Aligning interests: The Impact of CEO Compensation Schemes on Corporate Executive Behaviour and the Cost of Debt

A thesis presented in fulfilment of the requirements for the degree of

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ABSTRACT

A key element of corporate governance is executive compensation. This study examines the effectiveness of two compensation methods for chief executives: inside debt and vesting equity.

In essay one, inside debt aligns management incentives with inside bondholder incentives (since they both hold debt), resulting in less risky corporate policies and reducing corporate risk-taking. This study shows empirically that inside debt is associated with less problematic situations (i.e., small earnings declines), less real activity spending cuts (such as marketing and R&D research), and lower yield spreads on corporate bonds.

In essay two, company executives and bond investors are concerned about short-term prices. When executives' compensation includes vesting equity, their interests are aligned. In this study, vesting equity reduces the cost of debt. Among the two components of vesting equity, the option lowers costs of debt, while stock keep costs high. The results suggest investors view vesting options as the best way to align executives' and bondholders' interests. Vesting equity may also reduce risk-taking activities, affecting bond prices.

In summary, the results show that bondholders are aware of the risk-taking and risk-avoidance incentives created by executive compensation schemes. Inside debt and vesting equity strengthen and align executive interests with those of inside and external bondholders.

ACKNOWLEDGMENTS

The adage ‘no man is an island’ holds true in academic pursuits. No one can claim to have completed a PhD alone. My academic journey has been made possible by the support of many distinguished scholars in finance, keen researchers, and academics, including ordinary people who have held my hand and encouraged me along the way. The experience of completing this thesis during the height of a worldwide lockdown resulting from the Covid-19 pandemic was excruciatingly challenging. I got married during this time as well. As a result, I have adapted quickly to my new situation, learning to write from my bedroom and common room, multi-task and think while watching my nieces and nephews (whom I love) or doing school runs, not to mention the distracting scent of my mother’s kitchen and the noise from the television.

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errors in my thesis. His editing skills and suggestions meant that my thesis was better crafted. This accomplishment is my tribute to him.

Finally, "Not to us, LORD, not to us but to your name be the glory, because of your love and faithfulness" (Ps 115:1 *NIV*). God led this journey from beginning to end, I could not have done this without Him. "Now to the King eternal, immortal, invisible, the only God, be honor and glory for ever and ever. Amen" (1 Tim 1:17 *NIV*).

DEDICATION

To my beloved grandparents,

Pita Latu Manu O'Uiha and Manu Opea I'vaha Huakau

&

Isikeli Matawalu and Irinieta Neisau

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LIST OF ABBREVIATIONS

CEO	Chief Executive Officer(s)
ID	Inside Debt
VE	Vesting Equity
VO	Vesting Option
VS	Vesting Stock

Chapter One: INTRODUCTION

1.1 BACKGROUND AND MOTIVATION

All companies have their own hiring methods and compensation structures for their Chief Executive Officers (CEOs). The different executive compensation plans offered by companies affect the behavior of corporate executives and the cost of debt on various levels. These adverse effects have a detrimental and indelible impact on the performance and value of companies. It is no surprise that internal governance mechanisms and executive pay have been the focus of Corporate Finance literature, an area of vigorous debate in academia, and a challenge for policymakers, financial experts, and advisors (Edmans & Liu, 2010; Liu, Mauer, & Zhang, 2014; Smith, 1776; Tung & Wang, 2012). CEO compensation packages are believed to have contributed significantly to the recent Global Financial Crisis of 2008. As a result, scholars have studied the issue of 'excessive' CEO compensation to find a solution (Aguinis, Martin, Gomez-Mejia, O'Boyle, & Joo, 2018; Frydman & Jenter, 2010; Hitt & Haynes, 2018; Sauerwald, Lin, & Peng, 2016; Wade, O'Reilly III, & Pollock, 2006).

An excellent example is the departing CEO of Genesis HealthCare (October 2020), who received a $5.2 million 'retention' bonus, a $650,000 cash retirement bonus, and a $300,000 consulting contract. In addition to losing 2,812 residents to COVID-19, the nursing home chain had filed for bankruptcy and accepted $300 million in state and federal aid under the *Coronavirus Aid, Relief, and Economic Security Act* (Englund, 2021). A 2017 incident led to the pay packages of 350 of the largest US companies skyrocketing to disproportionate and outrageous levels. Elite CEOs earned an average of US$18.9 million in the form of salaries, bonuses, restricted stock grants, options grants, cashed-in company stock, and other long-term stimulus payments. In comparison, they earned about 312 times more than the average working person in the US (Campbell, 2018, Aug 16; Mishel & Schieder, 2018). Earnings disparities between top executives and ordinary workers continue to grow.[2] CEOs' compensation packages using stock options granted since 1978, for example, grew 1,007.5%, while ordinary workers' packages grew 11.9%. Now, CEOs earn 278 times as much as regular employees (Mishel & Wolfe, 2019). Some US CEOs have reacted to these findings by settling for an annual salary of only $1 (Loureiro, Makhija, & Zhang, 2020).

[2] The term "Executive(s)," "managers," and "CEO" are used interchangeably in this thesis.

Undoubtedly, the debate over excessive pay-outs given to some CEOs has overshadowed the fundamental issue of 'how' CEOs are paid (Jensen & Murphy, 2010). The two words answer is "pay design." The design of traditional executive compensation plans consisted of four components:

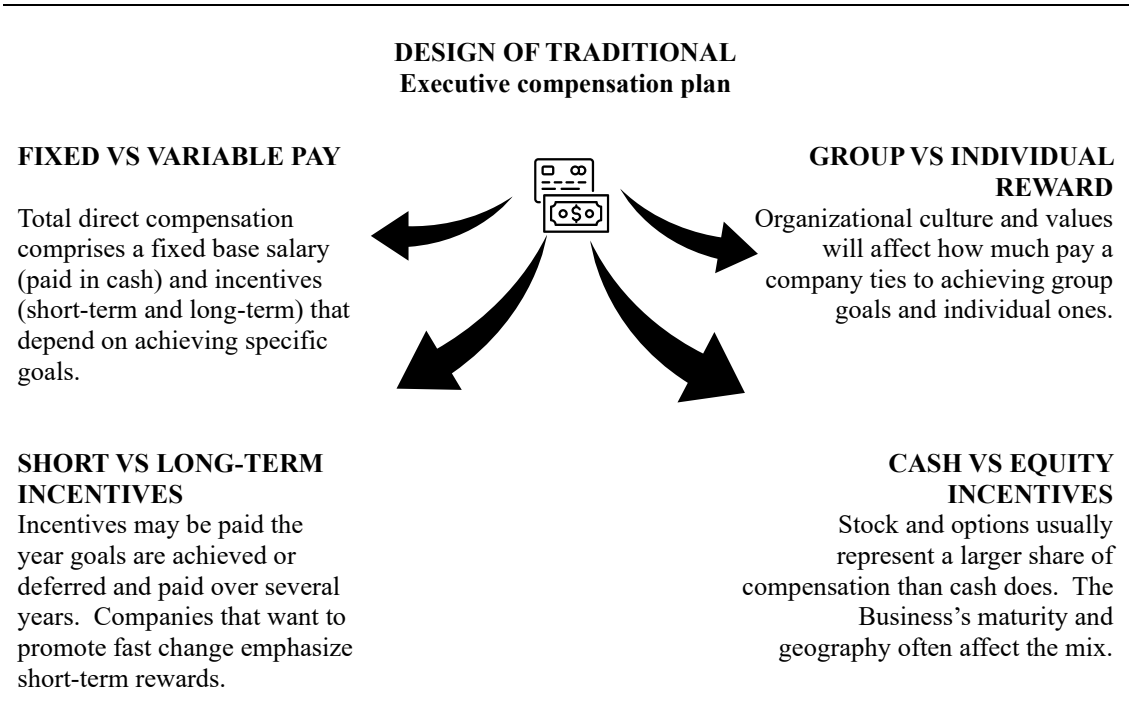


Figure 1: Four dimensions of executive compensation

Figure 1 describes the traditional compensation package for executives. Each company determines the proportions of each component in *figure 1* that makes up the overall compensation, their strategic objectives, ownership structure, governance style, cash flow, and ability to attract and retain talent (Groysberg, Abbott, Marino, & Aksoy, 2021). Executives negotiate with the compensation committee about the best short- and long-term compensation frames and designs that encourage them to reach their goals.

A company's board has the right to construct a CEO compensation scheme or offer monetary incentives that maximize the company's value. In addition, boards can provide CEOs with stock ownership in company stock, performance-based bonuses, and stock options and help companies manage their performance-based dismissal decisions (Jensen & Murphy, 1990b, 2010). Many companies had difficulty finding the right balance between compensation and results. A clearly defined strategy is essential. Board members should understand the key elements of executive compensation and tie them to corporate goals (Jensen & Murphy, 2010). This study examines two long-term pay incentives: (a) CEO inside debt and (b) CEO vesting

equity. This research aimed to discover how debtholders perceive managerial incentives and how they react to them. As well as the alignment of incentives between managers and debtholders, the results of inside debt and vesting equity provided insight into compensation structure consequences. Hopefully, this research will guide companies in designing a compensation package for their top executives that is more effective.

1.2 PURPOSE OF THE RESEARCH

Most major corporations structure their CEO compensation packages using long-term debt-like or long-term equity-like compensation plans. Some firms combine both types of plans. *Figure 2* summarizes the two executive compensation packages that often influence executives to behave in specific ways.

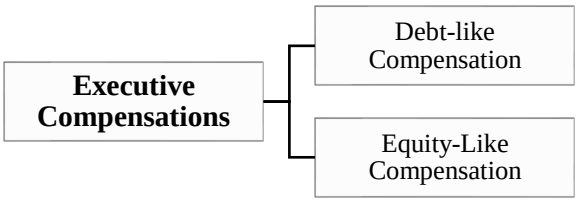


Figure 2: Types of Executive Compensation

Debt-like compensation (*Figure 3*) comprises two types: 'other deferred compensations' and 'defined benefit pensions.' These two components of inside debt (ID) have debt-like payoffs where the firm must make future payments to company executives.[3] But ID may mitigate the risk-shifting problems often caused by equity-like pay between the executive and firm owners, equity and bondholders (Jensen & Meckling, 1976).

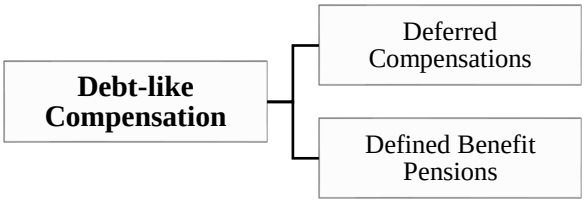


Figure 3: Debt-like Compensation

ID can resolve agency debt costs better than bonuses and salaries because the payoff depends on bankruptcy or the value of an insolvent firm (Edmans & Liu, 2010). ID is unique in two different ways. First, the payment structure is similar to a put-option, which makes the debtholder an investor over the long term. In contrast, an equity holder's economic pay-off structure is more like a call option, which is short-term oriented. However, both investment

[3] We use the terms "Inside Debt" and "Debt-like compensations" interchangeably. ID has debt-like payoffs (for example, pensions and other deferred contracts) which are held inside the company by the inside bond investors, in this instance, by the managers. It differs from outside debt, which is held by external investors.

types must be met at a future date unless the firm defaults (Sundaram & Yermack, 2007). Second, the value of debt securities is highly influenced by the firm's liquidation value. This means that bondholders have a greater incentive to maximize the value of their bonds in the event of bankruptcy. CEOs who get paid in debt securities become long-term bondholders. As a result, CEOs should become increasingly concerned with their firms' long-term growth. Despite this, excessive debt in total compensation can have a detrimental effect on executive incentives. It may cause them to become overly protective and underinvest in ventures crucial to the long-term viability of their firms (Jensen & Meckling, 1976). Therefore, optimal pay packages are necessary to create incentives that benefit both firm owners.

Essay One (chapter 2) attempts to determine how and in what ways ID reduces myopic behaviours among CEOs. The subsequent results of essay one will provide us with an insider's perspective.

Equity-like compensation(s) (*Figure 4*) comprises three common types: stock options, employee stock purchase plans,[4] and restricted stocks.[5] Most companies award their executives with stock options. It does not mean that executives own the stock. It only means that they have the "option to buy stock" as non-cash payments over time, enabling them to become firm owners. Companies use *incentive stock options*[6] for CEOs or *non-statutory stock options*[7] for general employees as a form of payment. Both incentive options have unique characteristics, conditions, benefits, challenges, and tax consequences. Only incentive stock options receive special treatment when all the rules and holding periods are met, giving CEOs an additional tax advantage. Public companies prefer to use incentive stock options for

[4] In the US, it is a tax-efficient way for CEOs to acquire corporate stock, often at a discount. Executives contribute to the plan by having contributions deducted from their paychecks between the offering date and purchase date.
[5] Restricted stock may be in the form of restricted stock units or restricted stock awards. It is unregistered shares of ownership in a corporation issued to corporate affiliates, but the shares cannot be sold until a vesting schedule has been completed. The stock is forfeited if the executive leaves before the stock vests.
[6] This type of stock option can also be called a "statutory stock option" since it is only offered to key employees and top-level managers that receive preferential tax treatment. Contrary to non-statutory stock options, they are subject to many restrictions. As they must be held for a longer period, they can carry more risk, but also offer greater potential for greater returns. Profits from qualified incentive stock options are generally taxed at the capital gains rate after they've been sold, not the higher ordinary income rate.
[7] Non-statutory stock options are also called "non-qualified stock options." These are a more commonly available type of employee stock option than incentive stock options. Employees with non-statutory stock options can buy the stock at a fixed price for a defined period, as the market value of the stock increases, allowing them to profit from the difference. Employees are not restricted by waiting periods, profits, price, employee status, etc. Employees who sell shares after vesting have the potential to make unlimited profits immediately. As soon as the employee exercises the option, he or she will pay income tax on the difference between the market share price of the stock. Startups and small companies with limited resources tend to use this compensation option to make up for salary deficiencies when they hire talent.

executive compensation. Many start-ups use incentive stock options in place of cash compensation as a form of equity compensation. Incentive stock options and non-statutory stock option plans confer unique benefits without costing the company anything in the short run.[8] It makes stock options particularly attractive to start-ups and companies in their early stages. In this study, incentive stock options are considered the incentive paid to top-tier executives.

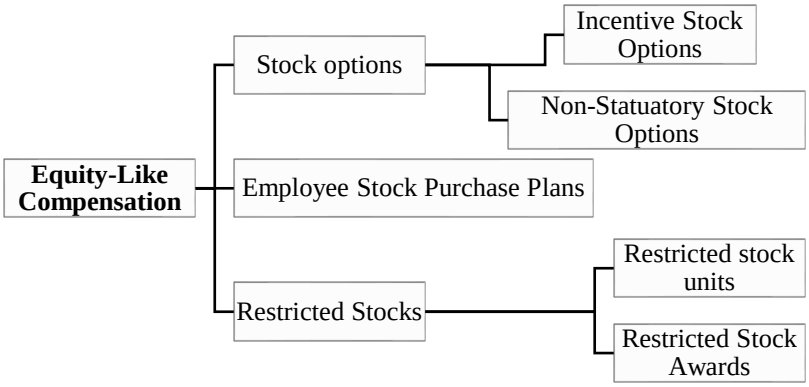


Figure 4: Equity-like Compensation

Stock options are granted at a pre-determined and discounted price to executives as a future payment for their service. But exercising such rights requires earning the stock through a 'vesting schedule' independent of the stock price. *Figure 5* illustrates vesting as a process in which the executive acquires the right to exercise the stock after a fixed period (time-based), usually between three to five years, or after the company hits a milestone (performance-based) specified in the options agreement.[9] Vesting stock options is a stimulus for executives to perform and become long-term stakeholders,[10] inadvertently ensuring sustained value creation (PrioriLegal, 2021).

[8] Specifically, Proiri Legal discussed Incentive Stock Options (ISOs), their tax implications, and the qualifying dispositions of ISOs. Cf. Non-Statutory Stock Options (NSO) and what they are and how they work. Tax considerations, including the advantages and disadvantages of this pay option.

[9] As an example, if a manager is granted 5,000 stock options with a four-year vesting schedule and 25% of the grant vests each year, the manager gains access to 25% of the options on the anniversary of the grant date. Managers can only keep (exercise) their options at the end of the fourth year.

[10] Executive ownership conditions include resignation, termination, death, permanent disability, or retirement, as well as corporate actions (e.g., merger & acquisition, consolidation).

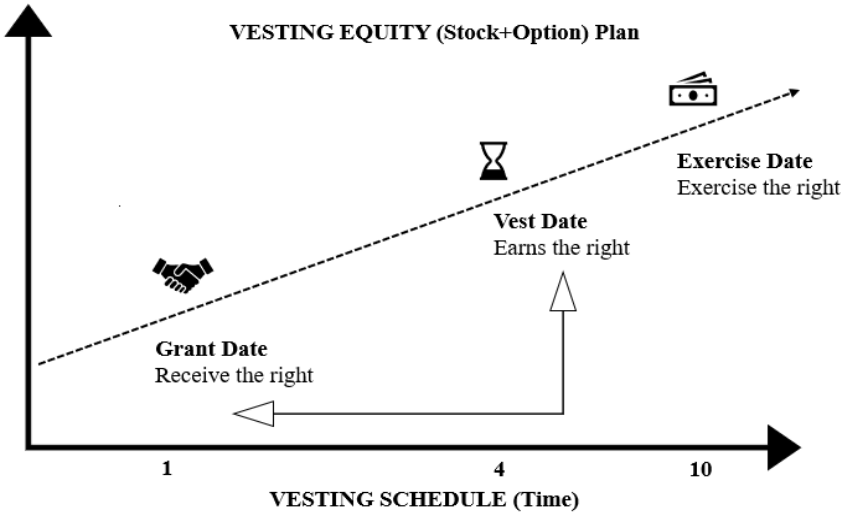


Figure 5: Vesting Schedule for Equity (Stock + Option)

Essay Two (Chapter 3) examines how VE affects corporate bond yield spreads. Bond investors' perceptions of managerial incentives are an essential part of this study. E2 will provide a perspective from outside the firm, from a bond investor's point of view on the executive incentive, and how they respond to the executive incentive.

1.3 Theories of Pay Incentives

How much should executives receive as their total pay, and why? This question has been a thorny issue at the centre of drawn-out debates among scholars. It has also been the source of many agency conflicts and theories. Here, we will briefly highlight: I. The *perfect contracting approach*, and II. The *imperfect contracting approach*.

I. The perfect contracting approach remains the dominant approach used to explain agency problems (Bebchuk & Fried, 2009). The executives' pay is often linked to the company's performance through salaries and bonuses, stock and option awards, or the real threat of dismissal if the company doesn't perform well. According to Jensen & Meckling (1976), situations such as these align the interests of executives and shareholders. However, in scholarly studies, the association between pay and performance is inconclusive. Some studies suggest the association is weak (Finkelstein & Boyd, 1998; Jensen & Murphy, 1990b). [11] Nevertheless, the mixed results are influenced or compounded by the poor conditions

[11] Studies have documented strong positive association between pay and corporate performance (Abowd, 1990; Belliveau, O'Reilly III, & Wade, 1996; Gerhart & Milkovich, 1990; Hall & Liebman, 1998; Leonard, 1990; McConaughy & Mishra, 1996; Tosi Jr & Gomez-Mejia, 1994); a negative association (Brick, Palmon, & Wald, 2006; Core, Holthausen, & Larcker, 1999); and weak association (Finkelstein & Boyd, 1998); *n*o association (Kerr & Bettis, 1987; Miller, 1995).

inherent in the market, such as agency issues that arise from moral hazards and adverse selection.

The rise of agency problems is widely attributed to the failure of three key assumptions of the perfect contracting approach: (a) When executives prefer lower returns with known risks over higher returns with unknown risks. Although these people avoid risk, they inadvertently reduce the firm's value. (b) Executives who make decisions based on their own aims. As a result, self-interest levels are often bound by norms of equity and fairness. They usually draw upon strategy, organizational behavior, economics, politics, philosophy, sociology, and social psychology.[12] And (c) when the interests of executives do not align with those of the principals. The perfect contracting approach theory alone, however, tends to become prohibitive and leads into a "blind alley" (Barkema & Gomez-Mejia, 1998), where the flaws and cumulative "anomalies" of executive pay become more evident (Bebchuk & Fried, 2009).

II. The imperfect contracting approach explores executive compensation levels and structures. A further fifteen theories help explain executive pay and why it is structured in the way it is (Balsam, 2002; Gomez-Mejia, 1994; Gomez-Mejia & Wiseman, 1997; Otten, 2008). These theories can be classified under the *value*, *agency*, and *symbolic* approaches (Otten, 2008). They are distinguished by: (1) the primary task of pay and (2) the justification for pay level and structures. The *value approach* includes theories arguing that market forces (e.g., supply and demand) influence executive pay. Theories under the *agency approach* use other mechanisms (e.g., discretionary powers) besides market forces and their influences on executive risk levels. And the *symbolic approach* includes theories that explore the impact of social constructs (e.g., status, reputation) on pay levels and structure. These theories can be partial, direct, or indirectly traced back to the principles of economic theories. See *Figure 6*.

[12] The paper by Bosse and Phillips (2016) provides a list of references under each literature type noted.

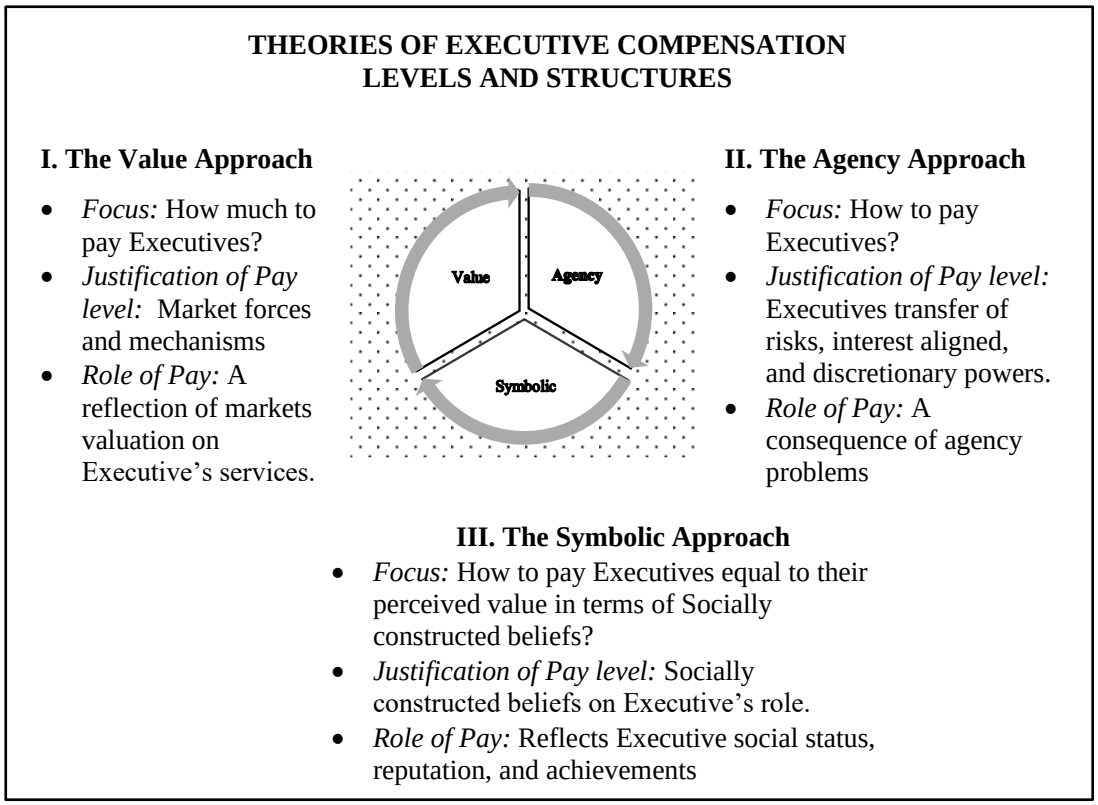


Figure 6: Theories of executive compensation levels and structures

I. The value approach consists of five theories. The focus of these theories is to determine 'how much' the executive gets paid. The Value Approach uses the economic laws of supply and demand to support the level and structure of pay. The executive's pay levels are reflected in how the market perceives or values their service. See *Figure 7.*

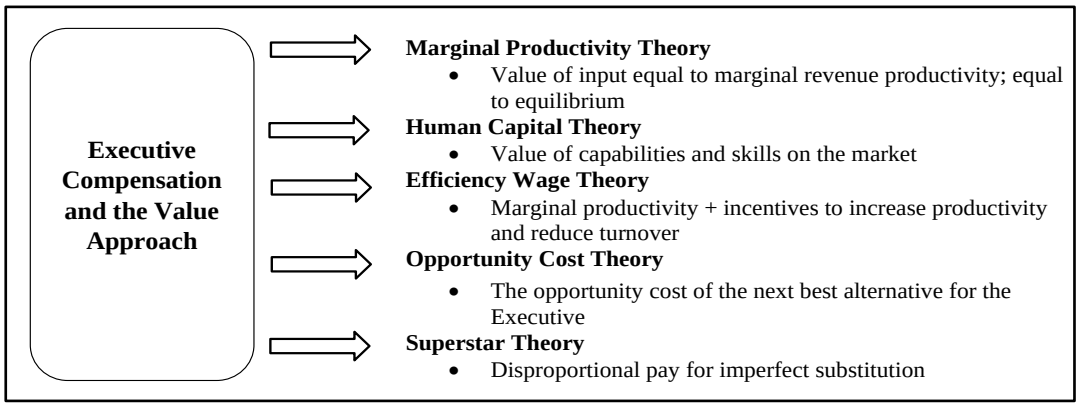


Figure 7: Executive compensation and the value approach

The fundamental theories of pay incentives are discussed by order of most-to-the-least: (1) Proponents of the *Marginal Productivity theory* of wage argue that the pay should reflect the value of the Executive's marginal revenue productivity. Essentially, the executive is compensated more in proportion to his productivity; the better his performance, the more he is

paid (Gomez-Mejia, 1994; Roberts, 1956).[13] (2) Productivity is associated with and influenced by the executives' increasing experience, accumulated knowledge, and skills (human capital). The increasing value of the *human capital* attracts a higher compensation or remuneration package (Agarwal, 1981; Carpenter, Sanders, & Gregersen, 2001; Combs & Skill, 2003; Harris & Helfat, 1997). (3) Under the *theory of efficiency wage*, pay reflects the above the market-level paid to the executive to incite 'extra' efforts. Firms that promise a premium above market-level wage may experience greater productivity and lower executive turnover (Balsam, 2002; Lazear, 1995; Prendergast, 1999). (4) Theorists that argue the case of *opportunity cost* put forth that pay reflects the loss or benefit that could have been enjoyed if the alternative employer was chosen by the Executive (Gomez-Mejia & Wiseman, 1997). The higher the opportunity cost, the greater the payment paid out to the Executive. (5) Those supporting the *superstar theory* suggest that pay levels reflect a firm's willingness to pay for an executive's talent for which no good substitute exists. Firms will pay more for exceptional talent, skills, and capable executives (Rosen, 1981). Each theory is unique and bases its arguments on different market forces and mechanisms.

II. The agency approach focuses mainly on how CEOs are paid (Barkema, Geroski, & Schwalbach, 1997; Ferri & Göx, 2018; Göx & Hemmer, 2020; Jensen & Murphy, 1990a; Meng & Tian, 2020). Pay levels are considered a consequence of the agency problem of labour market forces and the risk implications facing executives and their discretionary powers. The Agency Approach includes two distinct groups influenced by different pay-setting processes. See *Figure 8*.

Group one considers paying as a partial solution to the agency problem supported by the *complete contracting*[14] and *prospect* theories. An entire pay contract that accounts for the executive's risk-aversion should transfer risks to the risk-averse executive. Such a contract incentivizes an efficient trade-off between various agency costs (e.g., monitoring or bond costs), minimizing residual losses for shareholders (Jensen & Meckling, 1976). Prospect theorists propose contract incentives based on loss aversion assumptions (Kahneman & Tversky, 2013). Extensions by behavioural theorists argue executives will take necessary risks, however, only until they attain targeted performance goals (Wiseman & Gomez-Mejia, 1998). Then, other

[13] Neo-classical economists that pioneered theory of marginal productivity of wage include Chamberlain (1948); Hicks (1963); Longfield (1834)

[14] Often referred to as 'agency theory' and considered the 'official story' for executive pay (Bebchuk & Fried, 2009).

risk-bearing caused by monitoring mechanisms, or risk level, shifting, or sharing, will determine the pay level for the loss-averse executives.

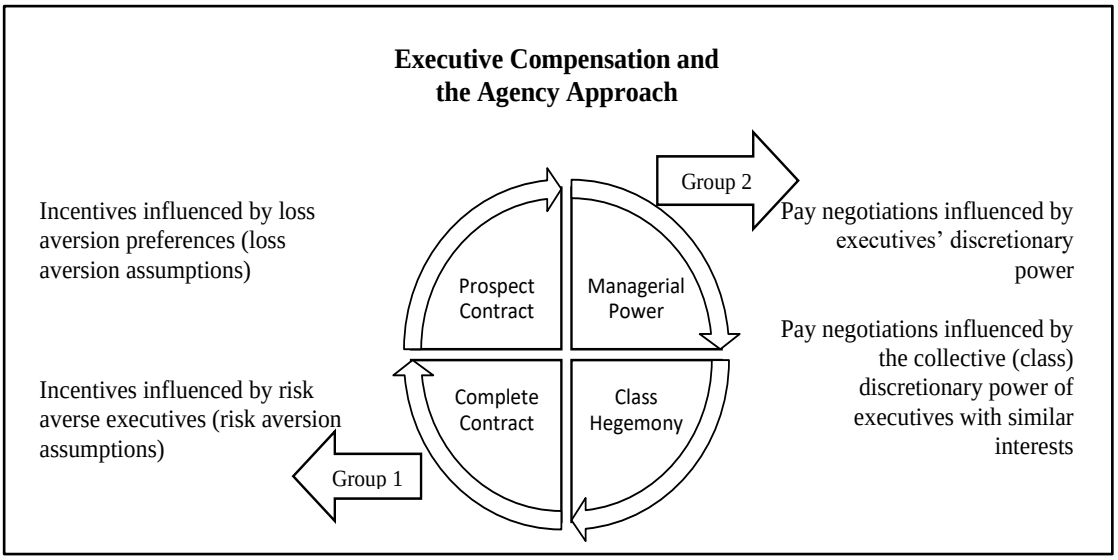


Figure 8: Executive compensation and the agency approach

Group two argues that pay-setting results from executives holding discretionary power because of ownership-control separation (Berle & Means, 1932). Two theories support this line of thought, *managerial power* and *class hegemony* theory. Theorists of managerial power suggest that executives are naturally inclined toward setting their pay when mechanisms to govern their use of power are weak (Bebchuk & Fried, 2009; Van Essen, Otten, & Carberry, 2015).[15] Accordingly, the design of pay becomes an agency issue, not a solution to the agency problem (Bebchuk & Fried, 2003; Bebchuk, Fried, & Walker, 2002). Theorists of class hegemony argue that executives across different firms bond through similar interests and collectively use their shared discretionary power to protect their privileges and wealth (Gomez-Mejia, 1994). Pay is an outcome of social managerial class power to protect their interests and objectives at potential risk.

III. The symbolic approach argues that the primary role of pay is to reflect an executive's status, dignity, and expectations and serve as a motivating mechanism. An executive's myopic behaviour often occurs when they focus primarily on the short-term and ignore the long-term consequences. The theories of pay incentives underscore the significance of myopic behaviour as part of behavioural finance and often include self-deception, heuristic simplification, emotions, and social influence factors. The symbolic approach, for example,

[15] The paper by Winter and Michels (2019) questions the managerial power approach by reassessment of the role of power in corporate governance debates. A key argument used is that 'more power' can mean 'better opportunities' which lead to positive impact between power and compensation.

includes elements that serve as incentives for myopic behaviour among executives. Here, the seven theories are discussed briefly. *See Figure 9.*

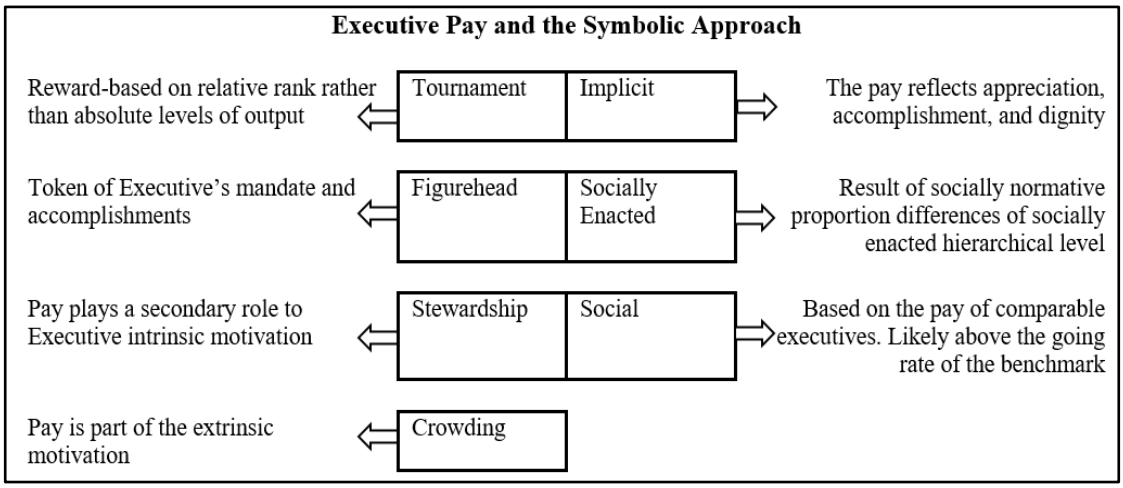


Figure 9: Executive compensation and the symbolic approach

The fundamental theories of the symbolic approach are discussed as follows: (1) *Tournament*. Rank is paramount here. Compensation is not based on performance or accomplishments. The pay is based on rank (Lazear & Rosen, 1981), so as the executive climbs higher in rank, their pay increases. However, the theory is most applicable to lower-level employees who compete for positions on the corporate ladder (Balsam, 2002; Rosen, 1981). (2) *Figurehead*. In this approach, pay is set according to the executive's ability to manage various social, legal, and ceremonial duties pertinent to being CEO of the firm.[16] The pay reflects the status of the executive and is intended to reinforce their figurehead image within the company (Gomez-Mejia, 1994). (3) *Stewardship*. Executive's intrinsic (e.g., need to achieve and receive recognition) motivation to act as true stewards overrides the need to pursue self-interest, even if executives-shareholder interests are not aligned (Davis, Schoorman, & Donaldson, 1997; Donaldson & Davis, 1991). In contrast to agency theorists,[17] and based on the sociological and psychological arguments, executives value their role as stewards, hence cooperation. (4) *Crowding Out*. In a similar vein, this theory argues that if executives have higher levels of intrinsic motivation, they require lower pay, thus fewer incentives to balance their extrinsic and intrinsic motivations. The payment reflects only a tiny portion of the executive's intrinsic and relative motivation. (5) *Implicit*. Also known as 'psychological contracts' held by executives that engage their trust-based behaviour (Baker, Gibbons, &

[16] Ungson and Steers (1984) identified three roles: (1) communicator of key information within and outside firm; (2) manage political coalition within and outside the firm; (3) internal politician between the board and new directors hired, and executive pay-setting process.
[17] Executives are individualistic, opportunistic and self-serving.

Murphy, 2002; Rosen, 1985a). It is a set of beliefs, obligations, and entitlements which executives expect to receive from shareholders and the firm (Morrison & Robinson, 1997; Rousseau, 1989).[18] Pay levels reflect the recognition that the psychological contract has been accomplished (Kidder & Buchholtz, 2002). (6) *Socially Enacted Proportionality*. The pay levels are set based on the hierarchical levels and ranks within a firm. The pay of executives will differ from that of their immediate subordinates (Simon, 1957). The salary of graduates who begin at the lowest rung of the paying scale is based on the market-level driven by peer-firms and forces in the industry. (7) *Social comparison*. In this theory, pay is set in comparison to pay level set for the executive of other industry firms. Pay reflects the normative judgment of the executive of their own pay and experience vs pay and experience of other executives (O'Reilly III, Main, & Crystal, 1988).

There are different theories of pay incentives, though their intrinsic nature converges when it comes to executive compensation. These theories suggest that executive pay is a fundamental governance element within organizations (cf. Hambrick and Finkelstein, 1995). The process of pay setting is affected by the approaches to executive compensation. As a result, pay levels and structures are influenced by socially constructed (national) corporate governance arrangements and organizational procedures and by the motivation of both executives and lower-level employees.[19]

1.4 DEFINITION OF KEY TERMS

According to Deloitte, top-tier US executives' annual compensation package has four components: their base salary (30%), their incentive plans (20%), their long-term incentives (40%), and their benefits (10%).[20] This study focuses primarily on long-term incentive plans. Below, the terms pertinent to this study are defined:

1. *Debt-like compensations* or *ID* - comprise mainly 'deferred' and 'pensions' compensation. These post-employment benefits are paid to CEOs at a fixed amount upon retirement, subject to the firms' solvency. ID exposes executives to the same default risks facing outside creditors.

[18] Psychological contract is rooted in social concepts and reciprocal relationships where people share things of value (Blau, 1968).
[19] Cross reference the following papers: Bebchuk and Fried (2004); Bratton (2005); Conyon and Murphy (2000); Finkelstein and Hambrick (1989); Finkelstein and Boyd (1998); Gomez-Mejia (1994); Jensen, Murphy, and Wruck (2004); Rosen (1985b); Ungson and Steers (1984).
[20] See Deloitte on Executive Compensation: Plan, Perform and Pay.

2. *Deferred* – is an incentive compensation designed to keep executives at the company for a longer period of time. An executive's deferred compensation plan may be qualified or non-qualified and paid later after earning income. Executives may choose deferred compensation since it may offer tax benefits through pension plans, retirement plans, and stock options.
3. *Pensions* – are remuneration plans that an employer promises to pay an executive for life after retirement. Generally, there are two types of plans: "define benefit plans," in which an executive is regularly paid a fixed sum upon retirement. The "defined contribution plan" allows the executive and the firm to invest funds over time for savings later provided to the executives at retirement. They are both referred to as superannuation plans.
4. *Equity-like compensations* – include stock options, employee stock purchase plans, and restricted stock. Executives receive these plans in non-cash payments. As part of equity-like compensation, the executive holds some ownership stakes in the company's investment vehicles.
5. *Stock options* – are when a company offers it's executive the option to buy shares of its stock at a predetermined price (also known as the 'exercise price') subject to certain conditions. A stock option holder cannot exercise, sell, or transfer their options until the 'vesting' date has passed, usually between one and five years. Other conditions might include a method of payment once exercised, a term of award/expiration date, a method and limitation for exercising, and termination conditions (death, disability, or retirement).[21]

1.5 RESEARCH PROCEDURE

The research proceeds in the following manner:

Scope. Management is an international phenomenon. As a result, research findings on executive compensation and its ripple effect may apply to economies with similar pay structures. The GFC impacted the Securities and Exchange Commission in a big way. The commission mandated the disclosure of deferred compensation and defined pension plans for company executives and directors in late 2006. Before this law, most corporations did not disclose such information. Post-2007, however, brought unprecedented economic pressures to the world economy. In August 2020, the global bond market had a value of approximately

[21] See sample Stock Option Agreement contract by U.S Securities and Exchange Commission (SEC).

USD$128,3 trillion. There was $49.9 trillion in corporate debt alone.[22] The US and China dominated the debt securities market. The US owed $10.5 trillion in debt securities compared to China's $7.4 trillion.

Delimitation. Investors in the US bond market are facing escalating levels of debt[23] and credit risks.[24] As a result, agencies and credit risk must be analyzed along with the overall structure of a CEO's compensation package, including the size and level of each pay component. A company's compensation package may provide essential risk-taking incentives and an indication of the magnitude of risk it faces. US markets play a significant role in the global economy, making them ideal for examining the effects of ID and VE among US corporations.

Structure. Chapter 1 introduces the dissertation in five parts. First, background and motivation. Second is the purpose of the research. Third, the theories of pay incentives concisely reviewed essential approaches relevant to Chapters 2 and 3. Fourth is the outline of research procedures. And last, a definition of key terms is used throughout the thesis. Chapter 2 investigates CEO ID and myopic corporate behaviours. It explored the fundamental question: Do CEO ID levels matter? Chapter 3 (Essay Two) focused on bond investors and their response to VE incentives. It examined CEO VE and corporate cost of debt. Empirical tests sought answers to the question: Do CEO VE incentives align Manager-Bondholder interest? Chapter 4 concludes the thesis. It presents the significant findings of E1 and E2 and discusses the implications of the results. A reference and an appendix section are included.

[22] Corporate debt markets differ from public sector debt and from non-negotiable debt such as syndicated and bank loans.

[23] See the updated documents - US Corporate Bond Statistics by SIFMA updated on March 11,2021 (Accessed March 13, 2021); and Bond Market Size by ICMA.

[24] A major risk for bondholders is that a company fails to make timely interest or principal payments. In that case, the company defaults on its bond repayment schedule. The company's credit rating depends on its ability to meet its obligations on time. The bondholders who purchase corporate bonds are lending money to the company issuing the bond. Thus, they have no equity in the company. The bondholders, unlike shareholders, receive only the interest and principal, no matter how profitable the company becomes. In a bankruptcy, bond investors have priority over shareholders when it comes to company assets.

Chapter Two - ESSAY ONE

The impact of CEO inside debt compensation on corporate behaviours:

Does CEO inside debt levels matter?

This chapter examines the effect of CEO inside debt compensation on the myopic nature of firms' decisions. The analysis uses three measures of CEO inside debt – relative debt, relative deferred and relative pension – and tests for an association with (i) myopic management choices, (ii) future managerial choices, and (iii) consequence of the cost of debt. The results show that inside debt lowers the incentive to manage earnings. And reduces myopic management over time, which bond investors can observe, anticipate, and respond to positively. Section 2:1 introduces the topic. Section 2:2 discusses the literature related to the hypotheses presented in Section 2:3. Section 2:4 describes the data and methodology. Section 2:5 details the empirical results.

ABSTRACT

Myopic decisions and actions are often a result of market-driven motivations. Any compensation scheme encourages individuals to manipulate performance metrics. As a result, short-term performance tends to induce manipulation when CEOs prioritize short-term earnings over long-term investments. These decisions may negatively impact a corporation's performance over the long run. First, the research concluded that executives inside debt holdings are associated with less problematic situations (small earnings declines), which may prompt managers to become myopic. Second, inside debt lessens a company's chances of becoming myopic (t+1). Companies with higher debt-to-equity ratios tend to be more long-term oriented and less likely to cut real activity spending. The negative correlation becomes more apparent for firms with younger executives and those with long tenure. Third, inside debt lowers corporate bond yields, demonstrating that shareholders have more trust in companies when executives hold higher debt-to-equity ratios. Inadvertently, inside debt lowers bond yields for bonds with higher risks (e.g., longer maturity and lower credit rating). The results of the multivariate regression remain significant. Inside debt aligns the long-term incentives of managers with those of debt holders, which generally motivates them to utilize less speculative corporate policies and risks.

Keywords: inside debt, deferred plans, defined pension, managerial myopia, executive compensation.

2.1 INTRODUCTION

During the financial crisis of 2007-2009, companies with long-term management objectives consistently garnered higher revenue, earnings, economic profit margins, and market capitalization than their industry competitors (Barton, Manyika, & Williamson, 2017; Barton, Manyika, Koller*, et al.*, 2017). However, the recession exposed two crucial issues relevant to this study. In the first place, the lack of robust mechanisms for corporate governance (e.g., ownership structures, boards of directors, management remunerations, internal control and audit, transparency & disclosure) may have triggered short-term managerial behavior by some CEOs (Jiang, 2018; Kaplan, 2018). Secondly, the recession magnified the inside debt (ID) impact, positively affecting CEO behaviour. Reiterating the importance of restructuring CEO compensation packages to improve firm performance. This chapter examines how ID compensation holdings affect myopic managerial behavior.

