 2001. Moreover, when creditors enjoy strong legal protection, debt may be regarded as more risky. A negative relation, correspondingly, is observed between leverage and creditor right protection (De Jong et al., 2008).

In contrast, using a similar measure, Kayo and Kimura (2011) find a statistically significant negative relation between bond market development and leverage in both the emerging and developed country sample. Yet, the change in sign may be contributed to high multicollinearity between bond market development and creditor protection. De Jong et al. (2008) include creditor right protection while Kayo and Kimura (2011) do not. The inclusion of variables that are highly collinear can change the signs of independent variables. Lastly, Kayo and Kimura (2011) find evidence in support of the prediction that tangibility is less important when the bond market is more developed.

Stock market development

Like bond market development, stock market development can also explain variation between capital structures across countries. In countries where the stock market is more developed, the supply of capital is larger which lowers the cost of equity (Kayo & Kimura, 2011). Naturally, firms operating in countries with developed stock markets may be more inclined to use equity financing, all else equal. Both De Jong et al. (2008) and Kayo and Kimura (2011) find statistically significant negative relations between stock market development and leverage, consistent with the prediction that stock market development facilitates equity financing.

Interestingly, while Kayo and Kimura (2011) find a statistically significant negative relation for the full sample and sample of emerging countries, the sample with developed countries shows a positive sign. Therefore, they propose a fruitful avenue for future research to examine whether the stock markets in developed countries have reached their "limit", causing firms to increase leverage to maintain their investment projects.

Market- and Bank-oriented countries

Financing decisions can also be the results of a country's financing origins. Firms operating in countries that are market-oriented (e.g.: United States, United Kingdom) may be more inclined to use equity financing compared to firms operating in countries with

bank-oriented origins (e.g.: Japan, Germany, France), which may be more likely to use debt financing. Results of Rajan and Zingales (1995) suggest that this distinction is not significant enough to explain capital structure variation across countries. Other studies also document zero effect regarding the market- and bank-oriented distinction (De Jong et al., 2008; Kayo & Kimura, 2011). Some of these insignificant findings may be attributed to the fact that banks, in bank-oriented countries, provide both debt and equity (Rajan & Zingales, 1995).

Macroeconomic conditions

Arguably, during times of expansion, firms are more inclined to borrow because stock prices go up, costs of financial distress go down, and taxable income and cash holdings increase (Frank & Goyal, 2009). Also, as predicted by the model of Zwiebel (1996), leverage should decrease when the market is growing, and increase when the market is declining. Though, economic expansion also allows firms to rely more on internal financing, which allows them to avoid adverse selection as a result of asymmetric information and reduces the need for external finance.

Consistent with the first prediction, De Jong et al. (2008) and Frank and Goyal (2009) find a statistically significant positive relation between gross domestic product and leverage. These results support the theoretical prediction that firms are inclined to borrow more. In contrast, consistent with the latter theoretical prediction, Kayo and Kimura (2011) document a statistically significant negative relation in the full sample and sample comprising developed countries. Thus, empirical support is found for the prediction that firms can rely more on internal financing in times of economic prosperity.

Inflation is another macroeconomic condition that can influence capital structures and financing decisions because inflation increases the value of the tax shield (Frank & Goyal, 2009). However, as argued for, and supported by Antonczyk and Salzmann (2014), who study 23,815 firms from 42 countries, inflation can also increase the real taxes in non-linear tax systems.

Cultural values

Complementary to the idea that capital structures reflect values and cognitive bases of powerful actors in the firm is culture. For instance, Chui et al. (2002) study 5,591 firms over 22 countries and find conservative societies to be less likely to issue debt[5]. They posit three possible explanations. First, conservative societies emphasize *harmony* within, and between firms, and tend to behave according to the interest of the group. As a result, these societies have less severe agency problems, and use less debt financing. Second, conservative societies are concerned with the public image. High financial leverage increases the probability of bankruptcy which is regarded as a sign of losing public image. Firms in those societies, therefore, use less debt financing. Lastly, conservative societies

5 Chui et al. (2002) use the cultural dimensions of Schwartz which include: (1) conservatism refers to values concerned with security, conformity, and tradition; (2) intellectual and affective autonomy refers to values as individuality, autonomy, self-direction, and hedonism; (3) hierarchy refers to the legitimacy of hierarchical roles; (4) mastery refers to peoples tendency to change their surroundings and get ahead; (5) egalitarian values refer to the transcendence of selfish interests; and (6) harmony vales the harmony with nature.

value security, conformity and tradition, resulting in inherently more risk-averse societal members which results in less debt financing and more equity financing.

Societies that value *mastery* are more likely to use equity (Chui et al., 2002). Firms operating in countries with high mastery are more willing to use aggressive policies because managers want to show what they are capable of and create opportunities to "*get ahead*". That is to say, managers do not want to be restricted by debt covenants (Chui et al., 2002). Thus, conservative societies and societies whom value mastery use less debt financing. Chui et al. (2002) show robust empirical evidence in support of these predictions, robust after controlling for industry effects, differences in economic performance, legal system, development of financial institutions and other firm-specific determinants.

In addition, Antonczyk and Salzmann (2014) find a statistically significant negative relation between in-group collectivism and leverage. Countries with strong *individualism* tend to use more leverage. Also, since the in-group collectivism is a proxy for overconfidence, societies that exhibit overconfidence have more levered capital structures. These findings are consistent with the findings of Fauver and McDonald (2015). Importantly, corporate governance mechanisms can mitigate cultural influences and larger firms are less likely to be influenced by cultural values than smaller firms (Fauver & McDonald, 2015). On a finale note, while culture is evidently important, none of the reviewed studies elaborate nor incorporate the fact that some large firms have an own firm culture that may also mitigate the national cultural effects.

A.7 STRUCTURING MANAGERIAL CONTRACTS

In this model, management has two investment opportunities with three potential outcomes each of which requires an initial investment (I). First, management can decide to invest in a *risk-less* project with payoff (I) (i.e. a zero net present value project since investment and payoff are equal). Second, management can decide to invest in a *risky* project with probability q of a high payoff (H) and probability $1-q$ of a low payoff (L), where $H > I > L$. Furthermore, if the manager decides to take the risky project and the outcome is L, the manager's salary (S) is reduced by a penalty (ψ). The manager would only invest in the risky project if $qS + (1-q)(S-\psi) \geqslant S$. This exposition shows that mangers would always be better off investing in the risk-less project because under no possible scenario of q will the manager be *strictly* better off investing in the risky project.

Then, in order to align incentives, managers are offered, in addition to their salary (S), a proportion of the equity payoff (α). Furthermore, debt is issued with a fixed payment (F) such that $I > F > L$. As a result, managers will invest in the *risky* project if $(1-q)(S-\psi) + q(S+\alpha(H-F)) \geqslant S + \alpha(I-F)$. First, note that the fixed interest payment (F) only results in a payoff for the manager when the outcome of the risky project is high (H). It follows, then, that the optimal contract, given the three possible outcomes, is the sum of salary (S) and the equity proportion of returns less the expected penalty costs which depends on the outcome of the risky project. In the end, the model shows that managerial compensation contracts should be structured in a way that considers both agency costs of debt and agency costs of equity[6].

6 There are other alternative mechanisms that control the agency costs of different external claims. For example, direct monitoring by external claimants (e.g.: banks), debt covenants which constrain investment decisions, regulatory supervision, other fancy securities, and reputation effects (John & John, 1993).

A.8 OTHER CEO CHARACTERISTICS DESCRIBED IN THE UPPER ECHELON THEORY

What follows is a brief description of other characteristics mentioned in the seminal paper of Hambrick and Mason (1984) that are not directly relevant for this thesis.

Socio-economic group

The fifth observable demographic indicator is manager's socio-economic background (e.g.: ethnicity, religion, economic classes such as middle-class or upper-class). Hambrick and Mason (1984) explain that little attempts have been made to link socio-economic background to particular strategies, let alone financial leverage. The difficulty of socio-economic background is made apparent the study of Channon (1979). Channon (1979) observed that entrepreneurs are likely to come from 'humble' origins while executives of professionally managed firms came from upper-class families. Yet, it was not clear whether ownership (e.g.: entrepreneurial) or the socio-economic background was driving the results.

Career experience

The sixth observable demographic indicator is career experience. Managers that have only worked for a single firm may be limited/constraint in their thinking, steering corporate decisions in conventional directions (Hambrick & Mason, 1984). The upper echelon theory, therefore, argues that top managers with many years of *inside* experience are less likely to explore new areas (e.g.: unrelated diversification), and are more (less) likely to enhance growth and profitability in stable (volatile) environments.

Financial position

The seventh observable demographic indicator is the financial position of top managers (i.e. their wealth). The more total income managers derive from their employment at the firm, the more likely the firm is to increase profitability (Hambrick & Mason, 1984). The argument is that managers may be inclined to pursue non-economic objectives when they have alternative sources of income. This is consistent with Fama (1980)'s idea that managers with a significant portion of their wealth vested with the firm want to reduce firm risk to lower the exposure of their personal under-diversified portfolios.

Team heterogeneity

The final observable demographic indicator is TMT heterogeneity. Heterogeneous TMTs are predicted to make strategic decisions quicker and, in stable (turbulent) environments, team homogeneity (heterogeneity) will be positively associated with profitability (Hambrick & Mason, 1984). The underlying associated concepts, drawn from the sociology literature, is the idea of a 'cohort'. A cohort is a group of individuals that all share a particular year (e.g.: year of birth, year entering the job market) which leads to similar experiences and corresponding values and perceptions (Hambrick & Mason, 1984).

B METHODOLOGY

B.1 REGRESSION MODEL ASSUMPTIONS

B.1.1 *Assumptions for OLS regression*

Described by Wooldridge (2015), the assumptions required for pooled OLS using first differencing are as follows.

I The model in the population can be written as $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k + \epsilon_{it}$ where β_0, β_1, ..., $\beta_k x$ are the unknown parameters of interest and ϵ_{it} is the stochastic error term;

II The sample is a random sample from the cross section;

III The independent variable change over time and there is no perfect correlation among the independent variables;

IV For each year t, the expected value of the stochastic error term, conditional on the independent variables for all years is zero: $E(\epsilon_{it}|X_i) = 0$. The capital X_i represents a vector including all independent variables;

V The variance of the errors, conditional on all independent variables, is constant: $Var(\Delta\epsilon_{it}|X_i) = \sigma^2$ for $t = 1, ..., T$;

VI The stochastic errors are uncorrelated, conditional on the independent variables;

VII Conditional on the independent variables, the differences in the stochastic errors are independent and identically distributed normal random variables.

Under the first four assumptions, the estimators are unbiased. The fifth and sixth assumption ensure the standard errors are asymptotically valid. The seventh assumption ensures a normal distribution such that the t and F statistics have exact distributions. When this is not the case approximations can be used.

B.1.2 *Fixed-effect estimation assumptions*

Based on Wooldridge (2015) and Rabe-Hesketh and Skrondal (2012), the assumptions required for fixed-effect estimation are as follows:

I For each i, the model is $y_{it} = \alpha_i + \beta_1 x_{1it} + ... + \beta_k x_{kit} + \epsilon_{it}$ where $t = 1, ..., T$, where the βs are the parameters to estimate and a_i is the unobserved firm-specific effect;

II The sample is a random sample from the cross section;

III Each independent variable varies over time and there is no perfect correlation among the independent variables;

IV For each year t, the expected value of the stochastic error term, conditional on the independent variables for all years and the unobserved firm-specific effect is zero:

$E(\epsilon_{it}|X_i, \alpha_i) = 0$. The capital X_i represents a vector including all independent variables;

V $Var(\epsilon_{it}|X_i, \alpha_i) = Var(\epsilon_{it}) = \sigma_\epsilon^2$, for all $t = 1, ..., T$;

VI Conditional on the independent variables, the stochastic errors are uncorrelated: $Cov(\epsilon_{it}, \epsilon_{-it}|X_i, \alpha_i) = 0$ where $-i$ refers to an observation that is *not* i;

VII Conditional on the independent variables (X_i) and the unobserved firm-specific effect (α_i) the stochastic errors (ϵ_{it}) are independent and identically distributed as $Normal(0, \sigma_\epsilon^2)$.

As can be seen, the first four assumptions are identical to the assumptions for pooled OLS using first differencing. When these assumptions hold, the estimates are said to be unbiased. Under the first six assumption, the fixed-effect estimation is the *best* linear unbiased estimator. The last assumption has a similar interpretation as the last assumption for pooled OLS using first differencing.

B.1.3 *Two-stage least squares estimation assumptions*

Based on Wooldridge (2015), the assumptions required for fixed-effect estimation are as follows:

I For each i, the model is $y_{it} = \beta_0 + \beta_1 x_{1it} + ... + \beta_k x_{kit} + \epsilon_{it}$ where $t = 1, ..., T$, where the βs are the parameters to estimate and a_i is the unobserved firm-specific effect. The instrumental variables are denoted as π_{it};

II The sample is a random sample;

III There is no perfect correlation among the instrumental variables and the rank condition for identification holds (see Wooldridge (2015, p.552) for more on the rank condition for identification);

IV The stochastic error term has zero mean and is uncorrelated with the independent variable;

V For the collection of instrumental variables (Π) it should hold that $E(\epsilon^2|\Pi) = \sigma^2$;

VI Conditional on the independent variables, the stochastic errors are uncorrelated: $Cov(\epsilon_{it}, \epsilon_{-it}|X_i, \alpha_i) = 0$ where $-i$ refers to an observation that is *not* i;

Under the first four assumptions, the 2SLS estimator is consistent. Under the first five assumptions the estimators are asymptotically normally distributed.