The problem and purpose for research*:* The inequity and executive compensation structures highlight the need for an equilibrium between the firm's short- and long-term goals. Top executives must plan strategically and manage and implement company resources efficiently. Well-designed and dynamic compensation plans should align executive interests with shareholders and creditors, reducing equity and debt costs (Jensen & Meckling, 1976; Sundaram & Yermack, 2007; Wei & Yermack, 2011). However, corporate firms face two challenges when designing equitable pay packages: managing the conflict between managers and shareholders. The second challenge involves the disagreements between debtholders and shareholders. Equity compensation is often prescribed to help reduce disputes between managers and shareholders due to its incentive effects. Inside equity (IE) usually exacerbates hostilities by encouraging asset substitutions and shifting wealth risk from shareholders to creditors.

Literature on managerJensen & Murphy, 1990bial compensation has tended to focus on biased IE holdings. Researchers found a positive relationship between CEO incentive effects and shareholder equity values (Currim, Lim, & Kim, 2012; Currim, Lim, & Zhang, 2018). It occurs when the interests of managers and shareholders are aligned (J. Coles, N. Daniel, & L. Naveen, 2006; Core & Larcker, 2002; Nagar, Nanda, & Wysocki, 2003).[25] However, IE

[25] Stock and options as 'Inside equity' can become a substitute for effective governance. It attracts and retains the more productive managers (Banker, Lee, Potter, & Srinivasan, 2000); and investors who associate higher value on riskier opportunities (Certo, Daily, Cannella, & Dalton, 2003).

incentives have also revealed a sinister side. In 2008, for example, among the banks that performed poorly, those firms whose executives held equity-based compensation performed worse (Fahlenbrach & Stulz, 2011).[26] CEOs paid with IE are more likely to make riskier financial and investment decisions (Cohen, Hall, & Viceira, 2000). Option grants and voluntary disclosures are sometimes manipulated by managers, resulting in increased price volatility and increased risk for their firms. Opportunistic behavior is connected to stock option compensation (Yermack, 1997). The more skilled the CEO, the more aggressive the risk-taking investment strategies they will explore to achieve potential economic gains (Aboody & Kasznik, 2000; Lie, 2005).

This chapter aims to determine whether CEO ID compensation reduces myopic corporate behavior. The identification of CEOs with ID is often associated with less risky financing and investment policies, lower costs of debt, and less restrictive loan terms, complemented by robust quality controls and transparent financial reporting (Cassell, Huang, Manuel Sanchez, & Stuart, 2012; Dhole, Manchiraju, & Suk, 2016; Sundaram & Yermack, 2007; Wei & Yermack, 2011). Deferred benefits and defined pensions are common in ID settlements. They are an important part of an executive's total compensation package. Corporate executives sometimes hold even higher debt-to-equity ratios (Bebchuk & Jackson Jr, 2005; Edmans & Liu, 2010; Gerakos, 2010; Sundaram & Yermack, 2007). While there has been progress in implementing internal corporate governance mechanisms, the effects of ID compensation on management myopia remain a vast area for empirical research.

The significance of this study: There has been extensive research demonstrating the stimulative effects of CEO IE holdings and earnings management.[27] However, debt-like compensation schemes of CEOs receive little attention. The results of this study provide additional empirical evidence for the debate between CEO IE versus ID. Until 2006, US firms were not required to disclose compensation paid in a debt-like form.[28] Therefore, investigations into the incentive effects of ID pay and managerial behavior remained strictly

[26] Cash bonus and option incentives were also found to have no adverse impact on bank performance.

[27] See studies that document equity-based compensation and manipulation of firm earnings and real activities: Healy (1985); Bergstresser and Philippon (2006); Dechow and Sloan (1991); Burns and Kedia (2006); and Coles, Hertzel, and Kalpathy (2006); Bartov and Mohanram (2004); Qiang and Warfield (2005); Efendi, Srivastava, and Swanson (2007); Jiang, Petroni, and Yanyan Wang (2010); and, Armstrong, Larcker, Ormazabal, and Taylor (2013).

[28] The Securities and Exchange Committee mandated disclosure of defined pension and other deferred compensations (ODC) only came into effect early 2007. Prior 2007, majority of U.S Corporate firms did not disclose such information.

confidential. Despite this, recent scandals involving undisclosed CEO earnings, GFC economic upheavals, and the COVID-19 pandemic have prompted greater oversight by regulators, policymakers, and academics (Kelly, 2020; Marques, 2020; Prentice, 2020). Even though CEOs control corporations and make crucial strategic decisions that positively influence firm value, shareholders remain owners, and bondholders remain creditors. Investigating the impetuses of effective ID will provide firms with new insight to aid them in designing appropriate and equitable compensation packages for their executives. This study is significant for three reasons:

Firstly, it provides further evidence supporting ID compensations. According to the economic theory of agency conflicts, ID is a suitable mechanism to lessen risk appropriation concerns.[29] This study helps to mitigate the potential risk of conflict between shareholders and debtholders (Edmans & Liu, 2010; Jensen & Meckling, 1976). Empirical evidence consistently supports the theoretical predictions. Increasing ID reduces risk-seeking behaviour by aligning the interests of both managers and debt holders (Anantharaman, Fang, & Gong, 2013; Cassell *et al.*, 2012; Chava, Kumar, & Warga, 2009; Chen, Dou, & Wang, 2010; Sundaram & Yermack, 2007; Tung & Wang, 2012; Wang, Xie, & Xin, 2010, 2017; Wei & Yermack, 2011). Evidence suggests that investors are less concerned about appropriation risks when executive compensation contains higher debt-to-equity ratios. Bondholders are also less inclined to demand more rigorous accounting practices (Chi, Huang, & Sanchez, 2017; Dhole *et al.*, 2016; Li, Rhee, & Shen, 2018; Wang *et al.*, 2017).

Secondly, we complement the corpus of earnings management literature which emphasizes discretionary activities for long-term growth. According to Dhole *et al.* (2016), firms with higher ID levels are less likely to manipulate accruals-accounting measures and real spending to meet or beat earnings targets. Real activity spending included abnormal cash flows from operations, production costs, and discretionary expenditures. In this paper, we adopt a more rigorous method of identifying myopic firms and project future measures of myopia. This paper demonstrates that ID can reduce CEO myopia (t+1).

Third, we add to the literature dealing with market-induced myopic operation and investment decisions. Managerial myopia occurs under certain conditions and even persists among rational managers and investors (Bebchuk & Stole, 1993; Narayanan, 1985, 1996;

[29] See the relevant discussion in chapter 1 under the *Imperfect Contracting Approach* and in particular the Agency Approach section.

Shleifer & Vishny, 1989; Stein, 1988, 1989). We contribute by showing that the myopic behaviour of firms can reduce by including more ID in a CEO's compensation package.

Key findings: The study examined a broad sample of US companies, except for those engaged in financial services and public utilities, from 2006 to 2017. We use three variables to explain ID: (1) *Relative debt* as a ratio of a CEO's inside leverage to the firm's leverage. (2) The *relative deferred* ratio of the CEO's deferred compensation-to-equity to the firm's leverage. (3) The *relative pension* ratio of the CEO's pension-to-equity versus the firm's leverage. The three measures are similar to those used by previous researchers (Anantharaman *et al.*, 2013; Cassell *et al.*, 2012; Dhole *et al.*, 2016; Li *et al.*, 2018; Sundaram & Yermack, 2007; Wei & Yermack, 2011). In addition, we examine whether higher ID holding affects: (1) incentives for firms to become myopic, (2) realised myopia at (t+1), and (3) the cost of debt. Three related findings tested in this study are hereafter summarized.

First, we found a negative association between ID and the 'chances' or 'incentives' for firms to become myopic. We follow the methodology suggested by Bushee (1998), where minor cuts in earnings indicate that firms face a problematic situation that leads to myopic behaviour.[30] While Dhole *et al.* (2016) remain closest to this research, we use Bushee's alternative method to identify incentives to manage earnings.

Second, younger and long-tenured CEOs may benefit from higher IDs in reducing their realised myopia (t+1). The difference in ROA, MKT, and R&D between each firm, i, and period t, provides an indication of myopic managed firms. Intuitively, myopic managed firms will concurrently exhibit greater-than-normal profitability, less-than-normal marketing expenditure, and less-than-normal spending on R&D. The method used to identify the *realised* $myopia_{t+1}$ measure combines the models by Mizik (2010); Mizik and Jacobson (2007) and Braam, Nandy, Weitzel, and Lodh (2015).

Thirdly, higher ID holdings lead to positive external bond investor reactions. Bond investors perceive lower risk in bonds issued by firms that use ID, so they require lower premiums. ID reduces the bond yield spread, especially for bonds with higher risks, longer maturities, and lower credit ratings. Bond yield spreads are measured by the difference between bond yield to maturity and the interpolated yield on treasury bonds (Anderson, Mansi,

[30] *Earning decline* takes a binary outcome where the value of one suggests the firm's earnings before R&D and taxes (EBTRD) fell relative to its prior year ($EBTRD_t < EBTRD_{t-1}$), but by an amount that can be reversed if difference is smaller than prior R&D ($R\&D_{t-1}$), and zero otherwise.

& Reeb, 2004; Hao, Prevost, & Wongchoti, 2018; Prevost, Wongchoti, & Marshall, 2016).

Delimitations and procedures: The study is restricted primarily to a sample of US firms from 2006 to 2017. Although the study shows that ID is negatively associated with the alternative proxies of myopia, it does not explore the optimal debt-to-equity ratio for executives. The paper also focuses on only two components, actual activity spending (marketing and R&D expenditures) and not account-based earnings (discretionary accruals). We chose not to utilize discretionary accruals because real activities significantly impact future firm performance. In section 2.2, we review relevant literature on myopia. Section 2.3 develops the hypotheses of ID and myopia. Section 2.4 describes the collection of data and methodologies. In Section 2.5, we discuss the empirical results.

2.2 MYOPIC LITERATURE

Myopic behaviour is a part of behavioural finance and includes self-deception, heuristic simplification, emotions, and social influence factors. Much has been published about agency approach theories and how they affect executive compensations (Ferri & Gox, 2018; Gox & Hemmer, 2020; Meng & Tian, 2020). The primary focus of myopic behaviour is the present.

This review sheds light on decisions made with a short-term focus despite the long-term costs. We evaluate myopic literature and ask if CEOs inside debt levels help mitigate myopic behaviour? The following section continues the discussion of pay incentives which we began in the introduction and analyses papers that focus on corporate behaviour and myopic management incentives. This section examines the economics, finance, and management aspects of agency theory.

2.2.1 Agency Theory in Economics

Agency theory in economics is the embryonic and foundational theoretical framework for exploring the relationship of principal-agent and governance mechanisms as they connect to various distinctive disciplines.[31] Scholars in economics dating back to the 1700s first scrutinized this theory (Akerlof, 1970; Kenneth Joseph Arrow, 1971; Holmes, 1891; Marschak & Radner, 1972; Ross, 1973; Rothschild & Stiglitz, 1978; Smith, 1776; Spence, 1973). Smith (1776), recognized as one of the most distinguished thinkers of the Enlightenment era, helped set the fundamental assumptions about state, politics, history, law, ethics, and economic development and reform. In his magnum opus, *An Inquiry into the Nature of Causes of The Wealth of Nations*, Smith proposed the division of labour at the micro-economic level but did not develop it further. He did not use the contemporary terms "agency" or "corporate governance," nor did he develop a managerial governance model (Fleckner, 2016). Smith was a pioneer in prompting awareness of the underlying problem of firm managers in a capitalist society with the habit of becoming financially imprudent, deceitful, or prone to circumvent the company's proprietors. He asserted that laxity and profusion are expected to be common in

[31] See papers on behaviours of organizations (Eisenhardt, 1985; Eisenhardt, 1989; Kosnik, 1987), marketing (Basu, Lal, Srinivasan, & Staelin, 1985), accounting (Demski & Feltham, 1978), economics (Spence & Zeckhauser, 1978), and finance (Fama, 1980).

such companies, especially when corporate ownership and control are divorced.[32] Unfortunately, Smith does not elaborate on this aspect further.

Holmes (1891) reiterated the extent of exceptions for principals and employers (firm owners) to ward off accountability for the legal infractions of the laws in their relationship with non-servant agents and independent contractors. Later, scholars focused on markets with asymmetric information. Akerlof (1970) stressed why information asymmetries were crucial with the risk of agents exploiting market participants. Spence (1973) identified 'job signalling' due to private information held by the agents. How uninformed agents respond to information asymmetry was the emphasis by Rothschild and Stiglitz (1978). These early contributions regarding markets and asymmetric information are intrinsic to the agency problems that emerge between corporate owners (shareholders and debtholders) and their managers (executives).[33]

2.2.2 Agency Theory in Finance

The early discussions by economists prepared the cradle for the birth of scholarly debate in Finance. Since the early 1900s, investigations have addressed managerial agency (Berle & Means, 1932; Demsetz, 1983; Fama, 1980; Fama & Jensen, 1983; Jensen & Meckling, 1976). Berle and Means (1932), building upon the economic premise by Smith (1776), did not appear to be optimistic that the interest of managers and shareholders could be co-aligned. Because managers did not have equity ownership in firms, they lacked the motivation and the incentives to act for the principal. While stockholders benefited from the corporation's profits, they have no control over efficiently operating the company because they have surrendered all disposition and control to the managers. Under this condition, the conflicts of interest between the principal and agent may be resolved only in the agents' (managers) favour. Early economists had identified the principal-agent risk-sharing issues among individuals and groups (Kenneth Joseph Arrow, 1971; Eisenhardt, 1989; Wilson, 1968). Kenneth Joseph Arrow (1971) pointed out that agency relationships begin when the principal hands over or delegate authority to the managers. This results in firm owners becoming solely reliant upon the decisions made by the managers, disadvantaging the principal. His theory concentrated on risk aversion for the univariate utility function V(x).[34]

[32] See Galbraith (1987); Cf. Galbraith (1992); also see Pack (2010).
[33] See early established works on the 'Theories of Markets' (Jevon, 1871; Menger, 1871; Walras, 1874) that extend the traditional views of Smith (1776).
[34] Cf. Pratt (1964).

Burnham (1941) pointed to the probable increase of conflict when agents put their interests ahead of the principal of an organization. Although primarily addressing production managers (and not finance executives), three main themes may be drawn from Burnham's work. Firstly, the instruments of production are a major source of social dominance (Burnham, 1941, p. 89). Managerialism, due to its technical indispensability, becomes supreme for him. The system replaced capitalism, socialism, and fascism as the basis for controlling society (Gordon, 1942). Second, the managerial revolution and production depended upon state ownership, including "collective action, planning, security, coordination, and the elite" (Gordon, 1942). So, when state ownership deprived individuals of their property rights, they were unable to climb the economic ladder. The solution he proposed was simple; managers needed to control the state indirectly, which influenced the company's production (Burnham, 1941, p. 65). Third, managers are often motivated by their own interests. The result is "effective control over access to the means of production, symbolized by preferential treatment in the distribution of income." Thus, "social power" is rejected.[35]

The influential work of Jensen and Meckling (1976) marks the birth of the agency theory in the financial economics literature. Allusions to the agency theory may be identified in the earlier work of Coase (1937, 1960). However, Jensen and Meckling (1976) were the first to accentuate that a "contract" was essential to establish principal and agent rights within an organization. They drew from the rubric "property rights" literature by Alchian and Demsetz (1972). They stressed that although the principal and agent are in reciprocal behaviour, agency conflicts are inescapable because each party may adopt a different conflict resolution strategy (Jensen & Meckling, 1976). Hence, monitoring an agency relationship is crucial to ensure viable firm structures and corporate governance mechanisms to control agency problems created by the separation of ownership controls. It should be expected that the attempt to reduce opportunistic behaviours will incur agency costs due to broken contracts between the principal and agent. Agency costs include: (1) the overall expenses of monitoring, (2) the bonding costs between principal and agent, and (3) the residual losses. Residual loss is the primary expenditure that the principal seeks to reduce. The principal incurs monitoring costs by minimising residual loss, and the agent incurs bonding costs. The principal may control agency costs, but the minimum of the three costs are irreducible (Williamson, 1985).

[35] Gordon (1942); Cf. Johnston (2015).

Fama (1980) discusses the ownership of a firm through "contracts." He claims that firm managers are often influenced by internal and external market disciplines and opportunities for their services (1980, p.288). Hence, the need for security options (such as stock and bonds) to curtail the self-serving behaviour among top executives. Fama distinguished between "capital ownership" (shareholders and bondholders) and "firm ownership." And noted the essential role of the capital and labour markets as transparency mechanisms and quality checks against executives exploiting their powers. Thus, encouraging executives to be frugal when the market provides opportunities for their services. Fama and Jensen (1983) proposed stock-based packages. The incentive for agents who own equity in a firm naturally aligns their interests with firm owners. Bonds and stocks offer different levels of risk and return trade-offs. Bonds provide a lower return because the risk of holding bonds is lower relative to holding stocks. Stockholders (or equity holders) have higher risk-bearing and ownership of capital. Thus, reducing the costs of agency risks.

Two streams of agency theories are identified: The *positivist agency theory* and *pure principal-agent perspectives*. They share common themes using "contracts" as the primary form of analysis and the assumption that human nature is unique to each individual and influences their decision-making (sometimes self-centred or opportunistic) [36] and the precarious future of organizations and information asymmetry.

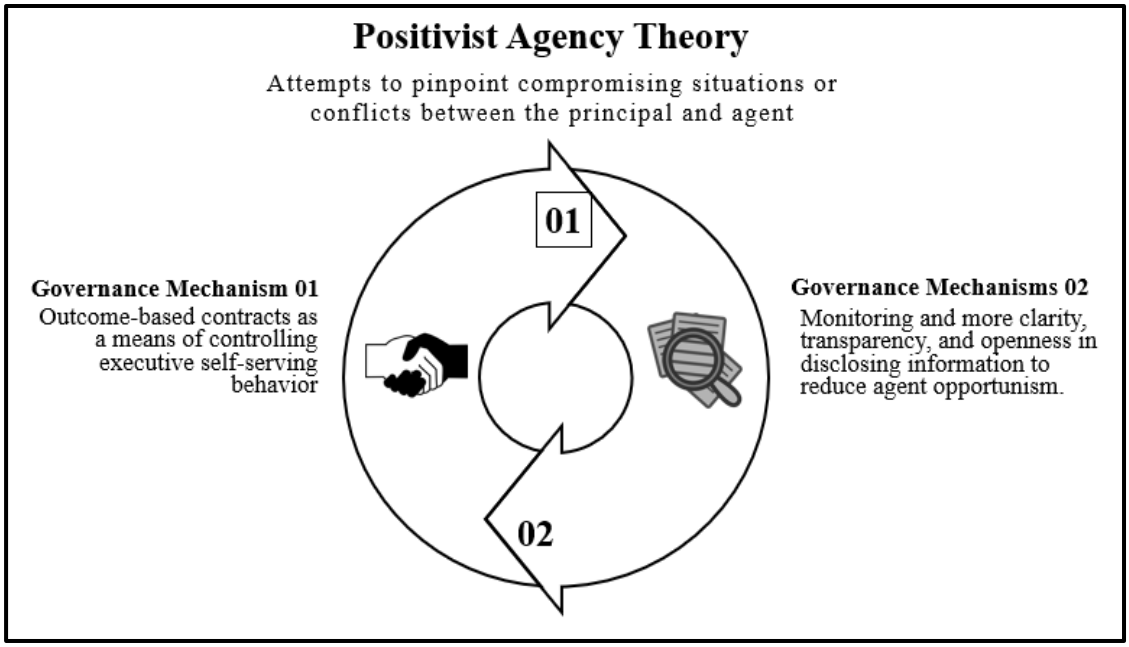


Figure 10: Positivist agency theory

[36] See the papers by Eisenhardt (1989); Jensen (2003); Simon (1955); Williamson (1985)

The positivist theory (*see Figure 11*) is primarily concerned with "why certain contractual relations arise" (Jensen 1983, p. 362) and governance mechanisms that help to resolve agency problems.[37] Despite its limitations, the positivist stream enriches economics by offering a more complex view of organizations and mechanisms to mitigate agency conflicts.[38]

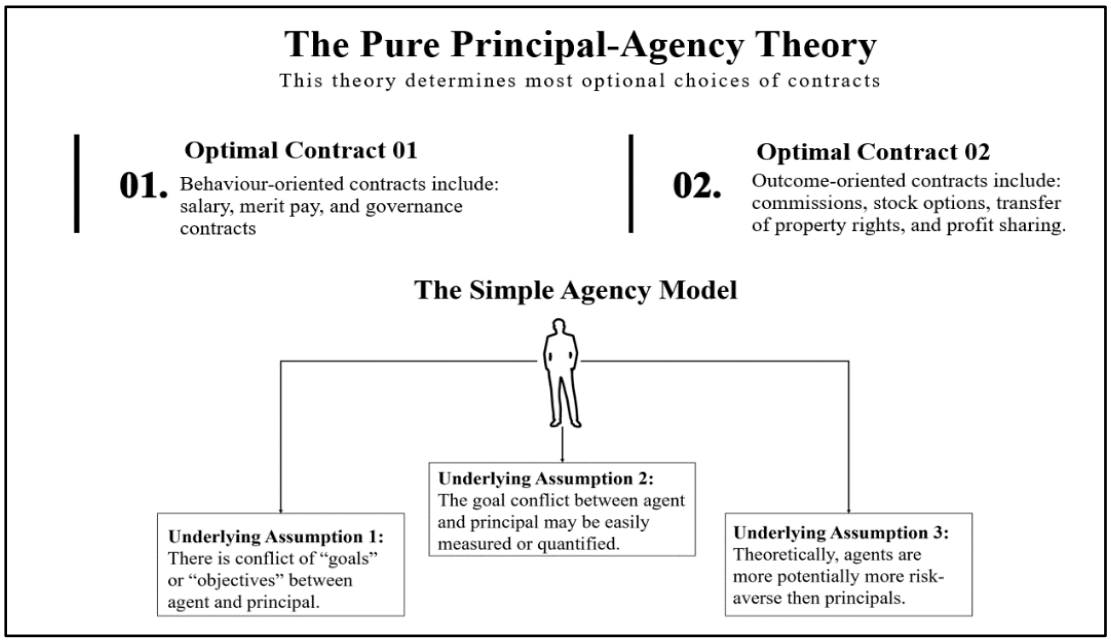


Figure 11: The pure principal-agency theory

The primary concern of the pure principal-agency theory[39] is complete information and transparency between principal and agent (*see Figure 11*). However, the trade-off between the costs that arise from the principal-agent risk-sharing and agent monitoring is crucial. If there is asymmetric information between the agent and the principal, then the risk shifts from the agent to the principal, and it becomes more challenging to monitor the agent's behaviour. Additionally, this shift of risk makes it difficult to measure outcomes (Anderson, 1985), compounding the monitoring of agent behaviour and the ability to structure an ideal or

[37] According to the theory, firm ownership of top executives curbs opportunism and risky managerial behavior. Another way to curb opportunism is through 'information systems'. The information effects of board of directors acts as mechanism for governance (Daily, Dalton, & Cannella Jr, 2003; Fama & Jensen, 1983; Rechner & Dalton, 1991); monitors against opportunistic management (Daily *et al.*, 2003; Fama & Jensen, 1983; Rechner & Dalton, 1991) and their role for firm performance (Mallette & Fowler, 1992; Park & Shin, 2004; Weisbach, 1988).

[38] Organizational theorists have criticised the positivist theory as minimalist (Hirsch, Michaels, & Friedman, 1987; Perrow, 1986). Microeconomists, on the other hand, have considered it to be tautological and lacking rigor (Jensen, 1983). Nonetheless, the positivist agency theory has ignited considerable research and popular interest (Barney & Ouchi, 1986)

[39] The Simple Agency model has been described in various ways by different writers – see Demski and Feltham (1978); Harris and Raviv (1979); Hölmstrom (1979); Shavell (1979). And, 'Underlying Assumption 3' is based on the argument that agents are more risk-averse when they are unable to diversify employment and Principals become risk neutral when they diversify investments (Eisenhardt, 1989).

equitable remuneration contract. Individual agents vary widely in their attitude towards risk-taking (Harris & Raviv, 1979; MacCrimmon, Wehrung, & Stanbury, 1986). There are several extensions to the simple agency model[40]; see *Figure 12*. The different extensions reflect the behavioural attitudes of the principal and agent and the optimal contract.

The agency streams are complimentary. The *positivist agency* identifies contract alternatives to align principal-agent interests. The *pure principal agent* determines which contract is most efficient under varying circumstances (e.g., risk aversions, goal conflicts, and information asymmetries). While outcome-oriented contracts solve issues of aligning principal and agent interests, it falls short of establishing a fair and equitable compensation package.

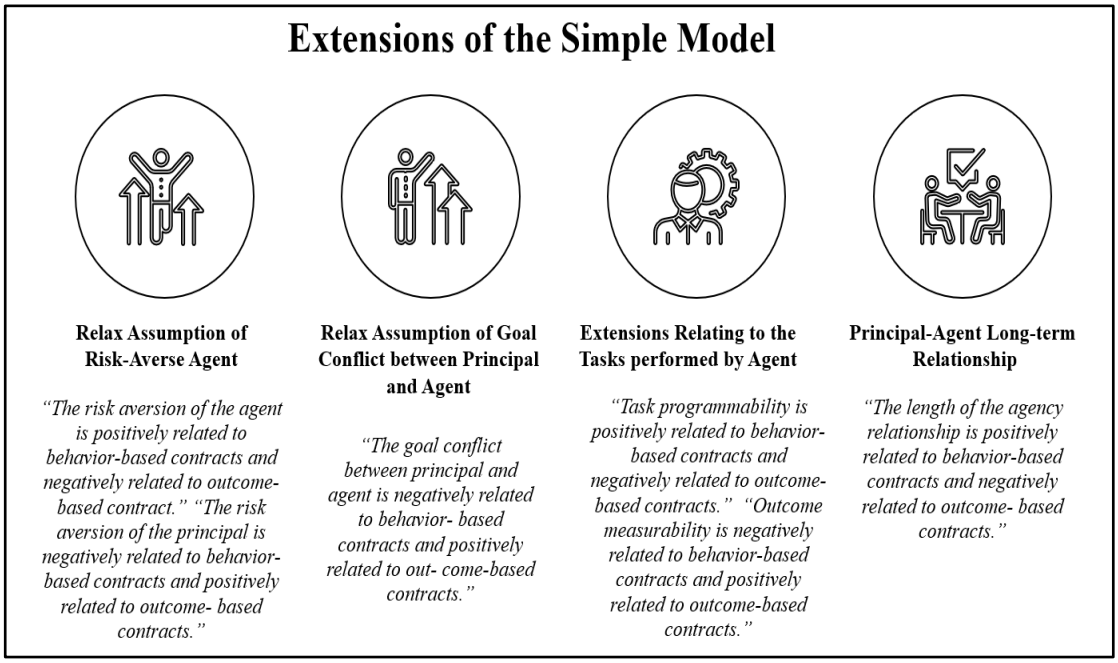


Figure 12: Extensions of the simple model

2.2.3 Agency Theory in Management.

Agency conflict stems from different ideas, goals, and perspectives between managers-shareholders-debtholders (Simon, 1955). Diversity can only attain a 'satisficing' or 'second-best' alternative and not the ultimately perfect outcome (see the '*imperfect contracting approach*') even after accounting for all potential risks associated with a course of action (Cyert & March, 1963). If managers were given ownership, as postulated in the '*Theories of Pay Incentives,*' they would likely seek to maximize personal gains. Managers put in extra effort

[40] See Eisenhardt (1989) 'Agency Theory: An Assessment and Review'. See section 'Principal-Agent Research' specifically Propositions 3-10 for more detailed explanation on these extensions.

to increase earnings once they meet the shareholder's required rate of return (Baumol, 1959). According to '*The value approach,*' firms seeking more significant market influence would maximize profit accruals. However, Baumol failed to consider the short and long-term performance effects of maximizing earnings (Christopher & Bryan, 1978). Salary, power, and reputation incentivized executives to make costly long-term consequences (Williamson, 1963). Firms thrive when there is a balance between their short-term and long-term goals and objectives (Marris, 1963). However, maintaining optimal value hinged on the skills and efficiency of the manager.

Myopic management then thrives under two types of environments: hidden action and information. Under poor market conditions, the activities of top-level decision-makers are less visible to firm owners making it easier for managers to make suboptimal decisions. The *agency approach* suggests that such conditions adversely influence managers to elevate self-wealth creation at the overall expense of firm value. Managers with asymmetric information and overly concerned with performance indicators engage in myopic behaviour (Grant, King, & Polak, 1996; Hirshleifer, 1992, 1993). Myopic managers often take advantage of and manipulate the favourable market expectation of a firm's value (Bizjak, Brickley, & Coles, 1993; Brandenburger & Polak, 1996). Sometimes, managers tamper with market perceptions even when the market may observe their actions (Akerlof, 1970; Brandenburger & Polak, 1996; Spence, 1973). Actions taken by executives should secure both short and long-term value if the firm is to survive (Merchant, 1990; Porter, 1992; Van der Stede, 2000).

Managerial myopia occurs when managers manipulate account-based earnings, such as discretionary accruals activities. Achieving earning targets is a high priority for CEOs motivated by firm owners' expectations of profits. These firm executives would engage in income smoothing, which is perceived as less risky to investors (Graham, Harvey, & Rajgopal, 2005). Firms sometimes close in on a zero earnings benchmark to temporarily boost sales earnings by giving price discounts (Roychowdhury, 2006). Managers will then receive today's earnings in exchange for potentially higher future earnings (Laverty, 1996, 2004). Managers driven by the desire for immediate gratification will often manifest such behaviours (Frederick, Loewenstein, & O'Donoghue, 2002; Loewenstein & Thaler, 1989). Sometimes mispricing in the stock market is linked to firm managers who inflate current earnings by cutting R&D spending. Usually, they are investors with short-term ownership. These firms offer executive compensation packages related to stock price or equity bias (Garel, 2017). Firms with a large

proportion of institutional investors holding transient ownership characteristics are more likely to cut spending on R&D. Marketing myopia encourages managerial short-termism (Bushee, 1998; Stein, 1988).

Managerial myopia also occurs when managers can alter real activities investments such as marketing and research and development expenditure. The long-term net economic impact is increasingly significant for firms whose managers manipulate actual investment activities compared to account-based earnings (Mizik, 2010). Although earnings management practices result in negative consequences for firms, when uncovered, cutting real activity spending affects the foundation of a firm's long-term performance. Real activity spending alters the amount and temporal flow of real economic profits. Hence, managers are more inclined to sacrifice assets that do not appear on the balance sheet nor related to production (Stein, 1989). Often discretionary marketing and R&D spending are usually the first to face the axe when managers fear the earnings targets are beyond reach or during an economic crisis (Baber, Fairfield, & Haggard, 1991; Deleersnyder, Dekimpe, Steenkamp, & Leeflang, 2009; Roychowdhury, 2006). CEOs reduce or cut R&D expenditure in the final years before retirement (Dechow & Sloan, 1991). Firms often manipulate marketing expenditures when they raise capital by offering seasoned equity offerings. These firms inflate earnings during offering periods, thus temporarily misleading investors (Mizik & Jacobson, 2007).

2.3 HYPOTHESES DEVELOPMENT

The background literature (Section 2.2) illustrates the principal-agent conflicts associated with corporate ownership and control separation. Those analyses point to two prominent themes: (a) the role of outcome-based contracts and (b) information transparency as fundamental mechanisms for controlling managerial behaviour. The theoretical links (*Figure 13*) illustrate the subsequent tests (hypotheses) of the effect of ID on the alignment of CEO and firm interests.

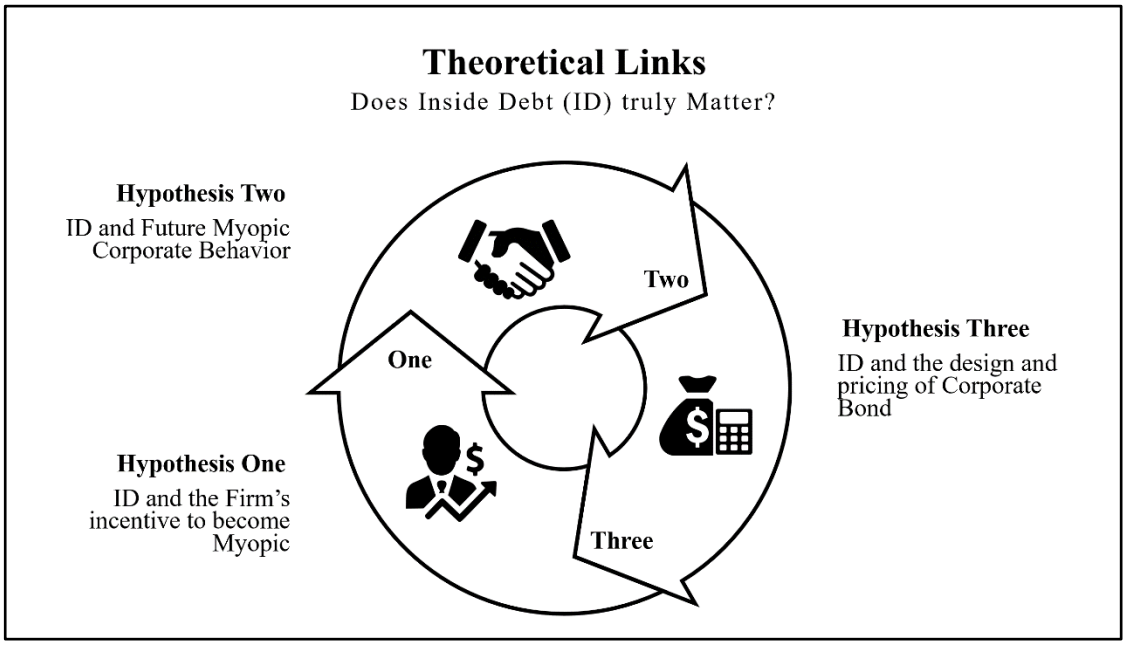


Figure 13: Essay 1 - Theoretical links

Section 2.3.1 establishes the association between ID and the opportunity for managers to become myopic (*Hypothesis One*). Section 2.3.2 explores if ID discourages future myopic behaviour (t+1) (*Hypothesis Two*). Section 2.3.3 evaluates the consequences of ID holdings and the cost of debt (*Hypothesis Three*).

2.3.1 ID and the Firm's Incentive to Become Myopic

CEOs are often encouraged to become myopic when confronted by insidious corporate situations and challenges.[41] These conditions often prompt CEOs to manipulate or cut real activity spending to meet or exceed earnings targets. Sometimes elite CEOs are seduced by

[41] See relevant studies of corporate situations that encourage accrual management: bonus plans (Gaver, Gaver, & Austin, 1995; Healy, 1985; Holthausen, Larcker, & Sloan, 1995), provision of bad debts (DeAngelo, 1988; McNichols & Wilson, 1988), debt covenants restraints (DeFond & Jiambalvo, 1994; Jaggi & Lee, 2002; Jha, 2013), initial public offerings (Siew Hong Teoh, Ivo Welch, & Tak J Wong, 1998), seasoned equity offerings (Cohen & Zarowin, 2010; Kim & Park, 2005; Siew Hong Teoh, Ivo Welch, & T. J. Wong, 1998)

exorbitant rewards to exceed the forecasted earnings (Bartov, Givoly, & Hayn, 2002; Koh, Matsumoto, & Rajgopal, 2008). However, failing to satisfy the predicted set earnings target reduces R&D spending (Skinner & Sloan, 2002) or temporary cuts to R&D spending (Kabukcuoglu, 2019; Shon & Yan, 2015). Similarly, companies that suffer a slight decline or loss in profits usually have a higher incentive to exploit R&D investment (Burgstahler & Dichev, 1997; Bushee, 1998). Baber *et al.* (1991) brought this phenomenon to the forefront in their study. For CEOs, the year earnings per share become the benchmark for operations. However, market analysts are still using the same yardstick to measure the quality and productivity of executives. Thus, the motivation of some CEOs is magnified to ensure that the company appears successful (Barth, Kasznik, & McNichols, 2001). Gomez-Mejia, Cruz, and Imperatore (2014) detected that CEOs of family-controlled firms that value 'family identity' instead of 'control and influence' were less expected to embrace manipulation of R&D expenditures.[42] The inquiry by Tsao *et al.* (2017) concurs with this finding. But, they did not include control-enhancing processes, such as voting-cash-flow rights.

In retrospect, there are two requisite features of ID compensations. (a) The pay-off structure resembles a put-option, motivating debtholders to become long-term investors. (b) CEOs paid in pensions, and deferred compensation is more likely to become long-term bondholders (see debt-like compensation in chapter 1). They have higher incentives to respond to the volatility of debt security and a firm's liquidation value by limiting the risks, which can negatively affect the value of their compensation schemes long-term. Because holding large debt ratios encourages CEOs to preserve the value of their holdings long-term, a higher ID holding should lower the probability of the firm managing earnings upward. Hence, we use small earnings decline to indicate instances where the firm manipulates earnings positively by cutting R&D expenditure for the current year. This leads to the following hypothesis:

H1: There is a negative association between CEO ID and small earnings decline.

2.3.2 ID and Future Myopic Corporate Behaviour

ID holdings play a requisite role in reducing a company's chances becoming myopic (t+1). Sundaram and Yermack (2007) have demonstrated how large and old US firms have benefited because CEOs often remain and work until they are eligible for a pension. CEOs would often

[42] Other studies of corporate situations that encourage manipulation of real-activities include: debt covenant violations (Tsao, Chang, & Koh, 2017), seasoned equity offerings (Cohen & Zarowin, 2010; Kothari, Mizik, & Roychowdhury, 2015)

undertake financing and investment decisions that protect the value of their pensions. The study by Cassell *et al.* (2012) supports this finding. Top-level CEOs are less likely to adopt high dividend policies that may endanger their future pension value (Eisdorfer, Giaccotto, & White, 2015). Tax sheltering activities are curbed with high relative debt (Chi *et al.*, 2017). Risks related to mergers and acquisitions are lower in the presence of ID holdings. Bondholders, in the short term, benefit at the expense of shareholders. However, post-merger, the acquiring firms would often restructure the remuneration packages of CEOs, which inadvertently reduces risk-shifting long-term (Phan, 2015).

Bank CEOs often took on less risk when holding the ID. During the recent global crisis, industrial firms were outperformed by Banks because they were subject to more stringent regulations prohibiting them from undertaking adverse and needless risks (Tung & Wang, 2012). Incentives to manipulate account-based earnings were reduced in the presence of ID (Dhole *et al.*, 2016). Security markets have a long-term focus and are not short-sighted. Therefore, they penalize myopic-managed companies (Jensen, 1988). The penalities were far more severe among companies with high investor sophistication (Tong & Zhang, 2014). Equity compensation packages did motivate higher advertising and R&D expenditure. These spending decisions demonstrated a constructive long-term compensation effect on market returns (Currim *et al.*, 2012). However, when CEOs resisted the pressures from analysts to meet target earnings, the tendency to retain long-term stock performances was higher (Currim *et al.*, 2018).

Acting in the interests of either the shareholders or bondholders is not a direct cause of myopia. Myopia arises when managers focus only on the firm's performance at the expense of the company's long-term growth. Refer to section 2.2.3 for an extended review on how risk-taking affects managerial myopia. CEOs with higher ID levels are expected to be less prone to engage in short-term decisions. This is because the features of debt-based securities made them more consistent with the long-term interest of the firm. Therefore, a higher ID holding is expected to reflect the greater long-term focus, reflected in an expected negative association between CEO ID and the proxy for future myopia (t+1). This leads to the central hypothesis:

H2: There is a negative association between CEO ID and future myopia (t+1).

Age has a direct influence on CEOs' risk appetite. CEOs worry about their careers, which prompts them to undertake conservative investments and policies that safeguard their

self-interest.[43] This is especially true for younger CEOs with longer tenure (Gibbons & Murphy, 1992a). Those with career concerns were more risk-averse. Especially if they lacked experience and prospects to land a secure or satisfying job (Hirshleifer & Thakor, 1992; Holmström, 1999). Absent contracts, CEOs would work harder in their early stages to build up recognition and credibility and not vigorous in their later years (Holmström, 1999; Hölmstrom, 1982). And young inexperienced managers of mutual funds, security analysts, and forecasters of macroeconomic activities are more likely to lose their job for poor firm performances (Chevalier & Ellison, 1999; Hong, Kubik, & Solomon, 2000; Lamont, 2002).

Younger CEOs are often much bolder in taking riskier investments.[44] Such as taking on high-risk acquisitions, which forecast higher returns for the firm. It was even more so if they held equity assets or when they expected or had the power to influence a significant compensation post-acquisition (Matta & Beamish, 2008; Yim, 2013). Li, Low, and Makhija (2017) concurred with these previous findings, but they did not consider the influence of pay incentives. Other studies have also established that a CEO's pay package does incentivize riskier decisions that result in firms devaluing (J. L. Coles, N. D. Daniel, & L. Naveen, 2006; Rajgopal & Shevlin, 2002; Sanders, 2001). As the related literature has confirmed, younger CEOs often have less to worry about job security. They get bolder because they are usually the last to get fired or forcefully removed if a company performs poorly (Jenter & Kanaan, 2015). Those who lost their jobs had no difficulty finding re-employment and received similar pay packages (Eckbo, Thorburn, & Wang, 2012). Studies also expect younger CEOs with career concerns to manipulate the market perception of a firm's performance. In their early years, it is easier for young CEOs to overstate firm earnings, especially if a firm's external and internal governance is weak (Ali & Zhang, 2015; DeAngelo, 1988; Elliott & Shaw, 1988). These firms observe low-quality financial reports and higher firm risks than their counterparts (Huang, Rose-Green, & Lee, 2012). Because of their long career horizon, younger CEOs can recoup any negative loss incurred and repair their damaged reputation (Prendergast & Stole, 1996). Younger CEOs often manage accruals instead of real activities when their firms are not reaching their targets, potentially destroying long-term value (Demers & Wang, 2010).

[43] See Bizjak, Lemmon, and Naveen (2008); Yim (2013) and compare with Fama (1980); Holmström (1999); Lazear and Rosen (1981).
[44] See papers that associate corporate risk-taking and younger CEOs (Bertrand & Schoar, 2003; MacCrimmon *et al.*, 1986; Orens & Reheul, 2013)

Kirton and Mulligan (1973) established that older executives were more conservative and less confident than their younger counterparts. A report on developments in corporate policies affecting older workers presented to the US Congress in 1981 also included a survey of top executives in the nations leading executive recruiting firms (Congress of the U.S, 1981). It discovered that when firms required specialized skills or during a financial crisis, the age factor was ignored. In those situations, CEOs best qualified, despite age, were selected. The above observations are supported by the findings of Hambrick and Mason (1984). They demonstrated that older executives were more conservative risk-takers than their younger counterparts. And while they may have shorter career horizons that should have incentivized greater focus on immediate project gains (Kabir, Li, & Veld-Merkoulova, 2018; Levesque, Phan, Raymar, & Waisman, 2014), they still chose less risky projects and policies that reduced firm risks compared to younger CEOs (Barker III & Mueller, 2002; Gibbons & Murphy, 1992b; Lundstrum, 2002; Serfling, 2014). Cuts in R&D spending were not observed in CEOs approaching retirement (Cazier, 2011) because of stock ownership incentives (Dechow & Sloan, 1991). If a higher ID represents a lower incentive to manipulate real activities, ID-Myopia should have a pronounced negative relation for younger risk-taking CEOs. This leads to the sub-hypothesis below:

H2A: The CEO ID-Myopia association is stronger for young CEOs.

Realised myopia, inside debt and entrenchment. Corporate governance structures and firm performance are negatively affected by managerial entrenchment, which is an extremely costly principal-agent conflict (Ruback & Jensen, 1983). As CEOs acquire more authority and administrative control, they are more likely to become entrenched and pursue their own interests rather than those of shareholders[45] (Berle & Means, 1932; Jensen, 1986; Jensen & Meckling, 1976; Weisbach, 1988). Some CEOs are motivated by power and practice anti-takeover tactics, such as poison pills, golden parachutes, or supermajority amendments.[46] Other CEOs lack the skills, competence, and qualifications to manage a firm and instead adopt unethical strategies for self-preservation (Herman, 1982; Shleifer & Vishny, 1989). Inadvertently, entrenched CEOs utilize complex investments or diversification to secure their positions, making the task of replacing them more expensive, and forcing shareholders to retain

[45] See papers that link managerial objectives and empire building, fame, and/or consumption of benefits at the high cost of long-term firm effectiveness (Baumol, 1959; Shleifer & Vishny, 1997; Williamson, 1963).
[46] See papers Arikawa and Mitsusada (2011); Barnhart, Spivey, and Alexander (2000); Singh and Harianto (1989); Subramaniam (2001).

them at the expense of the long-term viability of the firm (Bebchuk *et al.*, 2002; Chatterjee & Hambrick, 2007; Morse, Nanda, & Seru, 2011; Sauerwald *et al.*, 2016; Wade *et al.*, 2006).

It is often the case that entrenched CEOs suffer less monitoring and are subject to fewer disciplinary actions since they can evade the rigorous controls and mechanisms put in place to regulate corporations (Berger, Ofek, & Yermack, 1997; El-Khatib, Fogel, & Jandik, 2015; Hermalin & Weisbach, 1998; Walsh & Seward, 1990). With tenure, a CEO's authority and influence increase (Altunbaş, Thornton, & Uymaz, 2018; Arthur, 2001; Hill & Phan, 1991; Shen, 2003). CEOs become entrenched for a variety of reasons. CEOs play an important role on the board and in the selection process. Frequently, they influence board decisions (Coles, Daniel, & Naveen, 2014; Mace, 1979; Shivdasani & Yermack, 1999). To protect their authority, loyal directors are appointed while troublesome ones are discharged (Baldenius, Melumad, & Meng, 2014; Combs, Ketchen Jr, Perryman, & Donahue, 2007; Finkelstein & Hambrick, 1989). As Fredrickson, Hambrick, and Baumrin (1988) have pointed out, CEOs can increase their power over time by controlling voting and co-opting loyal directors.

Entrenched CEOs who exercise their influence over board committees have been identified to experience adverse corporate performances (Adams, Almeida, & Ferreira, 2005; Al Mamun, Balachandran, & Duong, 2020). Because of their entrenched practices, powerful CEOs cannot essentially adjust to ensure their firms remain competitive, ultimately reducing their value (Hambrick & Fukutomi, 1991; Miller, 1995). They participate in value-destroying mergers and acquisitions (Brown & Sarma, 2007), manipulate performance reports to alter market perception (Friedman, 2014), and manage earnings (Ali & Zhang, 2015; Feng, Ge, Luo, & Shevlin, 2011). Research has discovered that entrenched CEOs may also use their power to structure their payment incentives, benefiting themselves (Bebchuk & Fried, 2009; Hill & Phan, 1991; Morse *et al.*, 2011; Van Essen *et al.*, 2015). Long-tenured CEOs do not automatically make a CEO entrenched. However, the potential for CEOs to become entrenched and adopt negative behaviours detrimental to corporate performances is much higher for executives who hold their positions for more extended periods. Thus, if holding a larger ID represents lower incentives for management to be short-sighted, then the negative ID-myopia association should be stronger for longer-tenured CEOs. This leads to the next hypothesis:

H2B: The CEO ID-Myopia association is stronger for longer-tenured CEOs.

2.3.3 ID and the Design and Pricing of Corporate Bonds

Companies raise capital by issuing debt in corporate bonds.[47] Bond prices are not fixed; they are controlled by market interest rates, bonds' term-to-maturity, and the firm's credit ratings. Bond prices are lower when the interest rates are higher. Lower bond prices signal a high-risk investment, which results in bondholders demanding a higher yield to compensate for their vulnerability to the potential risk of default, liquidity, and information (Hubbard and O'Brien, 2014). The ID should be associated with the price and design of a bond because its value is sensitive to the risks of default and liquidity. Thus, we begin by examining how ID affects the price and design of a bond. Further, we explore the relationship between ID and bond debt costs with more significant risks.

The valuation models for the corporate bond are adopted to determine the price or cost of debt and hence, the bond credit (yield) spread. There are two streams of theoretical models of credit (yield) spreads, (a) the reduced form models and (b) the structural models. The models are not disconnected or disjointed but consist of different informational assumptions. The reduced-form presumes that a company's default time information is less detailed and inaccessible (Duffie & Singleton, 1999; Jarrow, Lando, & Turnbull, 1997; Litterman & Iben, 1991; Madan & Unal, 1998). The structural model assumes that a firm's predictable default time and includes an exceedingly detailed information set. This review concentrates on the latter. Black and Scholes (1973) set the foundations for the option pricing framework, upon which Merton (1974) expanded the structural model that incorporated default risk into the bond valuation. Other extensions brought to the limelight other risk components to bond valuation but also improved the original framework. For instance, they incorporated these provisions in a bond contract, "safety covenants, subordination arrangements, and restrictions on the financing of interest and dividend payments" (Black & Cox, 1976). These provisions included a contract constructed to increase the value of bonds. Other improvements included the compound option and coupon bonds (Geske, 1977), the stochastic interest rate (Longstaff & Schwartz, 1995), and the optimal capital structure (Leland, 1994; Leland, 1998; Leland & Toft, 1996) among alternatives.[48]

[47] See the following studies for more on the pricing of corporate bonds, structure, and behaviour (Bao, Pan, & Wang, 2011; Chen, Liao, Kuo, & Hsieh, 2013; Aboody, Hughes, & Bugra Ozel, 2014; Bansal, Connolly, & Stivers, 2014)

[48] See other papers related to structural models Briys and De Varenne (1997)

Research has disclosed that default risks cannot satisfactorily explain yield spreads (Campbell & Taksler, 2003; Collin-Dufresn, Goldstein, & Martin, 2001; Collin-Dufresne & Goldstein, 2001). Longstaff, Mithal, and Neis (2005) demonstrated that the non-default component is time-varying and strongly related to both bond-specific liquidity measures and macroeconomic bond market liquidity. Chen, Lesmond, and Wei (2007) and Lin, Wang, and Wu (2011) detected that liquidity risks are priced into corporate yield spreads. And the survey by Huang, Huang, and Oxman (2015) linked deteriorating stock liquidity to a higher probability of corporations defaulting on their debt obligations, increasing the yield spread and lowering firm value. Information risks also play an essential role in determining yield spread (Duffie & Lando, 2001; Lu, Chen, & Liao, 2010; Yu, 2005). Chen, Liao, Kuo, and Hsieh (2013) empirically demonstrate that U.S corporate bond yield spread widens with increasing information asymmetry. The findings are robust after controlling other variables that influence yield spreads.[49] Hao *et al.* (2018) discovered that firms with higher information risk exhibited poor credit ratings and wide yield spreads. According to the theory of discretionary disclosure, companies whose public disclosure is more costly withhold negative publicity, firm-specific information, and transparency (Darrough & Stoughton, 1990; Feltham & Xie, 1992; Shin, 2003; Verrecchia, 1983). Bond investors will demand a substantial risk premium or a higher yield to bear the risks of insufficient or low-quality information disclosure by the managers (Lu *et al.*, 2010; Sengupta, 1998; Shin, 2003; Yu, 2005).

Some studies show the relationship between managerial incentive structures and bond prices. Prospective bondholders often consider managers who own more stock options as high-risk-takers (Ortiz-Molina, 2006). Some studies associated higher ID ownership with lower loan yield spreads, fewer covenant restrictions, and ultimately reduced agency costs of debt (Anantharaman *et al.*, 2013; Chava *et al.*, 2009; Wang *et al.*, 2017). In this sense, the design of pay packages may influence the cost of new debt issues. Bond prices are affected by the expected future risks which bondholders may anticipate. Bondholders often closely monitor the ID levels held by top-level managers (Wei & Yermack, 2011). When CEOs retain high debt holdings, it builds the confidence of bondholders and reassures them that their interests are secured and protected; thus, they require fewer risk premiums. Consistent with the findings of previous research, higher debt-to-equity ratios reduce the risk appetite of CEOs. Therefore, if bondholders trust that managers holding ID will behave optimally, the bond prices and yield

[49] Controlled variables include firm's own leverage ratio, equity volatility, maturity, coupon, issuance amount, credit rating, R&D intensity, and firm size.

spread should reflect their optimism. When there is a higher ID holding, a lower bond yield is expected. This leads to the subsequent hypotheses:

H3: There is a negative association between CEO ID and yield spread.

The high-risk nature of issuing long-term maturity bonds. Unlike short-term maturity bonds, issued longer maturity bonds come with more significant interest rate risks, given the higher default risks. Longer maturities allow managers to act in the interest of shareholders to select riskier projects that provide substantial gains at the expense of bondholders (Nash, Netter, & Poulsen, 2003). Diamond (1991) noted that borrowers (the issuing firms) with private information and high credit ratings prefer short-term debt. Having private information enables them the flexibility to refinance debts with better borrowing terms at a lower cost. This assumes that longer-term maturity bonds have higher refinancing costs.

Information asymmetry influences bond prices and hence the yield spread. When bond investors have information asymmetry, the yield spreads for short-term bonds are wider, intensifying as bond maturity decreases (Lu *et al.*, 2010). The outcome of Yu's (2005) analysis compliments Lu's (2010) but from the quality of information disclosure perspective. Bonds issued by firms with analyst earning forecast dispersions have higher credit spreads. This negative effect was more substantial for bonds with lower credit quality and longer maturity (Güntay and Hackbarth (2010). Bonds locked in for the long term may have lower refinancing of debt risks and are associated with higher interest rate risks. And, issuing long-term bonds by low-rated firms results in higher yield spreads. Bond investors recognize the risk of refinancing debt for various bond maturities (Gopalan, Milbourn, Song, & Thakor, 2010).

The high-risk nature of low rated firms. The borrowing entities and credit risk of specific debt securities are assessed independently by Credit Rating Agencies (CRAs). The CRAs disclose the credit risk assessment and disseminate this information to the market (Boot, Milbourn, & Schmeits, 2006; Healy & Palepu, 2001). Ideally, credit ratings help to mitigate information asymmetry and lower the firm's cost of capital. A firm's capacity to access the public debt markets depends mainly on its credit rating or rating level (Diamond, 1991; Faulkender & Petersen, 2006; Gopalan, Song, & Yerramilli, 2014; Harford & Uysal, 2014). This also influences how their capital is structured or how investment decisions are made. Corporate firms issuing debt with poor credit ratings have a higher risk premium and interest charge attached to the issued loan. A company with a good credit rating increases its options

for raising capital from the public debt market or financial institutions at a lower interest rate. Credit ratings are affected by uncertain and transparent firm-specific information.

Credit ratings become a measure of a company's financial constraints and debt capacity. High-rated firms lower financial limitations and can access public debt markets much easier (Campello & Chen, 2010; Faulkender & Petersen, 2006; Whited, 1992). These companies can raise capital to meet their investment needs at short notice. Firms with good credit ratings have lower information asymmetry and adverse selection problems (Frank & Goyal, 2009; Liu & Malatesta, 2006; Sufi, 2007). They also benefit from lower debt costs, which, all else remaining equal, leads to increased debt capacity (Billett, Hribar, & Liu, 2015). Rauh and Sufi (2010) show that firms with poor credit ratings rely more frequently on costly forms of debt financing. Other studies document a robust negative relationship between credit rating levels and bond yield spreads (Liu & Thakor, 1984; West, 1973; Ziebart & Reiter, 1992).

The negative association between ID and yield spread anticipate to be stronger for firms that issue long-term maturity bonds and firms rated low, according to CRAs. These firms represent a higher risk to bondholders and potential bond investors. If bondholders view ID as an indication of (a) the greater alignment of CEO-bondholder interests; and (b) CEOs behaving optimally, then this information will be reflected in the price of bonds (yield spread). So, a higher ID reduces yield spread, and this negative association should be more robust for bonds with higher risks. The above assumptions lead to these hypotheses:

H3A: The CEO ID-Myopia association is stronger for long-term bonds.

H3B: The CEO ID-Myopia association is stronger bonds issued by low credit-rated firms

2.4 DATA AND METHODOLOGY

CEO inside debt compensation includes two components with debt-like payoffs: other deferred compensation and defined-benefit pensions. Following prior theoretical predictions (Edmans & Liu, 2010; Jensen & Meckling, 1976) and empirical application (Anantharaman *et al.*, 2013; Cassell *et al.*, 2012; Dhole *et al.*, 2016; Li *et al.*, 2018; Sundaram & Yermack, 2007; Wei & Yermack, 2011), the CEO's relative (to the firm) debt ratio are estimated:

$$[1]\ Relative\ debt = \frac{\left(\frac{IDH}{EH}\right)}{\left(\frac{FD}{FE}\right)};\ [2]\ Relative\ deferred = \frac{\left(\frac{ID}{EH}\right)}{\left(\frac{FD}{FE}\right)};\ [3]\ Relative\ pension = \frac{\left(\frac{IP}{EH}\right)}{\left(\frac{FD}{FE}\right)}$$

Where *relative debt* is the ratio of CEO to firm leverage. The inside leverage (*IDH*) is calculated based on the sum of deferred and accumulated pension benefits, while the inside equity (*EH*) represents the fair value of all stock holdings, including restricted stocks and options. The firm's leverage is the sum of current and long-term debt (*FD*) scaled by the market value of equity (*FE*). Additionally, two components of relative debt are examined: the ratio of CEO deferred compensation to firm leverage [equation 2]. And the ratio of CEO benefit pension to firm leverage [equation 3]. The following section describes the sample and variable measures used to test the three hypotheses previously mentioned.

2.4.1 Sample and Variable measurement

Three datasets have been merged to form the primary ID sample: small earnings decline realised myopia and corporate at-issue bond. **Table 1** presents the sample selection and distribution. **Panel A** contains data covering the period 2000-2017.[50] Accounting and financial data are obtained from Compustat and DataStream records. The Centre for Research in Securities Prices (CRSP) provides stock returns and other price-related information. And other variables for the bond yield spread analysis were obtained from SDC Platinum, the IBSE via DataStream, TRACE, and the FRED Economic Database. **Appendix A** provides variable descriptions and sources. To be included in the final sample, these criteria must be met:

1. Missing observations needed to calculate the main dependent and independent variables are excluded (Bushee, 1998; Campbell, Galpin, & Johnson, 2016; Van

[50] We will not have complete information on executive compensation until 2007, when the SEC's 2006 mandate goes into effect. Unfortunately, we did not have the funds to buy data beyond 2017. Hence, the final sample with complete data is limited to 2006-2017. Similar restrictions apply to Essay 2.

Bekkum, 2016).

2. Public utility (4900-4999) and financial service (6000-6999) companies are excluded (Borah, James, & Park, 2020; Eom, Helwege, & Huang, 2004; Liu *et al.*, 2014).[51]
3. The *executive compensation* sample excludes any firm-year with incomplete data essential to calculating the executive pay ratios (Edmans & Liu, 2010; Lu-Andrews & Yu-Thompson, 2015).
4. The *earnings decline* sample excludes any observations with no current or prior-year R&D expenditure or an R&D-to-sales ratio lower than 1% since they are not significant enough to influence earnings decisions (Bushee, 1998).
5. The *myopia* sample excludes firm-year data with missing values used to identify myopic firms. However, any missing R&D spending value is replaced with zero.[52]
6. The *at-issue bond* sample excludes: convertible bonds without a conventional yield to maturity (e.g., floating-rate bonds); bonds with synthetic features or exotic structures; and, prior to combining SDC-FISD datasets, duplicates identified by the issuer, issue date, final maturity, and coupon are removed (Jameson, King, & Prevost, 2020; Powers, 2017).

To minimize the effects of extreme outliers, each variable is winsorised at the 1% tail distribution and logged selectively. The final sample has 6,136 firm-year observations, representing 929 unique firms from 2006 to 2017. **Panel B** shows the sample distribution by year. **Panel C** shows the sample as classified by industry. Three industries dominate the final sample: business equipment (e.g., computers, software, and electronics) has 31%, manufacturing with 24%, and healthcare at 16%. The remaining firms fall into other sectors, which represent less than 10% of the overall sample. The next section discusses the models used to test the hypotheses.

[51] Fama and French (1992) exclude these firm types, because: (1) The 'special regulatory status' of utility firms means decisions made by governments or states affect them more than private companies. (2) Assessing the liquidity of financial firms is difficult – i.e., high leverage in financial firms is normal, while high leverage in non-financial firms suggests distress.

[52] Accounting, finance, and strategic management scholars interpret missing R&D values differently under various assumptions. Refer to Koh and Reeb (2015) to learn how each discipline handles missing R&D values and the assumptions when conducting empirical research.

Table 1. Sample Selection and Distribution

The table describes the process of data selection and distribution of sample data by year and industry.

Panel A. Sample Selection	
Total number of observations relating to ExecuComp (period 2000-2017)	60,565
Less: Observations with insufficient data on COMPUSTAT to calculate real activities management proxies (2000-2017) and utility and finanace firms.	47,265
Less: Observations without data to calculate Inside Debt components and other control variables	7,164
Final Sample (Matching Firm-Year =929)	**6,136**

Panel B. Sample Distribution by Year

Year	Frequency	Percent
2006	396	6.45
2007	575	9.37
2008	576	9.39
2009	537	8.75
2010	524	8.54
2011	580	9.45
2012	566	9.22
2013	567	9.24
2014	563	9.18
2015	556	9.06
2016	559	9.11
2017	137	2.23
Total	**6136**	**100**

Panel C. Sample Distribution by Industry*

SIC-FF12	Frequency	Percent
Business Equipment	1944	31.68
Manufacturing	1462	23.83
Healthcare, Medical equipment & Drugs	978	15.94
Chemical and Allied Products	503	8.20
Consumer Non-durables	410	6.68
Consumer Durables	364	5.93
Other	192	3.13
Energy – Oil, Gas, and Coal extraction & products	150	2.44
Wholesale, Retail, and others	71	1.16
Telephone and television transmission	62	1.01
Total	**6136**	**100**

* The Standard Industrial Classification (SIC) Fama-French 12 Industry Portfolio is used.

2.4.2 Econometric Model

A multivariate regression analysis is used to examine whether higher ID holdings lower myopia incentives (H1), lower realised myopia (*t+1*) (H2), and lower debt costs (H3). This section describes the model and control variables.

i. The effect of inside debt on managers' incentive to be myopic

To test *H1* on the impact of CEO inside debt on firms' incentive to become myopic, the following logit model is estimated:

$$[4]\ Small\ earning\ decline_{it} = a_0 + a_1 Inside\ debt_{it} + a_2 PCRD_{it} + a_3 CIRD_{it} + a_4 CCAPX_{it} + a_5 CSales_{it} + a_6 Market\ value\ of\ Equity_{it} + a_7 DEG_{it} + a_8 Leverage_{it} + a_9 Free\ Cash\ Flow_{it} + a_{10} Tobins\ Q_{it} + \sum_{j=1}^{J} \partial_j Industry\ FE + \sum_{x=1}^{X} \emptyset_x Year\ FE_{ix} + e_{it}$$

The dependent variable is a *small earning decline* which takes a binary outcome where the value of one indicates the firm's earnings before R&D and taxes (EBTRD) decreased from the prior year $(EBTRD_t < EBTRD_{t-1})$. Those firms that show a small loss in earnings at *t* compared to their profits at *t-1* may reverse the small earnings decline, but only if the loss is less than their R&D expense at *t*. Firms with small earnings declines have an incentive to cut R&D spending (Baber *et al.*, 1991; Bushee, 1998; Tsao *et al.*, 2017). To cut earnings, managers expect pre-tax and pre-R&D earnings early enough in the fiscal year. The results follow the simple random walk model of expected R&D spending by Bushee for reasons of parsimony. Firms that experience a small decline in $EBTRD_t$ relative to the $EBTRD_{t-1}$ are firms with unexpected decreases in R&D spending and vice versa. The variables of interest are the *CEOs relative debt*, *relative deferred* and *relative pension* ratios. The set of control variables relates to incentives to cut R&D expenditures unrelated to myopic investment behaviours (e.g., p*rior change in R&D, change in industry R&D intensity,* and *tobins q*) and firm-level characteristics:

1. *Prior change in R&D* - proxies for changes in opportunity sets of firms over time

because, under Berger (1993) expectation model for the level of R&D intensity, a firm facing a decline in R&D opportunity sets (e.g., positive NPV projects) over time has greater motivations to cut R&D in that year.

2. *Change in industry R&D intensity* - captures the R&D opportunity sets within the firm's industry, and the change in the level of R&D spending is critical for firms' competitive advantage (Berger, 1993; Bushee, 1998). Firms in industries with increasing R&D are less likely expected to cut R&D.
3. *Tobin's q* - captures the marginal benefit-to-cost ratio associated with the firms' decision to undertake new investment. The accounting treatment of R&D expenditures provides insight into its future value. Hence, firms with higher *Tobin's q* have more valuable R&D opportunities and face a higher cost of reducing R&D for myopic reasons (Berger, 1993; Bushee, 1998).
4. *Change in capital expenditure* - captures the investment opportunities of a firm during its transitional stage. Firms transitioning into a more mature stage in their investment life will have less funds available for R&D (Perry & Grinaker, 1994).
5. *Change in sales* - captures the effects of firm growth, where high-growth companies are considered less likely to cut R&D.
6. *Firm size* – Among large firms with a quality information environment, opportunities to manage earnings are lower, ceteris paribus (Dang, Li, & Yang, 2018; Wiedman, 1996). Managers of smaller firms have a greater likelihood of experiencing cash flow problems, prompting them to cut R&D spending (Opler, Pinkowitz, Stulz, & Williamson, 1999). When firms are cash-constrained, they are unlikely to take on long-term projects that may involve substantial investment (Souder & Shaver, 2010).[53]
7. *Distance from earnings goal* - captures the firm's likelihood to manage earnings as they drift further away from their expected earning target. The higher the value, the more likely the firm's ability to meet earning targets with fewer severe cuts in R&D (Bushee, 1998).
8. *Free Cash Flow* - Negative cash flow companies may be more inclined to raise equity when they are near their financial obligations. Increasing earnings can

[53] Dang *et al.* (2018) captured a firm's growth prospects and equity market conditions using three firm size proxies: total assets (AT), total sales (TS), and market value of equity (MVE). According to Jalilvand and Harris (1984), the informational environment of the firm is controlled when AT is included, and the MVE reflects cash constraints.

reduce undervaluation (Dechow, Sloan, & Sweeney, 1996). Firms low on cash may cut R&D expenditures and use the available funds for investment.

9. *Leverage* – Captures the opportunities to manage earnings when firms are highly focused on meeting debt covenants and have limited growth opportunities (Duke & Hunt, 1990; Myers, 1984).

ii. The effect of CEO ID on myopic firm decisions (t+1)

According to *H1*, ID may be able to reduce the incentives for firms to become myopic, and the situation may improve over time. Hence, *H2* seeks to determine whether ID reduces myopia (*t+1*) through the following model estimate:

$$
\begin{aligned}
[5]\ Myopia_{i\,t+1} &= a_0 + a_1 Inside\ debt\ proxies_{it} + a_2 Size_{it} + a_3 CEO\ Tenure_{it} \\
&+ a_4 CEO\ Age_{it} + a_5 Firm\ Age_{it} + a_6 ROA_{it} + a_7 Sales\ Growth_{it} \\
&+ a_8 Leverage_{it} + a_9 Book - to - market_{it} + a_{10} CAPEX_{it} \\
&+ a_{11} Tangibility_{it} + a_{12} RD_{it} + a_{13} Liquidity\ Constraint_{it} \\
&+ a_{14} Tax\ Loss\ Indicator_{it} + \sum_{j=1}^{J} \partial_j Industry\ FE + \sum_{x=1}^{X} \emptyset_x Year\ FE_{ix} + e_{it}
\end{aligned}
$$

Different authors measure *Myopia* in a variety of ways. This study follows Mizik and Jacobson (2007) method to identify potentially myopic firms. Myopic firms are identified using two instruments of discretionary earnings management: (a) cuts in marketing and (b) cuts in R&D spending.[54] Myopic firms were determined by taking the difference in current (ROA, MKT, and R&D)[55] and the estimated expected levels ($(\widehat{ROA}_{it|it-1})$, $(\widehat{Mktg}_{it|it-1})$, R&D $(\widehat{R\&D}_{it|it-1})$) for each firm *i*, and, period *t*. Intuitively, if the managed firm is myopic, they will concurrently exhibit greater-than-normal profitability, $\left(ROA_{it} - \widehat{ROA}_{it|it-1}\right) > 0$, less-than-normal marketing expenditure $\left(Mktg_{it} - \widehat{Mktg}_{it|it-1}\right) < 0$ and less-than normal spending on R&D $\left(R\&D_{it} - \widehat{R\&D}_{it|it-1}\right) < 0$. Firm earnings are expected to adjust to

[54] This measure of myopia is of realised myopia not the incentive for myopic decision. For model regression tests, the dependent myopia measure is therefore moved forward by one year (*t+1*) in order to break up endogeneity.

[55] Where profitability (ROA) is measured as $\frac{Operating\ inc.before\ dep}{Total\ assets}$; marketing intensity (MKT) - $\frac{SGA-R\&D\ Expenditure}{Total\ assets}$; innovation intensity (R&D) -$\frac{R\&D\ expenditure}{Total\ assets}$ (Dutta, Narasimhan, & Rajiv, 1999; Mizik, 2010; Mizik & Jacobson, 2007). Note: using the marketing intensity metric over advertising metric is advantageous in the sense that it reflects all marketing-related spending and a larger sampling is preserved.

changing marketing and R&D expenditure. The adjustment depends on two things: (1) time – which requires a model to include several lags of marketing and R&D as regressors; and (2) difference in current and past profit levels – which suggests a dynamic model, in which lags of the dependent variable are also regressors. We assume persistence in the dependent level to determine 'normal' next-period levels.[56] A fixed-effects autoregressive panel data forecast regression with two-period lags is used:

$$[6]\ ROA_{it} = \alpha_{roa,i} + \emptyset_{roa} \times ROA_{i,\ t-1} + \beta_{roa} ROA_{i,\ t-2} + \sum_{t=1}^{T} \delta_{roa,t} * Year_{year} + \sum_{t=1}^{T} \lambda_{roa,sic} * SIC_{sic} + \varepsilon_{i\,t}$$

$$[7]\ Mktg_{it} = \alpha_{mktg,i} + \emptyset_{mktg} \times Mktg_{i,\ t-1} + \beta_{mkt} Mkt_{i,\ t-2} + \sum_{t=1}^{T} \delta_{mkt,t} * Year_{year} + \sum_{t=1}^{T} \lambda_{mkt,sic} * SIC_{sic} + \varepsilon_{it}$$

$$[8]\ R\&D_{it} = \alpha_{r\&d,i} + \emptyset_{r\&d} \times R\&D_{i,\ t-1} + \beta_{rd} RD_{i,\ t-2} + \sum_{t=1}^{T} \delta_{rd,t} * Year_{year} + \sum_{t=1}^{T} \lambda_{rd,sic} * SIC_{sic} + \varepsilon_{it}$$

Models [6], [7], and [8] show that the actual levels for firm profit are ROA_{it}, marketing- $Mktg_{it}$And, R&D - $R\&D_{it}$ intensity for firm *i* in period *t*.[57] The firm-specific intercepts are $\alpha_{roa,i}$, $\alpha_{mktg,i}$ and $\alpha_{r\&D,i}$. The respective estimates of persistence - $\emptyset_{roa}$, $\emptyset_{mktg}$, and $\emptyset_{r\&d}$ for each dependent influenced by its lagged value ROA_{it-1}, $Mktg_{it-1}$ and $R\&D_{it-1}$. We control for each dependent value using their lag at two periods *(T=2)*, and the error term $\varepsilon_{i,t}$ For observed or unobserved individual-specific effects correlated with the predictor variable. Time fixed effects (δ_i), and industry effects (λ_t) are controlled. For each regressed model, the dependent is excluded as a control variable.

Mizik and Jacobson (2007) and Mizik (2010) identified *Myopia* using Anderson and Hsiao's (1981) instrumental variable estimation approach to estimate autoregressive forecast

[56] We assume persistence in the dependent level (∅) in order to determine 'normal' next-period levels under two conditions: untransformed errors are independent and identically distributed, and, errors are only correlated within individuals, not across them.

[57] Any MKT or R&D values that are missing are replaced with zeros (Hirschey, Skiba, & Wintoki, 2012).

models of equations [6], [7] and [8]. However, this paper employs instead of the generalized system method of moments (GMM) estimation approach. Traditional models take the first difference of the equation and then use instrumental variables (IV) (Anderson & Hsiao, 1981; Arellano & Bond, 1991; Holtz-Eakin, Newey, & Rosen, 1988). The GMM approach, advanced by Arellano and Bover (1995) and Blundell and Bond (1998, 2000), responds to the inconsistency and bias in parameter estimates of Arellano and Bond (1991) proposed first-difference GMM model. Parameter consistency is subject to the stationary relationship between variables and error terms. Where $E(\Delta X_{i,2\varepsilon_i}) = 0$ or the level of the initial change in explanatory variable at *t* ($\Delta X_{i,t}$) and subsequent change at *t2* ($\Delta X_{i,2}$) both correlate to ε_i, but remain stationary. [58] Unlike Arellano and Bond (1991), Blundell and Bond (1998) GMM considered the potential endogeneity effects of lagged variable values for error term, weakening the estimates and making them biased. The approach transforms the instruments, making them exogenous to the error term relative to transforming the predictor variables to remove the fixed effect, as evident in the first-difference model. By regressing in levels, the implied stronger correlation between the variable in level with their instruments reduces weak parameter estimates and bias caused by the firm-specific effects, which cannot be controlled. The instruments for the equations in levels are valid if the changes in the dependent variable satisfy stationary restrictions.[59]

Unlike Mizik's binary myopia measure, this paper realised myopia measure is continuous and derived following the paper by Braam *et al.* (2015).[60] Once models [6], [7], and [8] are estimated, then myopic firms are identified by: first calculating the abnormal profitability, $(ROA_{it} - \widehat{ROA}_{it|it-1})$, marketing expenditure $(Mktg_{it} - \widehat{Mktg}_{it|it-1})$, and R&D spending $(R\&D_{it} - \widehat{R\&D}_{it|it-1})$. Then, multiplying abnormal marketing and R&D expenses by a negative one. Finally, aggregate the three measures into one measure to proxy *myopia*, where the higher (lower) the aggregate value, the greater (lesser) the extent of company myopia. Additional controls include firm-level characteristics (1-10), CEO features (11), and

[58] Ferreira, Ding, and Wongchoti (2015) explain a correlation between the LEVEL of explanatory variable and firm-specific effect. But no correlation between the DIFFERENCES of explanatory variable and firm-specific effect. Two assumptions must hold for consistency: (1) instrumented variable is asymptotically uncorrelated with the error term- $\varepsilon_{i,t}$ (exogeneity); and (2) correlated with the explanatory variable (endogenous).

[59] The GMM estimation method address concerns about omitted variables, reverse causality, and measurement error that arise with the use of instrumental variables.

[60] Cohen and Zarowin (2010); Cohen, Dey, and Lys (2008); Gunny (2010); Roychowdhury (2006) and Zang (2012) use the same metrics for real activities manipulation measure and provide further validity of the constructed proxy.

executive compensation factors (12-16) that influence myopic behaviour:

1. *Firm size* - larger firms are more likely to make a risky investment. There are systematic variations in the risk levels undertaken for firm investment and financial policies (Pastor & Veronesi, 2003). Larger firms are more susceptible to information asymmetries, which can encourage manipulation.
2. *Firm age* - Firms with growth opportunities that miss their earning targets face a heavy backlash from market analysts and are more likely to feel the pressure to manage earnings (Skinner & Sloan, 2002). As high-growth firms are often young, they have a harder time accessing capital to finance risky projects than older firms, so they are more likely to decide to manage earnings (Hymer & Pashigian, 1962).
3. *Market-to-book ratio* and *sales growth* to capture growth opportunities.
4. *Capex, R&D expenditure*, *tangibility, ROA,* and *leverage* capture the risk-taking effects of investment and financial policies and variations in capital structure and profitability (Chava & Purnanandam, 2010; Chung, Firth, & Kim, 2005; Healy & Wahlen, 1999).
5. *Liquidity constraint* and *tax-loss indicator* capture the effects of low liquidity and tax benefits associated with the deferral of income to the future on decisions to become myopic (Cassell *et al.*, 2012; Sundaram & Yermack, 2007)
6. *CEO tenure* and *age* capture characteristic-related effects on decisions to manage earnings (J. L. Coles, N. D. Daniel*, et al.*, 2006; Wiersema & Bantel, 1992). As Berger *et al.* (1997) note, longer-tenured CEOs are likely more entrenched and may avoid taking risks.
7. *CEO vega/delta ratio* to capture the risk-seeking behaviour of executives motivated by their holding of stock option grants (Core & Guay, 2002; Guay, 1999)
8. *Cash compensation* – a proxy for CEOs' level of risk-aversion. Entrenched CEOs with higher cash compensation may be less risk-seeking (Berger *et al.*, 1997). They are less risk-averse because they have more capital to invest outside the firm (Guay, 1999).
9. *Market leverage* and *return* capture changes in stock price performance in the market, which may directly affect the CEO incentives through its effect on stock price volatility (J. L. Coles, N. D. Daniel*, et al.*, 2006)
10. *Cash surplus* – Low-growth firms manage discretionary accruals to offset low or negative earnings when the firm holds a high cash surplus (Chung *et al.*, 2005).

iii. The effect of inside debt on the yield spread

In *H2*, ID is expected to improve myopic management over time, which bond investors can observe and anticipate. Thus, *H3* examines whether bondholders perceive greater inside debt holdings positively (negatively), thus lowering (increasing) the risk premium on issued bonds, which will result in tightening (widening) yield spreads. The following model estimate is used:

$$
\begin{aligned}
[9]\ Yield\ spread_{it} &= a_0 + a_1 Inside\ debt_{it} + a_2 MWC_{it} + a_3 FPC_{it} + a_4 modified\ duration_{it} \\
&+ a_5 offering\ amount_{it} + a_6 subordinated\ bond_{it} \\
&+ a_7 Privately\ placed\ bond_{it} + a_8 Firm\ size_{it} + a_9 Debt\ Ratio_{it} \\
&+ a_{10} Tobins\ q_{it} + a_{11} Sale\ growth\ 3yrs_{it} + a_{12} Profits_{it} \\
&+ a_{13} Std.\ Profits_{it} + a_{14} Negative\ Earning_{it} + a_{15} Tangibility_{it} \\
&+ a_{16} Stock\ BAS_{it} + a_{17} Number\ of\ Analysts_{it} + a_{18} Yield\ Curve\ Slope_{it} \\
&+ a_{19} 10yr\ Treasury\ rate_{it} + a_{20} Std.(10yr\ Treasury\ rate)_{it} \\
&+ a_{21} Bond\ rate\ spread_{it} + a_{22} Residual\ Bond\ rating_{it} \\
&+ \sum_{j=1}^{J} \partial_j Industry\ FE + \sum_{x=1}^{X} \emptyset_x Year\ FE_{ix} + e_{it}
\end{aligned}
$$

The dependent variable, *yield spread*, is measured as the difference between the yield of an issued corporate bond and a Treasury bond of similar maturity. Additional controls include firm-level (1-7) and bond-level (8-13) characteristics that influence the cost of bonds:

1. *Firm size* controls for larger corporations with more analysts following, greater investor recognition, lower probability of financial distress, and liquid securities (Mansi, Maxwell, & Miller, 2011).
2. *Leverage* controls for variations in the firm's capital structure and measures its default risk (Anderson *et al.*, 2004).
3. *Market-to-book* captures the expected cash flow growth opportunities in the year of the bond offering. Higher growth rates indicate how quickly the firm generates inflows of cash from operations (Adam, 2000).
4. *Sales growth,* as measured by sales growth over three years, accounts for realised growth opportunities.
5. *ROA* captures firms that perform better are less likely to manage earnings and have a quality information environment.

6. *Std. of profitability* and *negative earnings* capture the cash flow risks (Ortiz-Molina, 2006).
7. *Tangibility* - Firms with tangible assets pose less risk to bondholders and provide good collateral because these assets are observable, easier to monitor by lenders, and provide good security (Jameson *et al.*, 2020; Ortiz-Molina, 2006).
8. *MWCP* and *FPC* capture the risks associated with reinvesting bonds (Alderson, Lin, & Stock, 2017; Prevost *et al.*, 2016).
9. *Modified duration* and *residual bond rating* capture maturity length and coupon effects and the market's overall assessment of default risks (Anderson *et al.*, 2004).
10. *Offering amount* controls for liquidity since larger issues offered are associated with economies of scale in underwriting and reduction in liquidity (Bhojraj & Sengupta, 2003). And interest rate exposure (Chen et al., 2010)
11. *Subordinate* and *private-placed bonds* control for systematic effects linked to privately placed bonds, such as lower liquidity (Livingston & Zhou, 2002).
12. *Analyst coverage* and *stock BAS* capture the influence of the information environment on-call provision choice (Banko & Zhou, 2010).
13. *Yield Curve, 10 year Treasury rate, std. (10yr Treasury rate),* and *Baa-Aaa spread* control for the effect of market-level interest rate on bond contract design (Goyal, 2005; Nash *et al.*, 2003).

Overall, each model estimate discussed in equations [4], [5] and [9] includes Fama-French industry and year effects to control for unobserved industry and firm heterogeneity, which correlates with the independent variables (Bascle, 2008; Mauri & Michaels, 1998). To control heteroscedasticity and autocorrelation across firm-year, standard errors are clustered at the firm level (Petersen, 2009; Thompson, 2011).

2.5 EMPIRICAL RESULTS

2.5.1 Preliminary Results

Table 2 provides descriptive statistics of the key variables used in the empirical analysis.

[*Insert Table 2*]

Panel A indicate the mean and median value CEOs hold in *total compensation* (inside debt) are about US$6.14 million and US$816 thousand, suggesting that inside debt holdings are substantial for our sample CEOs. The mean and median *relative debt* is 5.014 and 0.279, respectively. The mean and median values for *deferred* are US$2.25 million and US$134 thousand. The average (median) *relative deferred* ratio is 2.28 (0.027). With respect to *pension,* the mean value is US$3.8 million, and the mean *relative pension* ratio is 1.357. These values remain consistent with past papers (Anantharaman *et al.*, 2013; Cassell *et al.*, 2012; Nanda, Prevost, & Upadhyay, 2019; Wei & Yermack, 2011).

Panel B presents the key-dependent variables, and **Panel C** the control variables. Concerning s*mall earning decline*, very few firms, only 18% in the overall sample, are identified as engaging in manipulating discretionary R&D activities to evade reporting earnings decrease. The *controls for incentive to become myopic* show extreme high and low values. Among the variables skewed to the right are *pcrd*, *ccapex*, *csales*, *firm size*, *deg*, *leverage*, and *tobins q*, while those skewed to the left are *cird* and *fcf*. The median values for pcrd, cird, and tobins q are 0.043, 0.000, and 1.491, respectively. The *small earning decline* sample is further divided into two groups: yes-cut firms are those whose earnings have been reduced. No-cut firms have not made any cuts. Panel D shows that the *yes-cut* sample has fewer observations than the *no-cut* sample. Under the *yes-cut* (*no-cut*) sample, the median for *pcrd* is 0.013 (0.047), the *cird* is -0.00006 (0.000032), and the *tobins q* is 1.05 (1.59). The *CCAPEX* (*CSales*) shows a median of -0.016 (-0.303). These values are lower than the median in the sample without cuts. For the *yes-cut* sample, the median firm size value is US$644 million, leverage is 22%, and free cash flow is -US$24 thousand. The *DEG* is 1, implying low firm earnings, suggesting firms are far from their earnings goals. The statistics exhibit higher medians for each variable under the no-cut sample.

Myopia has a mean (median) of 0.406 (0.432) and a standard deviation of 0.194.[61] The *controls for realised myopia* show the mean and median of firm size are US$10.39 and US$2.22 billion. Firms have been in operation for about 30 years, while their CEOs, on average, are aged 56 years old and have held office for about 6.5 years.[62] Among the firm-level controls, the mean *capex, market-to-book, sales growth, ROA, leverage,* and *tangibility* are 0.036, 0.598, 0.047, 0.038, 0.244, and 0.181. About 6.5% of firms exhibit positive operating cash flow, and 67% of firms have tax loss carried forward to the current year. R&D spending averages US$318 million. With respects to the controls for compensation, the mean (median) *vega-to-delta* are 0.441 (0.365); *cash* are US$1.02 billion (US$875 million); *market leverage* are 6.74 (6.77); *market return* are 0.239 (0.167); and *cash surplus* are 0.065 (0.059).

Bond yield spread has a mean (median) spread is 0.022 (0.016) and a standard deviation of 0.018. The *controls for bond yield spread* show that 71% of bonds issued have make-whole call provisions; 16.4% of bonds issued do not have fixed-price provisions; 1.6% of bonds issued are not senior subordinate, and 15.2% of bonds issued do not identify under the rule 144A. The mean (median) modified duration is 2.07(2.08), and the par value of debt initially issued is around US$1.32 billion (US$646 million). The mean *analyst coverage*, *stock BAS, yield curve slope, 10yr T-rate, std.of 10yr T-rate,* and *bond rate spread* are 1.61, 0.071, 0.019, 0.027, 0.002, and 0.01.

[61] For robustness check, an alternative measure of 'realised myopia' is used and called 'Myopia (AH)'. The results are not tabulated but remain consistent across all testing.
[62] Prior studies document similar statistics: Berger *et al.* (1997); Coles, Daniel, and Naveen (2008); Ryan, Wang, and Wiggins (2009); Zhang (2009).

Table 2. Descriptive Statistics

The table provides the summary statistics for the variables used in this study. The primary sample has 6,136 observations and 929 unique companies covering the sample period 2006-2017. **Panel A** presents the main independent variables (X) – the dollar value of Compensations and ID measures. **Panel B** – the Y variables dependent on X. **Panel C** – Control variables related to the observed variable (Y). **Panel D** – Small Earning Decline sample divided by Yes-Cut vs. No-Cut firm. The variable definitions are provided in **Appendix A.** All variables are winsorized at 1st and 99th percent.