C

DATA

C.1 CEO EDUCATION ALLOCATION

Business-related: business administration, strategy, commerce, marketing, business policy, management development, executive management programs, strategic-, industrial-, public/private-, production-, international-, engineering-, and financial management.

Engineer-related: engineering, industrial-, electrical-, manufacturing-, aeronautical and astronautical-, nuclear-, aerospace-, computer-, chemical-, mechanical-, petroleum-, civil-, metal-, business-, petroleum and environmental-, systems, control and industrial-, polymer engineering, chemistry, mathematics, physics, computer science and artificial intelligence, physical chemistry, reactor technology, foot technology, textile technology, electrical technology, engineering science, and nuclear science;

Other subjects: administrative sciences, political sciences, natural sciences, metallurgy and materials science, science in systems, biology, microbiology, organic chemistry, molecular biology and agricultural zoology, organic chemistry, geology, geophysics, psychology, pharmacy, health care administration, hospital administration, public administration, industrial administration, international relations, industrial and labor relations, industrial relations, pre-medicine, medical doctor, foreign service, operations research, government, public policy, symbolic systems, related support services, English, history, European history, Asian studies, American studies, urban studies, communication, journalism, and (liberal) arts.

Elite universities: Amherst College, Brown University, Carleton College, Columbia University, Cornell University, Dartmouth College, Grinnell College, Harvard University, Haverford College, Johns Hopkins University, Massachusetts Institute of Technology, New York University, Northwestern University, Oberlin College, Pomona College, Princeton University, Stanford University, Swarthmore College, United States Military Academy, United States Navel Academy, University of California (Berkeley and Los Angeles), University of Chicago, University of Michigan, University of Pennsylvania, Wellesley College, Wesleyan University, Williams College, and Yale University (Finkelstein, 1992).

Unclassified universities: University of the Witwatersrand, Milan polytechnic, London University Imperial College, Institut d'Etudes Politiques de Paris, HEC Paris, Gothenburg University, HEC Lausanne, INSEAD, West Midlands College, University of Glamorgan, University college Dublin, University of Western Ontario, Swiss Federal Institute of Technology, University of Montreal, Stockholm School of Economics, University of Rome, University of Eindhoven, University of Nijmegen, University of Waterloo, Glasgow University, Edinburgh University, University of Goettingen, University of Wuerzburg. University of Notre Dame, Institute Maua de Technologica, University of New South Wales, and University of Linkoping.

C.2 DISTRIBUTIONAL GRAPHS AND FIGURES

Figure 11: Distribution of leverage by industry (Fama and French (1997)'s industry classification).

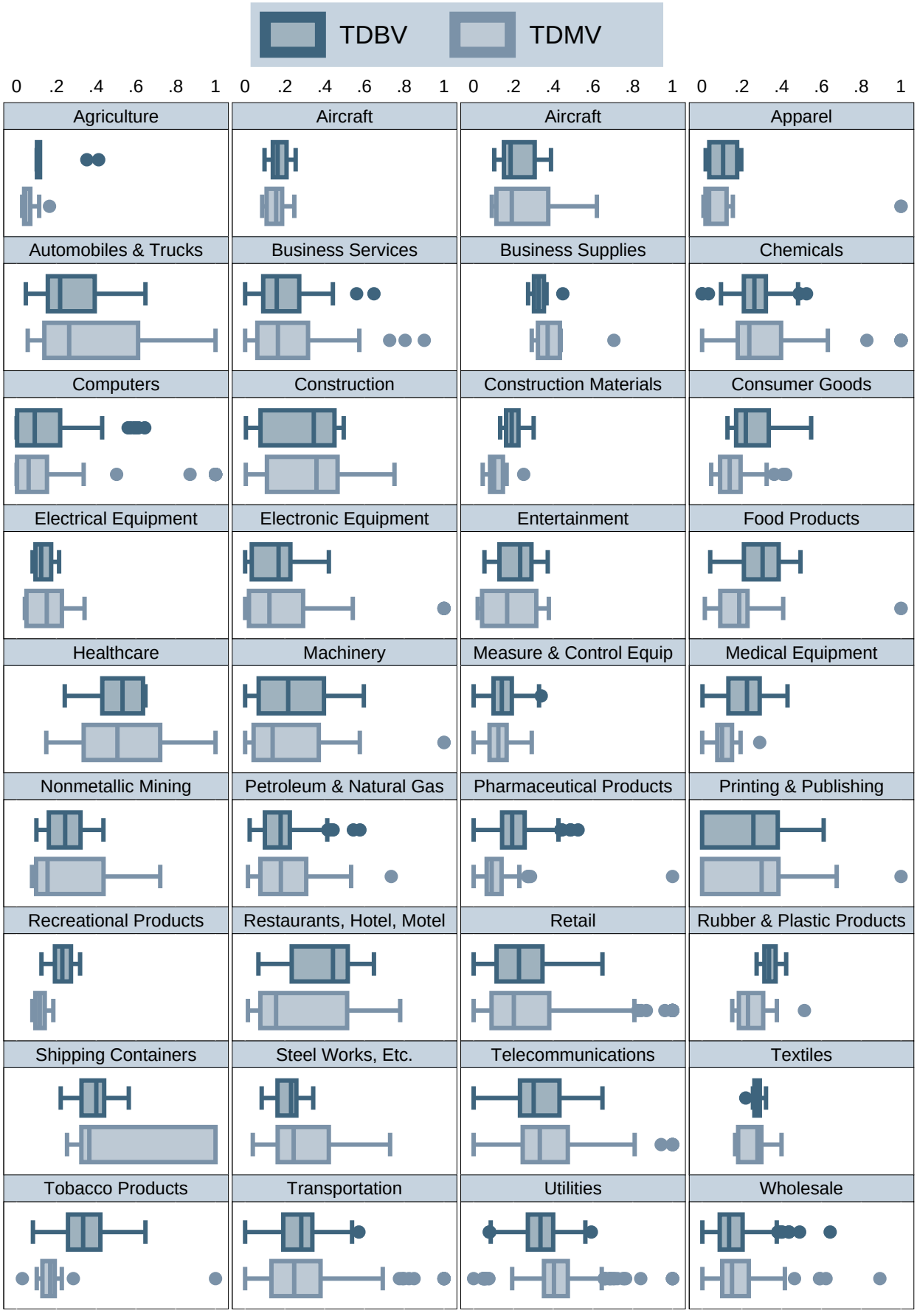


Figure 12: Gender distribution by industry (Fama and French (1997)'s industry classification).

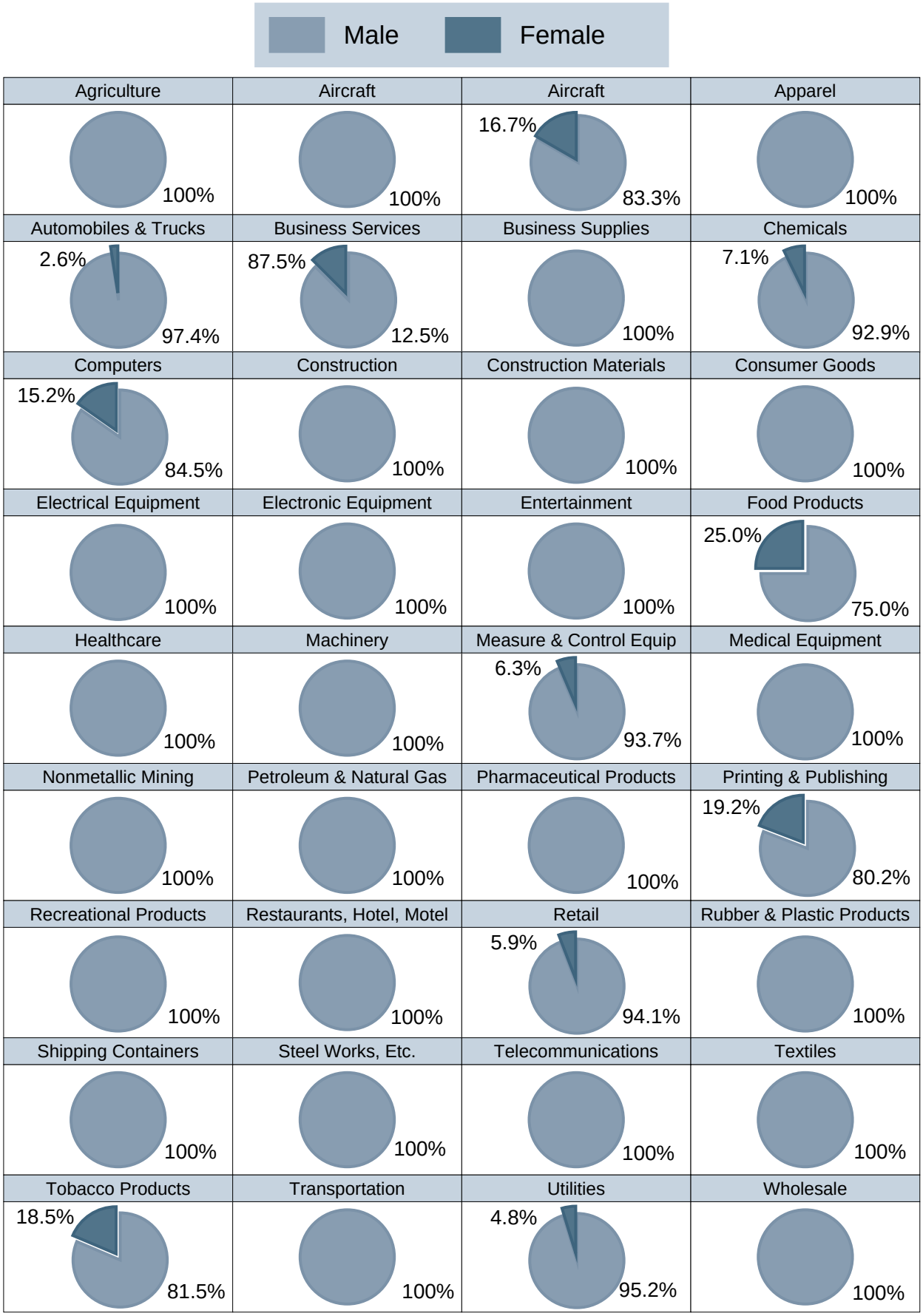


Figure 13: Age distribution by industry (Fama and French (1997)'s industry classification).

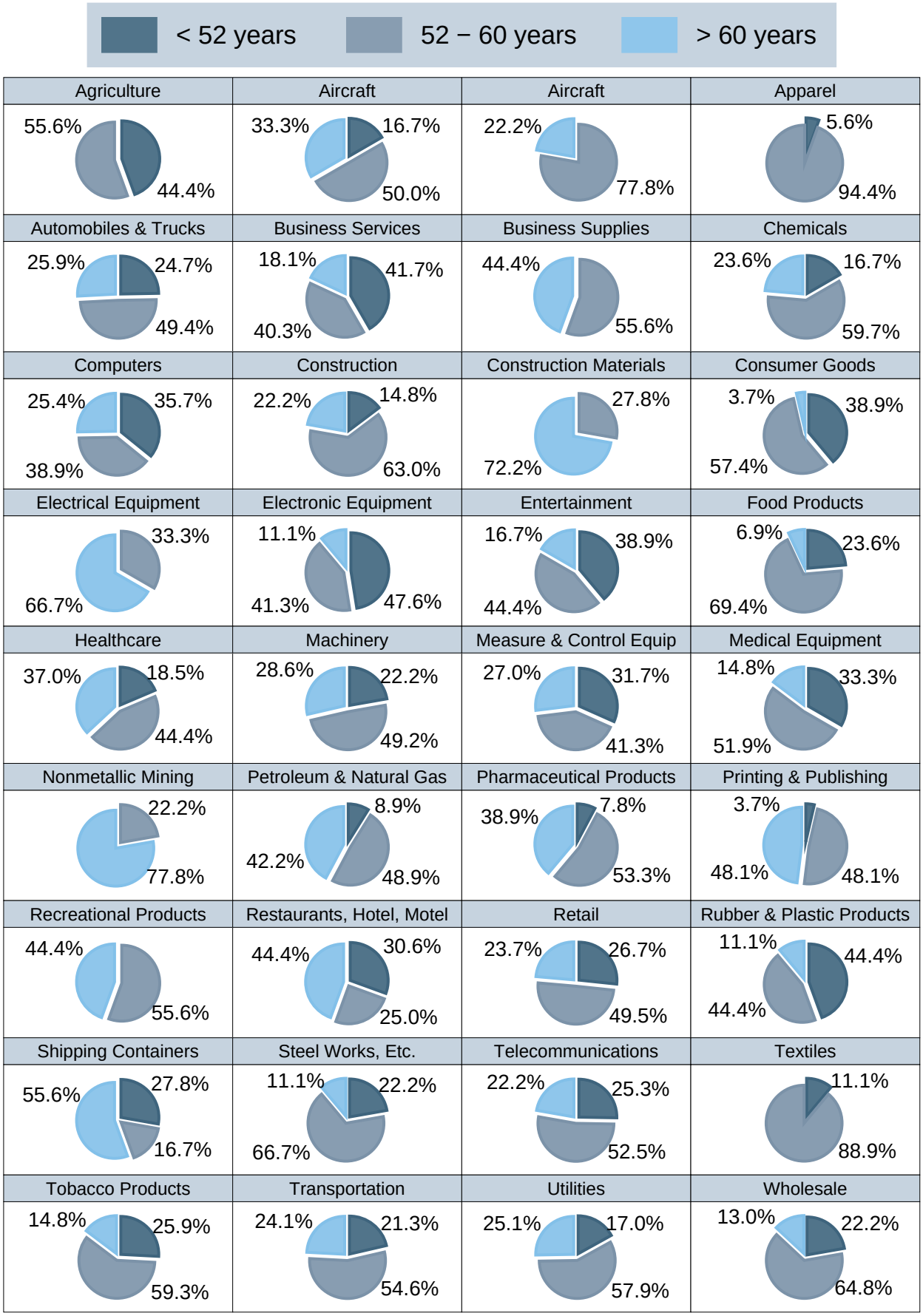


Figure 14: Functional experience by industry (Fama and French (1997)'s industry classification).