	N	Mean	St.d	Q1	Median	Q3
Panel A: Main Independent Variables						
Total compensation*	6136	6144.34	12300	0	815.85	6384.49
Deferred value *	6136	2253.89	5577.88	0	134.19	1833.69
Pension value*	6136	3769.87	8208.06	0	0	3419.34
Relative debt	6136	5.014	35.778	0	0.279	1.574
Relative debt^{+}	6136	0.643	0.947	0	0.246	0.946
Relative deferred	6136	2.28	21.951	0	0.027	0.458
Relative deferred^{+}	6136	0.353	0.715	0	0.027	0.377
Relative pension	6136	1.357	5.959	0	0	0.699
Relative pension^{+}	6136	0.376	0.694	0	0	0.53
Panel B: Main Dependent Variable						
Small earning decline (1/0)	4907	0.181	0.385	0	0	0
Myopia (*GMM)*	6006	0.406	0.194	0.354	0.432	0.503
Myopia (*AH*)	6079	0.462	0.19	0.422	0.493	0.55
Bond yield spread	4289	0.022	0.018	0.010	0.016	0.030
Panel C: Controls for incentive to become myopic						
PCRD	4831	0.068	0.324	-0.030	0.043	0.159
CIRD	4897	-0.0003	0.012	-0.002	0.000	0.001
CCAPEX	4896	0.032	0.415	-0.095	0.017	0.168
CSALES	4896	0.804	4.391	-0.335	0.812	2.365
Firm size**	4907	10531.14	20122	863	2533	9157
DEG	4905	0.382	0.486	0	0	1
Leverage	4902	0.204	0.136	0.109	0.197	0.280
Free cash flow	4678	0.198	0.283	0.099	0.209	0.320
Tobins q	4902	1.822	1.337	1.059	1.491	2.151

	N	Mean	St.d	Q1	Median	Q3
Panel C: Controls for realised myopia						
Firm size **	6136	10391.8	26986.22	775.11	2218.7	6687.45
Firm size $^{+}$	6136	7.795	1.646	6.653	7.705	8.808
CEO tenure	5587	6.511	6.106	2	5	9
CEO age	6101	55.787	6.35	51	56	60
Firm age	6136	29.356	21.842	13.858	22.449	40.595
Firm age $^{+}$	6136	3.133	0.812	2.699	3.155	3.728
ROA	6136	0.038	0.132	0.019	0.055	0.091
Sales growth	6130	0.047	0.112	-0.009	0.037	0.091
Leverage	6136	0.244	0.181	0.122	0.224	0.334
Book-to-market	6136	0.598	0.244	0.423	0.579	0.748
Capex ratio	6136	0.0357	0.0306	0.164	0.0272	0.0441
Capex^{+}	6136	0.036	0.031	0.016	0.027	0.044
R&D exp. **	6136	318.604	769.283	20.327	59.434	201.208
R&D exp.$^{+}$	6136	0.035	0.029	0.016	0.027	0.043
Tangibility	6136	0.181	0.136	0.083	0.145	0.244
Liquidity constraint	6136	0.065	0.247	0	0	0
Tax loss indicator	6136	0.67	0.47	0	1	1
CEO's vega/delta ratio	6136	0.441	0.4	0.123	0.365	0.65
Cash compensation*	6136	1017.29	817.197	638.84	875	1104.61
Cash comp.$^{+}$	6136	0.331	0.251	0.116	0.311	0.501
Market leverage	6136	6.74	0.673	6.461	6.775	7.008
Market lev.$^{+}$	6136	0.392	1.959	0.077	0.181	0.348
Market seturn	6136	0.239	0.295	0.074	0.167	0.299
Cash surplus	6103	0.065	0.385	-0.111	0.059	0.231
Cash surplus^{+}	6073	0.107	0.101	0.054	0.096	0.155

Table 2. *continues*

Panel C. Controls for bond yield spread						
Residual [a]	3855	0.000	1.693	-1.116	0.005	1.084
Residual [b]	3855	0.000	1.699	-1.131	0.006	1.083
Residual [c]	3855	0.000	1.692	-1.108	0.010	1.091
MWCP[++]	5024	0.711	0.454	0	1	1
FPCP[++]	5024	0.164	0.371	0	0	0
Modified duration[+]	4291	2.068	0.387	1.761	2.083	2.240
Offering amount **	5024	1318.85	2334.68	361.37	645.89	1263.07
Offering amount [+]	5024	6.637	1.001	5.960	6.498	7.228
Sub-ordinated bond[++]	5024	0.016	0.124	0	0	0
Privately place bond [++]	5024	0.152	0.359	0	0	0
Firm Size [+]	5022	2.285	0.163	2.175	2.298	2.403
Debt ratio	5024	0.335	0.154	0.230	0.309	0.425
Tobins q	5022	1.875	0.836	1.284	1.644	2.228
Sales growth (prior 3 years)	5006	0.042	0.095	-0.004	0.032	0.076
Profits	5016	0.144	0.080	0.101	0.137	0.178
Std. of profits (prior 5yrs)	5017	0.032	0.033	0.013	0.022	0.038
Negative earnings [++]	5024	0.117	0.322	0	0	0
Tangibility	4971	0.290	0.247	0.095	0.201	0.426
Stock BAS	4929	0.071	0.126	0.020	0.034	0.082
Number of analysts	5024	1.610	0.557	1.099	1.609	2.079
Yield curve slope	5015	0.019	0.009	0.015	0.020	0.025
10-year treasury rate	5024	0.027	0.009	0.020	0.024	0.034
St.d (10-year treasury rate)	5024	0.002	0.001	0.001	0.002	0.003
Baa-Aaa spread	5024	0.011	0.005	0.009	0.010	0.013

Panel D: Small earning decline by Yes-Cut vs No-Cut firm

Yes-Cut Sample	**N**	**Mean**	**St.d**	**Q1**	**Median**	**Q3**
PCRD	860	0.070	0.386	-0.077	0.013	0.156
CIRD	878	-0.001	0.013	-0.001	0.000	0.001
CCAPEX	877	-0.096	0.439	-0.164	-0.016	0.035
CSALES	877	-1.319	4.604	-2.204	-0.303	0.470
Firm size**	888	2998	8741	229	644	2066
DEG	886	0.658	0.475	0.000	1.000	1.000
Leverage	887	0.235	0.178	0.103	0.223	0.333
Free cash flow	831	-0.107	0.401	-0.215	-0.024	0.089
Tobins q	887	1.506	1.637	0.748	1.054	1.561
No-Cut Sample						
PCRD	3971	0.068	0.309	-0.022	0.047	0.159
CIRD	4019	0.000	0.012	-0.002	0.000	0.001
CCAPEX	4019	0.059	0.404	-0.084	0.033	0.196
CSALES	4019	1.268	4.203	0.050	1.109	2.693
Firm Size**	4019	12196	21499	1165	3359	11320
DEG	4019	0.321	0.467	0.000	0.000	1.000
Leverage	4015	0.197	0.124	0.110	0.194	0.270
Free cash flow	3847	0.264	0.196	0.151	0.239	0.344
Tobins q	4015	1.892	1.250	1.147	1.594	2.245

*Dollar value in $US. Thousand; ** Dollar value in $US. Million; + Variable is log+1; ++ Variable is Binary

[a] Predicted residual of Moody's rating using *relative debt* and all other independent X variables in

[b] Predicted residual of Moody's rating using *relative deferred* and all other independent X

[c] Predicted residual of Moody's rating using *relative pension* and all other independent X

Variable Abbreviations: PCRD - Prior change in R&D. CIRD - Change in Industry R&D intensity. CCAPEX - change in capital expenditure. CSALES - Change in Sales. DEG - Distance from earnings goal.

2.5.2 Correlation Matrix

Table 3 presents the Pearson correlation among key variables used in model estimates in equation 4 (**Panel A**), equation 5 (**Panel B**) and equation 9 (**Panel C**).

[*Insert Table 3 – Panel A, Panel B & Panel C*]

Panel A shows a negative and statistically significant association between *small earning decline* and ID proxies - *relative debt, deferred,* and *pension.* The negative coefficient implies a dampening effect of the ID measures for the incentive to cut R&D spending. With respect to other control variables, a negative and statistically significant association is observed with *CCAPEX, CSales, firm size*, *DEG*, *free cash flow,* and *tobins q*. These results are consistent with prior studies (Berger, 1993; Bushee, 1998; Dang *et al.*, 2018; Opler *et al.*, 1999; Perry & Grinaker, 1994; Souder & Shaver, 2010; Wiedman, 1996). And, for *leverage,* a positive and statistically significant correlation with a *small earning decline*. Results are consistent with Myers (1984) and others (Duke & Hunt, 1990)**.**

Panel B expects *myopia* to be positive and statistically significant in relation to *firm size and age, CEO age, ROA, sales growth, leverage, R&D expenditure, tangibility, cash compensation, and surplus cash*. These positive relations remain consistent with past papers (J. L. Coles, N. D. Daniel*, et al.*, 2006; Hymer & Pashigian, 1962; Pastor & Veronesi, 2003; Skinner & Sloan, 2002). But there is a negative and significant 1% correlation between *Myopia* and: *book-to-market* ratio, *liquidity constraint*, *CEOs vega-delta* ratio, *market leverage,* and *return*. The direction and strength of the variables suggest that firms with a lower value, liquidity, vega-delta ratio, market leverage, and returns engage in managing real activities. Results remain consistent with previous study predictions (Sundaram & Yermack, 2007).

Panel C predicts a negative and statistical significance between the *yield spread* and these variables: the three ID (*relative debt, deferred, pension*) ratios, *MWCP, modified duration, offering amount, firm size, market-to-book, ROA* and the number of *analyst coverage*. The results are as expected and in line with prior study predictions (Anderson *et al.*, 2004; Mansi *et al.*, 2011). A wide yield spread means bondholders demand a premium on high risk bond. The variables found positive and statistically significant in association with *yield spread* include *FPCP, subordinate*, *PPP, firm leverage,* the *std. of profits, negative earning, tangibility, stock BAS, yield curve slope, 10yr T-rate, std. of 10yr t-rate* and *bond rate spread.* Overall, the predicted sign aligns with preceding reviews (Anderson *et al.*, 2004; Ortiz-Molina, 2006).

Table 3, Panels A-C, reports some high correlations, which may indicate models may suffer from multicollinearity. To test for multicollinearity in regression models, the variance inflation factor (VIF) test is used. The VIF values for each variable in our regression model can be found in section 5.1.2. Overall, there does not appear to be any multicollinearity that would warrant corrective measures, as each VIF for each variable does not exceed 5. The univariate results will be the focus of the next section.

Table 3. Pairwise Correlation

This table provides pairwise correlation for all firm-specific variabless using *small earnings decline* dataset (**Panel A**), *myopia* dataset (**Panel B**) and *yield spread* dataset (**Panel C**). The variable definitions are provided in section 5.1.1 **Appendix A.**

Panel A: Small Earnings Decline-ID	1	2	3	4	5	6	7	8	9	10	11	12	13
Small Earning Decline (1)	1.000												
Relative Debt (2)	-0.133*	1.000											
Relative Def (3)	-0.095*	0.808*	1.000										
Relative Pension (4)	-0.121*	0.718*	0.250*	1.000									
PCRD (5)	0.002	0.004	0.023	-0.03	1.000								
CIRD (6)	0.003	-0.016	-0.015	-0.02	0.009	1.000							
CCAPEX (7)	-0.143*	0.004	0.01	-0.013	0.038*	0.008	1.000						
CSALES (8)	-0.226*	0.005	0.006	-0.005	0.018	0.011	0.449*	1.000					
Firm Size (9)	-0.176*	0.164*	0.134*	0.161*	0.066*	0.015	0.028	0.036	1.000				
DEG (10)	0.267*	-0.003	-0.014	0.02	0.047*	0.002	-0.147*	-0.333*	-0.043*	1.000			
Leverage (11)	0.109*	-0.201*	-0.203*	-0.086*	-0.009	-0.007	0.001	-0.005	0.089*	0.061*	1.000		
Free Cash Flow (12)	-0.500*	0.086*	0.071*	0.075*	0.012	0.037	0.041*	0.087*	0.244*	-0.243*	-0.076	1.000	
Tobins Q (13)	-0.111*	-0.023	0.024	-0.076*	0.076*	0.02	0.042*	0.055*	0.123*	-0.153*	0.059*	0.113*	1.000

* Significant at the 1 per cent level.

Table 3. ***continues***

Panel B: Myopia-ID	1	2	3	4	5	6	7	8	9	10	11
Myopia (GMM) (1)	1.000										
Relative Debt (2)	0.073*	1.000									
Relative Def (3)	0.032	0.796*	1.000								
Relative Pension (4)	0.093*	0.738*	0.262*	1.000							
Firm Size (5)	0.382*	0.193*	0.117*	0.237*	1.000						
CEO Tenure (6)	-0.008	-0.024	-0.023	-0.036*	-0.113*	1.000					
CEO Age (7)	0.079*	0.128*	0.055*	0.158*	0.079*	0.379*	1.000				
Firm Age (8)	0.102*	0.186*	0.105*	0.209*	0.347*	-0.014	0.136*	1.000			
ROA (9)	0.641*	0.149*	0.122*	0.116*	0.255*	0.031	0.02	0.074*	1.000		
Sales Growth (10)	0.092*	-0.093*	-0.045*	-0.113*	-0.089*	0.113*	-0.008	-0.199*	0.165*	1.000	
Leverage (11)	0.031	-0.199*	-0.196*	-0.097*	0.173*	-0.107*	0.044*	0.005	-0.175*	-0.021	1.000
Book-to-Market (12)	-0.028	-0.072*	-0.108*	0.003	-0.017	-0.077*	0.038*	0.023	-0.282*	-0.198*	-0.038*
CAPEX (13)	0.006	0.028	0.011	0.040*	0.013	0.007	-0.02	-0.002	0.082*	0.058*	-0.039*
Research&Dev. Exp. (14)	0.195*	0.108*	0.112*	0.090*	0.748*	-0.061*	-0.022	0.256*	0.131*	-0.025*	0.055*
Tangibility (15)	0.106*	0.095*	0.008	0.159*	0.114*	-0.036*	0.081*	0.119*	0.039*	-0.142*	0.067*
Liquidity Constraint (16)	-0.351*	-0.098*	-0.078*	-0.080*	-0.252*	0.015	0.006	-0.075*	-0.476*	-0.095*	0.092*
Tax Loss indicator (17)	-0.004	-0.116*	-0.050*	-0.138*	-0.053*	0.008	-0.001	-0.051*	-0.053*	0.049*	0.046*
CEO Vega/Delta Ratio (18)	-0.103*	0.081*	0.054*	0.095*	0.122*	-0.287*	-0.141*	0.156*	-0.136*	-0.175*	0.050*
Cash Compensation (19)	0.226*	0.161*	0.078*	0.190*	0.505*	0.024	0.094*	0.238*	0.157*	-0.049*	0.118*
Market Leverage (20)	-0.022	-0.153*	-0.167*	-0.066*	0.137*	-0.090*	0.035*	0.02	-0.287*	-0.108*	0.562*
Market Return (21)	-0.080*	-0.025	-0.019	-0.017	-0.070*	0.015	-0.011	-0.038*	-0.088*	-0.018	0.019
Cash Surplus (22)	0.207*	0.062*	0.111*	-0.023	0.056*	0.065*	-0.057*	-0.035*	0.469*	0.153*	-0.193*

* Significant at the 1 per cent level.

Table 3. ***continues***

Panel B: Myopia-ID	12	13	14	15	16	17	18	19	20	21	22
Book-to-Market (12)	1.000										
CAPEX (13)	-0.01	1.000									
Research&Dev. Exp. (14)	-0.181*	-0.096*	1.000								
Tangibility (15)	0.176*	0.680*	-0.185*	1.000							
Liquidity Constraint (16)	0.087*	-0.051*	-0.121*	-0.043*	1.000						
Tax Loss indicator (17)	0.011	-0.051*	0.002	-0.062*	0.027	1.000					
CEO Vega/Delta Ratio (18)	0.205*	-0.039*	0.166*	0.004	0.053*	-0.057*	1.000				
Cash Compensation (19)	-0.021	0.02	0.349*	0.100*	-0.132*	-0.039*	0.057*	1.000			
Market Leverage (20)	0.438*	0.012	-0.023	0.183*	0.165*	0.011	0.127*	0.070*	1.000		
Market Return (21)	0.127*	0.000	-0.023	0.000	0.006	0.008	0.028	-0.032	0.107*	1.000	
Cash Surplus (22)	-0.401*	0.014	0.298*	-0.138*	-0.413*	-0.025	-0.044*	0.022	-0.349*	0.02	1.000

* Significant at the 1 per cent level.

Table 3. ***continues***

Panel C. Yield Spread-ID	1	2	3	4	5	6	7	8	9	10	11	12
Yield Spread (1)	1.000											
Relative Debt (2)	-0.265*	1.000										
Relative Def (3)	-0.224*	0.803*	1.000									
Relative Pension (4)	-0.196*	0.808*	0.352*	1.000								
Make-whole Call (5)	-0.226*	0.129*	0.110*	0.105*	1.000							
Fixed-Price Call (6)	0.339*	-0.209*	-0.153*	-0.170*	-0.695*	1.000						
Modified duration (Log) (7)	-0.109*	0.058*	0.061*	0.031	0.111*	-0.054*	1.000					
Offering Amount (Log) (8)	-0.348*	0.149*	0.149*	0.102*	0.290*	-0.253*	-0.166*	1.000				
Sub-ordinated Bond (9)	0.117*	-0.056*	-0.034	-0.058*	-0.101*	0.144*	-0.01	-0.115*	1.000			
Privately Placed Bond (10)	0.515*	-0.158*	-0.109*	-0.129*	-0.261*	0.325*	-0.122*	-0.180*	0.090*	1.000		
Firm Size (Log) (11)	-0.588*	0.281*	0.254*	0.209*	0.353*	-0.409*	0.123*	0.684*	-0.143*	-0.348*	1.000	
Debt Ratio (12)	0.273*	-0.309*	-0.261*	-0.237*	-0.175*	0.210*	-0.085*	-0.095*	0.057*	0.206*	-0.169*	1.000
Market-to-book (13)	-0.367*	0.189*	0.158*	0.119*	0.086*	-0.193*	0.066*	0.112*	-0.058*	-0.150*	0.334*	0.100*
Sales Growth (14)	-0.005	-0.140*	-0.067*	-0.139*	-0.070*	0.082*	0.017	-0.038*	0.046*	0.096*	-0.059*	0.014
Profits (15)	-0.312*	0.192*	0.154*	0.141*	0.056*	-0.159*	0.067*	0.094*	-0.035	-0.154*	0.253*	-0.048*
Std. Dev Profitsb (16)	0.240*	-0.106*	-0.085*	-0.082*	-0.055*	0.097*	-0.035	-0.02	-0.006	0.104*	-0.151*	0.111*
Negative Earnings (17)	0.413*	-0.147*	-0.131*	-0.102*	-0.143*	0.229*	-0.081*	-0.092*	0.024	0.168*	-0.260*	0.188*
Tangibility (18)	0.142*	-0.002	-0.005	-0.009	-0.032**	0.055*	0.031	-0.076*	0.057*	0.011	-0.076*	0.037*
Stock BAS (19)	0.423*	-0.121*	-0.114*	-0.074*	-0.125*	0.153*	-0.116*	-0.192*	0.069*	0.181*	-0.325*	0.173*
Number of Analysts (20)	-0.343*	0.086*	0.114*	0.028	0.241*	-0.233*	0.096*	0.372*	-0.094*	-0.230*	0.566*	-0.161*
Yield Curve Slope (21)	0.175*	0.009	-0.005	0.015	0.03	-0.034	-0.069*	-0.008	-0.018	0.01	-0.039*	0.011
10-year Treasure rate (22)	0.043*	0.038*	0.041*	0.025	-0.072*	0.018	-0.055*	-0.125*	0.088*	0.023	-0.188*	-0.107*
Std. Dev.10yr rate (23)	0.232*	0.071*	0.044*	0.068*	0.022	-0.046*	-0.049*	-0.009	-0.01	-0.024	-0.048*	-0.070*
Bond rates spread (24)	0.367*	0.105*	0.045*	0.119*	0.049*	-0.088*	-0.107*	0.009	0.007	-0.043*	-0.019	-0.068*

* Significant at the 1 per cent level.

Table 3. ***continues***

Panel C. Yield Spread-ID	13	14	15	16	17	18	19	20	21	22	23	24
Market-to-book (13)	1.000											
Sales Growth (14)	0.011	1.000										
Profits (15)	0.622*	0.154*	1.000									
Std. Dev Profitsb (16)	-0.007	-0.015	-0.259*	1.000								
Negative Earnings (17)	-0.237*	-0.156*	-0.403*	0.276*	1.000							
Tangibility (18)	-0.194*	-0.036	-0.067*	0.236*	0.190*	1.000						
Stock BAS (19)	-0.183*	-0.041*	-0.160*	0.087*	0.216*	0.039*	1.000					
Number of Analysts (20)	0.139*	-0.077*	0.073*	0.045*	-0.080*	0.068*	-0.215*	1.000				
Yield Curve Slope (20)	-0.062*	-0.171*	-0.021	0.027	0.063*	0.006	0.027	0.109*	1.000			
10-year Treasure rate (21)	-0.099*	0.134*	0.03	-0.031	0.013	0.056*	0.241*	-0.351*	-0.252*	1.000		
Std. Dev.10yr rate (22)	-0.068*	-0.056*	0.023	0.014	0.008	0.038*	0.125*	-0.069*	0.256*	0.119*	1.000	
Bond rates spread (23)	-0.089*	-0.105*	0.000	0.026	0.052*	0.059*	0.185*	-0.050*	0.164*	-0.002	0.506*	1.000

* Significant at the 1 per cent level.

2.5.3 Univariate Analysis

Table 4 presents the difference-in-mean comparison of high- and low-level ID holding firms. The two firm groups are determined by identifying the overall sample median and dividing the sample by firms with ID levels greater than the median as "High" and those with lower ID levels as "Low."[63] The null (H_0) and the alternative (H_1) hypotheses are expressed as below:

$$H_0: \mu_1 = \mu_2$$
$$H_A: \mu_1 \neq \mu_2$$

Where H_0 (H_1) suggest the means for the High Relative Debt group and the Low Relative Debt group are equal (not equal). The statistical significance of the group means differences provide evidence for the expected association between ID and myopic investment behaviour.

[*Insert Table 4*

Panel A shows the univariate results for firms under the "High Relative Debt" vs "Low Relative Debt" groups. *Myopia* is lower for high relative debt ratio firms, which suggests higher ID lowers future myopic management. The high relative debt groups include firms much larger, older, spend more on R&D and hold higher cash compensations. Statistically, these results are significant. **Panel B** shows that *Myopia* is lower for the "High Relative Deferred" group. As seen in **Panel C**, the coefficient sign and statistical significance remain consistent for firms under the "High Relative Pension" group.

Overall, the negative and statistical significance of group mean-difference of *Myopia* under the High ID firm groups leads to a rejection of the null and acceptance of the alternative hypotheses.

[63] We also conducted a univariate analysis of firm groups using annual sample medians as a robustness check. The results are similar. However, this analysis is not included in the current study.

Table 4 - Univariate Analysis

The table presents the difference-in-means comparison for "Low" vs "High" ID groups and their firm and CEO-level Characteristics. Using the primary sample of 6,136 observations and 929 unique companies covering the sample period 2006-2017, **Panel A** compares the means of Low vs High Relative Debt firms' myopia, firm, and Executive level characteristics for the two groups: Low Relative Debt vs High Relative Debt. Firms with high (low) relative debt have a ratio above (below) the median value identified by year and industry. **Panel B** shows the results for the Low Relative Deferred vs High Relative Deferred group. **Panel C** reports the results for Low Relative Pension vs High Relative Pension. See section 5.1.1 **Appendix A** for variable description.

	Panel A - Relative Debt				**Panel B** - Relative Deferred				**Panel C** - Relative Pension			
	N=1663 (Low) vs 3706 (High)				*N=1317 (Low) vs 4108 (High)*				*N= 1142 (Low) vs 4283 (High)*			
	LOW	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**
Myopia (GMM)	0.447	0.438	0.01	5.147***	0.456	0.437	0.019	9.564***	0.454	0.438	0.016	8.101***
Size	7.444	7.965	-0.521	-11.116***	7.804	7.789	0.015	0.292	7.498	7.871	-0.373	-7.884***
ROA	0.03	0.045	-0.016	-4.254***	0.041	0.04	0.001	0.353	0.044	0.039	0.004	1.252
Firm Age	3.101	3.179	-0.078	-3.377***	3.21	3.127	0.082	3.256***	3.151	3.147	0.004	0.157
CEO Tenure	6.519	6.685	-0.166	-0.866	6.29	6.748	-0.458	-2.290**	6.579	6.652	-0.074	-0.33
CEO Age	55.485	55.593	-0.109	-0.571	56.238	55.336	0.902	4.494***	55.872	55.471	0.401	1.815*
Sales Growth	0.046	0.047	0	-0.031	0.032	0.052	-0.02	-5.982***	0.035	0.05	-0.014	-3.865***
Leverage	0.272	0.23	0.042	7.793***	0.281	0.232	0.048	8.607***	0.248	0.243	0.006	1.024
Book to Market	0.639	0.572	0.067	9.312***	0.659	0.57	0.09	11.949***	0.641	0.578	0.063	8.006***
Capex	0.038	0.033	0.005	5.294***	0.039	0.033	0.006	6.581***	0.039	0.033	0.006	6.233***
R&D expenditure	3.597	4.599	-1.002	-21.018***	3.583	4.501	-0.918	-17.664***	3.39	4.515	-1.125	-22.595***
Tangibility	0.206	0.168	0.038	9.510***	0.232	0.162	0.07	16.003***	0.22	0.167	0.053	12.162***
Liquidity Constraint	0.085	0.053	0.032	4.141***	0.064	0.064	0	0	0.062	0.064	-0.002	-0.252
Tax Loss Indicator	0.655	0.683	-0.027	-1.954*	0.645	0.682	-0.036	-2.403**	0.675	0.672	0.003	0.188
CEO Vega/Delta	0.305	0.34	-0.036	-5.043***	0.296	0.339	-0.043	-5.611***	0.29	0.339	-0.049	-6.155***
Cash Compensation	6.709	6.764	-0.055	-2.881***	6.799	6.727	0.072	3.589***	6.722	6.751	-0.029	-1.45
Market Leverage	0.312	0.2	0.112	11.358***	0.346	0.198	0.148	12.569***	0.275	0.223	0.052	5.338***
Market Returns	0.077	0.059	0.017	1.413	0.061	0.066	-0.006	-0.443	0.053	0.068	-0.015	-1.107
Cash Surplus	0.074	0.11	-0.036	-11.804***	0.069	0.109	-0.04	-14.740***	0.076	0.105	-0.03	-11.488***

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively

2.5.4 Main Results

i. Effects of CEO inside debt holdings on small earning decline

Table 5 presents the results of the association between CEO inside debt and the proxy of managers' incentive to be myopic.

[*Insert Table 5*]

The estimated coefficients on *relative debt* and *pension* are negative and statistically significant, as are control variables *change in Industry R&D intensity* and *capital expenditure* and *sales, size, distance from earning goal, leverage, free cash flow*, and *tobins q*. The marginal effects are computed to make sense of the logit output values (see **Appendix C** for results). On average, a one-unit increase in an executive's *relative debt* ratio leads to a 2%-point drop in the probability that the firm exhibits a *small earning decline*. For *relative pension,* the probability of the firm cutting R&D spending reduces by 4.4%. This suggests that higher ID is associated with a lower incentive to be myopic, that is firm to cut earnings or R&D relative to the prior year. With respect to other control variables, the *small earning decline* is negatively correlated with *CCAPEX, CSales*, *firm size*, *free cash flow*, and *tobin's q*. Our results align with prior findings (Berger, 1993; Bushee, 1998; Opler *et al.*, 1999; Osma & Young, 2009; Souder & Shaver, 2010). Executives of smaller firms often cut R&D spending in response to the lack of funds for investment opportunities. On the other hand, a *small earning decline* is positive and statistically significant at a 1% level with *CIRD*, *DEG*, and *firm leverage*. An interesting finding is that *CIRD* is positive and statistically significant in association with a *small earning decline*, implying that R&D spending is likely to be cut in industries with high R&D. While firms further from their earning goals cut R&D to reduce the gap and firms with high debt-to-equity obligations are more likely to cut R&D to meet debt covenant obligations.

Overall, these findings support *H1*, that firms have less incentive to cut earnings or R&D when ID is higher. Inside debt compensations are a powerful mechanism to counter myopic earnings management.

Table 5 - ID and Incentive to be Myopic

The table presents the results from the estimation of Equation 4 - *H1*. Dependent variable is the measure of small earnings decline calculated following Bushee (1998). Key variable of interest is the inside debt proxy - *relative debt* (**Model 1**), *relative deferred* (**Model 2**) and *relative pension* (**Model 3**). Each model includes a Fama-French 12 industry and year effects. Definitions of variables used in the model are in the appendix. The t statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsor at 1st and 99th percentiles.

Y= Small earning decline	**Model (1)** *Relative Debt (Log+1)*	**Model (2)** *Relative Def (Log+1)*	**Model (3)** *Relative Pen (Log+1)*
Main X	-0.2379***	-0.1324	-0.4412***
	(2.88)	(1.436)	(3.616)
PCRD	0.2492	0.2534	0.2277
	(1.225)	(1.248)	(1.123)
CIRD	22.0714***	21.6486***	23.2728***
	(2.864)	(2.813)	(2.968)
CCAPX	-0.5412***	-0.5436***	-0.5451***
	(3.767)	(3.784)	(3.779)
CSALES	-0.1140***	-0.1131***	-0.1159***
	(7.356)	(7.347)	(7.337)
Firm Size^{x}	-0.0034***	-0.0034***	-0.0033***
	(3.130)	(3.238)	(3.083)
DEG	0.7145***	0.6981***	0.7213***
	(6.411)	(6.275)	(6.488)
Leverage	1.7365***	1.9193***	1.8421***
	(4.353)	(4.794)	(4.657)
Free Cash Flow	-8.7753***	-8.8148***	-8.7551***
	(15.410)	(15.488)	(15.366)
Tobins Q	-0.2751***	-0.2713***	-0.2881***
	(4.533)	(4.503)	(4.624)
Constant	0.0697	-0.0199	0.0325
	(0.114)	(0.033)	(0.052)
Year & Industry FE	Yes	Yes	Yes
Std.Error Cluster (Firm)	Yes	Yes	Yes
Observations	4,641	4,641	4,641
Chi2	574***	573.4***	579.7***
Adjusted R2	0.457	0.455	0.459

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.
Note: A variable with a superscript (^{x}) indicates that its coefficient estimates are multiplied by 100. This note is applicable to all tables in this thesis.

ii. ID encourages long-term oriented management

Table 6 presents the association results between CEO inside debt and realised myopia (t+1).

[*Insert Table 6*]

The estimated coefficients of all three inside debt proxies are negative and statistically significant at a 1% level for *relative debt* and *pension* and deferred at a 5% level. This suggests that higher ID is associated with lower future myopic behaviour. The estimated coefficient of *relative debt* is -0.0067, *relative deferred* is -0.0065, and *relative pension* is -0.0084. These results are also economically significant. In column 1, for example, increasing *relative debt* by one standard deviation (0.947) implies a reduction in myopia (t+1) equal to 3.27 %.[64] Similarly, in column 2, the increasing *relative deferred* ratio by one standard deviation reduces myopia (t+1) by 2.4%, while *relative pension* lowers realised myopia by about 3%.

The results on other independent variables show, ceteris paribus, if a CEO's *tenure* increases by one year, then *myopia* (t+1) is expected to decrease by about 0.0045 units, while the *age* of the CEO would increase *myopia* (t+1) by 0.0009 units. In economic significance, increasing *tenure* by one standard deviation should reduce *myopia* (t+1) by about 14%, while *age* increases *myopia* (t+1) by 3%. With respect to control variables, there is a negative and statistically significant coefficient estimate for *firm age, capex, returns* and *CEO vega-to-delta* ratio. Young firms and newly appointed CEOs are associated with higher myopia (t+1). *Myopia* is more likely to occur when the firm has firms with lower capital expenditure levels and lower market returns. On the other hand, *firm size, ROA, sales growth, leverage, market-to-book,* and *tangibility* ratio face greater incentives to become myopia, consistent with prior study findings (Chava & Purnanandam, 2010).

[64] This paper follows the measure of economic significance (E_s^s) following the second method by Mitton (2021). Using, the summary statistics in *Table 2*, E_s^s is derived by multiplying the estimated regression coefficient of explanatory variable on its standard deviation then scale by the standard deviation of the dependent variable.

Table 6 - ID and Realised Myopia

The table presents results from the estimation of Equation 5 - *H2*. Dependent variable is the measure of myopic firms identified using Mizik and Jacobson (2007). Key variable of interest is the inside debt proxy - *relative debt* (**Model 1**), *relative deferred* (**Model 2**) and *relative pension* (**Model 3**). Each model includes a Fama-French 12 industry and year effects. Definitions of variables used in the model are in the appendix. The t statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsor at 1st and 99th percentiles.

	Model (1)	**Model (2)**	**Model (3)**
Y= Realised Myopia	*Relative Debt (Log+1)*	*Relative Def (Log+1)*	*Relative Pen (Log+1)*
Main X	-0.0067***	-0.0065**	-0.0084***
	(3.386)	(2.334)	(3.780)
Size	0.0229***	0.0226***	0.0232***
	(6.679)	(6.544)	(6.766)
CEO Tenure	-0.0045*	-0.0046*	-0.0046*
	(1.914)	(1.921)	(1.946)
CEO Age	0.0009**	0.0008**	0.0009**
	(2.404)	(2.2)	(2.454)
Firm Age	-0.0081***	-0.0085***	-0.0080***
	(3.836)	(4.022)	(3.811)
ROA	0.9684***	0.9678***	0.9688***
	(19.564)	(19.528)	(19.565)
Sales Growth	0.1523***	0.1535***	0.1525***
	(5.183)	(5.222)	(5.188)
Leverage	0.0822***	0.0846***	0.0863***
	(3.695)	(3.846)	(3.907)
Market to Book	0.1295***	0.1310***	0.1312***
	(6.941)	(7.072)	(7.011)
Capex	-0.9957***	-0.9829***	-0.9965***
	(4.524)	(4.474)	(4.517)
R&D expenditure	-0.0013	-0.0011	-0.0016
	(0.342)	(0.285)	(0.4275

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 6. ***continues***

Tangibility	0.1816***	0.1777***	0.1835***
	(5.064)	(4.978)	(5.078)
Liquidity Constraint	-0.0071	-0.0068	-0.0069
	(0.370)	(0.357)	(0.361)
Tax Loss Indicator	0.0037	0.0042	0.0034
	-1.084	-1.226	-0.982
CEO Vega/Delta	-0.0353***	-0.0363***	-0.0357***
	(-4.060)	(-4.184)	(-4.114)
Cash Compensation	0.0057	0.0052	0.0058
	-1.363	-1.241	-1.381
Market Leverage	-0.012	-0.0115	-0.0123
	(-0.782)	(-0.748)	(-0.798)
Market Returns	-0.0253*	-0.0254**	-0.0252*
	(-1.960)	(-1.966)	(-1.952)
Cash Surplus	-0.0672	-0.0654	-0.0685
	(-0.809)	(-0.791)	(-0.822)
Constant	0.0671*	0.0745*	0.0619
	-1.7	-1.883	-1.574
Year & Industry FE	Yes	Yes	Yes
Std.Error Clustering by Firm	Yes	Yes	Yes
Observations	5,425	5,425	5,425
R-squared	0.634	0.633	0.633
F-Statistics	56.39	56.33	54.74
Root MSE	0.119	0.119	0.119

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

[*Insert Table 6A and 6B*]

CEO age sub-test. *H2A* requires dividing the realised myopia sample into CEOs aged below 59 years, the 'Young' subset (A), and CEOs over 60 years, the 'Mature' subset (B).[65] The results in *Table 5A* support debt-like pay and its relevance, specifically in dampening future myopic behaviour. For the 'Young' CEO group (Model 1), the coefficient estimate for *relative debt* is negative and significant at a 1% significance level. For every unit increase change in relative debt, there is a decrease in the myopia of about 0.7 bp (0.0071). Furthermore, the chi-square is statistically significant, indicating a difference between the coefficients of the two groups tested. As seen in Model 2 (Model 3), the negative relationship between *relative deferred* (*pension*) is statistically significant at the 5% (1%) level. A unit increase in *deferred* and *pension* holding decreases myopia by 0.8 bp, respectively. The chi-square is statistical

[65] Earlier papers analysed the sample based on median age (55-56 years), but we are unable to divide the sample by median age, 56 years, due to the skewed distribution of the Relative Debt ID measures.

significance for the group mean-difference test for *relative debt* but not a *relative pension*. Overall, our findings prove that paying executives with ID encourages less myopic managerial behaviours, especially that of younger CEOs with greater career concerns.

CEO tenure sub-test. *H2B* divides the full sample into two groups: Firm CEOs that held the position for less than 4 years, the 'Short Tenure' group (A), and 5 years or more, the 'Long Tenure' group (B). All else equal, the *myopia-ID* association is expected to be more pronounced for long tenure CEOs. *Table 5B* documents a negative and significant association, and this relation remains across each Model. For example, in Model 1, firm CEOs holding higher *relative debt* reduce *myopia* by 0.81 bp (0.0081) and is significant at the 1% statistic level for the long tenure group (B). The coefficient group comparison difference-in-mean test is significant at the 5% statistical level. Model 2 and 3 results are consistent in negative and significant for the remaining two ID measures. Higher ID levels can reduce being myopic, especially for companies with long tenure CEOs.

Overall, these results indicate the role of inside debt compensations in influencing long-term oriented management. Specifically, the higher the inside debt holding of the CEO, the less likely a firm will engage in managing real activities.

Table 6A - Executive age sub-sample

The table provides the results for *Hypotheses 2a*. The full sample is divided into two groups: Firms whose CEOs are aged 59 years below fall into the 'Young' group (A). And firms whose CEOs are aged 60 and above are identified as 'Mature' group (B). The coefficient estimates for the the firm- and executive-level controls are not reported for brevity. Each model controls for Fama-French 12 industry and year effects. Definitions of variables used in the model are in the appendix. The t statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsor at 1st and 99th percentiles.

	Model (1)		**Model (2)**		**Model (3)**	
	Relative Debt (Log+1)		*Relative Def (Log+1)*		*Relative Pen (Log+1)*	
Y= Realised Myopia	A	B	A	B	A	B
Main X	-0.0071***	-0.0032	-0.0082**	-0.001	-0.0080***	-0.0069*
	(2.822)	(1.004)	(2.315)	(0.238)	(2.842)	(1.845)
Constant	0.1160**	0.069	0.1224**	0.0708	0.1109**	0.0678
	(2.332)	(0.596)	(2.46)	(0.611)	(2.217)	(0.587)
Controls	YES	YES	YES	YES	YES	YES
Year & Industry FE	YES	YES	YES	YES	YES	YES
Std.Error Clustering by Firm	YES	YES	YES	YES	YES	YES
Observations	4,022	1,403	4,022	1,403	4,022	1,403
R-squared	0.64	0.706	0.64	0.706	0.64	0.707
F-Statistics	55.02	15.52	54.9	15.72	54.39	14.49
Root MSE	0.122	0.108	0.122	0.108	0.122	0.108
Chi2		2.89		4.61		0.1
pvalue		0.0892		0.0318		0.7473

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 6B - Executive tenure sub-sample

The table provides the results for *H2b*. The full sample is divided into two groups: Firms whose CEOs have less than four years tenure are categorised as 'Short-Tenure' firms (A). And firms whose CEOs have 5 and more years are classified as the 'Long-Tenure' group (B). The coefficient estimates for the the firm- and executive-level controls are not reported for brevity. Each model controls for Fama-French 12 industry and year effects. Definitions of variables used in the model are in the appendix. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsor at 1st and 99th percentiles.

	Model (1)		**Model (2)**		**Model (3)**	
	Relative Debt (Log+1)		*Relative Def (Log+1)*		*Relative Pen (Log+1)*	
Y= Realised Myopia	A	B	A	B	A	B
Main Independent Variable	-0.0022	-0.0081***	0.0009	-0.0086**	-0.0066*	-0.0089***
	(0.669)	(3.066)	(0.225)	(2.189)	(1.781)	(3.133)
Constant	0.0926	0.0857	0.0956	0.0976*	0.0867	0.0795
	(1.599)	(1.605)	(1.634)	(1.843)	(1.487)	(1.487)
Controls	YES	YES	YES	YES	YES	YES
Year & Industry FE	YES	YES	YES	YES	YES	YES
Std.Error Clustering by Firm	YES	YES	YES	YES	YES	YES
Observations	2,542	2,883	2,542	2,883	2,542	2,883
R-squared	0.712	0.606	0.712	0.605	0.712	0.605
F-Statistics	50.33	21.94	50.53	21.95	49.43	21.68
Root MSE	0.121	0.115	0.121	0.115	0.121	0.115
Chi2		5.21		6.5		0.29
pvalue		0.0225		0.0108		0.59

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

iii. ID positively influences bondholder trust

Table 7 presents the association results between CEO inside debt and cost of debt.

[*Insert Table 7*]

The coefficient estimates for *relative debt* and *pension* are negative and statistically and economically significant. A one-unit increase in the *relative debt* lowers the yield spread by approximately 0.12 bp (0.0012). For *relative pension,* the yield spread is expected to reduce by about 0.17 bp (0.0017). These results are also economically significant. In column 1, for example, increasing *relative debt* by one standard deviation implies a decrease in the cost of debt (*yield spread*) equal to 5.17 %. In column 2, increasing the *relative deferred* ratio by one standard deviation reduces the cost of debt by 2%, while *relative pension* has a reducing effect on the cost of debt equal to 5.36%. With respect to bond-level and firm financial controls, the coefficient sign and statistical significance remain largely consistent. A positive coefficient is shown between the cost of debt and the following controls: *debt ratio*, *modified duration* and *privately placed bonds*. In economic magnitude, increasing the firm *debt ratio* by one standard deviation could increase the cost of debt by 11.3%; *modified duration* could increase the cost of debt by 5.63% while *privately placed bonds* increase the cost of debt by about 18.28%. Amongst the firm financial controls, we show higher cash flow risks, proxy by *std. of profits,* and *negative earning*, leads to higher cost of debt (wider yield spreads), and these results are statistically significant at the 1% level. A higher *yield curve slope* and greater *bond rate spread* are associated with a higher spread. And *firm size*, *analyst coverage, market-to-book ratio,* and *10-year Treasury rate* have the expected signs and significance. Consistent with Mansi *et al.* (2011), larger firms have more analysts following, greater investor recognition, lower probability of financial distress, and greater security liquidity, therefore, a lower likelihood of a wide yield spread. Firms with higher *market-to-book* suggest greater cash flow growth opportunities and a negative relation with *yield spread*.

Based on the above results, inside debt compensation influences bondholder trust to a point where they demand a lower (higher) risk premium from CEOs who hold high (low) levels of inside debt.

Table 7 - Inside debt and cost of debt

The table presents results from the estimation of Equation 9 - *H3*. Dependent variable is yield spread measured as the difference between the issued corporate bond yield and treasury bond yield of similar maturity. Key variable of interest is the inside debt proxy - *relative debt* (**Model 1**), *relative deferred* (**Model 2**) and *relative pension* (**Model 3**). Each model includes a Fama-French 12 industry and year effects. Definitions of variables used in the model are in the appendix. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm and year levels.

Y= Yield Spread	**Model (1)** *Relative Debt (Log+1)*	**Model (2)** *Relative Def (Log+1)*	**Model (3)** *Relative Pen (Log+1)*
Main X	-0.0012*	-0.0006	-0.0017***
	(-1.756)	(-0.592)	(-2.781)
Moody's Rating Residual	-0.0022***	-0.0022***	-0.0022***
	(-7.823)	(-7.914)	(-7.827)
Make-whole Call Provision (1/0)	0.0002	0.0004	0.0003
	-0.362	-0.564	-0.428
Fixed-Price Call Provision (1/0)	0.0015	0.0016	0.0015
	-0.954	-1.029	-0.981
Modified duration (Log)	0.0032**	0.0032**	0.0032**
	-2.454	-2.43	-2.423
Offering Amount (Log)	0.0002	0.0002	0.0001
	-0.437	-0.482	-0.366
Sub-ordinated Bond (1/0)	0.0018	0.0018	0.0016
	-1.267	-1.236	-1.148
Privately Placed Bond (1/0)	0.0112***	0.0113***	0.0112***
	-8.567	-8.499	-8.506
Firm Size (Log)	-0.0368***	-0.0377***	-0.0367***
	(-9.406)	(-9.825)	(-9.517)
Debt Ratio	0.0161***	0.0172***	0.0165***
	-6.728	-7.17	-7.295
Market-to-book	-0.0025***	-0.0026***	-0.0025***
	(-6.415)	(-6.861)	(-6.423)
Sales Growth (prior 3 years)	0.0052	0.0065	0.005
	-1.064	-1.381	-1.021
Profits	-0.0016	-0.0019	-0.0014
	(-0.265)	(-0.299)	(-0.223)

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 7. ***continues***

Std.Profits (prior 5 years)	0.0560***	0.0583***	0.0560***
	-6.607	-6.706	-6.46
Negative Earnings (1/0)	0.0106***	0.0106***	0.0106***
	-8.867	-8.768	-8.819
Tangibility	0.0016	0.0014	0.0014
	-0.953	-0.861	-0.864
BAS over Prior year	0.0179**	0.0181**	0.0180**
	-2.443	-2.468	-2.442
Number of Analysts	-0.0015*	-0.0015	-0.0016*
	(-1.697)	(-1.579)	(-1.741)
Yield Curve Slope	0.4114***	0.4119***	0.4237***
	-3.345	-3.268	-3.602
10-year Treasure rate	-0.4147***	-0.4064***	-0.4351***
	(-2.890)	(-2.789)	(-3.140)
Std (10-year Treasury rate)	0.4558	0.4655	0.4423
	-1.404	-1.421	-1.363
Bond rates spread	1.1146***	1.1123***	1.1108***
	-13.154	-13.113	-12.994
Constant	0.0947***	0.0952***	0.0960***
	-8.184	-8.156	-8.4
Controls	Yes	Yes	Yes
Year & Industry FE	Yes	Yes	Yes
Std.Error Clustering by Time & Firm	Yes	Yes	Yes
Observations	3,855	3,855	3,855
R-squared	0.76	0.759	0.76
F-statistics	116.2	114.1	115.3

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

[*Insert Table 7A and 7B*]

Maturity sub-test. Table 7A divides the at-issue bond sample into short and long-term maturity subsets to examine *H3A*. Bonds are classified as long-term mature if their term to maturity is 10 or more years (A). And short-term bonds if bonds mature in less than 7 years (B). As seen in columns 1-3, the coefficient estimate for all proxies of ID remains largely negative and statistically significant with a *yield spread*, especially in the long-term bond subset. Specifically, the estimated coefficient on *relative debt* is 0.0012 and statistically significant at the 10% level for bonds with 10years of maturity (A). This result suggests that when managers hold higher relative debt, corporate debtholders trust them to behave optimally, inducing tighter yields, especially for higher risk bonds or longer maturity bonds. No significance is found for *relative deferred-yield spread,* see column 2. But a negative and significant at the 1% level is

presented for *relative pension* under firms identified with long term bond maturity. However, the comparisons for regression coefficients cannot confirm a statistically significant difference in the means between the two groups.

Credit-rating sub-test. To test *H3B***,** the at-issue bond sample is divided into low and high credit rated firms. Firms with a credit rating *zscore* below 1.81 have a higher probability of default and are identified as the "Low Rated" group (A). In comparison, firms with a 2.99 *zscore* have a lower probability of insolvency and are identified as the "High Rated" group (B). There is a consistent negative ID-yield spread relation, and the coefficient sign remains consistent across Models 1-3. Model 1 shows the negative association between *relative debt* and *yield spread* is 0.0018 and statistically significant at the 10% (5%) level for "Low Rated" firms. The result for the *relative deferred* measure is not significant under either subset (see Model 2). But the *relative pension* coefficient is negative and highly significant. The results show that bond investors become more sensitive in their decisions to purchase issued bonds of low- rated firms. And this sensitivity is reflected in a wider yield spread.

Overall, the findings show the role of inside debt compensations in influencing bondholder confidence that managers act in their best interest: the higher the inside debt holding of the CEO, the lower the yield spread in the cost of debt, especially for firms issuing bonds associated with higher risks (e.g., longer maturity and lower rating).

Table 7A - Term to maturity sub-sample

The table provides the results for *H3a*. The full sample is divided into two groups: Bonds classified 'Long Term' have a term to maturity of 10 or more years (A). While 'Short Term' Bonds mature in 7 or fewer years (B). The coefficient estimates for the the firm- and executive-level controls are not reported for brevity. Each model controls for Fama-French 12 industry and year effects. Definitions of variables used in the model are in the appendix. The t statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm and year levels. All variables are winsor at 1st and 99th percentiles.

	Model (1)		**Model (2)**		**Model (3)**	
	Relative Debt (Log+1)		*Relative Def (Log+1)*		*Relative Pen (Log+1)*	
Y= Yield Spread	A	B	A	B	A	B
Main Independent Variable	-0.0012*	-0.0008	-0.0005	-0.0003	-0.0017***	-0.0012
	(1.932)	(0.887)	(0.560)	(0.281)	(4.254)	(1.420)
Constant	0.0719***	0.1006***	0.0727***	0.1015***	0.0724***	0.1007***
	(6.142)	(7.565)	(6.259)	(7.583)	(6.196)	(7.588)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year & Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Std.Error Clustering by Time & Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,986	1,176	1,986	1,176	1,986	1,176
R-squared	0.69	0.802	0.689	0.802	0.691	0.802
F-statistics	51.15	56.75	50.37	56.82	52.38	55.86
Chi2		0.19		0.05		0.52
pvalue		0.6659		0.8303		0.471

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 7B - Credit rating sub-sample

The table provides the results for *H3b*. The full sample is divided into two groups: Firms classified 'Low Rated' has assigned a credit rating zscore of below 1.81. These firms represent a high probability of default (A). Firms that are 'High Rated' are assigned a credit rating zscore of 2.99 and above. These firms identify with having a lower chance of facing bankruptcy or insolvency (B). The coefficient estimates for the the firm- and executive-level controls are not reported for brevity. Each model controls for Fama-French 12 industry and year effects. Definitions of variables used in the model are in the appendix. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm and year levels. All variables are winsor at 1st and 99th percentiles..

	Model (1)		**Model (2)**		**Model (3)**	
	Relative Debt (Log+1)		*Relative Def (Log+1)*		*Relative Pen (Log+1)*	
Y= Yield Spread	A	B	A	B	A	B
Main X	-0.0018*	-0.0008	-0.0015	0.000023	-0.0027***	-0.0015***
	(1.923)	(1.441)	(1.474)	(0.03)	(2.636)	(4.535)
Constant	0.0980***	0.0773***	0.0983***	0.0778***	0.0999***	0.0776***
	(9.099)	(5.282)	(9.238)	(5.33)	(9.643)	(5.326)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year & Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Std.Error Clustering by Time & Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,453	1,264	2,453	1,264	2,453	1,264
R-squared	0.774	0.722	0.773	0.722	0.773	0.724
F Statistics	90.66	46.49	86.57	46.73	89.77	46.29
Chi2		5.03		7.53		0.79
pvalue		0.0249		0.0061		0.373

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

2.5.5 Robustness check

For robustness checks, instead of the Mizik (2010); Mizik and Jacobson (2007) proxy of myopia, we use the alternative proxy for the myopic firm as proposed by Anderson and Hsiao (1981). Table 7 confirms the main findings that less myopia (t+1) is associated with a higher ID compensation (*H2*), especially for younger CEOs (*H2a*) and long-serving CEOs (*H2b*). In Panel A, the coefficients for our ID variables are statistically and economically significant. A one-unit increase in the *relative debt* lowers realised myopia by approximately 0.51 bp (0.0051). For *relative deferred* (*pension*), realised myopia is expected to reduce by about 0.48 (0.68) bp, which is 0.0048 (0.0068). In terms of magnitude, a one standard deviation increase in *relative debt* leads to a decrease in myopia by about 2.54%. In contrast, *relative deferred* reduces myopia by 1.81% and *relative pension* equal 2.5%.

Panels B and C present results similar to those documented in Tables 6A and 6B. Interestingly, the Chi^2 is now statistically significant for the group mean-difference test for *relative debt* and *deferred* but not a *relative pension*. In sum, the results in Table 8 provide supporting evidence that ID reduces myopia (*t+1*).

Table 8 - Robustness check - ID and Realised Myopia, Anderson and Hsiao (1981) measure

The table presents results of inside debt proxies on the full sample and subsample of myopic firms. Dependent variable is the measure of myopic firms identified using Anderson and Hsiao (1981). Key variable of interest is the inside debt proxy - *relative debt* (**Model 1**), *relative deferred* (**Model 2**) and *relative pension* (**Model 3**). **Panel A** presents the result for *H2*. **Panel B** presents the sub-sample results for *H2a*. And, **Panel C** presents the sub-sample results for *H2b*. The coefficient estimates for the the firm- and executive-level controls are not reported for brevity. Each model includes a Fama-French 12 industry and year effects. Definitions of variables used in the model are in the appendix. The t statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsor at 1st and 99th percentiles.

Panel A

	Model (1)	**Model (2)**	**Model (3)**
Y= Realised Myopia	*Relative Debt (Log+1)*	*Relative Def (Log+1)*	*Relative Pen (Log+1)*
Main X	-0.0051***	-0.0048**	-0.0068***
	(-3.185)	(-2.119)	(-3.492)
Controls	Yes	Yes	Yes
Year & Industry FE	Yes	Yes	Yes
Std.Error Clustering by Firm	Yes	Yes	Yes
Observations	5,429	5,429	5,429
R-squared	0.701	0.701	0.701
F-Statistics	90.42	90.99	88.85
Root MSE	0.104	0.104	0.104

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Panel B

	Model (1)		Model (2)		Model (3)	
Y= Realised Myopia	*Relative Debt (Log+1)*		*Relative Def (Log+1)*		*Relative Pen (Log+1)*	
	A	B	A	B	A	B
Main X	-0.0058***	-0.0024	-0.0065**	-0.0005	-0.0070***	-0.0052
	(2.795)	(0.913)	(2.253)	(0.146)	(2.800)	(1.611)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year & Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Std. Error Clustering by Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,025	1,404	4,025	1,404	4,025	1,404
R-squared	0.705	0.762	0.705	0.762	0.705	0.762
F-Statistics	82.97	26.81	83.07	27.27	82.28	25.8
Root MSE	0.107	0.0936	0.107	0.0936	0.107	0.0935
Chi 2		5.30		7.93		0.62
pvalue		0.0213		0.0049		0.4325

Panel C

	Model (1)		Model (2)		Model (3)	
Y= Realised Myopia	*Relative Debt (Log+1)*		*Relative Def (Log+1)*		*Relative Pen (Log+1)*	
	A	B	A	B	A	B
Main X	-0.0011	-0.0063***	0.0017	-0.0066**	-0.0045	-0.0074***
	(0.416)	(2.865)	-0.521	(2.051)	(1.420)	(2.997)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year & Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Std. Error Clustering by Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,561	2,868	2,561	2,868	2,561	2,868
R-squared	0.768	0.669	0.768	0.669	0.768	0.669
F-Statistics	73.55	38.14	73.68	38.45	73.18	38.02
Root MSE	0.106	0.0999	0.106	0.1	0.106	0.1
Chi 2		6.19		7.01		0.67
pvalue		0.0128		0.0081		0.4136

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Chapter Three - ESSAY TWO

The impact of equity compensation schemes and the cost of debt: Does vesting equity matter to bond investors?

This chapter examines the investors' perception of an executive's incentive. It investigates whether equity compensation lowers the cost of debt (reflecting a lower risk for debtholders). The analysis uses three measures of CEO inside equity – vesting equity, vesting option and vesting stock – to test the association with (i) corporate bond prices and (ii) short-term executive risk taking. The result shows an increased amount of vesting equity in the year, lower bond yield spread, and lower corporate risk-taking activities, which bond investors view positively and respond accordingly. Section 3:1 serves as the introduction. Section 3:2 surveys the literature related to corporate bond pricing developed in Section 3:3. Section 3:4 presents the data collection and analysis methods. Section 3:5 concludes with the empirical findings.

ABSTRACT

Equity compensations often attract top-level executives and entice them to commit to a firm for a long time. Executives granted options or stock typically earn equity over time, so long-term incentives become short-term incentives as their equity vests. Accordingly, vesting equity indicates how concerned executives are about short-term price changes. This study tests the association between vesting equity, vesting options, and vesting stock and bond yield spreads. The association is also examined within subsamples for CEOs and firm-level characteristics. The results show that contemporaneous equity vesting leads to lower costs of debt (reflecting a lower risk for debtholders). Vesting options are especially associated with lower debt costs. The results are more pronounced in firms with young CEOs, short-tenured CEOs, short maturity bonds, low credit rating firms, firms with low credit and short maturity bonds, and low z-score firms with a short maturity. In addition, the relationship between vesting equity, vesting option, and vesting stock is examined in terms of the executives' short-term risk-taking. Vesting measures and short-term risk-taking proxy are negatively correlated, suggesting that since more equity is vested during the year, bond investors' concerns are alleviated by the reduced risk-taking activities of the executive.

Keywords: executive compensation, vested stock option, vested equity, cost of debt, yield spread.

3.1 INTRODUCTION

Companies are challenged to find investors to fund their projects and recruit, hire, and retain the most talented and skilled CEOs during the startup stage. As part of a company's total compensation package, equity has become a key component of attracting top executive and employee talent. Initially, equity compensation was designed to align executives with the firms' long-term interests.[66] The plans are a fairly cost-free way to attract, retain, and motivate CEOs since they are inexpensive and no initial cash outlay or accounting costs (Hall & Murphy, 2003).[67] However, equity compensation does incur a risk of loss if the CEO does not deliver because it offers the executives partial ownership of the company. Accordingly, this study examines the effect of vesting equity incentives on corporate bond price and risk-taking from the perspective of bond investors.

The problem and purpose for research. Agency relationship does not mean that firms have only one principal owner. The stakeholders' theory suggests multiple actors who offer a more comprehensive view of the firm than the shareholder theory (Shankman, 1999). Hence, it is essential to discuss: (I) ownership, (II) agency conflicts, and (III) equity compensation.

I. Ownership is a vital agency problem. Firm ownership can be explained in terms of stakeholders that can influence a firm or are affected by its operations. A company has both internal and external stakeholders. In *Figure 14,* internal stakeholders are described.

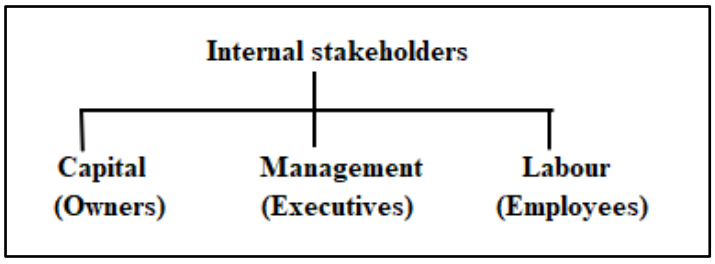


Figure 14: Internal key players of the firm

Internal stakeholders include capital, management and labour, with no particular order determining the principal factor (Fontrodona & Sison, 2006).[68] The different players are

[66] See the previous discussion in "Chapter 1: INTRODUCTION" of this thesis about how equity compensation is designed to retain executives' long-term interest in the firm.
[67] Options also provide tax benefits and deductions for the spread between the stock price and the exercise price, so that the 'perceived cost' is much lower than the actual stock value (Deutsch, 2007).
[68] Study cites the work of Llano (1997).

individuals or groups with a voice within an organization's daily operations. Investors and shareholders provide capital to public companies. *Capital* financiers may include individual owners with significant share holdings in the firm. Stakeholders must design a strategic plan and policies that positively influence the company long term. *Managers* are stakeholders appointed by the board of directors. Their pay package aligns with the interests of all company stakeholders. The role managers play in shaping the vision of any organization is pivotal.[69] *Labourers* are the human capital of any firm and its chief asset (Drucker, 2001, p. 16). In exchange for their knowledge and time, they add value to their company.[70] Each collaborator in the company receives a reward from the firm's profit.

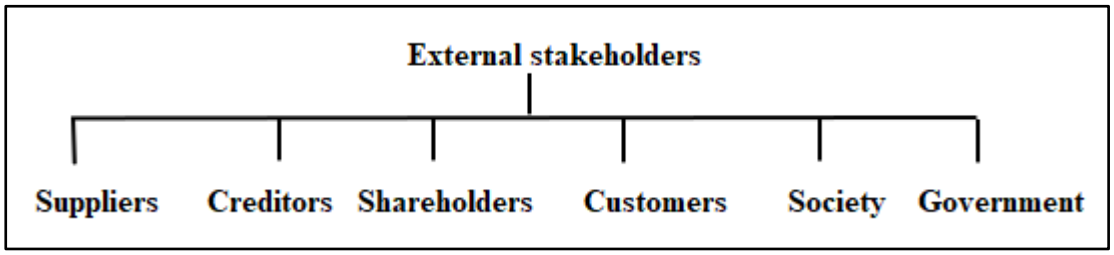


Figure 15: External key players of the firm

External stakeholders are listed partially in *Figure 15*. External groups or individuals do not work at the company and are not involved in its operations. They can, however, influence company operations and vice versa. For example, *suppliers* are providers of quality products for firms. *Creditors* are holders of debt securities and financiers of company projects.[71] While *shareholders* own shares and receive investment returns, they do not directly manage firm operations. Concerning *customers*, without them, businesses cannot survive. The *society* in which businesses operate today is dynamic and undergoing rapid changes, so managing economic growth for a positive outcome becomes imperative. *Governments* collect taxes from income (of corporations), payroll (of employees), and sales (from company spending). As well as establishing ethical codes, regulatory policies, and accounting procedures to ensure best business practices. Interdependence of all stakeholders is key to any company's long-term success.

[69] Managers have discretionary authority to make operational decisions. They aim to increase the net value of the firm and meet the shareholders' expectations of maximum investment returns (Shankman, 1999).
[70] Laborers contribute just as much to a firm as capital financiers. Companies valuing their employees' opinions and making them an integral part of their strategy and financial goals seem to perform better.
[71] A bondholder's rights are largely a matter of contract. There is no governing body of statutory or common law protecting the holder of unsecured debt securities against harmful acts by the debtor except in the most extreme situations (Kennedy, 1972). Bondholders are the checks and balances that safeguard the profitability of the business. Corporate law protects their relationship with the company

II. Agency conflicts. Managers, shareholders, and bondholders are three indispensable parties to the function of any company. All parties have different interests and asymmetric information, resulting in moral hazards, internal conflicts or agency costs.

Managers and shareholders. Today, company shareholders live worldwide in modern-day business and may not manage the business. They may instead hire managers to do so. Thus the essential but intricate relationship between managers (the agent) and shareholders (Quinn & Jones, 1995). Managers have a duty to act in the best interests of shareholders and other stakeholders. The corporate mechanisms of control incentivise and align the interests of all stakeholders. As shown in *Figure 16*, conflicts of interest pose a constant threat to managers and shareholders.

REPRESENTATIVE AGENCY CHALLENGES

Managers	***Shareholders***
• Appointed by shareholders via the company's board of directors • The board of directors design an equitable remuneration package • Actively involved in the setting goals, visions, and strategies of the company • The prerogative to ensure the company is profitable and performs to optimum level • May prefer high risk/return strategies (i.e. interests aligned with shareholders) • Maybe highly averse to risky projects or plans and risk devaluing the company	• No direct involvement in executive decisions of the company • Returns from investment subject to company performance • Silent partners who are not involved in the day to day operation of the company • Interest is focused on firm performance indicators to ensure maximum returns from profits of the company • Interest aligned with managers to benefit from maximum company profits • Rely absolutely on the best judgement of company managers

Figure 16: Representative Agency Challenges – Managers & Shareholders

Often, managers are tempted to flex their discretionary powers, exploit their rights, and engage in illicit activities without facing disciplinary action (Chesney & Gibson, 2008). The fact that this occurs without financial losses or risk to the company's reputation encourages managers to continue with fraudulent stock option practices over cash equivalent remuneration that consists of stocks. Investors expect a risk return for their stock portfolios but are exposed to the most risks (Buchholz & Rosenthal, 1998; Kim, Kitsabunnarat, & Nofsinger, 2004). It usually occurs when a company defaults due to poor management or inadequate investments by a CEO. A dysfunctional, inefficient, or dissatisfied agent deviating from best practices or governance policies creates "agency conflict" between management and shareholders.

Shareholders and bondholders. Similar agency problems plague shareholders and bondholders. A company's shareholders can be individuals or institutions that legally own

shares. Bondholders, or creditors, lending companies money at a predetermined interest rate. They are both distinct types of company stakeholders and relate to the company differently. *Figure 17* depicts the *agency challenges* which provide fertile soil for agency conflicts within the company.

REPRESENTATIVE AGENCY CHALLENGES	
Shareholders	***Bondholders***
• More inclined to take on risky investment projects • Desires premium returns from the company for their investments • Power to vote and change company management and direction • Shareholders own shares of stock in the company • Dividends for shareholders are withheld when the company makes no profit	• Less inclined to take on risky investment projects • More concerned for safer strategies to reduce the chances of default • No voting rights company meetings • Bondholders are creditors of the company • Interest is paid to debenture-holders regardless of company performance

Figure 17: Representative Agency Challenges – Shareholders and Bondholders

Agency problems arise when managers choose between shareholders and bondholders. The former receive residual income from their investments and typically require managers to undertake high-risk policies and investments. Bondholders, however, prefer strategies that do not compromise the fixed returns on their investments. This difference of interest is crucial when designing a compensation scheme that incentivizes CEOs to make decisions that benefit both parties. There are three principal mechanisms that minimize agency problems: (1) having an independent majority on the board to promote the best interests of the owners, (2) utilizing the "market for corporate control" to deter mischievous managers from manipulating earnings, and (3) offering stock and options to induce executives to embrace shareholders' interests (Core & Guay, 2002; Dalton, Hitt, Certo, & Dalton, 2007; Jensen & Meckling, 1976).

III. Equity compensation. Agency conflicts highlight three intricate issues with equity compensation schemes. (1) There is no one-quick-fix pay design model for companies to adopt and align executive's behaviours with the long-term interests of the firms. The ideal compensation designed as an antidote is an illusion. Additionally, managers and shareholders alike tend to be driven by their interests (Hanlon, Rajgopal, & Shevlin, 2003; Lambert & Larcker, 1987; Morck, Shleifer, & Vishny, 1988; Nyberg, Fulmer, Gerhart, & Carpenter, 2010). (2) The best practice guidelines and policies for pay design may not always work in all situations. Due to this, every company must tailor a risk-taking or risk-avoiding pay scheme for their executives. (3) Equity compensation is an essential risk-taking incentive (Dittmann, Yu, & Zhang, 2017). Its primary purpose is to attract and retain the best and most productive

managers (Banker *et al.*, 2000). According to Hall and Murphy (2002), nearly 94% of S&P 500 companies offered options as part of their compensation packages. The worth of which accounts for about 47% of their total compensation structure. Yet, it has also been found that 78% of executives will align their interests with short-term goals at the expense of long-term gains (Graham *et al.*, 2005).

Research has long shown that holding stock options causes the executive's wealth to be highly sensitive to the firm's stock price, which leads to myopic behaviour. Stock options align managers with shareholder interests (J. L. Coles, N. D. Daniel, *et al.*, 2006; Core & Larcker, 2002; Nagar *et al.*, 2003). But the manager is also motivated to manipulate grants, earnings, and real activities in order to maintain stock option value and influence investor perception (Cohen *et al.*, 2000; Yermack, 1997). Several studies support these findings (Bartov & Mohanram, 2004; Bebchuk & Fried, 2003; Bergstresser & Philippon, 2006; Bizjak *et al.*, 1993; Bolton, Scheinkman, & Xiong, 2006; Burns & Kedia, 2006; Cheng & Warfield, 2005; J. L. Coles, M. Hertzel, *et al.*, 2006; Dechow & Sloan, 1991; Healy, 1985; Peng & Roell, 2008; Qiang & Warfield, 2005; Stein, 1988, 1989; Thakor, 1990). According to Peng and Roell (2008), options provide greater incentives for executives to manipulate share prices than stock awards (also see Burns and Kedia (2006)). Few studies fail to conclude that stock option is associated with earnings management (Armstrong, Foster, & Taylor, 2009; Armstrong, Jagolinzer, & Larcker, 2010; Erickson, Hanlon, & Maydew, 2006). In light of this, Dechow, Ge, and Schrand (2010) explain the mixed results by pointing out the difficulties in measuring earnings management behaviour empirically. Despite this, bond investors understand that price sensitivities and volatility affect CEOs' risk-seeking behaviours, which impact the cost of borrowing. According to Barnea, Haugen, and Senbet (1980) and Daniel, Martin, and Naveen (2004), debt-holders recognize the incentive problem and discount debt value accordingly. Evidence suggests that bondholders value corporate bonds lower as perceived asset risk increases (Billett, Mauer, & Zhang, 2010).

Significance of the study. The study is significant in two ways. First, previous studies support how equity compensation aligns with the interest of executives and shareholders. In these studies, the effects of equity compensation on executives' behaviour are presented from shareholders' perspective. According to the classic asset substitution theory, the more equity the executive holds in compensation, the more likely they are to transfer risks to bondholders, resulting in higher agency costs for bondholders (John & John, 1993). Stock options may

encourage risk-averse executives to undertake risky investments (Haugen & Senbet, 1981; Lambert, Larcker, & Verrecchia, 1991; Smith & Stulz, 1985) or discourage excessive risk-taking (Carpenter, 2000; Guay, 1999; Hirshleifer & Suh, 1992; Ross, 2004). Consequently, the investors will respond by requiring higher yields (risk premium) to compensate for the additional risks associated with the investment projects (Fisher, 1959; John & John, 1993; McCulloch, 1864). This study adds to the corpus of existing CEO Compensation literature by examining vesting equity incentives and the cost of debt as valued by bond investors. The study also demonstrates the differential reaction of bond investors to the incentives induced by vesting options and vesting stock.

Second, executives may also be under significant pressure to become overly concerned with short-term price volatility (Stein, 1988, 1989).[72] Despite corporate bonds offering investors a steady income stream, all bonds are subject to credit, interest rate, and market risks. Other risks associated with bonds are embedded provisions. Bondholders may require higher premiums when firms issue bonds with higher credit risks and when the value of those bonds is sensitive to future market conditions. Additionally, market sentiment and reaction are affected to some degree by an executive's compensation incentives. This study contributes to the literature examining equity compensations, executive risk-taking behaviours, and bond investors' sentiments. Existing research establishes that bond investors know the risk-reduction incentives of VE, which should alleviate investor concerns and boost their confidence, affecting the price of bonds. The results in this study provide new evidence on bondholders' perspectives. Vesting equity is associated with a lower cost of debt (decreasing yield spread) and reduced corporate risk-taking.

Key findings: The study tests a broad sample of US firms, excluding financial services and public utility companies, over a twelve-year period (2006-2017). Three variables proxy CEO incentive: (1) *VE* – the aggregate options and stock scheduled to vest over a given year. (2) *VO* – the options are converted to share equivalents and scheduled to vest. (3) *VS* - the total amount of vesting restricted stocks. The measures are calculated per previous studies (Daniel, Li, & Naveen, 2020; Edmans, Fang, & Lewellen, 2017; Edmans, Fang, & Huang, 2021). The study examines how higher VE affects: investors' perceptions of the incentives associated with

[72] See studies with similar conclusions: Bebchuk and Stole (1993); Bizjak *et al.* (1993); Miller and Rock (1985) Benmelech, Kandel, and Veronesi (2010); Edmans (2009); Goldman and Slezak (2006). Goldman and Slezak (2006) posit that equity compensations is a double-edged-sword. While it motivates managers to exert productive effort it ma encourage manager to divert valuable firm resources to misrepresent performance.

equity compensation and its components and executives' risk-taking behavior.

This study has two key findings: *First*, we found a negative association between VE and the cost of debt. The cost of debt, *yield spread*, is measured as the difference between the bond's yield to maturity and the interpolated treasury bond security yield (Anderson *et al.*, 2004; Hao *et al.*, 2018; Prevost *et al.*, 2016). The risk exposure of the CEO and that of the bondholders affects their behaviour. Bond investors need premiums to compensate for potential risks influencing the value of their investments. In this study, VE is associated with lower debt costs. This is most evident for younger CEOs, shorter tenured CEOs, short maturity bonds, low credit rating firms, firms with short credit and short-term maturities, or firms with a low z-score with short-term maturities. Among the two components of VE, the cost of debt decreases with the VO and increases with VS. This implies that bondholders may view the vesting of shares within the year as detrimental to the value of their investment since managers might sell their shares soon after vesting and forfeit their short-term incentives. Consequently, bond investors will demand higher yields on bonds issued by firm CEOs with VS holdings. Additional tests revealed consistency in coefficient estimates, sign, and significance.

Second, higher VE is associated with lower risk-taking activities. We found that firm executives holding more VE are negatively associated with profitability (ROA), volatility in returns (Return), and default risk. Bond investors will be less likely to require higher yields on bond issuance if they perceive VE as a way to reduce CEO risk-taking incentives. This negative association only holds for VE and VO. By contrast, debt investors view VS as an indicator that managers are less likely to be concerned with short-term price fluctuations once their stocks vest. Our risk-taking channel tests indicate that vesting stocks increase risk-taking, which debtholders do not like, and respond by demanding a higher premium.

Delimitations and procedures. The study is restricted to US firms between 2006 and 2017. The analysis uses three measures of CEO incentive: the aggregate vesting equity, vesting option and vesting stock. This study is restricted in its ability to measure managers' short-term incentives, which is how fast they sell their stocks upon vesting. Here, we are primarily interested in perceived incentives, i.e., how investors perceive or understand CEO incentives. The chapter is organized as follows: Section 3.2 provides a review of bond pricing literature. Section 3.3 develops the hypotheses. Section 3.4 describes the data and methodology. Section 3.5 discusses the empirical findings. And an appendix and a list of tables are included.

3.2 CORPORATE BOND PRICING LITERATURE

Corporate bond prices are complex and often fluctuate. Investors should distinguish between two interest rates: (1) current market rates and (2) required to yield for an investor. Here, the former rate is expressed as *i*, and the latter as *r*. The literature we examine here reflects the perceptions of bond participants (bond holders and investors) regarding corporate bond pricing. Can equity vesting influence bondholders' and investors' behaviour? Studies have examined the structure, pricing, and behaviour of corporate bonds (Aboody, Hughes, & Bugra Ozel, 2014; Bansal, Connolly, & Stivers, 2014; Bao, Pan, & Wang, 2011; Chen *et al.*, 2013). The studies confirm that bond prices are not static but constantly fluctuate with interest rates, credit quality, and bond maturity. Market risks apply to bonds and other investments (Thau, 1994). There will be four parts to the review: a brief historical overview of corporate bonds will set the stage for subsequent discussion. Second, bonds as a primary source of capital finance. Third, the bond price and the factors determining its components, the coupon rate and yield (r). Last, market sentiment is reflected in the yield spread.

3.2.1 Historical overview of corporate bond

Bond markets have been traced to ancient promissory notes discovered in Ur Kasdim, a Hebrew city in ancient Sumer. Genesis 11:28, Genesis 11:31, Genesis 15:7, and Nehemiah 9:7 mention Ur of the Chaldeans, Abraham's birthplace [approximately 2000 BC].[73] Unearthed tablets in Ur reveal a thriving civilization with a liquid currency where personal promissory notes and selling loans were common practices. There are also ancient usury laws (of precious metals, commodities, or transferable credit transactions) in the Babylonian Law Code of Hammurabi (approx. 1934 B.C.).[74] Coined money in the Aegean (7th century BC) made usury and interest-bearing loans popular in Greece in the 6th century BC. In the 4th century BC, outrageous interest rates had become the norm (Frier, 1992). Greek philosophers such as Plato, Aristotle, Aristophanes, Cato, Seneca, and Plutarch condemned usury as contrary to nature (Vermeersch, 1912). Usury, however, did not cease in Greek cities of the third to first centuries BC.

Early Christian churches followed the Hebrew Bible's ethical code prohibiting interest on loans, food, or other purchases (Exodus 22:25; Deuteronomy 23:19-20; Leviticus 25:35-37). Lenders with interest were condemned in Canon 44 of the Arles Council (314) and Canon

[73] All citations from the Bible in this section of the study is taken from the "New King James Bible" 2022).
[74] See "How a city called Ur gave birth to the bond market" 2017); Williams (2015)

17 of the First Council of Nicaea (325). The Middle Ages forbade this. Lateran III (1179) and Lyons II (1274) condemned usurers. Those who demanded interest were declared heretics by the Council of Vienne (1311). However, Lateran IV (1215) only prohibited excessive interest rates (Vermeersch, 1912). Currency exchange was a method of concealing money in Italy, which led to the rise of banking. A key financial institution of the medieval period was Florence's Medici Bank, founded in 1397. It resulted in the Medici family becoming one of the wealthiest in Europe. As the chief bank for the Roman Catholic Curia, the Medici bank hid interest charges on loans under the complexities of currency exchanges. It had branches in Italy, London, Lyon, Geneva, Bruges, and Avignon ("The Medici Bank,").

In the 15th and 16th centuries, Italy saw conflicts and wars with other European powers. As a result of war costs, states issued war bonds, which were loans backed by promises of repayment. It started the bond market. Bonds would fund wars for the next few centuries (Pezzolo, 2007; Sullivan, 2014). Britain invested in innovative ways to finance the wars during the Napoleonic Wars, resulting in prosperity afterwards. Instead of higher coupon bonds, the British government issued consolidated annuities (Consols). International investors were able to purchase low-cost bonds for highly desirable British goods. The benefits of Post-war wealth and long-term bond price increases after 1813 fuelled the industrial revolution. The economic growth reached near modern levels (Hutchinson & Dowd, 2018). Today, bonds are a common source of capital financing projects or businesses. This topic is discussed in the next section.

3.2.2 The cost of capital – a brief introduction

From the early 1950s, the concept of cost of capital has been extensively discussed and documented (Arditti, 1973; Modigliani & Miller, 1963; Nantell & Carlson, 1975; Reilly & Wecker, 1973; Solomon, 1956).[75] Project funding or expanding operations requires equity or external funding sources (bank loans, supplier credit, public subsidies, public investors). Financed investments incur costs - the 'cost of capital'. The cost consists of two components: debt and equity financing. The realistic cost is the weighted average of the debt and equity

[75] The 'cost of capital' has been described as the "minimum required rate of earnings" by investors (Exley & Smith, 2006; Solomon, 1956); the required return for firms to cover the cost of debt and equity financing in order to meet investors yield of return; a tool for investors to decide whether to invest; a discount rate to estimate future cash flow in investment projects.

costs, taking into account the proportions and costs of each source of capital (WACC) (see *Figure 18)* (Bertomeu, Beyer, & Dye, 2011; Jagannathan, Liberti, Liu, & Meier, 2017).

$$WACC = \quad Cost\ of\ Debt + \quad Cost\ of\ Equity$$

$$\downarrow$$

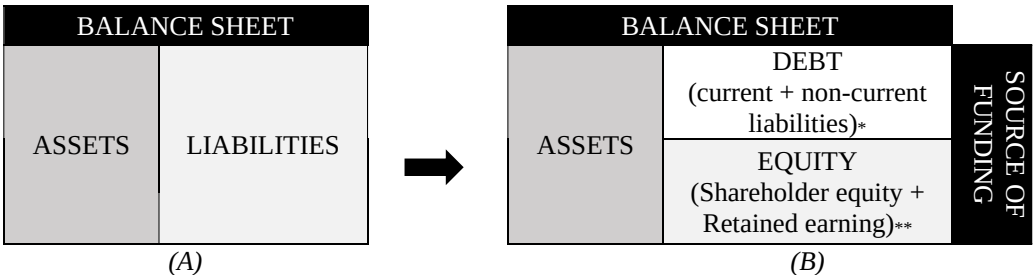
$$WACC = \quad \frac{D}{D+E}(r_d)(1-t) + \quad \frac{E}{D+E}(r_e)$$

Where: $E = market\ value\ of\ equity$, $D = market\ value\ of\ debt$, $r_e = cost\ of\ equity$, $r_d = cost\ of\ debt$, $t = corporate\ tax\ rate$

Figure 18: The cost of capital (WACC)

The WACC is important for two reasons: First, it represents what lenders should receive for maintaining their investment at market value. Second, they represent how much the company borrows. Corporate tax and economic and market conditions (supply and demand of capital, inflation, capital structure) affect the WACC. WACC is important because it (1) measures the financial risk a company faces when it is in debt; (2) measures the yield investors expect from stocks; (3) estimates the company's market value; and (4) can be used to estimate the discount rate when selecting between the projects. The following section examines the financial risks of corporate debt financing.

Cost of debt financing. By reviewing financial reports, investors can gain insight into a company's performance. A financial report consists of two parts: (1) what it owns, its assets, and (2) its liabilities, or its debt to its creditors (See *Figure 19 - A*).[76] In theory, a company's liabilities are financed by its debt or equity. A company's asset must be equal to its 'liabilities.' Liabilities or sources of funding for corporate firms include ‘debt’, ‘shareholder equity’ and ’retained earning’ (See *Figure 19- B*).



(A) *(B)*

Two sources of finance: (1) current/short-terms and non-current/ long-term debt (i.e. Bank loan or Bond Issues); (2) shareholders equity through the exchange of ownership rights for cash and retained profits re-invested into viable long-term projects***

Figure 19: A simple balance sheet

[76] The other reports, not mentioned in this paper, include the Statements of *Income, stockholder equity*, and *Cash flow*.

Firms that issue corporate bonds take on a debt obligation to buyers or investors who lend money to the firm. Firms are contracted to pay the bondholder a regular interest on the principal (i.e., coupon rate) and repay the principal owed within an agreed time, known as maturity (see *Figure 20*).

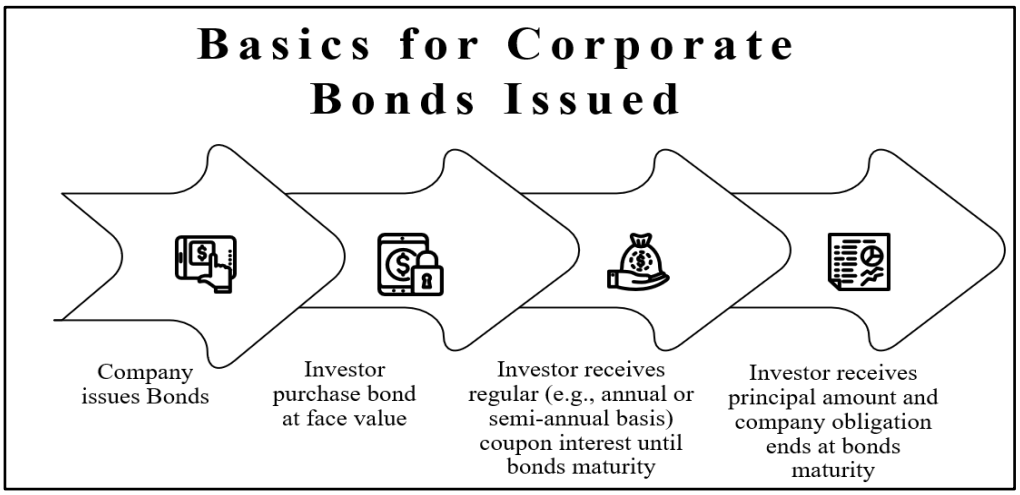


Figure 20: Advantage vs disadvantage: bond & equity

Corporate bond holdings attract benefits and disadvantages for investors. It may help to understand corporate bonds easier when compared to equity (see *Figure 21*). Like all investments, 'corporate bonds' are exposed to risks. Companies risk meeting their financial obligations on time and defaulting on their bonds. A company's credit ratings depend on its ability to meet its financial obligations; this is a critical concern to bondholders. These risks also influence and determine bond prices.

BONDS	EQUITY
• No ownership interest • entitled only to interest and principal on the bond • debt obligation stands despite financial difficulties • priority claims on company assets during bankruptcy	• Have ownership interest • Receives dividends from profits gained • no obligation to pay dividends to shareholders during financial difficulties • Second to bondholders in claims on company assets

Figure 21: Advantage vs disadvantage: bond & equity

3.2.3 Bond Price and Risk Premia - An Investors Perspective

To make informed investment decisions, bondholders and prospective investors of corporate bonds must understand the complexities of bond pricing. Whether a bond is issued for the first time or re-issued on the secondary market, the factors that determine its price include, but are not limited to, variables that measure a firm's probability of defaulting on the bond, changing market interest rates (i), market liquidity, and information transparency. We will start with a

brief overview of bond price and value to set the stage. We then discuss key factors or determinants that affect bond pricing and risk premium.

An overview of bond price and valuation. Bonds represent a significant portion of the financial market because they are a key source of corporate debt financing. As a debt instrument, bonds provide the investor (lender of capital) with a regular income stream (i.e., regular interest paid) and the face value redeemed at maturity. The issuer and buyer of the bond both sign the contract or indenture, which stipulates terms during purchase. There are four distinctive bond features (see *Figure 22*). Other features may also be included as per issuer or investor request.[77]

KEY FEATURES OF A BOND

Feature	Definition
Face Value	The initial price (*par value*) of a newly issued bond.
Coupon Rate	The rate of interest paid to the bondholder, derived as a percentage of bond *face value*.
Coupon	The value of the *coupon rate* as a percentage of *face value*
Maturity	The period of time until the *face value* is repaid to bondholder.

Figure 22: Key features of a corporate bond

Newly issued bonds are usually standard or *plain vanilla* bonds. First, these bonds will be sold on the 'primary market' at *par value* and then resold by the investor in the 'secondary market' at a premium or discount price. The bond's purchase price is derived as seen in the *Bond Price* equation below. The present value of all the future cash flows (interest and par value) is discounted by the required rate of return or yield (r).

$$Bond\ Price^{78} = C\frac{\left[1-\left(\frac{1}{(1+r)^n}\right)\right]}{r}+\frac{M}{(1+r)}$$

[77] Other features include *call provisions* or *embedded options* which allows the issuer of bond to buy back bond at a pre-specified price prior to maturity; This feature is a disadvantage to Bondholder, hence, issued bonds include a higher yield (r). A *Put provision* or *puttable* bond enables the buyer to sell the bond back to the issuer at a pre-specified price prior to maturity. Bondholders benefit from the rising market interests (*i)* since the bond can be sold on the secondary market and the proceeds reinvested at a higher r than the original bond. These bonds are issued with a lower r. A *Sinking Fund Provision* requires the issuer to buy back a fixed percentage of the outstanding bonds yearly, regardless of the level of i. Bondholders benefit from the reduction to risk of firm defaulting on bond. These bonds are issued with a lower r.

[78] Where, C = the value of each coupon interest paid up until maturity; r = required yield for bond; n = number of periods until maturity; M = is the par value of bond to be paid at maturity.

A bond's price reflects the maximum cost the prospective investor is willing to spend on a bond compared to what other investors earn from a similar type of bond. To entice the prospective investor, the bond issuer must offer a yield (*r*) that offsets the overall level of the investment risks. It is a yield resulting from all the coupons paid to maturity plus any gains from a 'build-in 'price appreciation. These risks are influenced predominately by market forces, buyers' and sellers' consensus, and risks specific to the corporate firm. Unlike the fixed coupon received by the bondholder, the bonds *r* continuous to fluctuate with the issuing firm's changing economic environment and financial health. Intuitively, investors who hold the bond to maturity only worry if the bond issuer becomes insolvent. But, for investors who wish to sell their bonds on the secondary market, understanding how bond price moves with changes to prevailing market interests (*i*), credit ratings, and corporate capital structure is crucial to making informed decisions.

Market interest rates. Market risks influence the premium investors to require the additional risks attached to an investment whose value fluctuates with *i.* Investors who seek to maximize the return on their investment will constantly compare its *r* with opportunities within the market. Intuitively, *i* determine the attractiveness of bonds to prospective investors. The relationship between prevailing interests-bond prices can be inverse; see *Figure 23*.

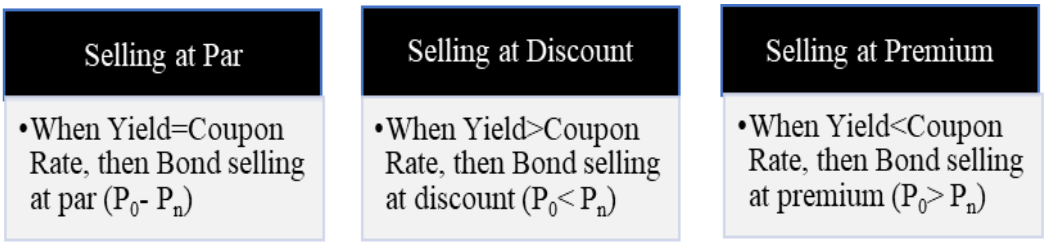


Figure 23: Price-Yield Relationship for re-issued Bonds

Prospective investors will not buy older or existing bonds at face value if *i* are higher than the *r* attached to that bond. Instead, new bonds are more attractive since their *coupon rate,* which closely mimics the current market interest, is higher than the *r* offered by the older bond. These older bonds can be sold only at a *discounted* price, less (greater) than the *par value*. *Figure 24* shows the conditions in which the price of a bond is at a discount or premium.

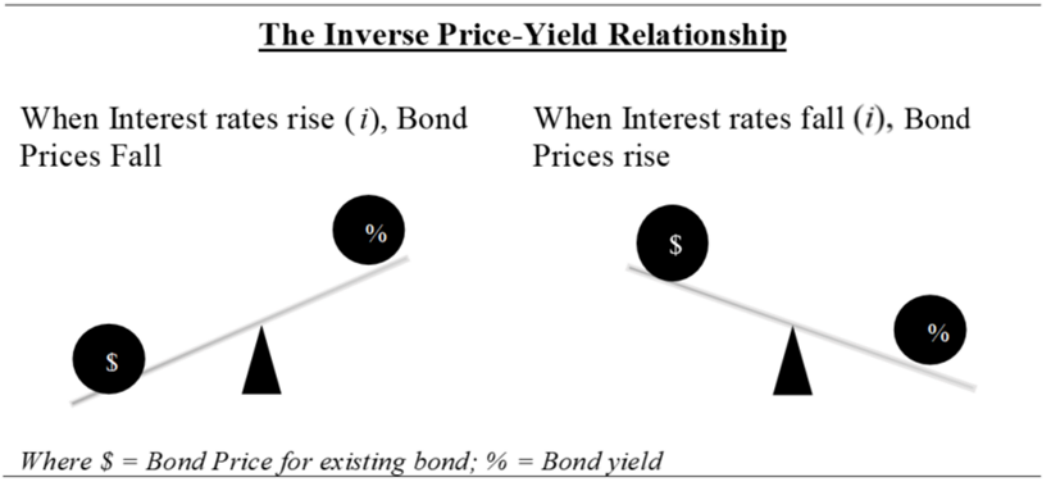


Figure 24: Market interest rate, bond price & yield - an inverse relationship

Determinants of the corporate bond risk premium. Despite being a riskier investment choice than government bonds, corporate bonds typically offer a higher yield or *r* as compensation for the additional risk. McCulloch, in *The Principles of Political Economy* (5th ed.)(1864), defined the basic risk premium as the "risk incurred by the lender of either not recovering payment at all, or not receiving it at the stipulated term." He said, "No person of sound mind would lend on the personal security of an individual of questionable character and solvency, and on mortgage over a valuable estate, at the same interest rate. Wherever there is risk, it must be compensated by a higher premium or interest" (pg 357-358). Added to this is Fisher's classical model (1959) for determining the risk premium of corporate bonds by identifying two important risks: a firm's 'default risk' and its 'marketability' or difficulty in reselling its bonds without incurring costs (liquidity).[79] Risk premium is the difference between a bond's market yield (r) and a pure interest rate (i.e., risk-free) on a bond with the same maturity. Generally, investors demand compensation for potential risks influencing investment value until maturity, so risk premiums are zero and positive. The higher the perceived risk on the investment, the wider the spread between yields or *r* (i.e., corporate bond versus government bond), and therefore the higher the premium required, which drives down

[79] The average risk premium on a firm's bond is estimated by a linear function $[x_0 = f(x_1, x_2, x_3, x_4)]$ of the four variables representing 'risk to default' and 'marketability'. Where, x_0 = Average risk premium; x_1 = earnings variability; x_2= period of solvency; x_3= equity/debt ratio, and x_4= bonds outstanding. The logarithmic average risk premium is determined by taking log of the above variables. The variables proxy for 'default risk' include: *Earnings Variability* is the coefficient of variation of the firm's net income over the last nine years (after all charges and taxes); *Period of* Solvency is the length of time the firm has been operating without forcing its creditors to take a loss; and *Firm Equity-to-Debt ratio* is the ratio of the market value of the equity in the firm to the par value of the firm's debt. The proxy for marketability: *firms bond outstanding* -

the price of high-yield bonds. *Figure 25* shows the three most relevant factors of a risk premium included in the price of a bond or cost of debt.