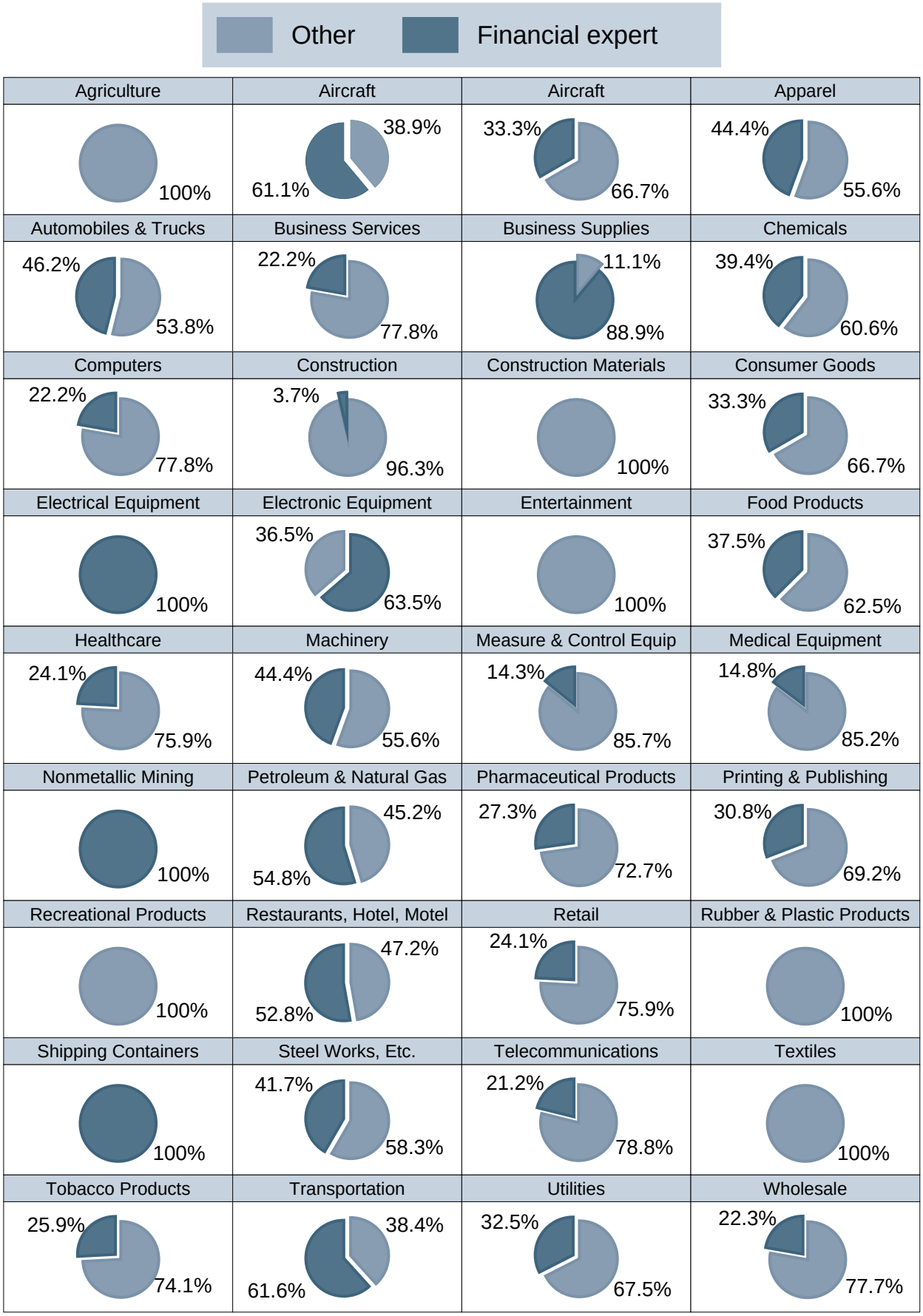


Figure 15: Distribution of book and market leverage by year (2007 through 2015).

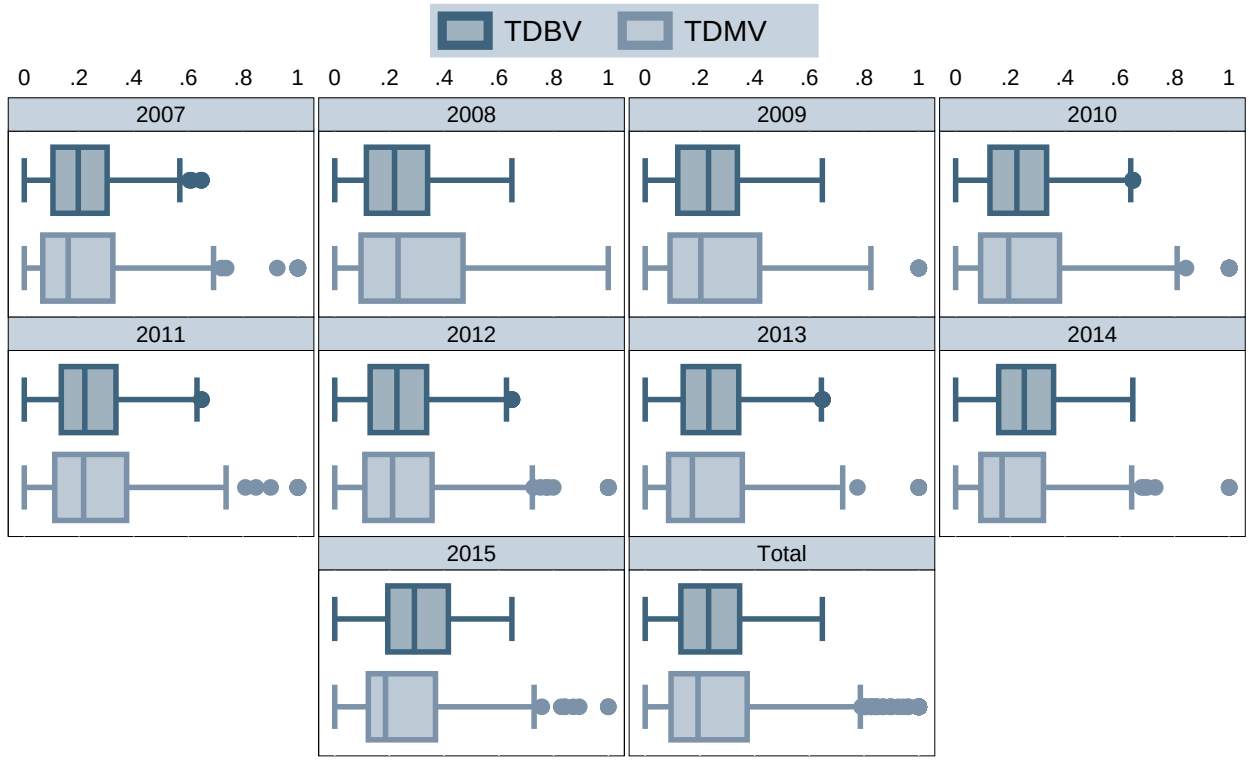


Figure 16: Gender distribution by year (2007 through 2015).

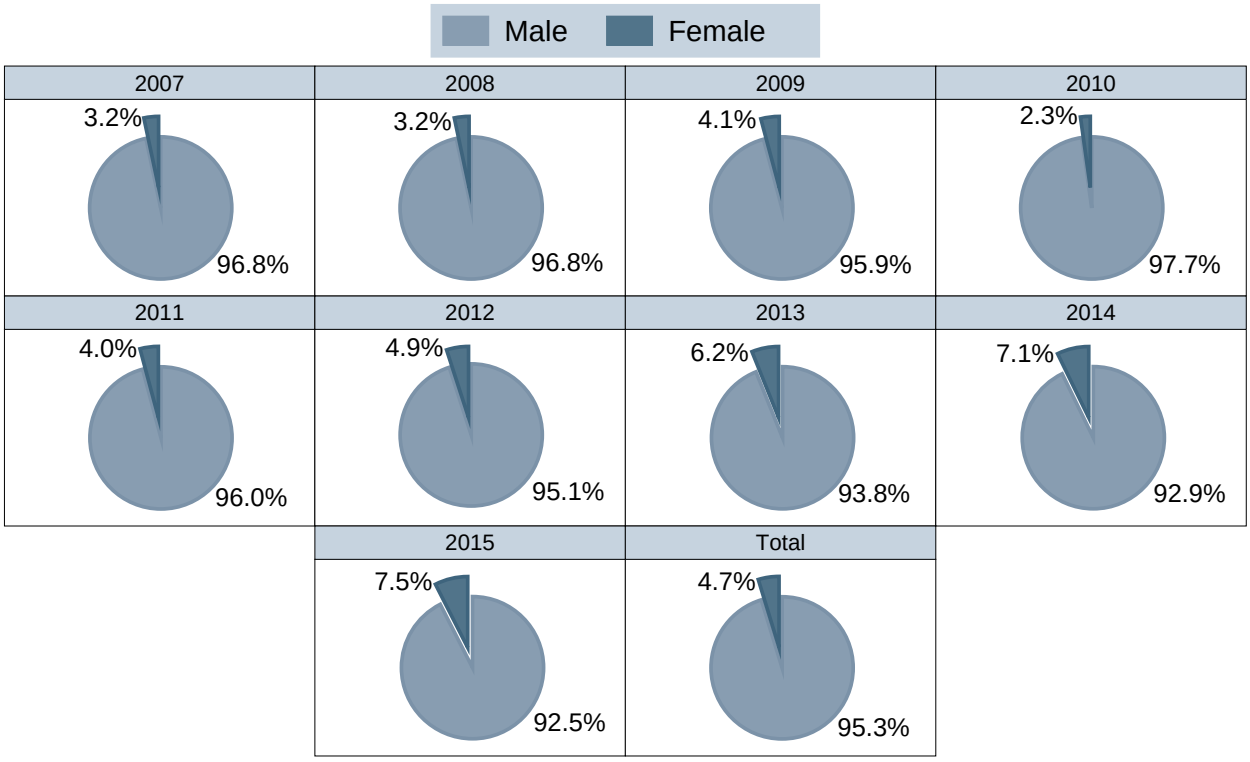


Figure 17: Age distribution by year (2007 through 2015).

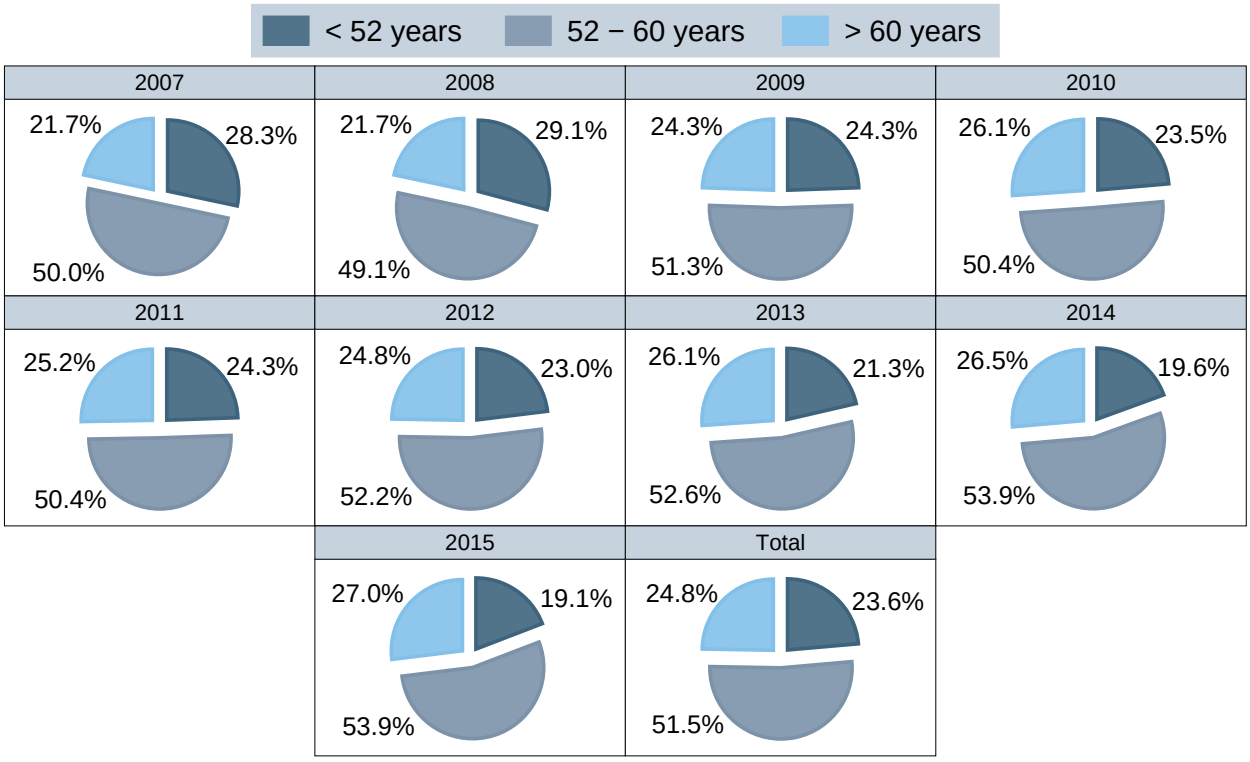


Figure 18: Functional experience distribution by year (2007 through 2015).

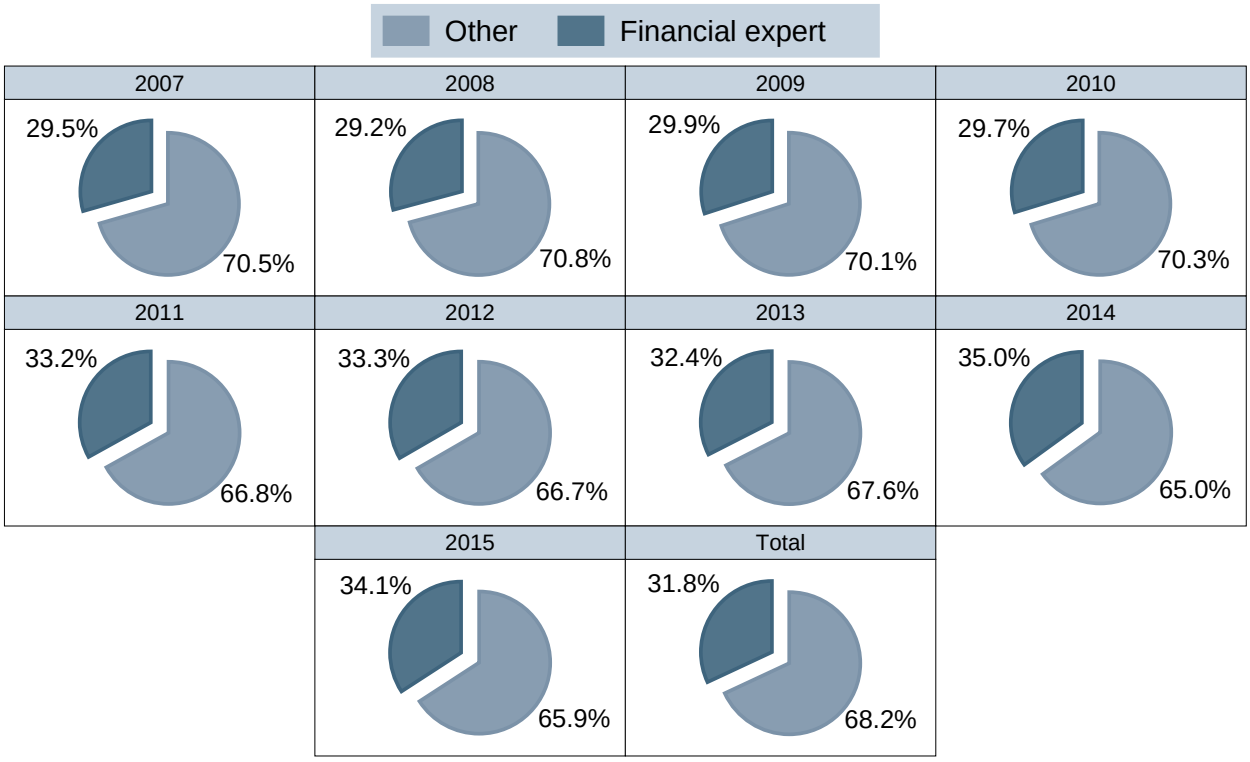


Figure 19: Principal component analysis: Scree plot.

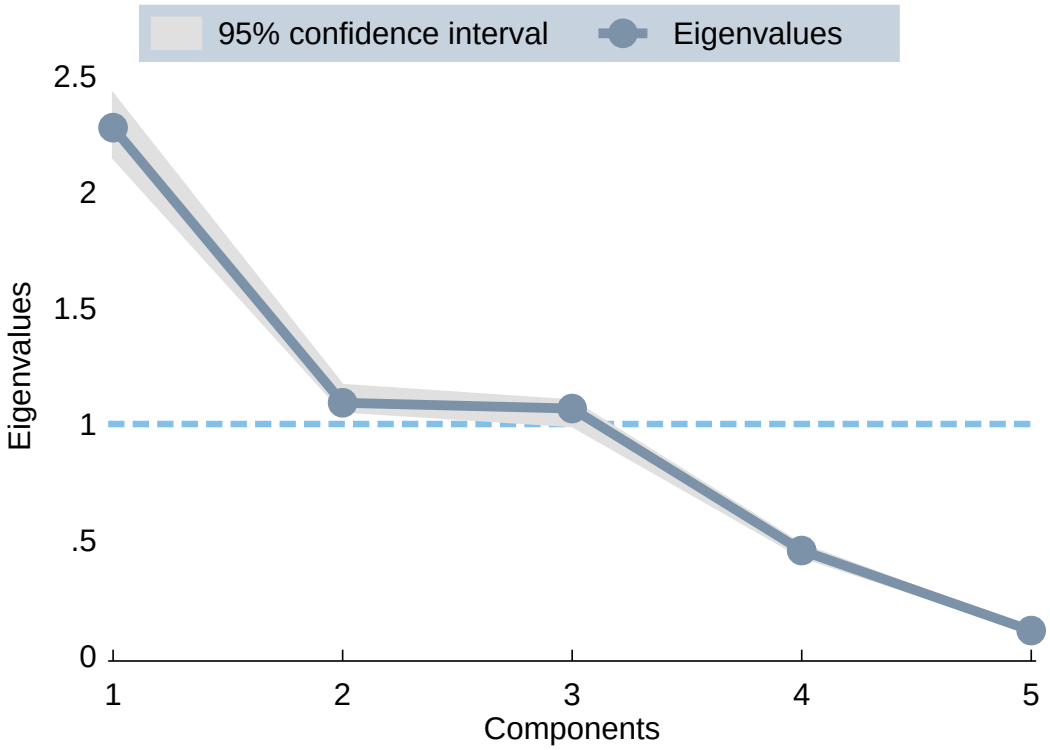
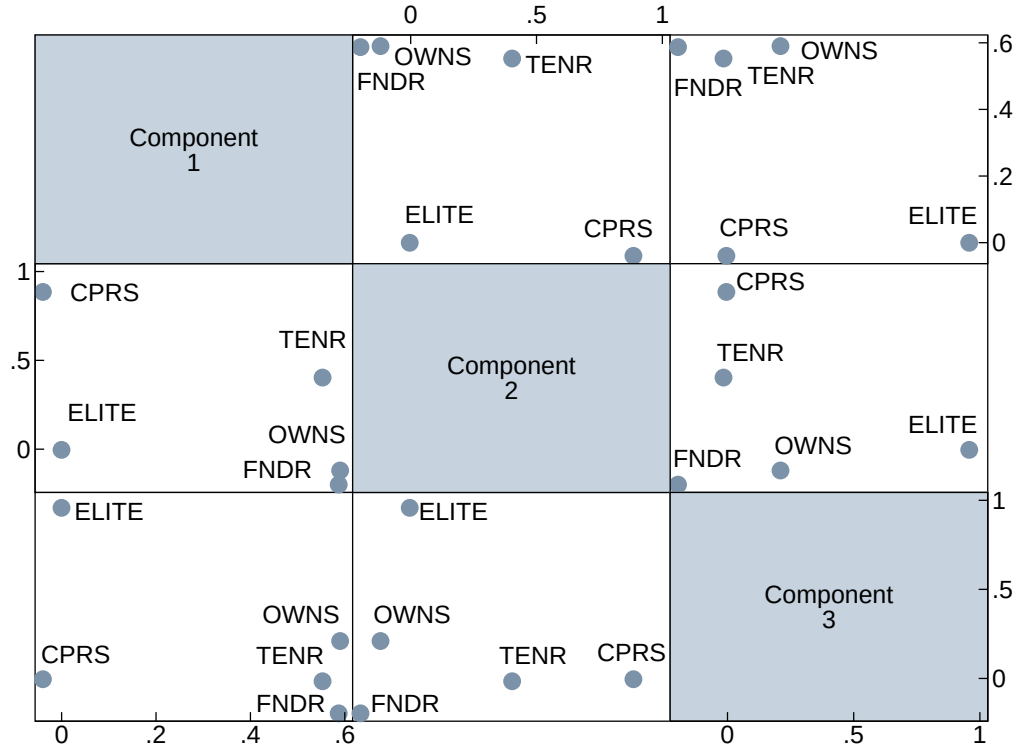


Figure 20: Principal component analysis: Loading plot.



C.3 FIRM BY INDUSTRY DISTRIBUTION

Table 18: Firm by industry distribution.

Industry	Frequency (N)	Proportion (%)	Cumulative (%)
Retail	333	16.09%	16.09%
Utilities	171	8.26%	24.35%
Computers	126	6.09%	30.44%
Wholesale	108	5.22%	35.66%
Transportation	108	5.22%	40.88%
Telecommunications	99	4.78%	45.66%
Petroleum & Natural Gas	90	4.35%	50.01%
Pharmaceutical Products	90	4.35%	54.36%
Automobiles & Trucks	81	3.91%	58.27%
Electrical Equipment	73	3.53%	61.80%
Business Services	72	3.48%	65.28%
Chemicals	72	3.48%	68.76%
Food Products	72	3.48%	72.24%
Machinery	63	3.04%	75.28%
Measure & Control Equipment	63	3.04%	78.32%
Healthcare	54	2.61%	80.93%
Consumer Goods	54	2.61%	83.54%
Steel Works, Etc.	36	1.74%	85.28%
Restaurants, Hotel, Motel	36	1.74%	87.02%
Aircraft	36	1.74%	88.76%
Tobacco Products	27	1.30%	90.06%
Printing & Publishing	27	1.30%	91.36%
Construction	27	1.30%	92.66%
Medical Equipment	27	1.30%	93.96%
Apparel	18	0.87%	94.83%
Construction Materials	18	0.87%	95.70%
Entertainment	18	0.87%	96.57%
Shipping Containers	18	0.87%	97.44%
Textiles	9	0.43%	97.87%
Rubber & Plastic Products	9	0.43%	98.30%
Agriculture	9	0.43%	98.73%
Business Supplies	9	0.43%	99.16%
Nonmetallic Mining	9	0.43%	99.59%
Recreational Products	9	0.43%	100.00%

Notes: Industry classification is based on Fama and French (1997) using first three SIC digits.

C.4 CORRELATION MATRIX

Table 19: Correlation matrix.

	TDBV	TDMV	AGE	FUNXP	GNDR	PWRX1	PWRX2	PWRX3	TANG	ASSET	SALES	GROW	FIND	ROA	ROE	BMET
TDBV	1															
TDMV	0.639***	1														
AGE	0.094***	0.051**	1													
FUNXP	0.124***	0.132***	-0.090***	1												
GNDR	0.000	0.008	-0.032	0.018	1											
PWRX1	0.020	0.059**	0.254***	-0.096***	-0.083***	1										
PWRX2	0.080***	-0.021	0.217***	0.004	-0.005	-0.164***	1									
PWRX3	-0.032	-0.054**	-0.099***	-0.017	0.090***	0.050**	-0.037	1								
TANG	0.219***	0.214***	0.154***	0.179***	-0.062***	-0.057**	0.029	-0.070***	1							
ASSET	0.176***	0.046**	0.050**	0.093***	0.092***	-0.152***	-0.062***	0.087***	0.154***	1						
SALES	0.056**	-0.037*	0.039*	0.061***	0.029	-0.156***	-0.055**	0.009	0.038*	0.819***	1					
GROW	-0.156***	-0.566***	-0.052**	-0.100***	-0.014	0.050**	-0.003	-0.020	-0.177***	-0.099***	-0.064***	1				
FIND	-0.467***	-0.600***	-0.054**	-0.158***	-0.042*	-0.017	-0.006	-0.090***	-0.216***	-0.290***	-0.056**	0.743***	1			
ROA	-0.177***	-0.435***	-0.006	-0.063***	-0.001	-0.040*	0.033	-0.081***	-0.056**	-0.019	0.110***	0.617***	0.656***	1		
ROE	-0.102***	-0.256***	0.000	0.017	0.079***	-0.056**	0.033	0.009	-0.071***	0.109***	0.149***	0.263***	0.284***	0.481***	1	
BMET	0.137***	0.233***	-0.036	0.015	0.165***	-0.106***	-0.076***	0.084***	0.068***	0.152***	0.032	-0.169***	-0.208***	-0.169***	-0.013	1

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The variables are as defined in Table 1.

D

RESULTS

D.1 OTHER TABLES

Table 20: Multivariate linear regression: Decomposition of explanatory power.

Dep. Var: TDBV	(1)	(2)	(3)	(4)	(5)	(6)
GNDR	0.027	0.018			-0.014	-0.026
	(0.019)	(0.025)			(0.021)	(0.024)
AGE_c	0.002**	0.001			-0.001*	-0.000
	(0.001)	(0.001)			(0.010)	(0.001)
FUNXP	0.031**	0.029**				-0.000
	(0.015)	(0.013)				(0.009)
$PWRX1_c$		-0.019				0.001
		(0.026)				(0.021)
$PWRX2_c$		0.071***				0.014
		(0.025)				(0.018)
$PWRX3_c$		0.003				-0.010
		(0.014)				(0.009)
TANG			0.096***	0.089**	0.088**	0.030
			(0.028)	(0.038)	(0.037)	(0.040)
ASSET			-0.017***	-0.008*	-0.009**	-0.015***
			(0.005)	(0.004)	(0.004)	(0.004)
GROW			0.082***	0.074***	0.070***	0.074***
			(0.008)	(0.009)	(0.009)	(0.009)
FIND			-0.084***	-0.076***	-0.073***	-0.076***
			(0.006)	(0.006)	(0.006)	(0.006)
ROA			0.219***	0.230***	0.207***	0.226***
			(0.073)	(0.079)	(0.071)	(0.070)
BMET			0.029**	0.012	0.011	0.007
			(0.013)	(0.012)	(0.011)	(0.011)
Education dummies	No	Yes	No	No	No	Yes
Industry + year dummies	No	No	No	Yes	Yes	Yes
Observations	1,831	1,482	1,735	1,798	1,756	1,430
Adjusted R^2	2.30%	11.85%	46.43%	63.00%	66.35%	68.59%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The standard errors are in parentheses and are adjusted for heteroscedasticity and clustering at firm level. Variables with subscript "c" are mean centered. The variables are as defined in Table 1.