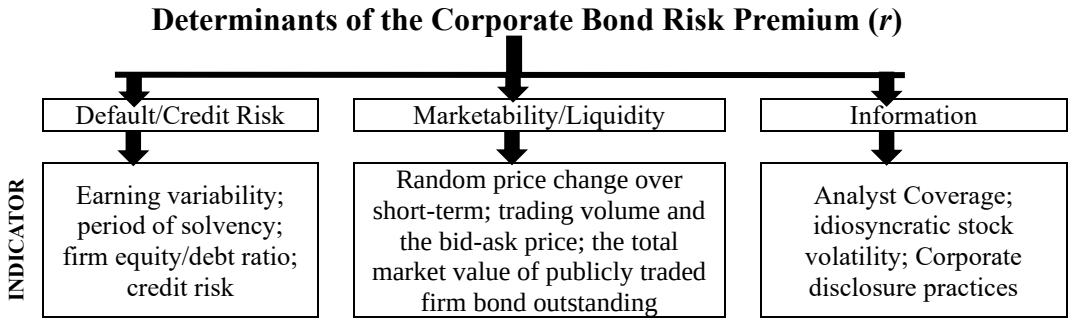


Figure 25: Corporate bond risk premia factors

Default risk. Two factors are considered by prospective investors in their estimate of the firm's risk of default: (1) the chance that the debt obligation is not met by bond maturity; and (2) the extent of loss to the investor if the firm does default on bond repayment. Fisher (1959) used three variables to indicate the chance that the issuing firm defaults on bond repayment – the firm's *earning capability*, *period of solvency*, and equity-debt ratio. A firm's financial viability (earning variability) remains a primary concern for investors over a reasonable time. Companies must be in a financial position where any change in net income as influenced by fluctuations in the market interest rates over a specified period has little to no impact on their financial position and cash flow. Prospective investors who perceive higher risk attached to the investments issued by companies with greater earnings variability will demand a higher yield. A firm's *solvency period* is another important measure of financial health. It demonstrates the ability of a company to manage its operations into the foreseeable future. Intuitively, the longer the firm's creditors go without incurring any losses on their investment, the less likely the firm will default in the foreseeable future on debt obligations. Investors require less premium the longer the firm's *period of solvency*. A firm's capital structure, the *equity-to-debt ratio*, says a lot about the risks of defaulting on investors or being unable to repay. Excessive debt can overburden the firm with high-interest rate payments, affecting the firm's ability to meet short-term and long-term debt obligations. Too much equity financing may mean that the firm has diminished ownership rights since the company sells an ownership share for funds. In both extreme cases, prospective investors will demand a higher-risk premium the greater the risks of defaulting on issued bonds or shares in return for funds.

Bond investors often review bond credit ratings to determine default risks. Bonds with identical coupons and maturity but different credit ratings are priced differently. Rating agencies (i.e., Fitch, Moody's and S&P) rank bonds by quality and risk levels, see *Figure 26*. The more (less) financially sound an issuer, the higher (lower) the price and lower (higher) the bond *r*. Bonds identified as *non-investment grade* bonds are high risk or low in quality. To entice bond investors, the issuer of this bond type will offer a higher *r* to compensate the investor for the higher risk of default on bond repayment.

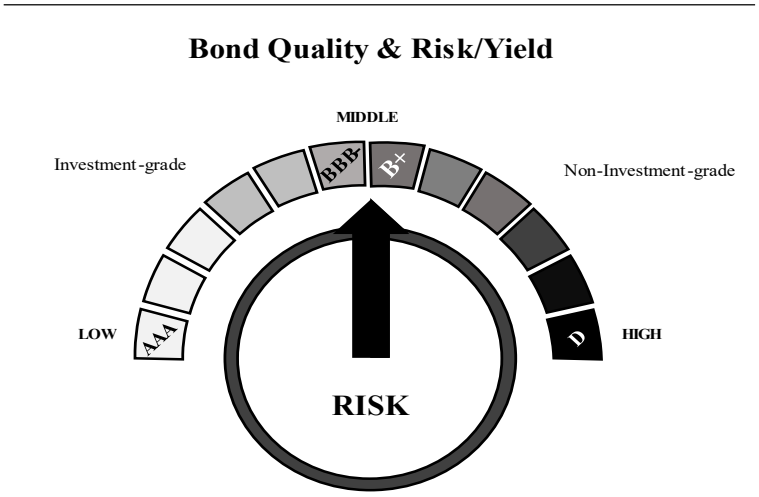


Figure 26: Ratings by S&P and Fitch Agency

Market and liquidity risk. Bonds that are difficult to turn into cash before maturity have greater marketability risks. This illiquidity of bonds in the market is exacerbated by imperfect market conditions. Here, investors incur a loss because of changes in the interest rate between the bond purchased and then sold. The risk of potential loss can be incorporated into a bond's risk premium in three ways: (1) random fluctuations in the price of a bond over a short period; (2) volume of trading and the 'spread' between 'bid' and 'ask' prices; and (3) the total market value of the publicly traded bonds the firm has outstanding. Fisher (1959) used 'publicly traded bonds outstanding' as a measure of marketability risks since their market value suggests liquidity of the bonds. *Ceteris paribus*, the greater the firm's outstanding bonds, the less difficulty the investor has in turning bonds into cash and the lower the risk premium demanded by the bond investors. Generally, when prevailing interest rates increase (decrease), the price of the outstanding bonds falls (rise), so the yield of the older bond is in line with the higher (lower) interest rate of the newer-issued bonds.[80]

[80] For example, if an investor owns a 10-year-old bond with a 4% yield, and she wishes to sell it in favour of a new bond issued with a 7% yield, she must sell the older bond at a discount.

Information risk. Prospective investors also consider information risks in bond valuation. Financial analysts play a critical role as intermediaries responsible for providing investors with information on price targets or earnings forecasts. Firms that have more or better information, unbeknownst to bond market investors, have greater information risks. The forecasts or recommendations provided by analysts may directly reduce the cost of capital by providing useful information (Li & You, 2015). With reduced information asymmetry, the demand for a firm's securities increases due to improvements in future liquidity, which lowers the cost of capital (Diamond & Verrecchia, 1991). As Leuz and Verrecchia (2000) discovered, there is a positive relationship between corporate disclosure and stock liquidity. Empirical study shows that good, reliable or quality information helps mitigate liquidity risk and lowers a firm's cost of capital (Ng, 2008).

3.2.4 Bond Yield Spread – An indicator of Market Sentiment

Section 3.2.3 established risk premium as relatively deterministic and based on risk components related to (i) default, (ii) liquidity and (iii) information.[81] These theoretic channels become most relevant to explaining corporate bond *yield spreads* or *credit spreads*.[82] *Figure 27* illustrates how yield spreads occur when there is a difference in the *r* of two comparable investments (i.e., similar maturity but different credit rating). Intuitively, high-yield bonds are low-quality and are a riskier investment choice relative to high-grade bonds. Because of the volatile nature of high-yield bonds, the yield spreads are wider, and lower bond prices are. As for maturity, the longer the bond's maturity, the more sensitive the price will be to the changes in interest rate.

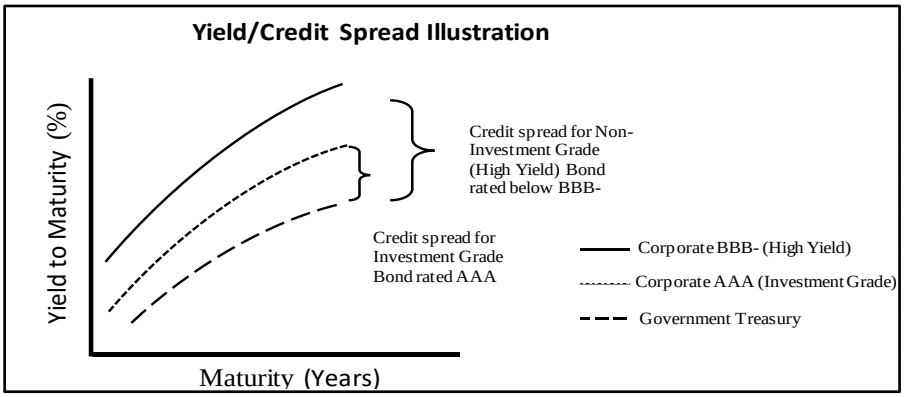


Figure 27: Difference in spread between Investments – for illustration purpose

[81] The risk premium on corporate stock is based, primarily, on components related to (1) business, (2) financial, (3) liquidity, (4) ex-change-rate, and (5) country-specific. All five risk factors have the potential to influence returns negatively.

[82] Other channels through which yields on bonds are affected include: Signalling, duration risk, safety, prepayment risk, inflation

Bond yields are expected rates of return for investors. But yield moves inversely to bond prices, which fluctuate with credit risks, supply and demand, or the general state of the economy. For example, high-rated bonds are viewed as lower-risk investments, and so their price rises as the yield spread narrows (see *Figure 28*). A spread indicates the bond's relative risk compared to a risk-free bond (i.e. Treasury Bond). Spreads can also be influenced by bonds of the same class but of different maturity. Risk-averse investors will be less interested in bonds with longer maturities but, if purchased, must provide a higher return to offset the risk. During the financial crisis, investors sought safer bonds, such as Treasury bills, leading to wider spreads on high-risk investments. In a sense, yield spreads show investors' risk appetite. For executive compensation, stock options have a greater impact on yield spreads because of their higher risk-taking incentives (Ortiz-Molina, 2006). A study by Bagnani, Milonas, Saunders, and Travlos (1994) showed that managerial stockholding ownership increases with bond premium when ownership is between 5-25%. Bondholders need higher returns on a bond investment to protect themselves against managerial-stockholder wealth transfer activities (especially due to risk-taking). In contrast, the association is negative for the high-level ownership range, implying that bondholders feel better protected since managers seek to protect their private wealth, reducing the likelihood of wealth transfer from the bondholder to the shareholder. DeFusco, Zorn, and Johnson (1991) demonstrate that granting executive stock options transfers wealth from bondholders to stockholders. Investors can, however, price and value newly issued bonds appropriately by understanding how incentives affect CEO risk-taking.(Parrino, Poteshman, & Weisbach, 2005).

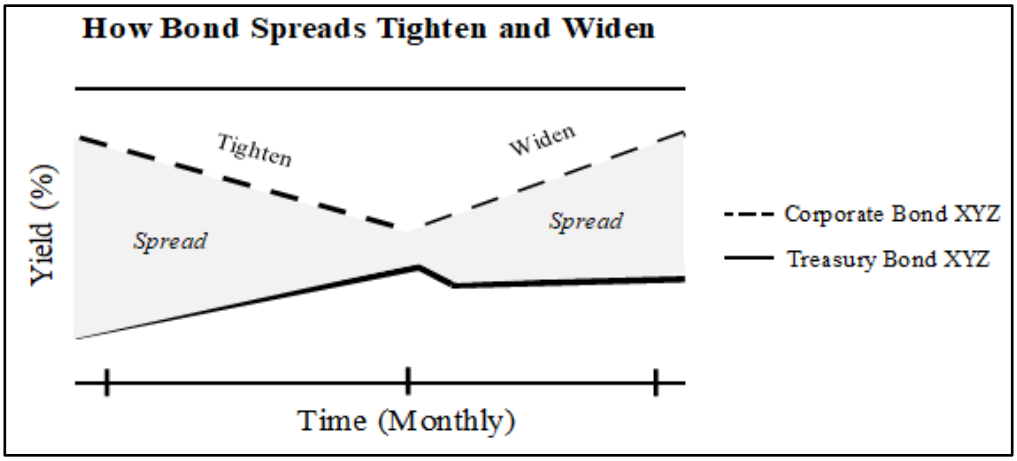


Figure 28: How bond spread tighten and widen - for illustrative purpose

3.3 HYPOTHESES DEVELOPMENT

Two significant themes were highlighted in section 3.2: (a) the variable degrees of risks (i.e., default, liquidity and information) facing issuer and investors of bonds. And (b) the impact of these risks on bond premiums, indirectly, the bond price.[83] The central idea in Edmans *et al.* (2017)'s paper is that VE increases the incentive for myopic actions (i.e. trading off long-term growth/survivability for short-term profits that boost stock price), which may prompt investors and bondholders to react. *Figure 29* shows the theoretical construct for Essay 2 tests (hypotheses) of how bond investors perceive and price the incentive effects of vesting equity.

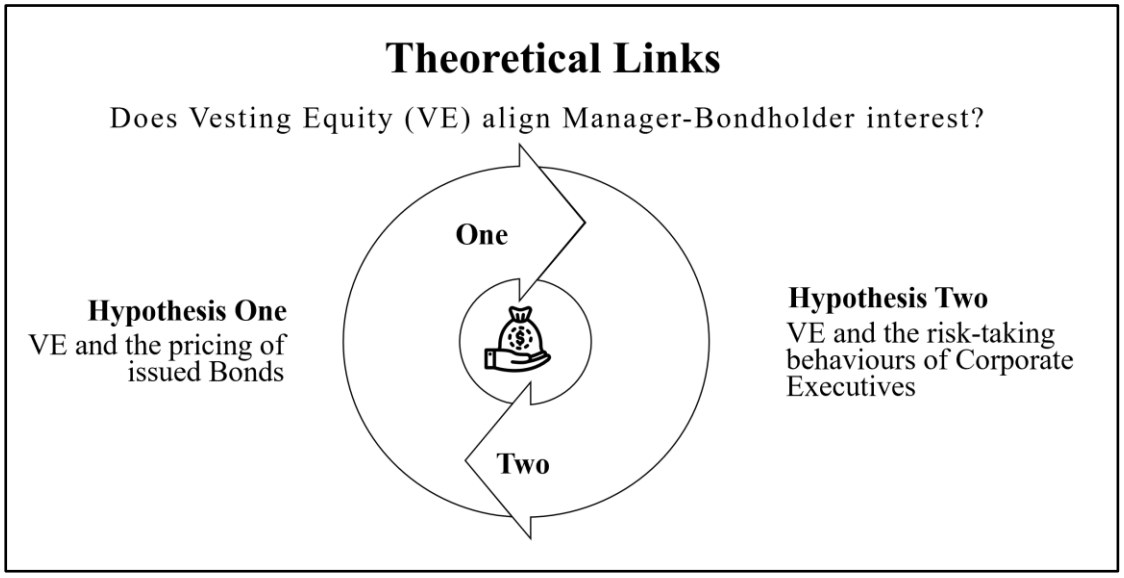


Figure 29: Essay 2 - Theoretical Links

Section 3.3.1 establishes the link between short-term price concerns and the cost of bonds (*Hypothesis One*). The association is also examined within subsamples of CEOs based on age, tenure, and selected bond characteristics. Section 3.3.2 (*Hypothesis Two*) examines the association between the proxies for short-term price concerns and short-term executive risk-taking, which has implications for influencing yield spreads.

3.3.1 The cost of vesting incentive

Existing literature lacks consensus on the incentive effects of stock option grants and CEO risk-taking. The seminal work of Jensen and Meckling (1976) first introduced that stock options contribute to optimal CEO risk-taking behaviours. Other theoretical findings reaffirm their

[83] The risk premium on corporate stock is based, primarily, on components related to the (1) business, (2) financial, (3) liquidity, (4) ex-change-rate, and (5) country-specific. All five risk factors may potential influence negatively the company's returns.

work (Bizjak *et al.*, 1993; Carpenter, 2000; Core & Guay, 1999; Gaver & Gaver, 1993; Guay, 1999; Haugen & Senbet, 1981; Jensen & Meckling, 1976; Kadan & Swinkels, 2008; Lambert *et al.*, 1991; Myers, 1977; Ross, 2004; Smith & Stulz, 1985). Essentially, options align the interests of CEOs and shareholders: a rise in stock options inadvertently increases the value of an option, benefiting both parties. However, options contracts have a dual effect through their leveraged position in the firm's equity, which may magnify risk-averse managers' exposure to the firm's risks and reduce their appetite for risk (Lambert *et al.*, 1991). An agency problem occurs when options become increasingly costless for modern CEOs, increasing managerial risk-taking due to the convexity of payoffs (Dittmann, Maug, & Spalt, 2010; Edmans & Gabaix, 2011; Gormley, Matsa, & Milbourn, 2013; Low, 2009). The convexity of pay-offs for options makes executives share the gains but not the losses (Bebchuk & Fried, 2003; DeFusco, Johnson, & Zorn, 1990). In other words, executives profit when the price of company stocks rises. If the stocks perform poorly, they are not penalized. Penalties are paid by shareholders and bondholders who lose part or even their entire investment.

There is evidence that incentivised risk-taking alters CEO behavior. As stock return volatility increases the option's value, CEO stock options promote managerial risk-taking (Haugen & Senbet, 1981; Smith & Stulz, 1985). Tufano (1996) found that managers with more options manage less gold price risk. According to Guay (1999), stock return volatility is positively related to CEO vega. Knopf, Nam, and Thornton Jr (2002) find a positive (negative) association between delta (vega) and derivative usage. Coles *et al.* (2006) found higher levels of vega associated with a greater incentive to invest in riskier policies (R&D and leverage) while delta encouraged more safe policy choices (CAPEX). Stock options encourage excessive risk-taking, documented across industrial, oil and gas companies, including banks (Agrawal & Mandelker, 1987; Datta, Iskandar-Datta, & Raman, 2001; Rajgopal & Shevlin, 2002; Saunders, Strock, & Travlos, 1990). Other analyses have also considered risk-averse managers. Risk-averse executives may be discouraged or encouraged to take risks when holding options (Lambert *et al.*, 1991). Carpenter (2000) and Ross (2004) show that equity compensation structures have an ambiguous effect on risk-taking by managers. Incentives may exacerbate the sensitivity of the managers' portfolios to utility function and firm stock price movements.[84] The adverse effects may cause managers to avoid taking risks essential to the execution of a project (Hirshleifer & Suh, 1992). Lewellen (2006) shows this to be true of the equivalent

[84] See on managerial utility maximization discussions.

certainty approach, particularly the in-the-money options, which discourages managers from risk-taking. Managers become exposed to more risk with increased delta while increasing vega offset aversion to risky projects (Core & Guay, 1999). Dittmann, Yu, and Zhang (2017) have shown that options are essential for an optimal contract. Options may aggravate the risk-taking behavior of executives, but they are a much better alternative with considerably less negative effects than common stocks (Parrino *et al.*, 2005). However, having neither (stock and options) is not an option because such a pay contract would have no managerial effort incentives.

Stock and options-based CEO compensation packages have grown in popularity in recent decades. The exposure of executive wealth to stock prices tripled from 1980-1994 (Hall & Liebman, 1998) and doubled from 1994-2000 (Bergstresser & Philippon, 2006). As stated earlier, CEOs' pay structures have two effects: (1) the sensitivity of pay structures to stock prices (delta), where a higher sensitivity reduces managers' risk-taking (Knopf *et al.*, 2002). (2) The sensitivity of pay structure to the performance of stocks (vega), where greater sensitivity translates into increased risk-taking by managers (J. L. Coles, N. D. Daniel, *et al.*, 2006; Knopf *et al.*, 2002). By manipulating CEO risk preferences, stock-based pay structures also affect other stakeholders (bondholders, creditors, suppliers, customers) perceptions of those risk preferences. According to Barnea *et al.* (1980), debtholders recognize the problems of managerial incentives and discount bond value accordingly. Leland and Toft (1996) found that short-term maturity debt reduced agency costs of asset substitution. Daniel *et al.* (2004) showed the firm's cost of debt was influenced by the CEO's vega and delta, which bond markets understood and responded accordingly, as reflected by the price of issued corporate bonds. In a similar study, bondholder returns were more negative with high vega than high delta option grants (Billett *et al.*, 2010). Vega induced wider yield spreads (Brockman, Martin, & Unlu, 2010; Shaw, 2012). Edmans *et al.* (2017) introduced a new measure of short-term incentives, which measures the sensitivity of equity to stock returns by the amount of stock and options scheduled to vest in a given quarter. They found that higher VE amounts were associated with lower investment spending, suggesting risk-taking reduction incentives.

In retrospect, two conclusions can be drawn from Sections 3.2 and 3.3.1. (1) Equities ready to vest in the year cause greater short-term price concerns. (2) Bond investors would take notice of these risk-taking reduction incentives of vesting equity in managerial behavior. Accordingly, yield spreads will reflect how closely the manager's interest is aligned with the bondholders'. Suppose bond investors consider vesting equity a good sign of risk-taking

reduction incentives. In that case, the yield spread will tighten (price increase) for firms whose executives hold greater vesting equity within the current year, *ceteris paribus.* This leads to the following hypotheses:

H1: There is a negative association between CEO incentives and the cost of debt.

i. CEO characteristics – age and tenure

The effect of vesting incentives on yield spread can differ by CEO characteristics. Investors may view younger CEOs with less tenure and more time in front to be less inclined to trade-off growth for short-term higher stock price because short-term oriented decisions will affect the long-term survivability of the firm (i.e., stock vesting should not affect yield spreads of these firms as much). Evidence suggests that younger (Bertrand & Schoar, 2003; Forbes, 2005; MacCrimmon *et al.*, 1986; Taylor, 1975) and wealthier CEOs (Kenneth J Arrow, 1971; Paravisini, Rappoport, & Ravina, 2017) are more prone to take risks. CEOs who are most likely to become entrenched and avoid risk-taking have longer tenures and higher cash compensations(Berger *et al.*, 1997). Those CEOs with higher cash compensation will have more money to invest outside the firm, be better diversified, and be less risk-averse (Guay, 1999). This leads to the following hypotheses:

H1a: The CEO incentives-cost of debt association is stronger for young CEOs.

H1b: The CEO incentives-cost of debt association is stronger for short-tenure CEOs.

H1c: The CEO incentives-cost of debt association is stronger for young and short tenure CEOs.

ii. Bond features – maturity and credit quality

Sections 3.2.3 and 3.2.4 provide relevant discussions on bond price, risk premia expected, and yield spread which is most relevant to this section. Investors want to be compensated for potential investment risk until maturity, so risk premiums are typically positive. If the investment is perceived as having a higher risk, the spread between yields or r (or corporate bond versus government bond) will widen, and the premium required will be higher, which drives down the price of high-yield bonds. Consequently, the impact of vesting incentives on yield spreads can vary by bond features. Equity vesting is a crucial indicator of executive risk-taking because options can only be exercised after they vest. Theoretically, executives become

more likely to engage in short-term-oriented behaviour if they can profit from it in the short term without facing the long-term consequences (Stein, 1988, 1989). From the bond investors' perspective, vesting equities provide the advantage of bringing profits forward through increased short-term price concerns by executives. Vesting equities increase cashflows and the chance that investors of high-risk investments receive their money back. This leads to the following hypotheses:

H1d-f: The CEO incentives-cost of debt association is stronger for short term bonds, high yield bonds, and distressed firms.

H1g: The CEO incentives-cost of debt association is stronger for high yield -short-term bonds

H1h: The CEO incentives-cost of debt association is stronger for distressed - short-term bonds.

3.3.2 The Incentive Effects on Cost of Debt through CEO Risk-Taking Behaviours

The implications of H1 are investigated through short-term risk-taking embedded in bond yields. Managerial incentives have been observed to have implications on corporate operation and policy decisions (Guay, 1999; Ju, Leland, & Senbet, 2002; Mehran, 1992; Mehran, Nogler, & Schwartz, 1998; Ross, 2004). The discussions in Sections 1.3 and 3.2 highlight the risk exposure of the CEO and the bondholders and the effect on behaviour. Three corporate risk-taking proxy measures are examined: (1) volatility in ROA; (2) volatility in Return; (3) creditworthiness of issuing firms. As shown in Section 3.2, bondholders dislike and react to high risk-taking decisions by raising the required yields. Suppose VE means executives are short-term oriented (avoidance of risk-taking) and this is preferred (more precisely, SAFER) by bondholders, especially when holding short-term debt. In that case, bondholders' reaction should be driven by the executive's risk-taking activities, which should alleviate their concerns and boost confidence in the executive. Three corporate risk-taking proxy measures are examined: (1) volatility in ROA; (2) volatility in Return; (3) creditworthiness of issuing firms. This leads to the three following hypotheses:

H2-H4. There is a negative association between CEO incentives and risk-taking proxies.

3.4 DATA AND METHODOLOGY

This section presents the sample and variable measurements. Then, the CEO incentive measure and its validity are short-term price concern measures. Finally, the models are used to test the hypotheses.

3.4.2 Sample and Variable measurement

There are three datasets merged into the primary dataset for executive compensation: at-issue corporate bonds (**H1**) and the proxies for short-term risk-taking: volatility in profitability, *SD(ROA)*(**H2**), volatility in the stock market, *SD(Return)*(**H3**), and default risk, *Moody's Rating*(**H4**). **Table 1 -** *Panel A* shows the sample selection. Data relevant to computing the dependent variable(s) is collected from 1993 to 2021, then combined with the compensation dataset, covering 1994 to 2017. Until 2006, US firms were not required to disclose the amount paid to executives. The Financial Accounting Standards Board released FAS 123R to improve executive pay-out disclosures, which requires firms to disclose grant level information related to stock grants and option grants made to employees.[85] We source the following database for the computation of variable inputs: Standard & Poor (S&P) Executive Compensation (ExecuComp) - which provides grant-level information on each stock and option award (vested and unvested). The Centre for Research in Securities Prices (*CRSP*) for stock returns and other price-related data. C*OMPUSTAT* for accounting and financial data of firm and market. Following Hao *et al.* (2018), bond data is collected from three databases: (1) cross-sectional variation for bonds, yield, rating, issue size, and embedded options using the Securities Data Company (SDC) Platinum new issues database. (2) Transactional bond price and yield data (including time-series variation) are sourced from the Mergent Fixed Income Securities Database (FISD) Transactions file and supplemented by (3) the Trade Reporting and Compliance Engine (TRACE) database.[86] *TRACE* also provides data on all secondary market transactions for investment grade and high yield debt, enabling comprehensive analysis. The St. Louis Federal Reserve (FRED) provided the risk-free Treasury rates.[87] **Appendix A**

[85] Under FAS 123R, equity compensation now appears as an expense on financial statements. Prior to the mandate, equity compensation was not considered a 'real monetary expense' since grants help attract key employees and align employee interests with shareholder interests. Yet equity compensation is a direct cost to shareholders since it transfers equity from stockholders to grantees.

[86] The FISD reports only trades made by insurance companies from 1994 to 2011. The supplementary information collected is from TRACE, which covers data between 2005 and now.

[87] While FRED provides indices for 3 and 6 months, 1-2-3-5-7-10 and 20 years maturities we've had to interpolate indices to obtain yield curves for maturities of missing years including 4,6,8 and 9.

provides variable descriptions and sources. Data selection criteria were as follows:

1. Exclude observations with missing inputs and Firm-CEO-years that cannot be matched to COMPUSTAT and CRSP.
2. Exclude financial ($6000 \leq SIC \leq 6999$) and utilities ($4900 \leq SIC \leq 4999$) firms to account for differences in information flow between regulated industries (Chuluun, Prevost, & Puthenpurackal, 2014; Petkevich & Prevost, 2018).
3. The *executive compensation* dataset omits firm-CEO-years with incomplete data to calculate VE, VO, and VS variables.
4. The *at-issue bond* dataset excludes bonds with convertible, floating rates, synthetic features, and exotic structures with no conventional yield to maturity. And before the *FISD-TRACE* file, duplicates are deleted by the issuer, issue date, final maturity and coupon (Petkevich & Prevost, 2018; Powers, 2017).
5. The *risk-taking* dataset excludes any missing values required to calculate the annualized quarterly *Sd(ROA)* variable, any missing daily price and asset total value below zero necessary to calculate Sd(Return), and any missing value inputs needed calculate additional control variables. Missing R&D expenditures are replaced with zero.

[*Insert Table 1- Panel A*]

3.4.1 The measure of CEO Incentive

There are two common methods to estimate the incentive effect of CEO equity compensation: the overall value the executive holds in equity and the total equities sold over a given year (Aggarwal & Samwick, 1999; Antle & Smith, 1986; Baker *et al.*, 2004; Bergstresser & Philippon, 2006; Cheng & Warfield, 2005; Core, Guay, & Verrecchia, 2003; Hall & Liebman, 1998; Jensen & Murphy, 1990b). Both methods assume executives are strongly incentivized by how their actions will affect their overall wealth. Where firm-year CEO wealth[88] includes two components: a fixed annual salary, $Wages_t$, and the total value of the CEOs equity

[88] Note that this treatment of CEO wealth excludes the executive's private wealth, CEO_PW_{it}, and how private wealth holdings can be optimally structured to hedge systematic risk from the wealth the CEO holds inside the firm (i.e. stocks and options). A CEO's Wealth is derived from: $= CEO\_PW_{it} + CEO\_Wealth_{it}$. Following prior papers (Himmelberg & Hubbard, 2000), we focus only on the latter component: CEO_Wealth_{it} – that is, the wealth of the CEO from within the firm (holdings in the form of equity)

holdings, $Total\ Shares_{it}\left[\omega_{it}P_{it} + \sum_{s=1}^{t-q} \omega_{it+s}E(P_{it+s})\right]$.[89]

$$CEO\_Wealth_{it} = Wages_{it} + Total\ Shares_{it}\left[\omega_{it}P_{it} + \sum_{s=1}^{t-q} \omega_{it+s}E(P_{it+s})\right]$$

The CEO_Wealth_{it} model can then determine what incentivizes the CEO ($CEO\_Incentive_{it}$). Intuitively, the value of a CEO's wealth depends on how many shares sold (ω_{it}) and the sale price (P_{it}). With greater equity to be sold, CEOs would be more concerned with the share price.

$$CEO\_Incentive_{it} = E\left(\frac{dW_{it}}{dP_{it}}P_{it}\right) = E(Total\ Shares_{it}\omega_{it}P_{it})$$

Studies have pointed to two limitations of $CEO\_Incentive_{it}$ measure (Edmans *et al.*, 2017; Edmans *et al.*, 2021; Johnson, Ryan, & Tian, 2009). First, the CEO incentive accounts for only the dollar value ($Total\ Shares_{it}P_{it}$) but not the fraction (ω_{it}) of equities sold at the given P_{it}. Secondly, CEOs sell their equity based on a set of choices (e.g., executives with negative private information about firm prospects may inflate the price to sell equity) likely correlated with omitted variables that may also influence investors' decision. To circumvent the drawbacks of earlier *CEO incentive* measures, this paper follows prior theoretical predictions and empirical applications (Daniel *et al.*, 2020; Edmans *et al.*, 2017; Edmans *et al.*, 2021) by examining CEO equities with vesting schedules:

$$[1A]\ Vesting\ Equity_{it} = Vesting\ Option_{it} + Vesting\ Stock_{it}$$

$$[1B]\ Vesting\ Option_{it} = [(UnvestedOptions_{t-1} + NewlyAwardedOption_t - UnvestedOptions_t) \times Delta_{it}] \times Closing\_Price_{it}$$

$$[1C]\ Vesting\ Stock_{it} = [Shrs\_Vest\_Num_{it} \times Delta_{it}] \times Closin\_Price_{it}$$

$Vesting\ Equity_{it}$ represent the CEO's short-term price concern. The aggregate price-sensitivity measure of options and stock is scheduled to vest within the year. It captures the effective dollar value of both the option and stock, where options are converted to 'stock'

[89] Prior papers (Baker *et al.*, 2004; Jensen & Murphy, 1990b) focus, primarily, on stocks and options as measures of CEO incentive. These compensation schemes have very large variations in value relative to Salay and Bondus pay (Hall & Liebman, 1998).

equivalents using the delta derived from the Black-Scholes Model for Option Price.[90] The *VE* measure addresses the limitations of the earlier model in two ways: (1) unlike 'total equity holdings' or 'actual equity sales', the amount of vesting equities in a given year is determined primarily by the schedule of equity grants made several years prior (Gopalan, Milbourn, Song, & Thakor, 2014). And evidence shows *VE* to be highly correlated with actual short-term equity sales (Edmans *et al.*, 2017). (2) Because CEOs know beforehand the number of and when equities vest, investments and policy decisions can be altered in their favour. **Appendix B** provides the step-by-step procedure to derive equations *1A, 1B* and *1C*. The next section discusses models used to test the hypotheses.

3.4.3 Econometric Model

A multivariate regression model of the effect of vesting on corporate bond yield spreads (**H1**) and the short-term risk-taking of corporate firms with respect to profit volatility (**H2**), price volatility (**H3**), and default risk (**H4**). This section describes the model and control variables.

i. The incentive effect of vesting equity on the cost of debt

To test *H1* on the impact of CEO incentives on corporate bond prices, the following multivariate model is estimated:

[2] $$Yield\ Spread_{it} = \beta_0 + \beta_1 CEO\ Incentive_{\ it} + \beta_2 Moody\ Rating_{it} + \beta_3 MWCP_{i,t} + \beta_4 FPCP_{\ it} + \beta_5 Duration_{\ it} + \beta_6 Offering\ Amount_{\ it} + \beta_7\ Subordinate_{it} + \beta_8 PPB_{\ it} + \beta_9 Firm\ size_{it} + \beta_{10} Debt\ ratio_{\ it} + \beta_{11} TobinsQ_{it} + \beta_{12} SaleGrowth_{3yr_{\ it}} + \beta_{13} Profits_{\ it} + \beta_{14} Std.(Profitability)_{it} + \beta_{15} Negative\ Earning_{it} + \beta_{16} Tangibility_{it} + \beta_{17} StockBAS_{it} + \beta_{18} Analysts_{it} + \beta_{19} Yield\ Curve\ Slope_{it} + \beta_{21} 10yr\ Treasury\ rate_{it} + \beta_{22} Std.(10yr\ Treasury\ rate)_{it} + \beta_{23} Baa - Aaa\ spreads_{it} + \sum_{j=1}^{J} \partial_j Industry\ FE + \sum_{x=1}^{X} \emptyset_x Year\ FE_{ix} + e_{it}$$

[90] In calculating VE, we collected the grant-level information on executive options. This grant-level information is used to compute the delta of VO, which captures the managers incentive to inflate the stock price. Edmans *et al.* (2017) argued that CEOs will take into account the delta of his options at the start of the year when making decisions.

The dependent variable, *yield spread*, measures the marginal cost of debt for the firm (*i*) and year (*t*). It represents the value resulting from the difference in the yield to maturity of bond and treasury bond with the same time to maturity. Sections 3.2.3 and 3.2.4 mention that as yield decreases, the spread tightens, and the bond price rises because investors view the bond as a 'low risk' investment. Following prior literature, the following bond and firm-level control variables are included (Bhojraj & Sengupta, 2003; Klock, Mansi, & Maxwell, 2005; Miller & Puthenpurackal, 2005; Ortiz-Molina, 2006):

1. *Moody's rating residual* control the market's overall assessment of default risk by controlling for the information contained in the bond- and firm-specific control variables (Chuluun *et al.*, 2014; Klock *et al.*, 2005; Mansi *et al.*, 2011).
2. *Analyst coverage, Tobin q, sales growth* and *stock BAS* control for information risk. Higher analyst coverage implies a quality informational environment (Mansi *et al.*, 2011). *Tobin q, sales growth,* and *stock BAS* accounts for the information environment around expected and realised growth opportunities (Corwin & Schultz, 2012).
3. *Offering amount* controls for interest rate exposure
4. *Yield Curve Slope, 10yr Treasury rate* and *Std. (10yr Treasury rate)* control for the macroeconomic interest rate environment at issuance (Jameson, King, & Prevost, 2021). And, *Baa-Aaa spread* control for the effect of time-varying risks premiums on spreads (Klock *et al.*, 2005)
5. *MWCP, FPCP, PPB, duration* and *subordinate bonds,* respectively, control for systematic effects linked to privately issued bonds (i.e., lower liquidity). These embedded options and seniority bonds control for prepayment and default risks.
6. *Firm size, debt, profitability, std.(profitability), negative earnings,* and *capital expenditure* control for additional dimensions of risk investors face that the *yield spread* may not fully capture.

ii. The incentive effect of vesting equity on corporate risk-taking activity

According to *H1,* CEO incentives lower yield spreads, and the association may be channelled through short-term risk-taking activities. Hence, *H2*, *H3*, and *H4* assess whether CEO incentives reduce short-term risk-taking through the following model estimates, respectively:

[3] $Sd(ROA)_{it}$

$$= \beta_0 + \beta_1 CEO\ Incentive_{\ it} + \beta_2 Capital\ Expenditure_{\ it} + \beta_3 R\&D_{\ it}$$
$$+ \beta_4 Profitability_{\ it} + \beta_5 Firm\ Age_{\ it} + \beta_6 MarketBook_{\ it}$$
$$+ \beta_7 Surplus\ Cash_{\ it} + \beta_8 Returns_{\ it} + \beta_9 Debt\ Ratio_{\ it}$$
$$+ \beta_{10} Sales\ growth_{\ it} + \beta_{11}\ HHI_{\ it} + \beta_{12} Vega_{\ it} + \beta_{13} Delta_{\ it}$$
$$+ \beta_{14} CEO\ Age_{\ it} + \beta_{15} Tenure_{\ it} + \beta_{16} Current\ Ratio_{\ it} + \beta_{17} LT\ Debt_{\ it}$$
$$+ \beta_{18} S\&P\ Ranking_{\ it} + + \beta_{19} Tangibility_{\ it} + \sum_{j=1}^{J} \partial_j Industry\ FE$$
$$+ \sum_{x=1}^{X} \emptyset_x Year\ FE_{ix} + e_{it}$$

The dependent variable, *sd(ROA),* is an annualized volatility of firm profitability computed from quarterly firm-year data. It captures the risk related to firm performance in relation to the CEO's investment decisions. Equation [3] controls for other risk-taking activities of the financial firm - *capital expenditure, R&D spending, and* HHI (Berger & Ofek, 1995; Bhagat & Welch, 1995). The volatility in returns on the asset is expected to increase as a firm increases its investments. The *debt ratio* is included to control for riskiness in corporate financing decisions. When there is a negative shock to the firm's underlying business conditions, the higher its leverage, the greater the (negative) impact on the firm's profitability (including a higher likelihood of default). *Sales growth* and c*ash surplus* control for realised and expected growth opportunities for the firm. Other controls influencing profit volatility include firm characteristics -*age, market-book ratio, C*EO characteristics – *vega, delta, age* and *tenure,* and others –*profitability, current* and *LT debt ratio, S&P ranking, returns,* and *tangibility.*

[4] $Sd(Return)_{it}$

$$= \beta_0 + \beta_1 CEO\ Incentive_{\ it} + \beta_2 Capital\ Expenditure_{\ it} + \beta_3 R\&D_{\ it}$$
$$+ \beta_4 Profitability_{\ it} + \beta_5 Firm\ Age_{\ it} + \beta_6 MarketBook_{\ it}$$
$$+ \beta_7 Surplus\ Cash_{\ it} + \beta_8 Debt\ Ratio_{\ it} + \beta_9 Sales\ growth_{\ it} + \beta_{10}\ HHI_{\ it}$$
$$+ \beta_{11} Vega_{\ it} + \beta_{12} Delta_{\ it} + \beta_{13} CEO\ Age_{\ it} + \beta_{14} Tenure_{\ it}$$
$$+ \beta_{15} Current\ Ratio_{\ it} + \beta_{16} LT\ Debt_{\ it} + \beta_{17} S\&P\ Ranking_{\ it}$$
$$+ \beta_{18} Returns_{\ it} + \beta_{19} Tangibility_{\ it} + \beta_{19} Retained\ earning_{\ it}$$
$$+ \beta_{19} BookPrice_{\ it} + \beta_{19}\ Div.Yield_{\ it} + \sum_{j=1}^{J} \partial_j Industry\ FE$$
$$+ \sum_{x=1}^{X} \emptyset_x Year\ FE_{ix} + e_{i,t}$$

The dependent variable, *sd(Return),* is the standard deviation of annualized stock returns computed from daily firm-year return data. This measure of firm risk is widely used (Agrawal & Mandelker, 1987; Guay, 1999; Salitskiy, 2015; Shue & Townsend, 2017) and easily observed by investors. This measure provides investors with information about current and long-term uncertainty in firm values. Controls are similar to those in Equation [3], plus variables that control for income ratios on which firms may base their decision to trade stocks– *retained earnings, book price,* and *dividend yield.*

[5] $Default\ Risk_{it}$

$$= \beta_0 + \beta_1 CEO\ Incentive_{\ it} + \beta_2 Residual\ Rating_{\ it} + \beta_3\ ROA_{it}$$
$$+ \beta_4 Debt\ Ratio_{\ it} + \beta_5 Quick\ Ratio_{\ it} + \beta_6 LT\ Debt_{\ it} + \beta_7 Firm\ Age_{\ it}$$
$$+ \beta_8 Negive\ Income_{\ it} + \beta_9 Sales\ Growth_{\ it} + \beta_{10} Size_{\ it}$$
$$+ \beta_{11} Surplus\ Cash_{\ it} + \beta_{12} Vega_{\ it} + \beta_{13} Delta_{\ it} + \beta_{14} CEO\ Age_{\ it}$$
$$+ \beta_{15} CEO\ Tenure_{\ it} + \beta_{16} HHI_{\ it} + \beta_{17} Working\ Capital_{\ it}$$
$$+ \beta_{18} Ret.earning_{\ it} + \beta_{19} PriceBook_{i,t} + \beta_{20} Callable_{it} + \beta_{21} Putable_{it}$$
$$+ \beta_{22} Duration_{it} + \beta_{23} Issue\ Amount_{it} + \beta_{24} Rule\ 144A_{it}$$
$$+ \beta_{25} StockBAS_{it} + \beta_{26} Analyst_{it} + \beta_{27} 10yr\ Treasury\ rate_{it}$$
$$+ \beta_{28} Std.(10yr\ Treasury\ Rate)_{it} + \beta_{29} Baa - Aaa\ Spread_{it}$$
$$+ + \sum_{j=1}^{J} \partial_j Industry\ FE + \sum_{x=1}^{X} \emptyset_x Year\ FE_{ix} + e_{it}$$

The dependent variable, *default risk*, is measured by Moody's credit quality rating (Petkevich & Prevost, 2018). The bond letter ratings are converted to numerical equivalents, ranging from 1 ("Aaa") to 21 ("C"). Companies classified as 'high quality' have ratings between AAA and AA and are regarded by investors as low risk of default. Equation [5] controls for policies that influence corporate profitability (*ROA* and *debt ratio),* financial health (*LT debt* and *quick ratio*), valuation (*price-book*) and growth opportunities (*sales growth* and *surplus cash).* *Also,* CEO characteristics and incentives (*age, tenure, vega,* and *delta*), firm characteristics (*age* and *size*), and industry (*HHI*). At the bond level, selected characteristics (*duration; issues; stock BAS, analyst coverage, 10yr Treasury rate,* and *Baa-Aaa spreads*), embedded and seniority provisions (*subordinate, PPP; callable* and *puttable bonds*).