Table 21: Multivariate linear regression (alternative control measures): Gender.

	TDBV (1)	TDBV (2)	TDBV (3)	TDMV (4)	TDMV (5)	TDMV (6)
GNDR	-0.055	-0.038	-0.045	0.070	0.049	0.047
	(0.054)	(0.055)	(0.055)	(0.060)	(0.060)	(0.065)
AGE_c	-0.001	-0.001	-0.001	-0.000	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FUNXP	0.001	-0.002	-0.002	-0.016	-0.014	-0.015
	(0.009)	(0.009)	(0.009)	(0.011)	(0.011)	(0.011)
$PWRX1_c$	0.003	-0.006	-0.001	0.022	0.016	0.027
	(0.020)	(0.021)	(0.021)	(0.022)	(0.020)	(0.021)
$PWRX2_c$	0.030	0.025	0.031	0.020	0.013	0.018
	(0.019)	(0.019)	(0.019)	(0.020)	(0.019)	(0.019)
$PWRX3_c$	-0.019**	-0.017*	-0.018*	-0.036***	-0.032***	-0.033***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
$GNDR \times PWRX1_c$	-0.133	-0.063	-0.061	0.495	0.238	0.289
	(0.352)	(0.356)	(0.354)	(0.381)	(0.405)	(0.429)
$GNDR \times PWRX2_c$	-0.203***	-0.212***	-0.213***	-0.140***	-0.146**	-0.121***
	(0.063)	(0.058)	(0.060)	(0.048)	(0.061)	(0.042)
$GNDR \times PWRX3_c$	0.164***	0.142***	0.151***	0.134***	0.131***	0.126***
	(0.037)	(0.035)	(0.035)	(0.034)	(0.030)	(0.034)
TANG	0.040	0.054	0.059	0.054	0.033	0.041
	(0.040)	(0.040)	(0.041)	(0.050)	(0.049)	(0.049)
ASSET		-0.015***			-0.021***	
		(0.004)			(0.005)	
SALES	-0.014***		-0.011***	-0.012**		-0.012**
	(0.003)		(0.003)	(0.005)		(0.005)
GROW	0.070***	0.076***	0.071***	-0.019**	-0.012	-0.026***
	(0.008)	(0.010)	(0.009)	(0.008)	(0.008)	(0.009)
FIND	-0.073***	-0.073***	-0.068***	-0.040***	-0.054***	-0.043***
	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
ROA	0.257***			-0.292***		
	(0.066)			(0.072)		
ROE		0.046**	0.038**		-0.048***	-0.057***
		(0.019)	(0.018)		(0.018)	(0.018)
BMET	0.003	0.005	0.003	0.014	0.021	0.019
	(0.011)	(0.011)	(0.012)	(0.015)	(0.014)	(0.015)
Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,436	1,428	1,429	1,434	1,431	1,432
Adjusted R^2	68.99%	69.26%	68.65%	69.61%	69.63%	68.82%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The SE are in parentheses and are adjusted for heteroscedasticity and clustering at firm level when required. Variables with subscript "c" are mean centered and are as defined in Table 1.

Table 22: Multivariate linear regression (alternative control measures): Age.

	TDBV (1)	TDBV (2)	TDBV (3)	TDMV (4)	TDMV (5)	TDMV (6)
AGE_c	-0.001	-0.001	-0.001	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GNDR	-0.017	-0.021	-0.025	0.032	0.044	0.037
	(0.024)	(0.021)	(0.022)	(0.029)	(0.028)	(0.029)
FUNXP	0.005	0.000	-0.001	-0.014	-0.012	-0.012
	(0.010)	(0.009)	(0.009)	(0.011)	(0.011)	(0.011)
$PWRX1_c$	-0.001	-0.009	-0.000	0.032	0.026	0.042**
	(0.016)	(0.016)	(0.016)	(0.021)	(0.020)	(0.020)
$PWRX2_c$	0.012	0.010	0.014	0.006	0.002	0.008
	(0.017)	(0.016)	(0.016)	(0.019)	(0.018)	(0.018)
$PWRX3_c$	-0.006	-0.005	-0.005	-0.025**	-0.023**	-0.025**
	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
$AGE_c \times PWRX1_c$	0.006***	0.006***	0.005***	0.001	0.001	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$AGE_c \times PWRX2_c$	-0.004**	-0.006***	-0.006***	-0.005*	-0.004	-0.005
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
$AGE_c \times PWRX3_c$	0.001	0.002	0.002	0.003	0.002	0.003
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
TANG	0.026	0.037	0.045	0.058	0.038	0.045
	(0.042)	(0.040)	(0.041)	(0.051)	(0.049)	(0.049)
ASSET		-0.014***			-0.21***	
		(0.004)			(0.005)	
SALES	-0.011***		-0.009***	-0.009*		-0.009*
	(0.004)		(0.003)	(0.005)		(0.005)
GROW	0.070***	0.079***	0.074***	-0.018**	-0.014	-0.031***
	(0.008)	0.005)	(0.009)	(0.008)	(0.008)	(0.010)
FIND	-0.071***	-0.073***	-0.068***	-0.039***	-0.052***	-0.040***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
ROA	0.206***			-0.327***		
	(0.068)			(0.077)		
ROE		0.042**	0.038**		-0.049***	-0.058***
		(0.018)	(0.018)		(0.018)	(0.019)
BMET	0.001	0.007	0.005	0.013	0.018	0.015
	(0.011)	(0.011)	(0.011)	(0.015)	(0.014)	(0.015)
All dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,431	1,421	1,420	1,428	1,421	1,424
Adjusted R^2	68.40%	70.12%	69.57%	68.68%	69.48%	68.09%

Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The standard errors are in parentheses and are adjusted for heteroscedasticity and clustering at firm level. The variables are as defined in Table 1.

Table 23: Multivariate linear regression (alternative control measures): Functional experience.

	TDBV (1)	TDBV (2)	TDBV (3)	TDMV (4)	TDMV (5)	TDMV (6)
FUNXP	0.002	-0.002	-0.002	-0.014	-0.012	-0.011
	(0.009)	(0.009)	(0.010)	(0.011)	(0.011)	(0.011)
GNDR	-0.030	-0.030	-0.032	0.031	0.043	0.041
	(0.025)	(0.022)	(0.023)	(0.028)	(0.026)	(0.028)
AGE_c	-0.000	-0.000	-0.001	-0.000	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.026)	(0.001)
$PWRX1_c$	0.018	0.007	0.014	0.031	0.018	0.033
	(0.023)	(0.023)	(0.023)	(0.024)	(0.023)	(0.023)
$PWRX2_c$	0.007	0.002	0.006	-0.028	-0.037	-0.024
	(0.024)	(0.024)	(0.025)	(0.027)	(0.026)	(0.026)
$PWRX3_c$	-0.004	-0.002	-0.003	-0.020	-0.016	-0.020
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
$FUNXP \times PWRX1_c$	-0.065*	-0.082**	-0.071*	-0.030	-0.011	-0.010
	(0.035)	(0.035)	(0.037)	(0.037)	(0.033)	(0.034)
$FUNXP \times PWRX2_c$	0.039	0.033	0.042	0.132***	0.132***	0.131***
	(0.037)	(0.036)	(0.037)	(0.047)	(0.045)	(0.045)
$FUNXP \times PWRX3_c$	-0.029	-0.029	-0.029	-0.029	-0.028	-0.023
	(0.021)	(0.020)	(0.021)	(0.025)	(0.025)	(0.025)
TANG	0.050	0.075*	0.080*	0.079	0.069	0.051
	(0.041)	(0.042)	(0.043)	(0.054)	(0.050)	(0.050)
ASSET		-0.014***			-0.021***	
		(0.004)			(0.005)	
SALES	-0.010***		-0.009**	-0.009		-0.010*
	(0.004)		(0.004)	(0.006)		(0.005)
GROW	0.071***	0.081***	0.073***	-0.015*	-0.010	-0.024***
	(0.008)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)
FIND	-0.072***	-0.074***	-0.069***	-0.040***	-0.055***	-0.043***
	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
ROA	0.196***			-0.302***		
	(0.067)			(0.075)		
ROE		0.036**	0.032*		-0.049**	-0.059***
		(0.017)	(0.017)		(0.019)	(0.019)
BMET	-0.000	0.001	0.000	0.012	0.018	0.010
	(0.012)	(0.012)	(0.012)	(0.015)	(0.015)	(0.016)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,440	1,418	1,419	1,428	1,420	1,431
Adjusted R^2	67.52%	68.76%	67.93%	68.77%	69.50%	68.40%

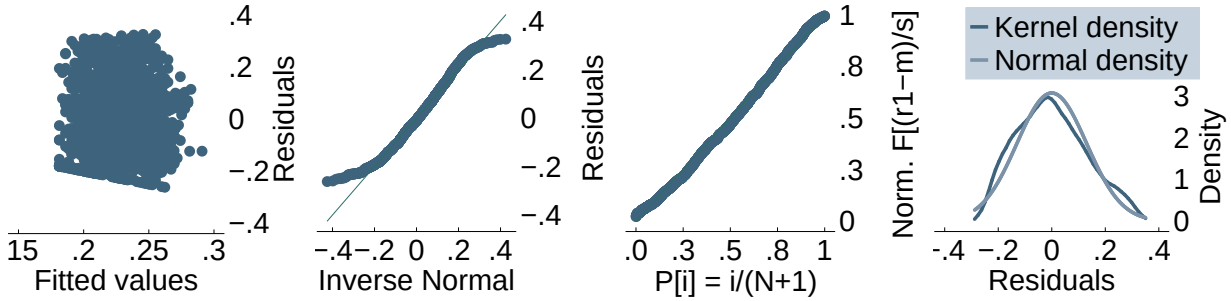
Notes: ***, **, and * point to statistical significance at the 1%, 5%, and 10%, respectively. The standard errors are in parentheses and are adjusted for heteroscedasticity and clustering at firm level. The variables are as defined in Table 1.

D.1.1 *Regression diagnostics: Decomposition of explanatory power*

Model 1

For the first regression model (variables: GNDR, AGE_c, and FUNXP) a total of 84 (4.23% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 90 (4.53% of sample), based on leverage values is 44 (2.22% of sample), and based on Cook's D is 21 (1.06% of sample). The Breusch-Pagan test shows heteroscedasticity is a concern [$\chi^2(1, N = 1,831) = 7.46, p(0.006)$] (see first Figure 21) and the Breusch-Godfrey test [$\chi^2(1, N = 1,831) = 1090.18, p(0.000)$] and Durbin-Watson D-statistic [$d(4, 1,831) = 0.368$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 21) and multicollinearity is not a concern with an average VIF of 1.01.

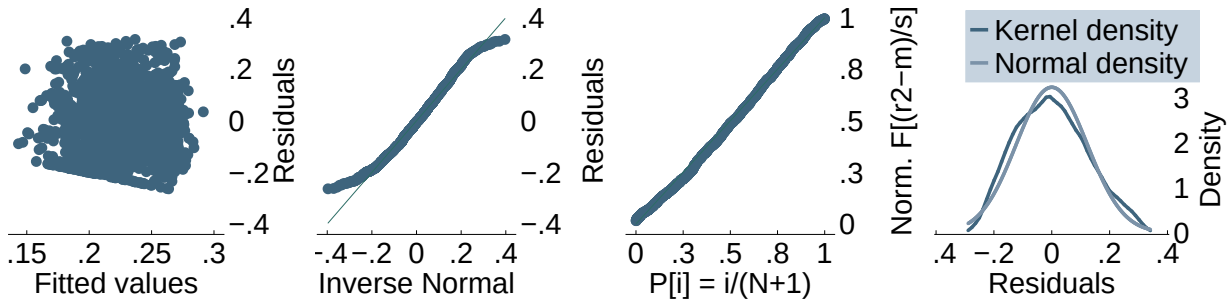
Figure 21: Regression diagnostics: Explanatory power regression (Model 1)



Model 2

For the second regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$) a total of 329 (18.90% of sample) observations are missing. The increase in missing values many stems from the inclusion of the CEO power variables. Furthermore, the number of observations excluded based on studentized residuals is 84 (4.82% of sample), based on leverage values is 138 (7.92% of sample), and based on Cook's D is 14 (0.80% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity [$\chi^2(1, N = 1,574) = 1.14, p(0.285)$] (see first Figure 22) while the Breusch-Godfrey test [$\chi^2(1, N = 1,574) = 853.34, p(0.000)$] and Durbin-Watson D-statistic [$d(7, 1,574) = 0.409$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 22) and multicollinearity is not a concern with an average VIF of 1.05.

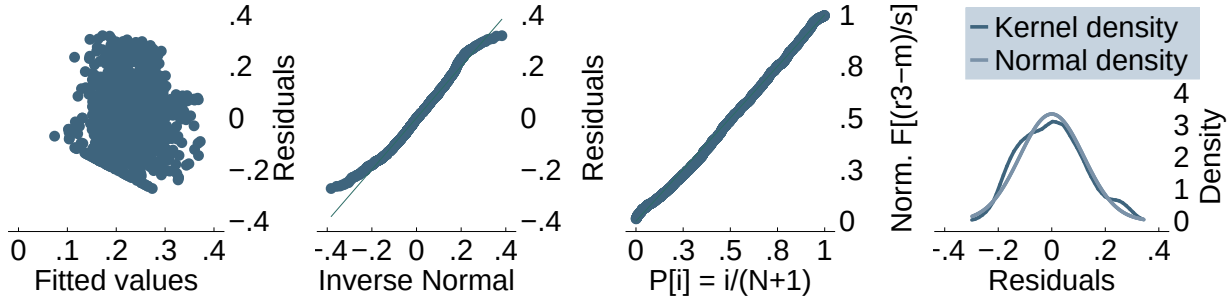
Figure 22: Regression diagnostics: Explanatory power regression (Model 2)



Model 3

For the third regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, and education dummies) a total of 448 (27.62% of sample) observations are missing. The increase in missing values many stems from the inclusion of the CEO power variables and education variables. Furthermore, the number of observations excluded based on studentized residuals is 77 (4.75% of sample), based on leverage values is 48 (2.96% of sample), and based on Cook's D is 15 (0.92% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity [$\chi^2(1, N = 1,482) = 0.06, p(0.815)$] (see first Figure 23) while the Breusch-Godfrey test [$\chi^2(1, N = 1,482) = 768.78, p(0.000)$] and Durbin-Watson D-statistic [$d(11, 1,482) = 0.443$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 23) and multicollinearity is not a concern with an average VIF of 1.15.

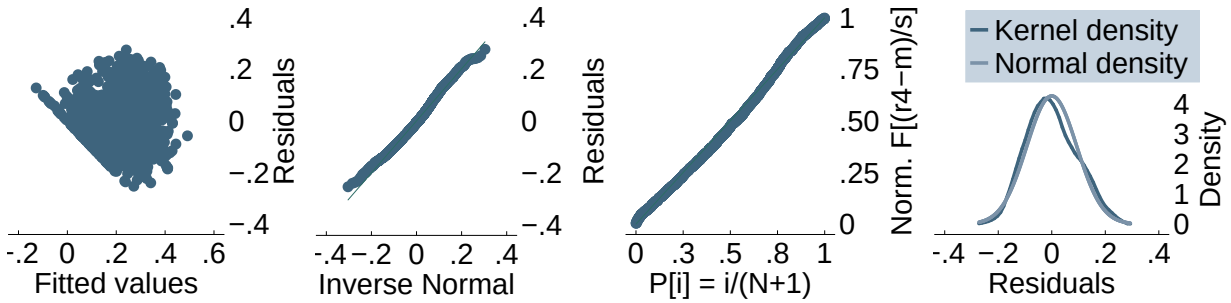
Figure 23: Regression diagnostics: Explanatory power regression (Model 3)



Model 4

For the fourth regression model (variables: TANG, ASSET, GROW, RISK, ROA, and BMET) a total of 167 (8.78% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 104 (5.47% of sample), based on leverage values is 9 (0.47% of sample), and based on Cook's D is 55 (2.89% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,735) = 19.36, p(0.000)$] (see first Figure 24) while the Breusch-Godfrey test [$\chi^2(1, N = 1,735) = 926.99, p(0.000)$] and Durbin-Watson D-statistic [$d(7, 1,735) = 0.425$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 24) and multicollinearity is not a concern with an average VIF of 1.15.

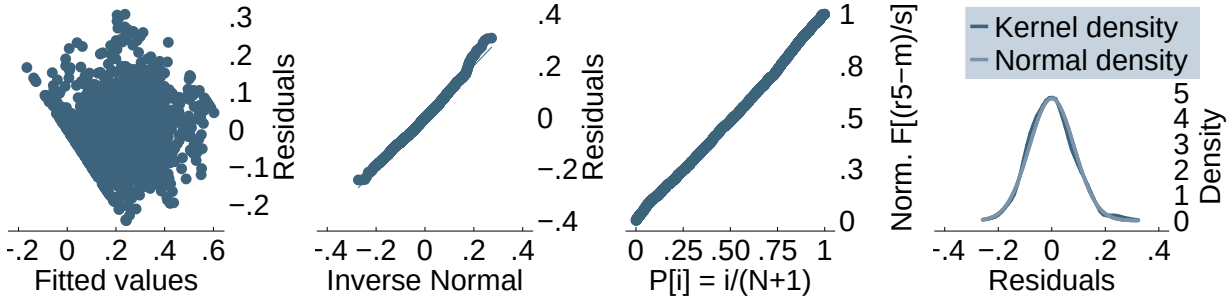
Figure 24: Regression diagnostics: Explanatory power regression (Model 4)



Model 5

For the fifth regression model (variables: TANG, ASSET, GROW, RISK, ROA, BMET, industry and year dummies) a total of 167 (8.78% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 88 (4.62% of sample), based on leverage values is 18 (0.95% of sample), and based on Cook's D is 25 (1.31% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity at 5% [$\chi^2(1, N = 1,777) = 3.74, p(0.053)$] (see first Figure 25) while the Breusch-Godfrey test [$\chi^2(1, N = 1,777) = 930.58, p(0.000)$] and Durbin-Watson D-statistic [$d(7, 1,777) = 0.440$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 25) and multicollinearity is not a concern with an average VIF of 5.88.

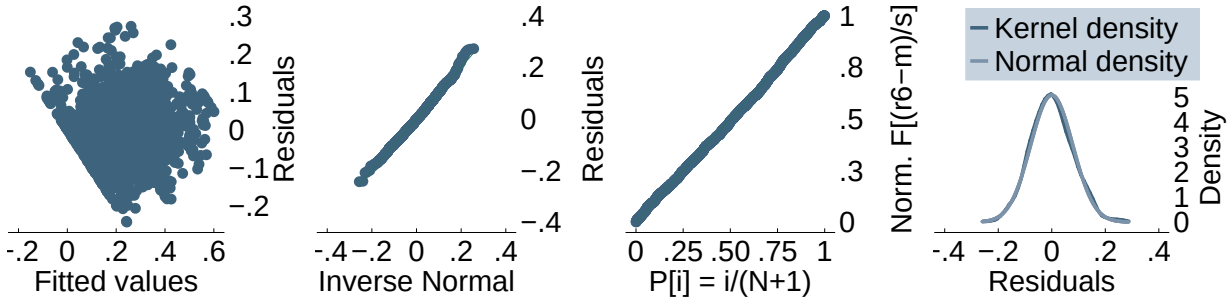
Figure 25: Regression diagnostics: Explanatory power regression (Model 5)



Model 6

For the sixth regression model (variables: GNDR, AGE_c, FUNXP, TANG, ASSET, GROW, RISK, ROA, BMET, industry and year dummies) a total of 190 (10.11% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 86 (4.57% of sample), based on leverage values is 10 (0.53% of sample), and based on Cook's D is 26 (1.38% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity [$\chi^2(1, N = 1,756) = 1.48, p(0.223)$] (see first Figure 26) while the Breusch-Godfrey test [$\chi^2(1, N = 1,756) = 901.21, p(0.000)$] and Durbin-Watson D-statistic [$d(59, 1,756) = 0.444$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 26) and multicollinearity is not a concern with an average VIF of 7.45.

Figure 26: Regression diagnostics: Explanatory power regression (Model 6)

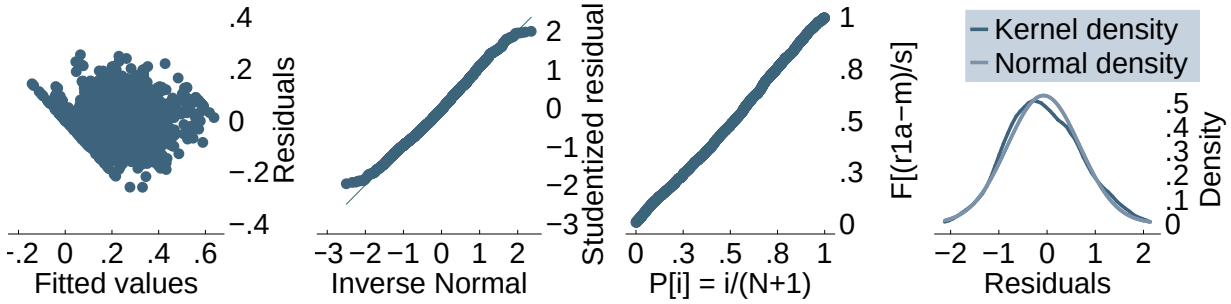


D.2 REGRESSION DIAGNOSTICS (POOLED OLS): GENDER

Model 1

For the first regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, industry and year dummies, and gender interactions) a total of 332 (19.02% of sample) observations are missing. The number of observations excluded based on studentized residuals is 95 (5.47% of sample), based on leverage values is 6 (0.35% of sample), and based on Cook's D is 39 (2.24% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,598) = 10.04, p(0.000)$] (see first Figure 27) while the Breusch-Godfrey test [$\chi^2(1, N = 1,598) = 757.61, p(0.000)$] and Durbin-Watson D-statistic [$d(65, 1,598) = 0.466$] indicate serial correlation is a concern. The residuals are approximately normally distributed (see last three Figures 27) and multicollinearity is not a concern with an average VIF of 5.23.

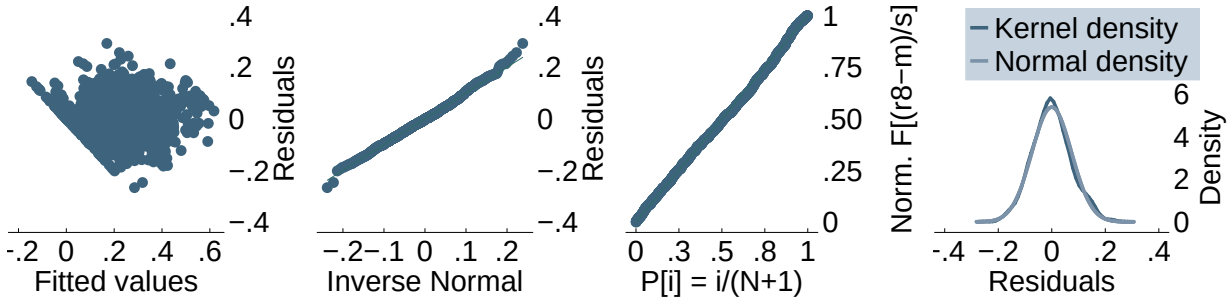
Figure 27: Regression diagnostics: Gender, power, and leverage (Model 1)



Model 2

For the second regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry and year dummies, and gender interactions) a total of 415 (25.08% of sample) observations are missing. The number of observations excluded based on studentized residuals is 84 (5.08% of sample), based on leverage values is 18 (1.09% of sample), and based on Cook's D is 33 (1.99% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,520) = 7.49, p(0.006)$] (see first Figure 28) while the Breusch-Godfrey test [$\chi^2(1, N = 1,520) = 753.90, p(0.000)$] and Durbin-Watson D-statistic [$d(64, 1,520) = 0.443$] indicate serial correlation is a concern. The residuals are approximately normally distributed (see last three Figures 28) and multicollinearity is not a concern with an average VIF of 6.69.

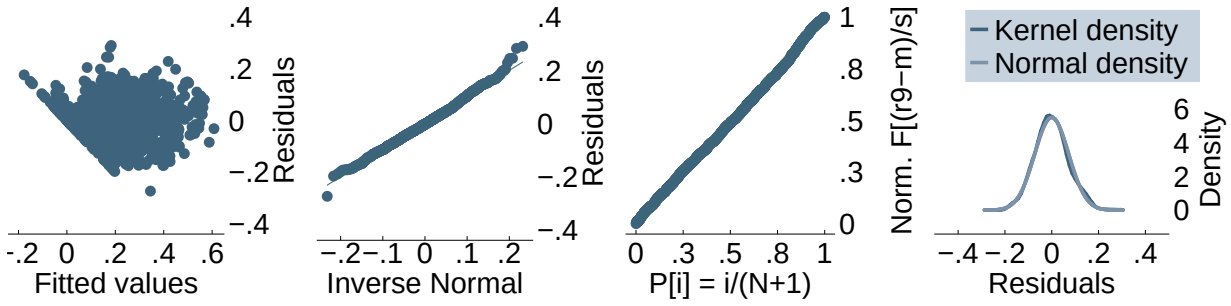
Figure 28: Regression diagnostics: Gender, power, and leverage (Model 2)



Model 3

For the third regression (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry, year and education dummies, and gender interactions) a total of 415 (26.97% of sample) observations are missing. The number of observations excluded based on studentized residuals is 84 (5.46% of sample), based on leverage values is 18 (1.17% of sample), and based on Cook's D is 22 (1.43% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,429) = 7.17, p(0.007)$] (see first Figure 29) while the Breusch-Godfrey test [$\chi^2(1, N = 1,429) = 678.16, p(0.000)$] and Durbin-Watson D-statistic [$d(68, 1,429) = 0.461$] indicate serial correlation is a concern. The residuals are approximately normally distributed (see last three Figures 29) and multicollinearity is not a concern (average VIF is 6.20).