Overall, the variables are winorized at 1% tails and logged selectively to minimize the effects of extreme outliers. Each model estimate discussed in equations [2], [3], [4], and [5] includes Fama-French industry and year effects to account for the unobserved firm and industry heterogeneity associated with independent variables (Bascle, 2008; Mauri & Michaels, 1998). Because firms may issue multiple bonds in a given year, standard errors are clustered at the firm level to control heteroscedasticity and autocorrelation (Petersen, 2009; Thompson, 2011).[91]

[91] We estimate the models using the CLUSTER2 Stata ado file written by Mitchell Petersen. See (Petersen, 2009)

3.5 EMPIRICAL RESULTS

3.5.1 Preliminary Results

Table 1 provides descriptive statistics for the key variables used in the empirical analysis.

[*Insert Table 1- Panel B & C*]

Panel B indicates the mean and median value of total CEO incentive (*vesting equity*) is about US$5.43 million and $2.38 million, respectively, which indicates substantial vesting equity for our sample CEOs. Vesting equity is approximately 6.34 and 7.77 in the logged version. The mean *vesting option* value is US$67 thousand, with a log of 1.30. The mean and median vesting stock values are US$74 thousand and US$4 thousand, respectively.[92] The log of these values is 2.21 and 1.49, respectively. As for the dependent variable, *yield spread*, the mean and median values are 0.019 and 0.014, which mirror the values documented in prior research (Hao *et al.*, 2018). The deviation from the sample mean is 0.018. The minimum and highest values in the dataset are 0.008 and 0.043. The dispersion among the observations in the dataset is small (0.00031 to be exact, *un-tabulated*). With respect to the control variables, most bonds issued by firms seem to have more *MWCP* provisions and fewer *FPCP* provisions. The mean value for *MWCP* is 0.604 vs 0.143 for *FPCP.* An average of 1,061,590 bonds were issued (or 6.28 log) for our sample. Bonds classified as "*subordinate*" and "r*ule 144A*" are few, with mean values reported at 0.038 and 0.193, respectively. The mean *duration* is 7.26 years, and *maturity is* -10.9 years. The mean value for the *altman score* is 3.8, implying firms exhibit lower default probability with a *credit rating* equal to 8, equating to a Baa1 letter rating. At the firm level, the mean and median values for *size* are about US$33.2 billion and US$11.51 billion. The log values are 9.38 and 10.4, respectively. Few firms show negative earnings. The mean values for other firm-level controls are: *tobin q* is 1.906, *sales growth* is 5.4%, *profitability* is 15%, *std.(profitability)* is 3%, and *tangibility* is 0.328. CEOs, on average, are 56 years old, with almost seven years in office. While the average number of an analyst is about 1, the *stock (BAS)* is 0.437, the y*ield curve is about 2%*, the *10yr treasury rate is* about 4%, *std.(10yr treasury rate)* is 0.2%, and the *Baa-Aaa* spread roughly 1%. **Panel C** - contains

[92] The values shown are for dataset by issue-year, meaning that a firm may issue multiple bonds within the year, however, the value of CEO VE, VO and VS is annualised. Untabulated, we run tab descriptive for '*atissue Bond dataset'* less firm-year duplicates. The mean values of VE are $3,607,000, with a mean of $57,000 ($48,000) coming from VO and VS.

descriptive statistics for the 'at-issue bond (*t-1*)' dataset. These statistics closely reflect those in Panel B.

Panel D – shows the mean and median value for profit volatility (*sd(ROA))* are about 1.5% and 0.7%, respectively. The deviation from the sample means it is about 2.26%. With respect to CEOs holding total *vesting equity,* the mean and median values are US$3.64 million and US$1.42 million. For the *vesting option*, the mean value is US$79 thousand. And, *vesting stock* shows a mean and median value of about US$47 thousand and US$11 thousand. Firms invest more in 'low risk' investments, as shown by their capital expenditures mean ratio of 0.032, compared to 'high risk' investments like R&D, with a mean of 0.009 (Bhagat & Welch, 1995). With a market concentration of 18%, our sample indicates above-average future growth and profitability. Further controls show mean and median profitability of about 1% and 1.3%, respectively. Sales have grown 5.2% over the past three years. The market book ratio is above 2 at the mean value, indicative of possible undervaluation. Companies have more than enough cash to pay off short-term obligations, as shown by a mean current ratio of 2; and a mean value of about 20% of assets financed with long-term debt, suggesting a good long-term financial position. The tangibility ratio mean is 0.27. The mean and median are 22% and 20% in terms of the debt ratio. Most firms have an average age of 25 years old and a CEO who is 55 years old with an average tenure of nearly 7 years. CEO risk-taking incentives have an average delta (vega) value of 522(122).

Panel E – shows the mean and median value for return volatility (*sd(Return))*, which is about 7.2% and 3.7%, respectively. The deviation from the sample mean is about 9.5%. The mean and median values for total *vesting equity* are US$3.62 million and US$1.41 million, respectively. The mean *vesting option* value is US$81 thousand. *Vesting stock* has a mean and median value of US$45 thousand and US$8 thousand. The values of the controls are about the same as those in Panel D. Regarding *retained earnings*; the average is about 56%. By having a high ratio, the company relies less on other types of financing. The mean and median *book prices* are about 2.2 and 0.851, respectively. Our sample firms pay out approximately 9% of their share price each year in *dividends* (0.3% at median).

Panel F - shows the average *default risk* rating for the companies in our sample is about 8, or a Baa1 letter rating. The mean and median vesting equity values are US$6.5 million and US$3.1 million, respectively. The mean vesting option value is US$76 thousand. Vesting stock has a mean and median value of US$87 thousand and US$22 thousand. Most bonds issued

have call features, while few have put features. The average bond amount issued is 1,220,000. Few bonds are classified as 'subordinate' or 'PPP' bonds. The average duration is 7.34 years. Firms with negative earnings are very few. Sales grew by about 2% over the past three years. Cash flow and profitability average about 3% and 2%, respectively. Companies have more than enough cash to meet short-term obligations, as shown by a mean current and long-term debt ratio of about 2 and 31%, respectively, similar to Panel D & E. While the average number of analysts is 2, the stock (BAS) is 0.364, the 10yr treasury rate is about 4%, the standard (10yr treasury rate) is 0.2, and the Baa-Aaa spread is about 1%.

Table 1. Descriptive Statistics

The table provides the summary statistics for the variables used in this study. **Panel A** shows the sample selection. **Panel B-F** – the summary statistics for the five datasets used in the multivariate analysis, respectively. The variable definitions are provided in section 5.2.1 **Appendix A**. All variables are winsorised at 1st and 99th percent.

Panel A: Sample Selection

	At-issue Bond		**Risk-taking**		
	No Lag	*Yes Lag*	*Sd(ROA)*	*SD(Return)*	*Default*
(i) Observations with sufficient data to calculate the main dependent variable. The period covers 1993 to 2021.	8427	8427	369808	1404837	8427
(ii) Observation with sufficient data on ExecuComp to calculate short-term price concern proxies. The period covers 1994 through 2017.	37662	37662	37662	37662	37662
(-) Unmatched firm-year observations between (i) and (ii)	29235	29235	350864	1384290	29646
(-) Public Utility (4900-4999) and Finance (6000-6799) firms	555	605	1860	1860	555
(-) Observations without data to calculate key dependent, independent and control measures	1096	3163	4127	3996	2821
Final Sample	**6776**	**4659**	**12957**	**14691**	**5051**

Panel B: Summary Statistics of at-issue Bond (t) dataset

Variable	**Issue-Year**	**Mean**	**Std.Dev**	**Q25**	**Median**	**Q75**	**Q90**
Dependent Variable							
	6776	0.019	0.018	0.008	0.014	0.026	0.043
Main Independent Variables: CEO incentives from Vesting equity							
Vesting Equity ($)*	6776	5430	9786	209	2378	7297	15435
Vesting Option ($)*	6776	67	235	0	0	21	205
Vesting Stock ($)*	6776	74	140	0	4	83	226
VE^{+}	6776	6.34	3.62	5.35	7.77	8.90	9.64
VO^{+}	6776	1.30	2.25	0.00	0.00	3.08	5.33
VS^{+}	6776	2.21	2.34	0.00	1.49	4.41	5.42

Panel C: Summary Statistics of at-issue Bond (t-1) dataset

Issue-Year	**Mean**	**Std.Dev**	**Q25**	**Median**	**Q75**	**Q90**
4659	0.022	0.019	0.009	0.016	0.03	0.048
4659	4283	8007	82	1778	5449	12475
4659	64	216	0	0	30	193
4659	56	115	0	0	61	165
4659	6.05	3.58	4.42	7.48	8.60	9.43
4659	1.37	2.26	0.00	0.00	3.44	5.27
4659	1.98	2.23	0.00	0.00	4.11	5.11

Table 1 - (*continued)*

Panel B: continues								*Panel C:continues*						
Other independent variables														
Additional controls for Yield Spread														
Residual [a]	6365	0	1.736	-1.073	0.039	1.113	2.198	4164	0	1.734	-1.062	0.057	1.074	2.131
Residual [b]	6365	0	1.737	-1.059	0.035	1.116	2.21	4164	0	1.735	-1.06	0.062	1.078	2.141
Residual [c]	6365	0	1.735	-1.047	0.035	1.126	2.189	4164	0	1.733	-1.054	0.06	1.068	2.132
MWCP[++]	6776	0.604	0.489	0	1	1	1	4659	0.587	0.492	0	1	1	1
FPCP[++]	6776	0.143	0.35	0	0	0	1	4659	0.156	0.363	0	0	0	1
Modified duration[+]	6776	2.038	0.385	1.757	2.073	2.226	2.604	4638	2.038	0.35	1.788	2.072	2.203	2.53
Modified Duration (yr)	6776	7.269	3.35	4.793	6.948	8.264	12.511	4638	7.175	3.081	4.975	6.94	8.048	11.55
Offering Amount [+]	6776	6.285	1.322	5.676	6.269	7.021	7.842	4659	6.187	1.18	5.621	6.204	6.846	7.602
Sub-ordinated Bond[++]	6776	0.038	0.191	0	0	0	0	4659	0.048	0.213	0	0	0	0
Privately Placed Bond [++]	6776	0.193	0.395	0	0	0	1	4659	0.239	0.426	0	0	0	1
Firm Size [+]	6776	9.382	1.489	8.318	9.366	10.404	11.379	4629	8.937	1.372	7.963	8.878	9.892	10.65
Debt Ratio	6776	0.332	0.147	0.231	0.313	0.413	0.524	4659	0.327	0.152	0.222	0.309	0.413	0.528
Tobins Q	6776	1.906	0.907	1.282	1.64	2.255	3.063	4659	1.844	0.903	1.25	1.576	2.116	2.881
Sales Growth (prior 3yrs)	6776	0.054	0.107	0.003	0.039	0.085	0.161	4650	0.055	0.104	0.003	0.042	0.092	0.159
Profitability	6776	0.149	0.073	0.105	0.143	0.186	0.232	4650	0.144	0.075	0.102	0.138	0.183	0.23
Std (Profitability)	6768	0.03	0.029	0.013	0.022	0.037	0.059	4644	0.032	0.031	0.013	0.023	0.039	0.063
Negative Earning [++]	6776	0.105	0.306	0	0	0	1	4659	0.128	0.334	0	0	0	1
Tangibility	6776	0.328	0.246	0.124	0.26	0.507	0.723	4615	0.319	0.237	0.125	0.255	0.466	0.692
Stock BAS	6776	0.437	0.679	0.027	0.088	0.645	1.405	4583	0.477	0.714	0.034	0.101	0.746	1.478
Analyst Coverage	6776	1.39	0.669	1.099	1.386	1.946	2.197	4659	1.284	0.672	0.693	1.386	1.792	2.079
Yield Curve Slope	6776	0.017	0.01	0.009	0.018	0.025	0.031	4659	0.017	0.011	0.008	0.018	0.025	0.032
10yr Treasure rate	6776	0.037	0.015	0.023	0.036	0.049	0.059	4659	0.038	0.015	0.023	0.037	0.051	0.06
Std.(10yr Treasury rate)	6776	0.002	0.001	0.001	0.002	0.003	0.004	4659	0.002	0.001	0.001	0.002	0.003	0.004
Baa-Aaa spreads	6776	0.01	0.004	0.008	0.009	0.012	0.014	4659	0.01	0.004	0.007	0.009	0.012	0.014
CEO age	6622	56.603	6.076	53	57	60	64	4546	56.461	6.319	52	57	60	64
CEO Tenure	6078	6.385	5.936	2	5	9	14	4168	6.185	5.989	2	4	8	14
Maturity	6776	10.844	8.506	5.274	10.005	10.063	30.014	4659	10.711	8.341	6.041	10.008	10.055	20.45
Altman's Zscore	6459	3.828	43.69	1.734	2.526	3.475	4.467	4434	4.416	52.716	1.76	2.572	3.589	4.68
Moody's Rating	6373	8.469	3.608	6	8	10	14	3195	9.197	3.551	7	9	11	15

Table 1 - (*continued)*

Panel D: Summary Statistics of SD(ROA) dataset								*Panel E: Summary Statistics of SD(Return)*						
Variable	**Firm-Year**	**Mean**	**Std.Dev**	**Q25**	**Median**	**Q75**	**Q90**	**Firm-Year**	**Mean**	**Std.Dev**	**Q25**	**Median**	**Q75**	**Q90**
Dependent Variable														
	12957	0.015	0.026	0.003	0.007	0.014	0.032	14691	0.072	0.095	0.028	0.037	0.061	0.168
Main Independent Variables: CEO incentives from Vesting equity														
Vesting Equity ($)*	12957	3638.93	6703.1	518.97	1423	3716.26	8932.8	14691	3611.3	6651.9	522.63	1414	3659	8780.87
Vesting Option ($)*	12957	79.215	214.62	0	0	63.595	214.82	14691	80.958	212.81	0	0	68.74	218.627
Vesting Stock ($)*	12957	47.377	93.02	0	10.8	53.1	132.54	14691	44.967	91.445	0	7.521	50	126.955
VE^{+}	12957	7.196	1.52	6.254	7.261	8.221	9.098	14691	7.195	1.511	6.261	7.255	8.205	9.08
VO^{+}	12957	1.839	2.362	0	0	4.168	5.374	14691	1.963	2.366	0	0	4.245	5.392
VS^{+}	12957	2.173	2.055	0	2.38	3.972	4.887	14691	2.054	2.061	0	2.018	3.912	4.844
Other independent variables														
Additional controls for SD(ROA)								*Additional controls for SD(Return)*						
Capital Expenditure	12957	0.032	0.031	0.012	0.022	0.04	0.068	14664	0.033	0.031	0.013	0.023	0.041	0.07
R&D	12957	0.009	0.015	0	0.001	0.012	0.028	14691	0.009	0.015	0	0.001	0.012	0.028
Profitability	12957	0.01	0.027	0.005	0.013	0.023	0.034	14691	0.01	0.028	0.004	0.013	0.022	0.033
Firm Age $^{+}$	12957	3.028	0.733	2.532	3.053	3.568	3.924	14691	2.985	0.777	2.464	3.027	3.556	3.946
Firm Age	12957	25.486	18.819	11.575	20.181	34.444	49.616	14691	25.048	19.236	10.751	19.64	34.03	50.732
Market-to-Book^{+}	12957	0.574	0.462	0.239	0.499	0.825	1.208	14691	0.569	0.464	0.233	0.49	0.82	1.207
Market-to-Book	12957	2.006	1.214	1.27	1.647	2.281	3.347	14691	1.998	1.219	1.262	1.633	2.271	3.344
Surplus Cash	12957	0.017	0.063	-0.007	0.022	0.049	0.08	14691	0.016	0.064	-0.008	0.02	0.048	0.079
Debt Ratio	12957	0.22	0.196	0.062	0.202	0.325	0.448	14691	0.224	0.178	0.072	0.211	0.333	0.454
Sales Growth	12957	0.052	0.118	-0.005	0.042	0.096	0.173	14691	0.054	0.122	-0.004	0.044	0.1	0.178
Industry Concentration (HHI)	12957	0.178	0.165	0.071	0.128	0.222	0.351	14691	0.174	0.161	0.071	0.126	0.219	0.339
CEO Vega	12957	122.3	191.5	15.3	53.2	145.3	315.8	14691	119.2	185.8	15.8	51.7	141.0	309.5
CEO Delta	12957	521.9	1201.8	80.9	193.4	490.1	1109.2	14691	510.6	1171.5	79.8	190.8	482.3	1089.7
CEO Age	12957	55.461	6.62	51	56	60	64	14691	55.412	6.645	51	55	60	64
CEO Tenure	12957	6.866	6.34	2	5	10	15	14691	6.813	6.328	2	5	9	15
Current Ratio	12957	2.381	1.693	1.357	1.925	2.791	4.218							
Long-Term Debt Ratio	12957	0.193	0.187	0.031	0.17	0.291	0.411							
S&P Quality Ranking	12957	0.349	0.477	0	0	1	1							
Returns	12957	0	0.004	-0.001	0	0.001	0.002							
Tangibility	12957	0.268	0.215	0.103	0.2	0.378	0.605							
Retained Earning								14691	0.559	1.79	0.061	0.174	0.481	1.263
Book Price								14691	2.203	5.772	0.39	0.851	1.932	1.719
Dividend Yield								14691	8.861	25.46	0	0.301	5.408	21.265

Table 1 - *continued*

Panel F: Summary Statistics of Default dataset

Variable	Issue-Year	Mean	Std.Dev	Q25	Median	Q75	Q90
Dependent Variables							
	5051	8.5	3.515	6	8	10	14
Main Independent Variables: CEO incentives from Vesting equity							
Vesting Equity ($)*	5051	6488.95	9833.12	736.94	3088.71	8301.888	16043
Vesting Option ($)*	5051	75.984	245.146	0	0	13.027	193.72
Vesting Stock ($)*	5051	87.246	149.204	0	21.898	101.675	269.41
VE[+]	5051	6.922	3.258	6.604	8.036	9.024	9.683
VO[+]	5051	1.276	2.262	0	0	2.641	5.272
VS[+]	5051	2.545	2.36	0	3.086	4.622	5.596
Other independent variables							
Additional controls for Moody Rating							
Residual [a]	5051	0	1.632	-0.986	0.026	1.045	2.009
Residual [b]	5051	-0.005	1.635	-0.993	0.026	1.052	1.998
Residual [c]	5051	0.004	1.637	-0.995	0.041	1.066	1.998
ROA	5051	0.015	0.017	0.007	0.015	0.023	0.032
Debt Ratio	5051	0.331	0.145	0.232	0.311	0.412	0.515
Quick Ratio	5051	1.593	0.866	1.036	1.341	1.877	2.689
Long-Term Debt Ratio	5051	0.311	0.474	0.194	0.27	0.369	0.475
Firm Age [+]	5051	3.327	0.938	2.859	3.516	4.012	4.375
Firm Age	5051	38.32	25.39	17.45	33.64	55.27	79.44
Negative Income [++]	5051	0.108	0.311	0	0	0	1
Sales Growth [+]	5051	7.914	1.452	6.918	7.905	8.902	9.915
Sales Growth	5051	0.018	0.056	-0.003	0.012	0.032	0.065
Firm Size	5051	9.892	1.559	8.76	9.896	11.029	12.06
Surplus Cash	5051	0.029	0.042	0.006	0.029	0.049	0.075
CEO Vega	5051	392	641	49	185	501	986
CEO Delta	5051	2544	20081	231	570	1297	2657
CEO Age	5051	56.504	5.776	53	57	60	63
CEO Tenure	5051	6.141	5.749	2	5	8	14
Industry Concentration (HHI)	5051	0.182	0.168	0.072	0.136	0.228	0.373
Working Capital	5051	0.109	0.181	0.007	0.076	0.181	0.297
Retained Earnings	5051	0.274	0.706	0.099	0.263	0.423	0.622
Price-Book Ratio	5051	0.374	0.415	0.195	0.331	0.516	0.758
Callable Bond ++	5051	0.81	0.392	1	1	1	1
Putable Bond ++	5051	0.007	0.083	0	0	0	0
Modified Duration [+]	5051	2.048	0.394	1.754	2.077	2.237	2.641
Modified Duration (yr)	5051	7.379	3.474	4.779	6.977	8.369	13.027
Offering Amount [+]	5051	6.471	1.239	5.806	6.43	7.19	8.007

Table 1 - *continued*

Sub-ordinated Bond[++]	5051	0.036	0.186	0	0	0	0
Privately Placed Bond [++]	5051	0.191	0.393	0	0	0	1
Stock BAS	5051	0.364	0.628	0.024	0.064	0.466	1.2
Analyst Coverage	5051	1.447	0.666	1.099	1.609	1.946	2.197
10yr Treasure rate	5051	0.035	0.015	0.022	0.032	0.047	0.057
Std.(10yr Treasury rate)	5051	0.002	0.001	0.001	0.002	0.003	0.004
Baa-Aaa spreads	5051	0.01	0.004	0.008	0.009	0.012	0.014

* Dollar value in $US. Thousand; ** Dollar value in $US. Million; [+] Variable is log+1; [++] Variable is Binary

[a] Predicted residual of Moody's rating using *vesting equity* and all other independent X variables in the regression model to take care of yield spread model specification issues

[b] Predicted residual of Moody's rating using *vesting option* and all other independent X variables in the regression model to take care of yield spread model specification issues

[c] Predicted residual of Moody's rating using *vesting stock* and all other independent X variables in the regression model to take care of yield spread model specification issues

3.5.2 Correlation Matrix

Table 2 shows the pairwise correlation for key variables in Equations [2], [3], [4], and [5].

[*Insert Table 2 - Panel A-D*]

Panel A shows a negative and statistically significant association between the *yield spread* and two CEO incentive proxies - *vesting equity* and *vesting option.* The negative coefficient implies that a greater value of VE and VO holding would decrease *yield spreads* (tighten). Interestingly, the sign is positive and significant for vesting stock at the 1% statistics level. Bondholders may view stock vesting as detrimental to their investments, requiring higher premiums. With respect to other control variables, a negative and statistically significant association is observed with *firm size*, *tobins q*, *profitability, MWCP, modified duration, offering amount, analyst coverage* and the *10yr Treasury rate.* And, for *PPP, FPCP, debt ratio, std.(profit), negative earnings, slope, sub-ordinated, tangibility, stock bid-ask-spread*, *std.(treasury rate),* and *Baa-Aaa spread,* the association with *yield spread* is positive and statistically significant. Overall, the signs follow prior studies.

Panel B only expects a negative and statistically significant association between profitability volatility and vesting equity. The negative coefficient suggests that profits are less volatile when CEOs hold greater amounts of VE. Results regarding vesting options and stock are mixed, with the latter showing an insignificant statistical significance. Concerning other

control variables, *profitability volatility* is expected to be negative and statistically significant with the following variables: *profitability, surplus cash, S&P ranking, returns, firm age, market-to-book, sales growth, HHI,* CEO *delta, vega, age* and *tenure*. And positive and statistically significant correlations with R&D, debt, and current and long-term debt ratios.

Panel C shows a negative and statistically significant relationship between *return volatility* and CEO incentive proxies - *vesting equity* and *vesting option*. A decrease in the volatility of returns is predicted as *VE* and *VO* rise. There is a negative and statistically significant correlation between *return volatility* and the following variables: *R&D, profitability, market-to-book, debt ratio, retained earnings, book price, dividend yield,* and *CEO vega* and *delta*. And a positive correlation between *return volatility* and *capital expenditures, sales growth*, and *CEO tenure*.

Panel D shows a negative and statistically significant association between *default risk* and two CEO incentive proxies - *vesting equity* and *vesting option.* Interesting, *vesting stock* has a negative sign but is not statistically significant. By increasing the holdings of these incentives, the credit quality of the bonds issued tends to increase. A number of control variables are negative and statistically correlated with default risk, including *ROA, firm age, surplus cash, retained earnings, modified duration, issued amount, analyst coverage, and std.(10year Treasury rate)*, and CEO *vega, delta,* and *age*. These variables are positive and statistically correlated with default risk: *debt ratio, quick ratio, long-term debt, negative income, price book, callable bonds, subordinate debt, PPB* and *stock bid-ask spread*.

In **Panels A-D,** correlations among variables are generally low, except in a few cases. High correlations point to multicollinearity in regression models. To ensure the validity of multivariate model results and ensure that multicollinearity is not a problem, the variance inflation factor (VIF) test is used. The values of VIF for each of the variables in our regression model can be found in section 5.2.3. Overall, multicollinearity does not threaten the regression coefficient as the value appears within the acceptable range of 5.

Table 2. Pairwise Correlation

The table provides pairwise correlation for all firm specific variables using *at-issue bond (t)* dataset (**Panel A**), *sd(roa)* dataset (**Panel B**), *sd(return)* dataset (**Panel C**) and the *default* dataset (**Panel D**). The variable definitions are provided in section 5.2.1 **Appendix A**.

Panel A: Yield Spread-CEO Incenitve	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Yield Spread (1)	1.000													
Vesting Equity (2)	-0.130*	1.000												
Vesting Option (3)	-0.154*	0.381*	1.000											
Vesting Stock (4)	0.091*	0.520*	-0.544*	1.000										
MWCP (5)	-0.060*	0.152*	-0.228*	0.325*	1.000									
FPCP (6)	0.326*	-0.066*	0.077*	-0.102*	-0.505*	1.000								
Modified duration (7)	-0.054*	0.050*	-0.067*	0.086*	0.188*	0.01	1.000							
Offering Amount (8)	-0.066*	0.152*	-0.267*	0.396*	0.424*	-0.208*	-0.051*	1.000						
Sub-ordinated Bond (9)	0.185*	-0.108*	0.062*	-0.135*	-0.180*	0.320*	-0.006	-0.089*	1.000					
Privately Placed Bond (10)	0.485*	-0.113*	0.056*	-0.103*	-0.215*	0.411*	-0.099*	-0.054*	0.264*	1.000				
Firm Size (11)	-0.366*	0.273*	-0.135*	0.375*	0.308*	-0.255*	0.056*	0.543*	-0.251*	-0.345*	1.000			
Debt Ratio (12)	0.287*	-0.060*	0.031	-0.055*	-0.140*	0.195*	-0.082*	-0.027	0.158*	0.251*	-0.191*	1.000		
Tobins Q (13)	-0.327*	0.063*	0.021	0.002	0.011	-0.074*	0.03	0.014	-0.095*	-0.161*	0.075*	-0.013	1.000	
Sales Growth (prior 3 years) (14)	0.009	-0.099*	0.056*	-0.127*	-0.105*	0.103*	0.014	-0.028	0.122*	0.153*	-0.156*	0.044*	0.034*	1.000
Profitability (15)	-0.318*	0.040*	0.019	-0.01	-0.003	-0.103*	0.042*	-0.038*	-0.061*	-0.176*	0.03	-0.049*	0.620*	0.056*
Std (Profitability) (16)	0.249*	-0.034*	-0.025	0.009	-0.015	0.118*	-0.031	0.034*	0.078*	0.146*	-0.135*	0.111*	0.028	0.080*
Negative Earnings (17)	0.384*	-0.058*	0.040*	-0.043*	-0.059*	0.181*	-0.066*	0.015	0.073*	0.202*	-0.121*	0.179*	-0.189*	-0.066*
Tangibility (18)	0.034*	-0.035*	0.140*	-0.162*	-0.101*	0.053*	0.025	-0.173*	0.045*	-0.006	-0.047*	0.037*	-0.125*	-0.024
Stock BAS (19)	0.039*	-0.145*	0.458*	-0.523*	-0.357*	0.164*	-0.135*	-0.363*	0.202*	0.130*	-0.353*	0.142*	-0.110*	0.097*
Analyst Coverage (20)	-0.104*	0.221*	-0.284*	0.456*	0.360*	-0.149*	0.087*	0.385*	-0.140*	-0.166*	0.498*	-0.131*	0.132*	-0.098*
Yield Curve Slope (21)	0.203*	0.109*	-0.162*	0.265*	0.179*	-0.001	0.002	0.141*	-0.024	0.045*	0.094*	-0.026	-0.056*	-0.201*
10yr Treasure rate (22)	-0.165*	-0.223*	0.540*	-0.672*	-0.397*	0.064*	-0.127*	-0.379*	0.137*	0.034*	-0.309*	0.022	-0.047*	0.200*
Std. (10yr Treasury rate) (23)	0.128*	-0.068*	0.114*	-0.151*	-0.085*	-0.016	-0.066*	-0.104*	0.021	-0.011	-0.055*	-0.033*	-0.046*	-0.03
Baa-Aaa spreads (24)	0.358*	0.022	-0.207*	0.215*	0.181*	-0.069*	-0.049*	0.143*	-0.046*	-0.040*	0.118*	-0.069*	-0.060*	-0.155*

* Significance at the 1 per cent level.

Table 2. ***continues***

Panel A: Yield Spread-CEO Incenitve	15	16	17	18	19	20	21	22	23	24
Profitability (15)	1.000									
Std (Profitability) (16)	-0.139*	1.000								
Negative Earnings (17)	-0.378*	0.261*	1.000							
Tangibility (18)	0.022	0.153*	0.110*	1.000						
Stock BAS (19)	-0.053*	0.029	0.108*	0.188*	1.000					
Analyst Coverage (20)	0.046*	0.065*	-0.035*	-0.055*	-0.433*	1.000				
Yield Curve Slope (21)	-0.045*	0.041*	0.071*	-0.073*	-0.314*	0.241*	1.000			
10yr Treasure rate (22)	0.03	-0.037*	0.015	0.213*	0.656*	-0.561*	-0.417*	1.000		
Std. (10yr Treasury rate) (23)	0.013	0.015	0.028	0.073*	0.153*	-0.158*	0.123*	0.191*	1.000	
Baa-Aaa spreads (24)	-0.02	0.047*	0.050*	-0.03	-0.241*	0.169*	0.336*	-0.337*	0.359*	1.000

* Significance at the 1 per cent level.

Table 2. ***continues***

Panel B: SD(ROA)-CEO Incenitve	1	2	3	4	5	6	7	8	9	10	11
SD(ROA) (1)	1.000										
Vesting Equity (2)	-0.071*	1.000									
Vesting Option (3)	0.035*	0.402*	1.000								
Vesting Stock (4)	0.012	0.078*	-0.823*	1.000							
Capital Expenditure (5)	0.018	0.013	0.084*	-0.114*	1.000						
R&D (6)	0.240*	0.023	0.110*	-0.036*	-0.150*	1.000					
Profitability (7)	-0.608*	0.135*	-0.052*	0.000	0.050*	-0.255*	1.000				
Firm Age (Log) (8)	-0.123*	0.067*	-0.106*	0.100*	-0.065*	-0.117*	0.093*	1.000			
Market-to-Book (Log) (9)	-0.037*	0.261*	0.120*	-0.089*	0.042*	0.315*	0.376*	-0.099*	1.000		
Surplus Cash (10)	-0.304*	0.105*	-0.093*	0.038*	0.137*	-0.417*	0.657*	0.058*	0.247*	1.000	
Returns (11)	-0.127*	-0.100*	-0.012	-0.021	-0.042*	-0.047*	0.124*	0.037*	-0.007	0.083*	1.000
Debt Ratio (12)	0.036*	0.034*	-0.047*	0.087*	-0.032*	-0.021*	-0.146*	0.046*	-0.154*	-0.072*	-0.031*
Tangibility (13)	-0.040*	-0.037*	0.055*	-0.090*	0.675*	-0.321*	-0.02	0.050*	-0.208*	0.100*	-0.004
Sales Growth (14)	-0.082*	0.128*	0.118*	-0.128*	0.122*	0.057*	0.214*	-0.184*	0.286*	0.113*	-0.017
Industry Concentration (HHI) (15)	-0.053*	-0.032*	-0.109*	0.067*	-0.072*	-0.228*	0.064*	0.102*	-0.081*	0.058*	0.032*
CEO Vega (16)	-0.082*	0.411*	0.188*	-0.026*	-0.071*	0.007	0.136*	0.164*	0.174*	0.117*	-0.003
CEO Delta (17)	-0.053*	0.262*	0.122*	-0.032*	0.024*	-0.023*	0.127*	0.003	0.222*	0.103*	0.015
CEO Age (18)	-0.071*	0.036*	-0.056*	0.061*	-0.024*	-0.128*	0.049*	0.167*	-0.071*	0.052*	0.030*
CEO Tenure (19)	-0.031*	0.019	-0.038*	0.053*	0.028*	0.022	0.01	-0.030*	0.026*	0.003	0.029*
Current Ratio (20)	0.044*	-0.109*	0.006	-0.041*	-0.177*	0.309*	-0.014	-0.140*	0.140*	-0.074*	0.001
Long-Term Debt Ratio (21)	0.018	0.035*	-0.064*	0.106*	0.051*	-0.209*	-0.132*	0.027*	-0.156*	-0.061*	-0.023*
S&P Quality Ranking (22)	-0.177*	0.156*	0.002	-0.038*	-0.042*	-0.140*	0.276*	0.181*	0.239*	0.254*	0.037*

* Significance at the 1 per cent level.

Table 2. ***continues***

Panel B: SD(ROA)-CEO Incenitve	12	13	14	15	16	17	18	19	20	21	22
Debt Ratio (12)	1.000										
Tangibility (13)	0.208*	1.000									
Sales Growth (14)	-0.047*	-0.057*	1.000								
Industry Concentration (HHI) (15)	0.031*	-0.045*	-0.048*	1.000							
CEO Vega (16)	0.025*	-0.063*	0.011	-0.018	1.000						
CEO Delta (17)	-0.017	-0.023*	0.130*	0.004	0.405*	1.000					
CEO Age (18)	0.041*	0.057*	-0.060*	0.080*	0.070*	0.118*	1.000				
CEO Tenure (19)	-0.038*	-0.015	0.071*	-0.016	0.027*	0.242*	0.382*	1.000			
Current Ratio (20)	0.270*	-0.280*	0.036*	-0.092*	-0.116*	-0.062*	-0.036*	0.075*	1.000		
Long-Term Debt Ratio (21)	0.958	0.220*	-0.040*	0.024*	0.016	-0.014	0.042*	-0.032*	-0.211*	1.000	
S&P Quality Ranking (22)	-0.005	-0.041*	0.028*	0.113*	0.195*	0.153*	0.073*	0.005	-0.115*	-0.027*	1.000

* Significance at the 1 per cent level.

Table 2. ***continues***

Panel C: SD(Return)-CEO Incenitve	1	2	3	4	5	6	7	8	9	10
SD(Return) (1)	1.000									
Vesting Equity (2)	-0.193*	1.000								
Vesting Option (3)	-0.085*	0.395*	1.000							
Vesting Stock (4)	0.001	0.080*	-0.827*	1.000						
Capital Expenditure (5)	0.034*	0.008	0.088*	-0.121*	1.000					
R&D (6)	-0.025*	0.021	0.117*	-0.045*	-0.138*	1.000				
Profitability (7)	-0.032*	0.130*	-0.068*	0.015	0.055*	-0.263*	1.000			
Firm Age (Log) (8)	0.042*	0.074*	-0.084*	0.076*	-0.062*	-0.125*	0.093*	1.000		
Market-to-Book (Log) (9)	-0.042*	0.252*	0.100*	-0.069*	0.049*	0.324*	0.361*	-0.109*	1.000	
Surplus Cash (10)	-0.014	0.103*	-0.110*	0.057*	0.135*	-0.422*	0.654*	0.065*	0.230*	1.000
Debt Ratio (11)	-0.098*	0.040*	-0.037*	0.077*	0.022*	-0.256*	-0.117*	0.074*	-0.214*	-0.064*
Sales Growth (12)	0.038*	0.113*	0.117*	-0.129*	0.122*	0.077*	0.195*	-0.191*	0.290*	0.081*
Industry Concentration (HHI) (13)	0.004	-0.027*	-0.110*	0.071*	-0.070*	-0.225*	0.068*	0.101*	-0.079*	0.065*
Retained Earning (14)	-0.170*	0.333*	-0.009	0.120*	-0.014	-0.087*	0.220*	0.268*	0.093*	0.196*
Book Price (15)	-0.147*	0.322*	-0.008	0.134*	0.002	-0.074*	0.085*	0.242*	-0.054*	0.096*
Dividend Yield (16)	-0.143*	0.244*	-0.014	0.090*	-0.019	-0.046*	0.124*	0.285*	0.083*	0.121*
CEO Vega (17)	-0.171*	0.410*	0.164*	-0.002	-0.080*	0.002	0.135*	0.164*	0.163*	0.117*
CEO Delta (18)	-0.056*	0.263*	0.108*	-0.017	0.016	-0.026*	0.128*	0.014	0.218*	0.104*
CEO Age (19)	0.019	0.035*	-0.066*	0.066*	-0.023*	-0.133*	0.059*	0.172*	-0.073*	0.058*
CEO Tenure (20)	0.091*	0.007	-0.048*	0.057*	0.034*	0.013	0.018	-0.017	0.025*	0.009

* Significance at the 1 per cent level.

Table 2. ***continues***

Panel C: SD(Return)-CEO Incenitve	11	12	13	14	15	16	17	18	19	20
Debt Ratio (11)	1.000									
Sales Growth (12)	-0.064*	1.000								
Industry Concentration (HHI) (13)	0.040*	-0.050*	1.000							
Retained Earning (14)	0.092*	0.016	0.035*	1.000						
Book Price (15)	-0.002	-0.02	-0.006	0.809*	1.000					
Dividend Yield (16)	0.074*	-0.071*	0.018	0.813*	0.690*	1.000				
CEO Vega (17)	0.042*	-0.003	-0.014	0.502*	0.497*	0.395*	1.000			
CEO Delta (18)	-0.011	0.118*	0.006	0.227*	0.235*	0.125*	0.406*	1.000		
CEO Age (19)	0.059*	-0.066*	0.079*	0.098*	0.081*	0.078*	0.073*	0.116*	1.000	
CEO Tenure (20)	-0.044*	0.070*	-0.014	-0.069*	-0.053*	-0.078*	0.024*	0.240*	0.377*	1.000

* Significance at the 1 per cent level.

Table 2. ***continues***

Panel D: Default-CEO Incenitve	1	2	3	4	5	6	7	8	9	10
Moody's Rating (1)	1.000									
Vesting Equity (2)	-0.193*	1.000								
Vesting Option (3)	-0.073*	0.325*	1.000							
Vesting Stock (4)	-0.029	0.505*	-0.609*	1.000						
ROA (5)	-0.446*	0.104*	-0.097*	0.122*	1.000					
Debt Ratio (6)	0.403*	-0.076*	0.037*	-0.065*	-0.156*	1.000				
Quick Ratio (7)	0.093*	-0.062*	-0.161*	0.082*	0.100*	-0.102*	1.000			
Long-Term Debt Ratio (8)	0.119*	-0.084*	-0.004	-0.047*	-0.072*	0.265*	-0.018	1.000		
Firm Age (9)	-0.406*	0.070*	-0.002	0.015	0.133*	-0.208*	-0.053*	-0.068*	1.000	
Negative Income (10)	0.316*	-0.075*	0.073*	-0.077*	-0.592*	0.188*	-0.017	0.053*	-0.147*	1.000
Sales Growth (11)	-0.613*	0.241*	-0.145*	0.326*	0.251*	-0.272*	-0.239*	-0.075*	0.344*	-0.200*
Firm Size (12)	-0.672*	0.284*	-0.175*	0.380*	0.351*	-0.193*	-0.143*	-0.039*	0.302*	-0.225*
Surplus Cash (13)	-0.374*	0.090*	-0.094*	0.123*	0.581*	-0.076*	-0.009	-0.031	0.034	-0.313*
CEO Vega (14)	-0.285*	-0.080*	-0.015	-0.041*	0.132*	-0.110*	-0.02	0.148*	0.157*	-0.095*
CEO Delta (15)	-0.063*	-0.140*	-0.040*	-0.067*	0.071*	-0.049*	0.066*	-0.001	0.008	-0.034
CEO Age (16)	-0.061*	0.000	-0.034	0.017	0.053*	-0.024	0.027	-0.008	0.102*	-0.081*
CEO Tenure (17)	0.062*	-0.112*	-0.043*	-0.028	0.005	-0.004	0.054*	0.063*	0.011	-0.057*
Industry Concentration (18)	-0.008	0.041*	-0.016	0.031	0.037*	-0.027	-0.077*	0.01	0.061*	-0.040*
Working Capital (19)	-0.001	-0.085*	-0.093*	0.014	0.091*	-0.160*	0.638*	0.602*	0.008	-0.042*
Retained Earnings (20)	-0.281*	-0.036	-0.026	-0.046*	0.202*	-0.177*	0.008	0.773*	0.164*	-0.158*
Price-Book Ratio (21)	0.126*	-0.057*	0.007	-0.053*	-0.191*	-0.222*	0.067*	-0.056*	-0.078*	0.096*
Callable Bonds (22)	0.142*	0.052*	-0.248*	0.272*	-0.042*	-0.031	0.130*	-0.067*	-0.074*	0.042*
Putable Bonds (23)	0.03	-0.006	0.088*	-0.090*	-0.021	0.026	-0.021	0.004	-0.022	0.002
Duration (24)	-0.054*	0.053*	-0.071*	0.087*	0.079*	-0.071*	0.049*	-0.076*	-0.015	-0.071*
Issue Amount (25)	-0.179*	0.161*	-0.284*	0.397*	0.080*	-0.044*	0.053*	-0.049*	0.094*	-0.017
Subordinate Debt (26)	0.308*	-0.105*	0.087*	-0.149*	-0.104*	0.172*	0.003	0.044*	-0.165*	0.084*
Privately Placed Bonds (27)	0.550*	-0.122*	0.088*	-0.124*	-0.247*	0.254*	0.106*	0.069*	-0.252*	0.224*
Stock BAS (28)	0.119*	-0.123*	0.510*	-0.529*	-0.197*	0.153*	-0.089*	0.075*	-0.107*	0.158*
Analyst Coverage (29)	-0.266*	0.209*	-0.325*	0.463*	0.140*	-0.164*	0.025	-0.062*	0.112*	-0.065*
10yr Treasure rate (30)	-0.022	-0.168*	0.609*	-0.672*	-0.131*	0.036	-0.182*	0.048*	-0.056*	0.059*
Std. (10yr Treasury rate) (31)	-0.054*	-0.073*	0.142*	-0.171*	-0.013	-0.017	-0.024	0.009	-0.012	0.025
Baa-Aaa spreads (32)	-0.032	-0.014	-0.205*	0.186*	0.008	-0.061*	0.023	-0.029	0.034	0.026

* Significance at the 1 per cent level.

Table 2. ***continues***

Panel D: Default-CEO Incenitve	11	12	13	14	15	16	17	18	19	20
Sales Growth (11)	1.000									
Firm Size (12)	0.868*	1.000								
Surplus Cash (13)	0.255*	0.353*	1.000							
CEO Vega (14)	0.293*	0.364*	0.068*	1.000						
CEO Delta (15)	0.073*	0.108*	0.077*	0.590*	1.000					
CEO Age (16)	0.090*	0.069*	0.044*	0.161*	0.155*	1.000				
CEO Tenure (17)	-0.081*	-0.070*	0.012	0.252*	0.301*	0.420*	1.000			
Industry Concentration (18)	0.134*	-0.021	0.036*	-0.066*	-0.041*	0.042*	-0.037*	1.000		
Working Capital (19)	-0.109*	-0.085*	-0.033	0.126*	0.067*	-0.006	0.072*	0.005	1.000	
Retained Earnings (20)	0.120*	0.153*	0.164*	0.244*	0.023	0.044*	0.064*	0.025	0.596*	1.000
Price-Book Ratio (21)	-0.124*	-0.200*	-0.179*	-0.061*	-0.025	-0.001	0.049*	-0.006	0.009	0.004
Callable Bonds (22)	0.017	0.041*	0.019	0.009	0.025	-0.040*	-0.039*	-0.03	0.031	-0.102*
Putable Bonds (23)	-0.062*	-0.059*	-0.032	-0.029	-0.008	-0.014	-0.019	-0.007	-0.015	-0.017
Duration (24)	0.039*	0.066*	0.071*	-0.008	0.019	0.046*	-0.012	0.013	0.003	-0.045*
Issue Amount (25)	0.480*	0.549*	0.123*	0.183*	0.084*	0.018	-0.061*	-0.011	-0.012	-0.021
Subordinate Debt (26)	-0.274*	-0.273*	-0.071*	-0.086*	-0.018	-0.023	0.027	-0.007	-0.007	-0.055*
Provately Placed Bonds (27)	-0.396*	-0.427*	-0.229*	-0.165*	-0.040*	-0.045*	0.025	-0.009	0.044*	-0.161*
Stock BAS (28)	-0.335*	-0.411*	-0.221*	-0.105*	-0.039*	-0.029	0.036	-0.041*	-0.018	-0.032
Analyst Coverage (29)	0.448*	0.541*	0.225*	0.180*	0.074*	0.032	-0.043*	-0.001	-0.012	0.050*
10yr Treasure rate (30)	-0.263*	-0.341*	-0.160*	-0.075*	-0.038*	-0.044*	0.050*	-0.034	-0.061*	0.019
Std. (10yr Treasury rate) (31)	-0.039*	-0.086*	-0.013	-0.021	-0.028	-0.021	0.014	-0.007	0.008	0.013
Baa-Aaa spreads (32)	0.110*	0.090*	0.079*	0.032	-0.008	-0.03	-0.048*	0.000	0.003	-0.001

* Significance at the 1 per cent level.