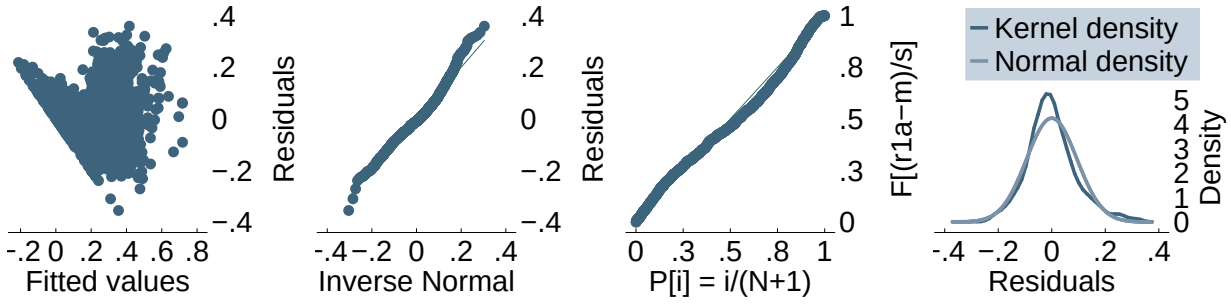
Figure 29: Regression diagnostics: Gender, power, and leverage (Model 3)



Model 4

For the fourth regression (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, industry and year dummies, and gender interactions) a total of 345 (20.00% of sample) observations are missing. The number of observations excluded based on studentized residuals is 88 (5.10% of sample), based on leverage values is 3 (0.17% of sample), and based on Cook's D is 26 (1.51% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,608) = 121.34, p(0.000)$] (see first Figure 30) while the Breusch-Godfrey test [$\chi^2(1, N = 1,608) = 655.59, p(0.000)$] and Durbin-Watson D-statistic [$d(64, 1,608) = 0.560$] indicate serial correlation is a concern. The residuals are approximately normally distributed (see last three Figures 30) and multicollinearity is not a concern (average VIF is 4.52).

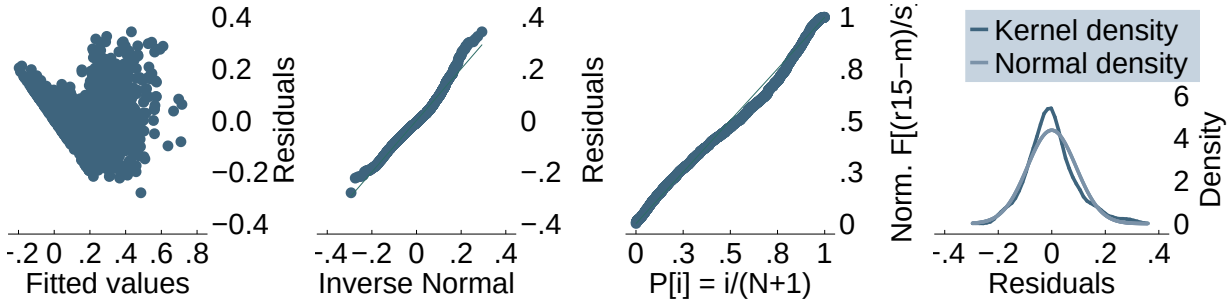
Figure 30: Regression diagnostics: Gender, power, and leverage (Model 4)



Model 5

For the fifth regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry and year dummies, and gender interactions) a total of 424 (25.76% of sample) observations are missing. The number of observations excluded based on studentized residuals is 82 (4.98% of sample), based on leverage values is 10 (0.61% of sample), and based on Cook's D is 27 (1.64% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,536) = 119.87, p(0.000)$] (see first Figure 31) while the Breusch-Godfrey test [$\chi^2(1, N = 1,536) = 636.72, p(0.000)$] and Durbin-Watson D-statistic [$d(64, 1,536) = 0.566$] indicate serial correlation is a concern. The residuals are approximately normally distributed (see last three Figures 31) and multicollinearity is not a concern with an average VIF of 4.46.

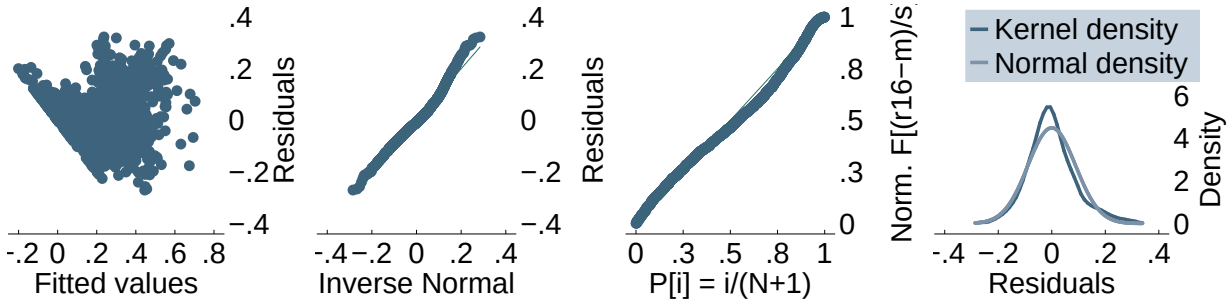
Figure 31: Regression diagnostics: Gender, power, and leverage (Model 5)



Model 6

For the sixth regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry, year and education dummies, and gender interactions) a total of 537 (35.03% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 84 (5.48% of sample), based on leverage values is 18 (1.17% of sample), and based on Cook's D is 25 (1.63% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,436) = 133.80, p(0.000)$] (see first Figure 32) while the Breusch-Godfrey test [$\chi^2(1, N = 1,436) = 584.12, p(0.000)$] and Durbin-Watson D-statistic [$d(68, 1,436) = 0.578$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 32) and multicollinearity is not a concern with an average VIF of 4.22.

Figure 32: Regression diagnostics: Gender, power, and leverage (Model 6)

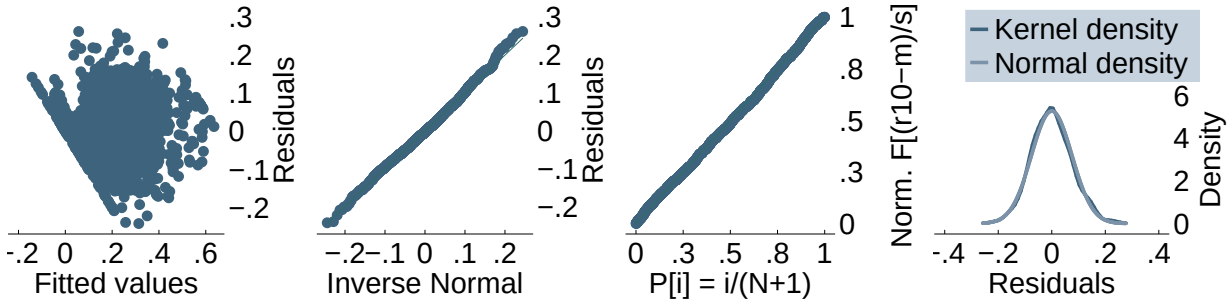


D.3 REGRESSION DIAGNOSTICS (POOLED OLS): AGE

Model 1

For the first regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, industry and year dummies, and age interactions) a total of 332 (25.07% of sample) observations are missing. The number of observations excluded based on studentized residuals is 95 (5.02% of sample) and based on Cook's D is 37 (1.63% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity [$\chi^2(1, N = 1,606) = 2.56, p(0.110)$] (see first Figure 33) while the Breusch-Godfrey test [$\chi^2(1, N = 1,606) = 768.53, p(0.000)$] and Durbin-Watson D-statistic [$d(65, 1,606) = 0.459$] indicate serial correlation is a concern. The residuals are approximately normally distributed (see last three Figures 33) and multicollinearity is not a concern with an average VIF of 4.93.

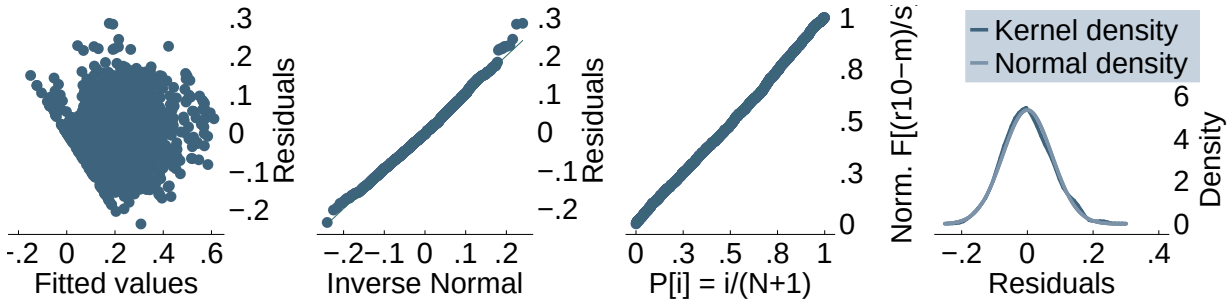
Figure 33: Regression diagnostics: Age, power, and leverage (Model 1)



Model 2

For the second regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry and year dummies, and age interactions) a total of 415 (25.07% of sample) observations are missing. The number of observations excluded based on studentized residuals is 83 (5.02% of sample), based on leverage values is 18 (1.09% of sample), and based on Cook's D is 27 (1.63% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity [$\chi^2(1, N = 1,528) = 0.52, p(0.472)$] (see first Figure 34) while the Breusch-Godfrey test [$\chi^2(1, N = 1,528) = 791.59, p(0.000)$] and Durbin-Watson D-statistic [$d(63, 1,528) = 0.430$] indicate serial correlation is a concern. The residuals are approximately normally distributed (see last three Figures 34) and multicollinearity is not a concern with an average VIF of 6.50.

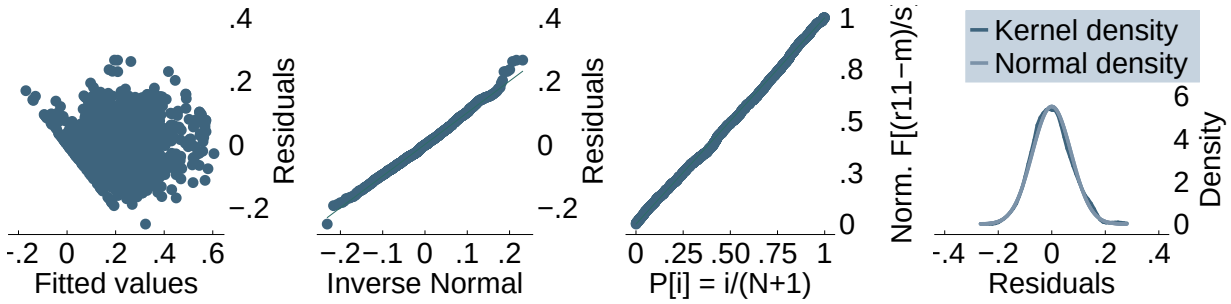
Figure 34: Regression diagnostics: Age, power, and leverage (Model 2)



Model 3

For the third regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry, year and education dummies, and age interactions) a total of 531 (34.50% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 77 (5.00% of sample), based on leverage values is 15 (0.97% of sample), and based on Cook's D is 23 (1.49% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity [$\chi^2(1, N = 1,425) = 1.73, p(0.189)$] (see first Figure 35) while the Breusch-Godfrey test [$\chi^2(1, N = 1,425) = 696.22, p(0.000)$] and Durbin-Watson D-statistic [$d(67, 1,425) = 0.446$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 35) and multicollinearity is not a concern with an average VIF of 5.33.

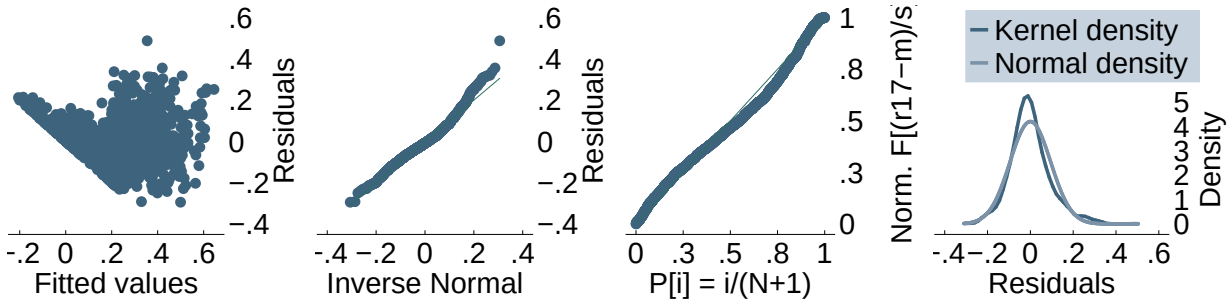
Figure 35: Regression diagnostics: Age, power, and leverage (Model 3)



Model 4

For the fourth regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, industry and year dummies, and age interactions) a total of 424 (34.50% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 77 (5.00% of sample), based on leverage values is 29 (0.97% of sample), and based on Cook's D is 22 (1.49% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,583) = 129.39, p(0.000)$] (see first Figure 36) while the Breusch-Godfrey test [$\chi^2(1, N = 1,583) = 647.70, p(0.000)$] and Durbin-Watson D-statistic [$d(61, 1,583) = 0.540$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 36) and multicollinearity is not a concern with an average VIF of 4.37.

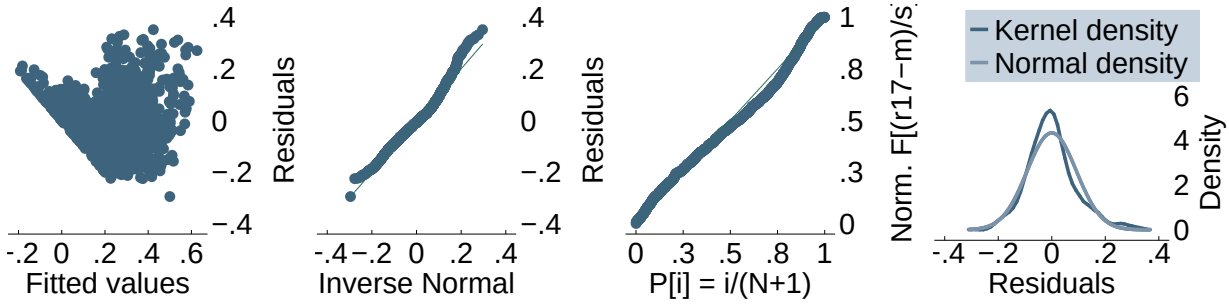
Figure 36: Regression diagnostics: Age, power, and leverage (Model 4)



Model 5

For the fifth regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry and year dummies, and age interactions) a total of 424 (25.76% of sample) observations are missing. The number of observations excluded based on studentized residuals is 77 (4.68% of sample), based on leverage values is 38 (2.31% of sample), and based on Cook's D is 15 (0.91% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,516) = 127.30, p(0.000)$] (see first Figure 37) while the Breusch-Godfrey test [$\chi^2(1, N = 1,516) = 633.76, p(0.000)$] and Durbin-Watson D-statistic [$d(61, 1,516) = 0.557$] indicate serial correlation is a concern. The residuals are approximately normally distributed (see last three Figures 37) and multicollinearity is not a concern with an average VIF of 4.30.

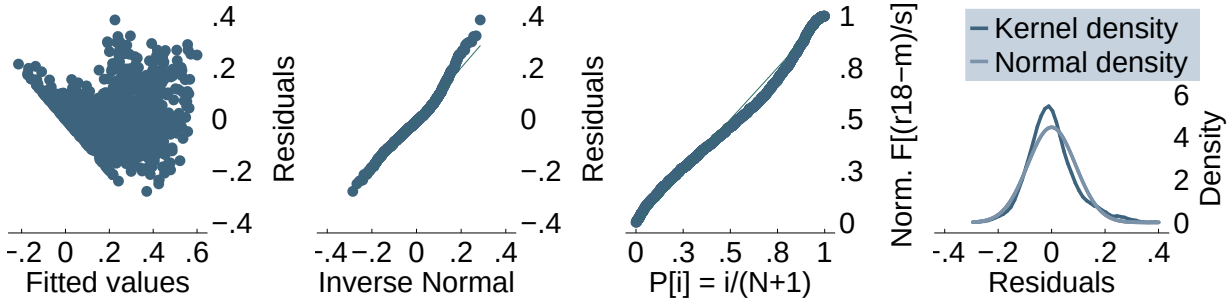
Figure 37: Regression diagnostics: Age, power, and leverage (Model 5)



Model 6

For the sixth regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry, year and education dummies, and age interactions) a total of 537 (35.03% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 66 (4.31% of sample), based on leverage values is 20 (1.30% of sample), and based on Cook's D is 29 (1.89% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,418) = 110.33, p(0.000)$] (see first Figure 38) while the Breusch-Godfrey test [$\chi^2(1, N = 1,418) = 563.69, p(0.000)$] and Durbin-Watson D-statistic [$d(66, 1,418) = 0.565$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 38) and multicollinearity is not a concern with an average VIF of 3.99.

Figure 38: Regression diagnostics: Age, power, and leverage (Model 6)

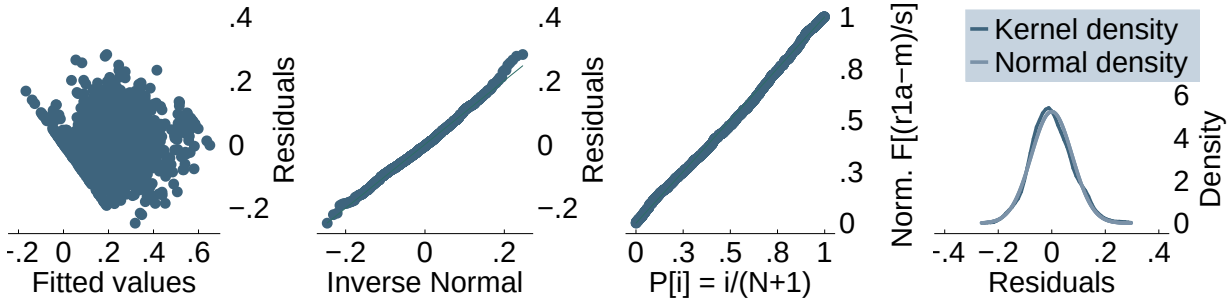


D.4 REGRESSION DIAGNOSTICS (POOLED OLS): FUNCTIONAL EXPERIENCE

Model 1

For the first regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, industry and year dummies, and functional experience interactions) a total of 332 (19.10% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 93 (5.35% of sample), based on Cook's D is 38 (2.19% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity at 5% [$\chi^2(1, N = 1,607) = 3.08, p(0.079)$] (see first Figure 39) while the Breusch-Godfrey test [$\chi^2(1, N = 1,781) = 753.55, p(0.000)$] and Durbin-Watson D-statistic [$d(65, 1,607) = 0.451$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 39) and multicollinearity is not a concern with an average VIF of 4.96.

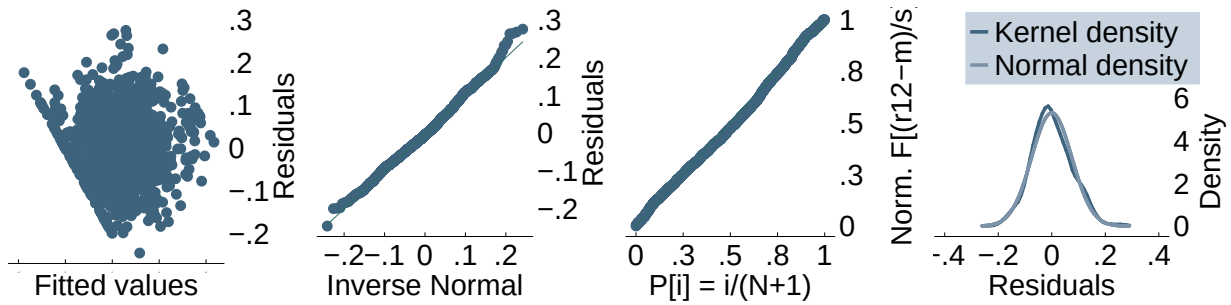
Figure 39: Regression diagnostics: Financial expertise, power, and leverage (Model 1)



Model 2

For the second regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry and year dummies, and functional experience interactions) a total of 415 (25.08% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 84 (5.08% of sample), based on leverage values is 35 (2.11% of sample), and based on Cook's D is 19 (1.15% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity at 5% [$\chi^2(1, N = 1,517) = 2.89, p(0.089)$] (see first Figure 40) while the Breusch-Godfrey test [$\chi^2(1, N = 1,517) = 753.48, p(0.000)$] and Durbin-Watson D-statistic [$d(62, 1,517) = 0.438$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 40) and multicollinearity is not a concern with an average VIF of 2.61.

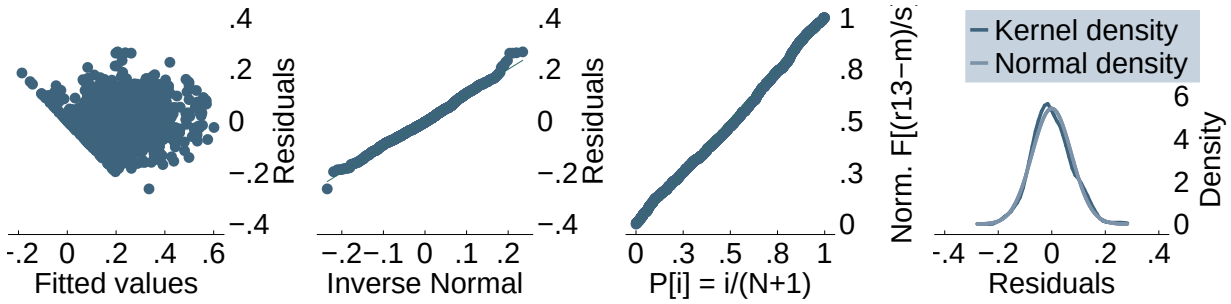
Figure 40: Regression diagnostics: Financial expertise, power, and leverage (Model 2)



Model 3

For the third regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry, year and education dummies, and functional experience interactions) a total of 531 (34.50% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 73 (4.74% of sample), based on leverage values is 32 (2.08% of sample), and based on Cook's D is 20 (1.30% of sample). The Breusch-Pagan test fails to reject the null of homoscedasticity $[\chi^2(1, N = 1,414) = 2.31, p(0.128)]$ (see first Figure 41) while the Breusch-Godfrey test $[\chi^2(1, N = 1,414) = 681.01, p(0.000)]$ and Durbin-Watson D-statistic $[d(66, 1,414) = 0.437]$ indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 41) and multicollinearity is not a concern with an average VIF of 2.60.

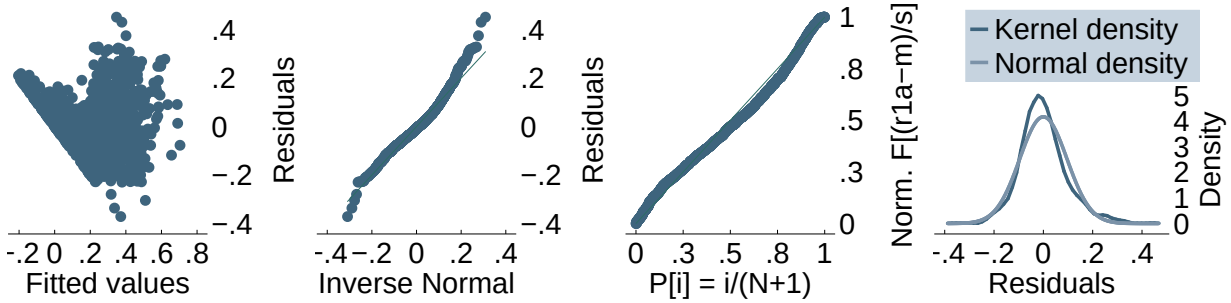
Figure 41: Regression diagnostics: Financial expertise, power, and leverage (Model 3)



Model 4

For the fourth regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, industry and year dummies, and functional experience interactions) a total of 345 (20.00% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 94 (5.45% of sample) and based on Cook's D is 25 (1.45% of sample). The Breusch-Pagan test rejects the null of homoscedasticity $[\chi^2(1, N = 1,606) = 130.29, p(0.000)]$ (see first Figure 42) while the Breusch-Godfrey test $[\chi^2(1, N = 1,606) = 646.88, p(0.000)]$ and Durbin-Watson D-statistic $[d(65, 1,606) = 0.549]$ indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 42) and multicollinearity is not a concern with an average VIF of 4.18.

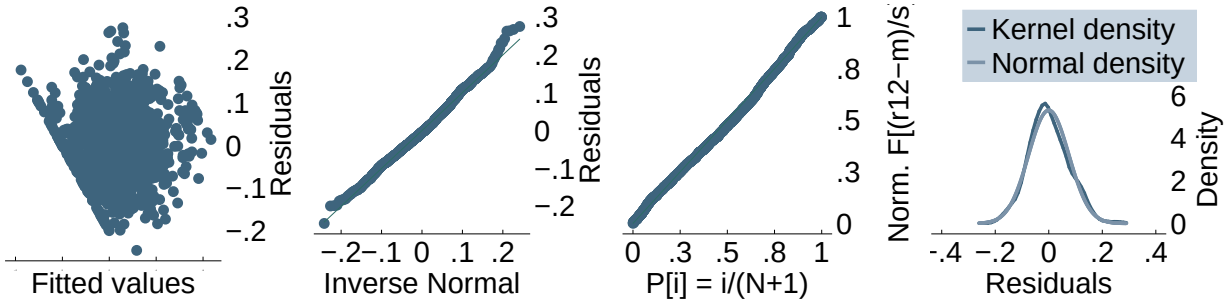
Figure 42: Regression diagnostics: Financial expertise, power, and leverage (Model 4)



Model 5

For the fifth regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry and year dummies, and functional experience interactions) a total of 424 (25.76% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 74 (4.50% of sample), based on leverage values is 37 (2.25% of sample), and based on Cook's D is 14 (0.85% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,514) = 113.55, p(0.000)$] (see first Figure 43) while the Breusch-Godfrey test [$\chi^2(1, N = 1,514) = 641.39, p(0.000)$] and Durbin-Watson D-statistic [$d(62, 1,514) = 0.564$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 43) and multicollinearity is not a concern with an average VIF of 4.28.

Figure 43: Regression diagnostics: Financial expertise, power, and leverage (Model 5)



Model 6

For the sixth regression model (variables: GNDR, AGE_c, FUNXP, $PWRX1_c$, $PWRX2_c$, $PWRX3_c$, TANG, ASSET, GROW, RISK, ROA, BMET, industry, year and education dummies, and functional experience interactions) a total of 537 (35.03% of sample) observations are missing. Furthermore, the number of observations excluded based on studentized residuals is 70 (4.57% of sample), based on leverage values is 35 (2.28% of sample), and based on Cook's D is 10 (0.65% of sample). The Breusch-Pagan test rejects the null of homoscedasticity [$\chi^2(1, N = 1,418) = 128.76, p(0.000)$] (see first Figure 44) while the Breusch-Godfrey test [$\chi^2(1, N = 1,418) = 553.42, p(0.000)$] and Durbin-Watson D-statistic [$d(66, 1,418) = 0.581$] indicate serial correlation is a concern. Lastly, the residuals are approximately normally distributed (see last three Figures 44) and multicollinearity is not a concern with an average VIF of 4.05.

Figure 44: Regression diagnostics: Financial expertise, power, and leverage (Model 6)