Table 2. ***continues***

Panel D: Default-CEO Incenitve	21	22	23	24	25	26	27	28	29	30	31	32
Price-Book Ratio (21)	1.000											
Callable Bonds (22)	0.025	1.000										
Putable Bonds (23)	-0.008	-0.063*	1.000									
Duration (24)	-0.019	0.217*	0.078*	1.000								
Issue Amount (25)	-0.022	0.285*	-0.039*	-0.083*	1.000							
Subordinate Debt (26)	0.055*	0.044*	0.048*	-0.014	-0.112*	1.000						
Privately Placed Bonds (27)	0.082*	0.050*	0.026	-0.106*	-0.100*	0.278*	1.000					
Stock BAS (28)	0.079*	-0.302*	0.100*	-0.142*	-0.340*	0.218*	0.177*	1.000				
Analyst Coverage (29)	-0.066*	0.257*	-0.065*	0.088*	0.390*	-0.151*	-0.213*	-0.444*	1.000			
10yr Treasure rate (30)	0.058*	-0.394*	0.124*	-0.121*	-0.379*	0.145*	0.061*	0.656*	-0.575*	1.000		
Std. (10yr Treasury rate) (31)	0.017	-0.102*	-0.002	-0.053*	-0.125*	0.026	0.009	0.163*	-0.159*	0.205*	1.000	
Baa-Aaa spreads (32)	0.045*	0.156*	-0.066*	-0.049*	0.121*	-0.039*	-0.051*	-0.208*	0.156*	-0.293*	0.387*	1.000

* Significance at the 1 per cent level.

3.5.3 Univariate Results

Table 3 presents the difference-in-mean comparison for high- and low- CEO incentive holding firms. We identify the overall sample median and then divide it into firms with *vesting equity* levels above the median and those with *vesting equity* levels below the median as "Low-Concern." This method is replicated for both *vesting option* and *vesting stock* tests.[93]

[*Insert Table 3 – Panel A-D*]

Panel A - Model 1 shows *yield spreads* are lower for high vesting equity firm CEOs, suggesting higher vesting induces a positive bondholder reaction. Bonds also have higher ratings, longer maturities, and higher interest rates. Firms are larger and have higher values of tobins q, sales growth, profits, and tangible assets. Z-scores are higher, and tenure is shorter. In contrast, low vesting equity groups have higher FPCP, subordinates, and PPB. Also, more leverage ratios, profit volatility, and stock BAS. Model 2 shows that the *yield spread* is lower for the high vesting option group. And the *yield spread* is lower for the high *vesting stock* group, as seen in Model 3. In Panel B, Model 1 demonstrates lower *sd(ROA*) for high vesting equity firm CEO groups. Model 2 shows that *sd(ROA*) is higher for 'High-Concern' groups compared to low concern groups. Model 3 shows higher *sd(ROA*) for 'High-Concern' groups. For Panel C, Model 1 shows *that sd(Return) is lower for firm CEOs with high vesting equity than* firm CEOs with low vesting equity holdings. Similarly, in Model 2, the *sd(ROA)* is lower for the high vesting option holding group. The results in Model 3 show *sd(ROA)* is lower for the high vesting option group. Finally, Panel D, Model 1 shows *that default risk is lower for firm CEOs with high vesting equity holdings than* firm CEOs with low vesting equity holdings. Similarly, in Model 2, the *default risk* is lower for the high vesting option holding group. And, in Model 3, the *default risks* are lower for firms identified to have higher *vesting stock* holding.

Overall, the table demonstrates two findings. First, *yield spread* reacts differently between the aggregate measure of *VE* and its two components – *VO*, and *VS*. Second, levels of *risk-taking* by CEOs differ between High- vs Low-concern groups. With respect to the t-statistics for these difference-in-means, across Panel A-D, the t-statistics are statistically significant at 1%.

[93] We also conducted a univariate analysis of firm groups using annual sample medians as a robustness check. The results are similar. However, this analysis is not included in the current study.

Table 3. Univariate Analysis

The table presents the difference-in-mean comparison for "Low-Concern" vs "High-Concern" firm-CEO groups. **Panel A** compares the means for the two groups, as determined by the *VE* sample median (Model 1), the *VO* sample median (Model 2) and the *VS* sample median (Model 3), using the *at-issue bond (t)* dataset of 6,776 observations over the sample period 2006-2017. **Panel B**, based on the *sd(roa)* dataset, compares the mean for the two groups as determined by the *VE* sample median (Model 1), the *VO* sample median (Model 2) and the *VS* sample median (Model 3). **Panel C**, based on the *sd(return)* dataset, compares the mean for the two groups as determined by the *VE* sample median (Model 1), the *VO* sample median (Model 2) and the *VS* sample median (Model 3). And, **Panel D**, based on the *default* dataset, compares the mean for the two groups as determined by the *VE* sample median (Model 1), the *VO* sample median (Model 2) and the *VS* sample median (Model 3). The variable definitions are provided in section 5.2.1 **Appendix A**.

Panel A - At-Issue Bond sample

	Model 1 - Vesting Equity *N = 2,243 (Low-Concern) vs. 3132 (High Concern)*				**Model 2 -** Vesting Option *N = 718 (Low Concern) vs. 4657 (High Concern)*				**Model 3 -** Vesting Stock *N = 1,516 (Low concern) vs. 3859 (High concern)*			
	LOW	**HIGH**	**mean-**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-**	**t-stats**
Bond-Level Characteristics												
Yield Spread	0.024	0.016	0.008	16.300***	0.604	0.472	0.132	6.724***	0.523	0.477	0.046	3.056***
Moody's Rating	9	8	1.712	17.776***	9	8	1.14	7.947***	9	8	0.576	5.422***
MWCP	0.645	0.672	-0.027	-2.088**	0.379	0.704	-0.325	-16.843***	0.8	0.606	0.194	15.013***
FPCP	0.177	0.103	0.074	7.593***	0.238	0.117	0.121	7.275***	0.121	0.139	-0.018	-1.783*
Modified duration	7.223	7.432	-0.208	-2.224**	6.661	7.45	-0.79	-7.488***	7.648	7.226	0.422	3.943***
Offering Amount	6.339	6.538	-0.199	-5.871***	5.628	6.582	-0.954	-18.791***	6.697	6.36	0.337	10.360***
Bonds Time to Maturity	11	11	-0.685	-2.990***	10	11	-0.939	-3.517***	11	11	0.066	0.262
Sub-ordinated Bond	0.057	0.024	0.033	5.970***	0.139	0.022	0.117	8.955***	0.019	0.045	-0.026	-5.303***
Privately Placed Bond	0.265	0.138	0.127	11.326***	0.34	0.168	0.172	9.272***	0.174	0.198	-0.024	-2.021**
Yield Curve Slope	0.018	0.017	0.001	4.661***	0.014	0.018	-0.004	-8.197***	0.019	0.016	0.003	12.075***
10-year Treasure rate	0.035	0.037	-0.002	-4.767***	0.052	0.033	0.019	47.980***	0.026	0.04	-0.013	-38.911***
Std. (10-year Treasury rate)	0.002	0.002	0.000	-0.166	0.003	0.002	0.000	6.737***	0.002	0.002	0.000	-4.396***
Baa-Aaa spreads	0.01	0.01	0.000	1.564	0.008	0.01	-0.002	-18.386***	0.011	0.01	0.001	10.780***

*, **, and *** Significance at the 10, 5 and 1 per cent level.

Table 3 - Panel A *continues*

	Model 1 - Vesting Equity				**Model 2 -** Vesting Option				**Model 3** - Vesting Stock			
	N = 2,243 (Low-Concern) vs. 3132 (High Concern)				*N = 718 (Low Concern) vs. 4657 (High Concern)*				*N = 1,516 (Low concern) vs. 3859 (High concern)*			
	LOW	**HIGH**	**mean-**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-**	**t-stats**
Firm&CEO-Level Characteristics												
Firm Size (Log)	9.127	9.855	-0.727	-18.765***	8.316	9.741	-1.425	-28.126***	9.628	9.521	0.107	2.558**
Debt Ratio	0.347	0.319	0.028	7.019***	0.365	0.325	0.04	6.628***	0.329	0.331	-0.002	-0.481
Tobins Q	1.828	2.009	-0.181	-7.360***	1.787	1.956	-0.169	-4.405***	1.939	1.931	0.008	0.318
Sales Growth (prior 3 years)	0.048	0.053	-0.005	-1.667*	0.082	0.046	0.036	7.676***	0.034	0.057	-0.023	-7.754***
Profits	0.14	0.158	-0.018	-8.870***	0.145	0.152	-0.007	-2.675***	0.147	0.152	-0.005	-2.013**
Std (Profits)	0.031	0.028	0.003	3.743***	0.031	0.029	0.002	1.639	0.03	0.029	0.001	1.023
Negative Earnings (1/0)	0.151	0.075	0.076	8.501***	0.145	0.101	0.044	3.152***	0.112	0.105	0.007	0.757
Tangibility	0.316	0.334	-0.018	-2.722***	0.371	0.32	0.051	6.176***	0.289	0.341	-0.053	-7.250***
Altman's Credit Rating Score	2.624	4.933	-2.309	-2.060**	2.64	4.174	-1.535	-2.031**	2.765	4.442	-1.677	-1.842*
Stock BAS	0.408	0.372	0.037	2.018**	1.081	0.28	0.802	24.035***	0.06	0.515	-0.455	-38.616***
Number of Analysts	1.4	1.5	-0.128	-7.033***	0.9	1.5	-0.645	-25.187***	1.6	1.4	0.25	14.593***
CEO Age	56	57	-0.383	-2.307**	56	57	-0.543	-2.174**	57	56	0.181	0.985
CEO Tenure	6	6	0.414	2.457**	7	6	0.938	3.399***	6	6	-0.171	-0.925

*, **, and *** Significance at the 10, 5 and 1 per cent level.

Table 3 - *Panel B - Sd(ROA) sample*

	Model 1 - Vesting Equity *N = 6493 (Low Concern) vs. 6646 (High Concern)*				**Model 2 -** Vesting Option *N = 2617 (Low Concern) vs. 2673 (High Concern)*				**Model 3 -** Vesting Stock *N = 3883 (Low Concern) vs. 3775 (High Concern)*			
	LOW	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**
Firm&CEO-Level Characteristics												
Sd(Roa)	0.016	0.013	0.003	6.560***	0.013	0.017	-0.004	-6.329***	0.014	0.016	-0.002	-3.712***
Capital Expenditure	0.032	0.032	0.000	-0.64	0.038	0.035	0.003	3.489***	0.029	0.029	0.000	-0.132
R&D	0.009	0.009	0.000	-0.989	0.007	0.013	-0.005	-11.854***	0.007	0.009	-0.002	-5.533***
Profitability	0.007	0.014	-0.007	-13.733***	0.011	0.008	0.003	3.435***	0.012	0.01	0.002	3.691***
Firm Age	24	27	-3.883	-11.799***	23	25	-1.16	-2.226**	26	27	-0.719	-1.687*
Market-to-Book	1.813	2.199	-0.387	-18.368***	1.932	2.344	-0.413	-10.895***	1.918	1.904	0.013	0.55
Surplus Cash	0.011	0.023	-0.012	-10.971***	0.016	0.008	0.008	3.995***	0.024	0.018	0.006	4.860***
Returns	0.000	0.000	0.001	6.904***	0.000	0.000	0.001	5.377***	0.000	0.000	0.000	1.992**
Debt Ratio	0.209	0.229	-0.02	-6.421***	0.208	0.213	-0.005	-1.127	0.204	0.246	-0.041	-9.730***
Tangibility	0.274	0.263	0.012	3.058***	0.314	0.273	0.04	7.104***	0.248	0.254	-0.006	-1.199
Sales Growth	0.041	0.062	-0.021	-10.027***	0.07	0.071	-0.001	-0.236	0.04	0.036	0.004	1.754*
Industry Concentration (HHI)	0.18	0.175	0.006	1.895*	0.171	0.146	0.025	6.605***	0.198	0.184	0.014	3.456***
CEO Vega	61	184	-123.97	-38.872***	63	214	-150.917	-26.984***	93	129	-36.098	-9.334***
CEO Delta	284	761	-476.81	-23.008***	368	867	-499.189	-12.233***	367	544	-177.04	-8.404***
CEO Age	55	56	-0.478	-4.113***	55	55	0.595	3.183***	55	56	-0.548	-3.709***
CEO Tenure	7	7	-0.32	-2.875***	7	6	0.59	3.325***	7	7	-0.751	-5.265***
Current Ratio	2.576	2.185	0.391	13.228***	2.384	2.381	0.002	0.043	2.551	2.202	0.349	9.709***
Long-Term Debt Ratio	0.185	0.202	-0.017	-5.157***	0.175	0.182	-0.006	-1.383	0.184	0.223	-0.039	-8.650***
S&P Quality Ranking	0.282	0.417	-0.134	-16.171***	0.363	0.349	0.014	1.06	0.362	0.326	0.036	3.316***

*, **, and *** Significance at the 10, 5 and 1 per cent level.

Table 3 - Panel C - *Sd(Return) sample*

	Model 1 - Vesting Equity *N = 7367 (Low Concern) vs. 7297 (High Concern)*				**Model 2** - Vesting Option *N = 3191 (Low Concern) vs. 3270 (High Concern)*				**Model 3** - Vesting Stock *N = 4145 (Low Concern) vs. 4049 (High Concern)*			
	LOW	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**
Firm&CEO-Level Characteristics												
Sd(Return)	0.088	0.055	0.033	21.540***	0.075	0.054	0.02	10.319***	0.091	0.064	0.027	11.672***
Capital Expenditure	0.033	0.033	0.000	-0.627	0.039	0.036	0.003	4.189***	0.029	0.029	0.000	0.342
R&D	0.009	0.009	0.000	-0.723	0.008	0.013	-0.005	-12.469***	0.007	0.009	-0.002	-5.307***
Profitability	0.007	0.013	-0.006	-14.289***	0.01	0.007	0.003	4.392***	0.012	0.01	0.002	3.969***
Firm Age	23	27	-4.242	-13.424***	24	24	-0.801	-1.649*	25	26	-0.947	-2.264**
Market-to-Book	0.483	0.656	-0.172	-22.865***	0.528	0.676	-0.147	-12.413***	0.549	0.534	0.015	1.524
Surplus Cash	0.01	0.022	-0.012	-11.554***	0.013	0.005	0.008	4.717***	0.024	0.018	0.006	5.150***
Debt Ratio	0.214	0.234	-0.02	-6.704***	0.216	0.219	-0.003	-0.724	0.209	0.249	-0.04	-9.655***
Sales Growth	0.045	0.063	-0.018	-9.051***	0.072	0.072	0.000	0.02	0.042	0.037	0.005	2.128**
Industry Concentration	0.177	0.172	0.004	1.674*	0.167	0.145	0.022	6.703***	0.196	0.182	0.014	3.569***
Retained Earnings	20.57	80.232	-59.666	-36.593***	24.8	62.323	-37.525	-16.590***	36.773	74.394	-37.621	-15.707***
Book Price	99.19	305.1	-205.909	-35.064***	101.6	244.34	-142.726	-18.043***	154.42	294.65	-140.225	-16.140***
Dividend Yield	3.504	14.275	-10.771	-26.094***	4.1	11.063	-6.964	-12.883***	6.458	13.323	-6.865	-11.198***
CEO Vega	59	180	-120.571	-41.376***	60	196	-136.244	-28.706***	94	130	-36.804	-9.844***
CEO Delta	279	744	-465.305	-24.476***	353	794	-441.269	-12.626***	371	549	-177.962	-8.830***
CEO Age	55	56	-0.496	-4.525***	55	55	0.598	3.549***	55	56	-0.524	-3.641***
CEO Tenure	7	7	-0.219	-2.095**	7	6	0.685	4.294***	7	7	-0.645	-4.676***

*, **, and *** Significance at the 10, 5 and 1 per cent level.

Table 3 - Panel D - *Default Risk sample*

	Model 1 - Vesting Equity *N = 2200 (Low Concern) vs. 2851 (High Concern)*				**Model 2** - Vesting Option *N = 698 (Low Concern) vs. 4587 (High Concern)*				**Model 3** - Vesting Stock *N = 1481(Low Concern) vs. 3804 (High Concern)*			
	LOW	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**
Bond-Level Characteristics												
Moody's Rating	10	8	2.057	21.262***	10	8	1.177	8.108***	9	8	0.658	6.240***
Callable Bonds	0.838	0.789	0.049	4.457***	0.623	0.825	-0.202	-10.510***	0.926	0.748	0.178	18.205***
Putable Bonds	0.008	0.006	0.001	0.593	0.021	0.005	0.016	2.865***	0.000	0.011	-0.011	-6.357***
Modified duration	2.042	2.052	-0.009	-0.857	1.991	2.052	-0.061	-4.518***	2.081	2.03	0.052	4.358***
Offering Amount	6.334	6.577	-0.243	-7.084***	5.651	6.585	-0.934	-18.286***	6.678	6.377	0.302	9.371***
Sub-ordinated Bond	0.058	0.019	0.039	6.938***	0.142	0.021	0.12	9.000***	0.019	0.044	-0.026	-5.243***
Privately Placed Bond	0.274	0.127	0.147	12.934***	0.348	0.169	0.179	9.482***	0.176	0.2	-0.024	-2.027**
10-year Treasure rate	0.035	0.035	-0.001	-2.162**	0.052	0.033	0.019	47.639***	0.026	0.04	-0.013	-37.978***
Std. (10-year Treasury rate)	0.002	0.002	0.000	-0.578	0.003	0.002	0.000	6.436***	0.002	0.002	0.000	-4.571***
Baa-Aaa spreads	0.01	0.01	0.000	0.212	0.008	0.01	-0.002	-18.709***	0.011	0.01	0.001	10.482***

*, **, and *** Significance at the 10, 5 and 1 per cent level.

Table 3 - Panel D - ***continues***

	Model 1 - Vesting Equity *N = 2200 (Low Concern) vs. 2851 (High Concern)*				**Model 2** - Vesting Option *N = 698 (Low Concern) vs. 4587 (High Concern)*				**Model 3** - Vesting Stock *N = 1481(Low Concern) vs. 3804 (High Concern)*			
	LOW	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**	**LOW**	**HIGH**	**mean-diff**	**t-stats**
Firm&CEO-Level Characteristics												
Profitability	0.012	0.017	-0.005	-10.867***	0.011	0.015	-0.004	-6.561***	0.015	0.015	0.001	0.956
Debt Ratio	0.352	0.314	0.039	9.221***	0.367	0.326	0.041	6.480***	0.331	0.331	0.000	0.003
Quick Ratio	1.723	1.492	0.23	9.292***	1.491	1.596	-0.104	-3.939***	1.784	1.503	0.281	9.714***
Long-Term Debt Ratio	0.317	0.306	0.011	0.948	0.324	0.307	0.017	1.783*	0.297	0.315	-0.018	-1.873*
Firm Age	3	3	-0.219	-8.202***	3	3	-0.253	-6.243***	3	3	-0.02	-0.656
Negative Income	0.152	0.074	0.078	8.604***	0.149	0.101	0.048	3.415***	0.108	0.106	0.002	0.165
Sales Growth	7.424	8.291	-0.867	-21.969***	6.884	8.051	-1.167	-21.009***	7.849	7.916	-0.067	-1.572
Firm Size	9.085	9.932	-0.846	-21.527***	8.289	9.731	-1.443	-28.381***	9.596	9.519	0.077	1.817*
Surplus Cash	0.023	0.034	-0.011	-9.194***	0.016	0.031	-0.016	-9.734***	0.032	0.028	0.003	2.649***
Working Capital	0.121	0.099	0.021	4.383***	0.1	0.108	-0.008	-1.484	0.123	0.101	0.022	4.668***
Retained Earnings	0.21	0.323	-0.113	-6.197***	0.198	0.282	-0.084	-5.608***	0.278	0.268	0.011	0.679
Price-Book Ratio	0.408	0.348	0.06	4.691***	0.433	0.363	0.069	4.164***	0.383	0.369	0.015	1.316
Stock BAS	0.405	0.333	0.073	3.966***	1.093	0.28	0.813	23.852***	0.061	0.515	-0.454	-38.089***
Analyst Coverage	1.343	1.527	-0.184	-9.852***	0.864	1.515	-0.651	-25.015***	1.601	1.361	0.24	13.756***
Industry Concentration (HHI)	0.171	0.19	-0.019	-3.984***	0.172	0.184	-0.012	-1.891*	0.173	0.186	-0.014	-2.684***
CEO Vega	364	414	-50.554	-2.674***	232	413	-180.506	-8.788***	471	357	114.432	4.815***
CEO Delta	4012	1411	2600.27	4.025***	1330	2692	-1362.13	-3.994***	5441	1372	4069.07	4.267***
CEO Age	56	57	-0.434	-2.589***	56	57	-0.622	-2.446**	57	56	0.228	1.231
CEO Tenure	6	6	0.407	2.433**	7	6	0.73	2.709***	6	6	-0.243	-1.308

*, **, and *** Significance at the 10, 5 and 1 per cent level.

3.5.4 Main Results

i. Vesting Pay reduces bond yield spread

Table 4 presents the association results between CEO incentive proxies and the cost of debt.

[*Insert Table 4*]

The regression coefficients on *vesting equity* and *vesting option* are negative and statistically significant at the 1% level. The coefficient of *VE* implies that a unit change in *VE* would correspond to a change in the *yield spread* by about 0.02 basis points (henceforth, bp). In economic significance, the effect equals a one standard deviation increase in *VE,* resulting in an annualized 4.02% decline in yield spread.[94] With respect to *VO,* a one standard deviation increase reduces yield spread by about 10%. However, for *VS,* an increase in one standard deviation would increase the cost of debt by approximately 11.70%. The differing results between the components of vesting equity imply that investors are aware of the incentive effects of the two pay components, making investment decisions based on how much risk they are willing to take on. For control variables, the coefficient sign and significance remain consistent across the regression models. Several control variables show negative and statistically significant coefficients at the 1 % level. For example, in column 1, holding all other variables constant, a one-unit increase *tobins q*, proxy expected growth opportunities, lowers *yield spread* by approximately 0.34 bp (0.0034). Economic significance corresponds to a 17.13% fall in *yield spread* following an increase by one standard deviation. As firms grow larger, a one standard deviation increase would lead to a decrease in *yield spread* equal to 28.13%. On the other hand, a one standard deviation increase in *profit volatility* (*negative earning*) leads to an increase in *yield spread* by 8.20% (15.30%).

In summary, *H1* has been supported by these findings that CEO incentives are associated with decreasing yield spread. CEO *vesting equities* and *vesting options* are viewed favourably as they align executives with bondholder interests while vesting stocks are not.

[94] This paper follows the measure of economic significance (E_s^s) following the second method by Mitton (2021). Using, the summary statistics in *Table 1*, E_s^s is derived by multiplying the estimated regression coefficient of explanatory variable on its standard deviation then scale by the standard deviation of the dependent variable.

Table 4. CEO incentive and cost of debt

The table presents the results from the estimation of Equation 2 - *H1* . Dependent variable is the proxy of cost of debt, *yield spread* . Key variable of interest is the proxies of CEO incentive, *vesting equity* (**Model 1**), *vesting option* (**Model 2**) and *vesting stock* (**Model 3**). Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

Y= Yield Spread	**Model 1** *Vesting Equity (t)*	**Model 2** *Vesting Option (t)*	**Model 3** *Vesting Stock (t)*
Main X	-0.0002***	-0.0008***	0.0009***
	(3.229)	(4.095)	(4.998)
Moody's Rating Residual	-0.0024***	-0.0024***	-0.0024***
	(10.58)	(10.665)	(10.736)
Make-whole Call Provision	0.0018*	0.0020*	0.0340***
	(1.663)	(1.873)	(1.744)
Fixed-Price Call Provision	0.0065***	0.0066***	0.0064***
	(5.474)	(5.459)	(5.322)
Modified duration	0.0009	0.0009	0.0009
	(0.837)	(0.839)	(0.819)
Offering Amount	0.0001	0.0000	0.0000
	-0.354	(-0.025)	(-0.001)
Sub-ordinated Bond	-0.0003	-0.0004	-0.0001
	(0.211)	(0.328)	(0.105)
Privately Placed Bond	0.0100***	0.0104***	0.0104***
	(8.678)	(9.368)	(9.553)
Firm Size	-0.0034***	-0.0033***	-0.0036***
	(9.278)	(9.985)	(10.038)
Debt Ratio	0.0160***	0.0162***	0.0161***
	(6.802)	(7.224)	(7.203)
Tobins Q	-0.0034***	-0.0032***	-0.0032***
	(6.862)	(6.869)	(6.636)
Sales Growth (prior 3 years)	0.0031	0.0028	0.003
	(1.055)	(0.991)	(1.048)
Profits	-0.0112*	-0.0120*	-0.0128**
	(1.661)	(1.806)	(2.007)
Std (Profits)	0.0509***	0.0498***	0.0491***
	(5.054)	(4.982)	(4.871)
Negative Earnings	0.0099***	0.0100***	0.0100***
	(7.529)	(7.868)	(7.825)
Tangibility	-0.0005	-0.0005	-0.0003
	(0.392)	(0.337)	(0.208)

Table 4. ***continues***

Stock BAS	0.0007	0.0012	0.001
	(0.919)	(1.586)	(1.347)
Number of Analysts	-0.0009	-0.0009	-0.0010*
	(1.644)	(1.605)	(1.933)
Yield Curve Slope	0.0424	0.0545	0.0423
	(0.697)	(1.147)	(0.905)
10-year Treasure rate	-0.2069***	-0.1442***	-0.1208***
	(4.519)	(3.657)	(3.084)
Std. (10-year Treasury rate)	0.2308	0.2367	0.2491
	(0.869)	(0.89)	(0.942)
Baa-Aaa spreads	1.3237***	1.3180***	1.3406***
	(9.344)	(10.545)	(10.694)
Constant	0.0377***	0.0347***	0.0340***
	(6.355)	(6.261)	(6.234)
Industry FE	YES	YES	YES
Year FE	YES	YES	YES
Firm S.E Clustering	YES	YES	YES
N	6,365	6,365	6,365
R2	0.679	0.685	0.686
F-Statistics	179	183.4	180.5
Root MSE	0.0099	0.0098	0.0098

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively

[*Insert Tables 4.1 & 4.1A*]

CEO age sub-test. *H1a* requires dividing the at issue bond sample into CEOs aged below 59 years, the 'Young' subset (A), and CEOs over 60 years, the 'Mature' subset (B). The coefficient estimates are negative and statistically significant at the 1% for the young CEO group (A). A one-unit increase in *VE* is expected to decrease *yield spread* by 0.03 bp. In economic significance, one can expect a one standard deviation increases in *VE to* reduce the *yield spread* by about 6% for young CEOs compared to 2% for mature CEOs. The Chi^2 statistics for the two groups are significant at the 5% level. Similarly, **Model 2** shows *VO* decreases *yield spread,* and the association is strongest for young CEOs compared to the mature CEO group. The Chi^2 statistics for the two groups are significant at the 5% level. In **Model 3**, *VS* increases yield spreads, particularly for the young CEO group. The coefficient estimates are significant at the 1% statistic level but insignificant at the Chi^2 statistics, implying no difference between the two group coefficients.

CEO tenure sub-test. For *H1b*, the sample is divided into two groups: firms whose CEOs hold tenure of less than 4 years, the 'short tenure' group, and with 5 or more years, the 'long tenure' group. The coefficient estimate is negative and statistically significant for each group under *VE* and *VO*, respectively. A one-unit increase in *VO* decreases *yield spread* by approximately 0.09 bp, and this association becomes most pronounced under CEOs with short tenure. This is compared to a 0.07 bp fall in the *yield spread* under the long-tenured group. The Chi^2 statistics are insignificant, implying no difference between the coefficient estimates examined under **Model 4** and **5**. Under **Model 6**, a one standard deviation increase in *VS* will increase *yield spread* by about 17% for CEOs holding positions 4 years and less vs 9% for CEOs holding 5 or more years, and Chi^2 statistics is highly significant at 1% statistic level.

CEO age and tenure sub-test. *H1c* divides the sample into groups based on CEOs' age and tenure: CEOs who are young with short tenure compared to those with long tenure, and CEOs who are older with short tenure compared to those with long tenure. Overall, the coefficient estimates for the groups tested under *VE* and *VO* are negative and statistically significant. However, the Chi^2 statistics are not significant. For *VS*, a higher amount of stock vesting is associated with an increasing *yield spread,* which is most pronounced for young CEOs with short tenure. The Chi^2 statistics show a high statistical significance at 1% level.

[*Insert Tables 4.2, 4.2A & 4.2B*]

Maturity sub-test, *H1d* divides the sample into two groups: short-term bonds, which mature within 7 years, and long-term bonds, which mature after 10 years. For the groups tested under VE and VO, the coefficient estimates are negative and statistically significant, and the association gets stronger for short-term bonds than long-term bonds. In each case, the Chi2 are statistically significant at the 1% level. The yield spread increases with VS and remains statistically significant at 1%. According to the Chi^2 statistics, the two groups have no statistical significance.

Credit quality sub-test, *H1e* divides the sample into two groups: high yield bonds with 'Ba2' or below rating and low yield bonds with a rating above Ba2. The coefficient estimates for the groups tested under VE and VO are negative and statistically significant. The association becomes stronger for high yield bonds than low yield bonds. The Chi^2 statistics indicate that the coefficient estimates of the two groups differ under VE tests. In contrast, yield spread increases with more VS for both groups tested. The Chi^2 statistics are insignificant.

Default probability sub-test, *H1f,* divides the sample into three groups: firms in distress with a high likelihood of default (A), firms with a moderate likelihood of default (B), and firms with a low likelihood of default (C). The coefficient estimates under VE and VO remain negative and statistically significant in association. A higher VE is associated with reducing yield spreads, which is stronger for highly distressed firms. This remains true for group comparisons under the VO as well. However, the Chi^2 statistics is significant only for VO tests. In the case of VS-yield spread, there is a positive and statistically significant association, and this association is stronger for distressed firms. The Chi^2 statistics are statistically significant at the 1% level.

Credit quality and maturity sub-test, *H1g,* divide the sample by Moody ratings and bond maturities: poor quality bonds with short maturity periods compared to long term bonds and high-quality bonds with short maturity periods compared to long term bonds. The coefficient estimates for the groups tested under VE and VO are negative and statistically significant, and the association is stronger for low-quality bonds with short-term maturities than for low-quality bonds with long-term maturities. The Chi^2 statistics are statistically significant, respectively. VS increases yield spread, which remains significant at the 1% statistical level. The association appears more pronounced for long-term maturities, but the Chi^2 statistics are insignificant, implying no real difference in coefficient estimates.

Default probability and maturity sub-test, *H1h* divides the sample according to default probability and bond maturity: high default probability with short-term maturities compared to long-term maturities and low default probability with short term maturities compared to long term maturities. In both VE and VO, the coefficient estimates are negative and statistically significant. In the group comparison under VE, the association is stronger among high default probability firms with short-term maturities than those with long-term maturities. The Chi^2 is statistically significant. With VO, the association is stronger for short-term bonds issued by high defaulting companies and long-term bonds issued by low default probability companies. The Chi^2 is significant in both cases. The yield spread increases with VS, which is significant at the 1% statistics level. The effect is more prominent in companies with low probability and long maturities. The Chi^2 statistics are significant.

In general, the results support H1 and its sub hypotheses. Bond investors believe that executives' decisions better align with their interests; hence they demand lower premiums on riskier investments. However, yield spread decreases with VE and VO but increases with VS,

which implies that bond investors perceive vested stock as a risk and, thus, demand higher premiums to compensate for it. Our subsamples found a negative association between CEO incentives and cost of debt, which is most pronounced in firms with young and short-tenured CEOs, short-term bonds, low credit rating firms, firms with low credit and short maturity bonds, and low z-score firms with short maturity.

Table 4.1 CEO incentive-yield spread and CEO characteristics

The table presents the results of *H1a* and *H1b*. The *at-issue bond* dataset is divided in two groups: firm CEOs aged 59 and below as the 'Young' group (A). And firm CEOs aged 60 and older identified as the 'Mature' group (B). The results are presented for *VE* (**Model 1**), *VO* (**Model 2**), and *VS* (**Model 3**). The sample is also divided into two groups: firms whose CEOs hold a tenure of less than 4 years are considered 'short-tenure' (A). Those with 5 or more tenure years are labeled as "Long-Tenure" (B). Results are presented for *VE* (M**odel 4**), *VO* (**Model 5**), and *VS* (**Model 6**). Additional controls are excluded for brevity purposes. Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

	Sub-group: Age					
	Model (1)		**Model (2)**		**Model (3)**	
Y= Yield Spread	*Vesting Equity (t)*		*Vesting Option (t)*		*Vesting Stock (t)*	
	A	B	A	B	A	B
Main X	-0.0003***	-0.0001	-0.0009***	-0.0006***	0.0010***	0.0008***
	(3.384)	(1.085)	(3.800)	(3.102)	(4.51)	(3.982)
Constant	0.0365***	0.0400***	0.0329***	0.0382***	0.0325***	0.0372***
	(5.898)	(5.981)	(5.74)	(5.743)	(5.74)	(5.605)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES
N	4,277	2,088	4,277	2,088	4,277	2,088
R2	0.681	0.684	0.688	0.688	0.687	0.691
F-Statistics	122	67.86	124.9	69.84	121.7	70
Root MSE	0.0103	0.00901	0.0102	0.00895	0.0102	0.00891
Chi-2 (Mean-Difference)		5.69		4.73		2.13
P-value		0.017		0.0297		0.1447

	Sub-group: Tenure					
Y= Yield Spread	**Model (4)**		**Model (5)**		**Model (6)**	
	A	B	A	B	A	B
Main X	-0.0002**	-0.0002**	-0.0009***	-0.0007***	0.0013***	0.0007***
	(2.530)	(2.172)	(3.718)	(3.230)	(5.393)	(3.622)
Constant	0.0342***	0.0401***	0.0309***	0.0374***	0.0309***	0.0364***
	(5.882)	(6.304)	(5.867)	(6.161)	(5.645)	(6.043)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES
N	2,708	3,657	2,708	3,657	2,708	3,657
R2	0.681	0.683	0.689	0.688	0.692	0.688
F-Statistics	96.14	104.1	98.86	105.2	100.7	104.1
Root MSE	0.00995	0.00985	0.00983	0.00977	0.00977	0.00977
Chi-2 (Mean-Difference)		0.7		1.4		11.44
P-value		0.4023		0.2369		0.0007

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 4.1A - CEO incentive-yield spread and CEO characteristics

The table presents the results of *H1c* which examines the relationship between CEO incentive and the cost of debt by comparing two groups based on age and tenure of the executive. The study contrasts two sets of groups: young executives with short tenures (4 years or fewer) with young executives with long tenures (5 years or more), and older executives with short tenures with older executives with long tenures. The regression model is run for each incentive proxy, *vesting equity* (**Model 1 & 2**), *vesting option* (**Model 3 & 4**), and *vesting stock* (**Model 5 & 6**). Additional controls are excluded for brevity purposes. Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

	Vesting Equity			
	Model (1)		**Model (2)**	
Y= Yield Spread	*Young CEOs with ST (A) vs LT (B)*		*Older CEOs with ST (A) vs LT (B*	
	A	B	A	B
Main Independent	-0.0002**	-0.0003**	-0.0002	-0.0001
	(2.241)	(2.373)	(0.958)	(0.587)
Constant	0.0340***	0.0388***	0.0368***	0.0410***
	(4.868)	(5.874)	(5.13)	(5.437)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES
N	2,218	2,059	490	1,598
R2	0.68	0.692	0.714	0.686
F-Statistics	79.39	67.81	28.03	51.38
Root MSE	0.0102	0.0103	0.00852	0.00906
Chi-2 (Mean-Difference)		0.07		0.73
P-value		0.7874		0.3928

	Vesting Option			
	Model (3)		**Model (4)**	
Y= Yield Spread	*Young CEOs with ST (A) vs LT (B)*		*Older CEOs with ST (A) vs LT (B)*	
	A	B	A	B
Main Independent	-0.0010***	-0.0009***	-0.0009**	-0.0005**
	(3.408)	(2.713)	(2.390)	(2.352)
Constant	0.0303***	0.0354***	0.0345***	0.0395***
	(4.771)	(5.546)	(4.463)	(5.316)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES
N	2,218	2,059	490	1,598
R2	0.689	0.696	0.721	0.689
F-Statistics	82.2	67.13	28.28	53.11
Root MSE	0.0101	0.0102	0.0084	0.00901
Chi-2 (Mean-Difference)		0.19		1.2
P-value		0.6602		0.2726

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 4.1A *continues*

	Vesting Stock			
	Model (5)		**Model (6)**	
Y= Yield Spread	*Young CEOs with ST (A) vs LT (B)*		*Older CEOs with ST (A) vs LT (B)*	
	A	B	A	B
Main Independent	0.0014***	0.0007***	0.0010**	0.0007***
	(5.548)	(2.647)	(2.496)	(3.05)
Constant	0.0302***	0.0348***	0.0351***	0.0382***
	(4.77)	(5.277)	(4.58)	(5.244)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES
N	2,218	2,059	490	1,598
R2	0.693	0.694	0.722	0.692
F-Statistics	84.61	66.31	28.02	52.6
Root MSE	0.00998	0.0102	0.00838	0.00897
Chi-2 (Mean-Difference)		13.37		0.92
P-value		0.0003		0.337

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 4.2. CEO incentive-yield spread and bond features

The table presents the results for *H1d - f*, for which CEO incentive and the cost of debt are examined by bond characteristics - maturity (**Models 1-3**), credit quality (**Models 4-6**), and the likelihood to default (**Models 7-9**). The maturity group was divided into bonds classified as 'Short Term' bonds maturing in 7 or less years (A) and 'Long Term' bonds maturing in 10 or more years (B). Bonds of firms with a Moody's rating of Ba2 or below are classified as High Yield or Non-Investment Grade bonds. And, Low yield or Investment-grade bonds issued by Firms rated Ba2 and above (B). The default probability group is divided into three types: low rated firms in distress with a high likelihood of defaulting (A). These firms have a zscore<1.81. Medium-sized firms with a zscore <=2.99 and >=1.81 (B). There is a moderate probability of default for these firm types. And High Rated firms with zscore>2.99. These firms are less likely to face bankruptcy or insolvency (C). Additional controls are excluded for brevity purposes. Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

	Sub-group: Bond Maturity					
	Model (1)		**Model (2)**		**Model (3)**	
Y= Yield Spread	*Vesting Equity (t)*		*Vesting Option (t)*		*Vesting Stock (t)*	
	A	B	A	B	A	B
Main X	-0.0003**	-0.0001	-0.0011***	-0.0006***	0.0009***	0.0009***
	(2.515)	(1.209)	(3.285)	(4.680)	(3.155)	(6.654)
Constant	0.0396***	0.0384***	0.0352***	0.0365***	0.0369***	0.0352***
	(5.472)	(5.794)	(5.766)	(5.716)	(5.853)	(5.709)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES
N	1,903	3,325	1,903	3,325	1,903	3,325
R2	0.667	0.629	0.677	0.636	0.671	0.641
F-Statistics	54.72	97.78	56.26	100.8	54.54	102.7
Root MSE	0.0107	0.00785	0.0105	0.00778	0.0106	0.00772
Chi-2 (Mean-Difference)		9.1		9.62		0.08
P-value		0.003		0.002		0.781

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 4.2. ***continued***

	Sub-group: Credit quality bond					
	Model (4)		**Model (5)**		**Model (6)**	
Y= Yield Spread	*Vesting Equity (t)*		*Vesting Option (t)*		*Vesting Stock (t)*	
	A	B	A	B	A	B
Main X	-0.0004***	-0.0001	-0.0007***	-0.0005**	0.0003	0.0007***
	(4.031)	(0.898)	(3.295)	(2.562)	(1.257)	(4.219)
Constant	0.0441***	0.0458***	0.0401***	0.0435***	0.0422***	0.0420***
	(6.437)	(6.594)	(6.868)	(6.428)	(6.787)	(6.282)
Industry FE	YES	YES	YES	YES	YES	YES
Firm FE	NO	NO	NO	NO	NO	NO
Year FE	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES
N	1,117	2,226	1,117	2,226	1,117	2,226
R2	0.723	0.64	0.728	0.646	0.725	0.648
F-Statistics	44.12	81.34	44.22	83.63	44.21	85.36
Root MSE	0.0105	0.00817	0.0104	0.00809	0.0104	0.00807
Chi-2 (Mean-Difference)		3.71		2.18		0
P-value		0.054		0.139		0.953

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 4.2. ***continues***

	Sub-group: Default probability								
	Model (7)			**Model (8)**			**Model (8)**		
Y= Yield Spread	*Vesting Equity (t)*			*Vesting Option (t)*			*Vesting Stock (t)*		
	A	B	C	A	B	C	A	B	C
Main X	-0.0003***	-0.0002	-0.0001*	-0.0011***	-0.0009***	-0.0004***	0.0015***	0.0010***	0.0003*
	(2.709)	(1.586)	(1.835)	(3.290)	(2.903)	(3.117)	(4.346)	(3.843)	(1.94)
Constant	0.0448***	0.0373***	0.0327***	0.0405***	0.0341***	0.0312***	0.0387***	0.0322***	0.0311***
	(3.961)	(5.75)	(5.377)	(3.817)	(5.58)	(5.166)	(3.903)	(5.49)	(5.168)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	1,726	2,270	2,066	1,726	2,270	2,066	1,726	2,270	2,066
R2	0.698	0.651	0.616	0.706	0.659	0.619	0.71	0.66	0.618
F-Statistics	65.69	66.63	52.57	69.32	66.68	54.8	70.54	71.1	53.54
Root MSE	0.0113	0.00949	0.00786	0.0111	0.00938	0.00783	0.011	0.00937	0.00784
Chi-2 (Mean-Difference)			4.28			16.91			38.97
P-value			0.1177			0.0002			0.000

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 4.2A - CEO incentive-yield spread and bond features

The table presents the results of *H1g* which examines the relationship between CEO incentive and the cost of debt by comparing firm groups based on bond maturity and credit quality. The study contrasts two groups: bonds rated 'Baa3' with short-term bond maturities at issuance (A) and bonds rated 'Baa3' with long-term bond maturities (B). We examine here the effect of incentive on spreads by poor quality bonds with different maturities. Also, we divide bonds rated 'Baa2' with short term bond maturity at issuance (A) and bonds' Baa2' with long term bond maturity (B). Here we test the impact of incentives on the spread of high-quality bonds with different maturities. For each incentive proxy, *vesting equity* (**Model 1-2**), *vesting option* (**Model 3-4**), and *vesting stock* (**Model 5-6**), regression models are run. Additional controls are excluded for brevity purposes. Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

	Vesting Equity				*Vesting Option*				*Vesting Stock*			
Y= Yield Spread	**Model (1)** *Poor Quality Bonds with ST vs LT*		**Model (2)** *High Quality Bonds with ST vs LT*		**Model (3)** *Poor Quality Bonds with ST vs LT*		**Model (4)** *High Quality Bonds with ST vs LT*		**Model (5)** *Poor Quality Bonds with ST vs LT*		**Model (6)** *High Quality Bonds with ST vs LT*	
	A	B	A	B	A	B	A	B	A	B	A	B
Main Independent	-0.0008**	-0.0002	-0.0002	0.0000	-0.0025***	-0.0004**	-0.0007**	-0.0004***	0.0002	0.0005**	0.0005**	0.0007***
	(2.276)	(1.459)	(1.387)	(0.049)	(2.980)	(2.402)	(2.013)	(3.058)	(0.303)	(2.071)	(2.511)	(5.333)
Constant	0.0939***	0.1153***	0.0211***	0.0213***	0.0950***	0.1135***	0.0185***	0.0203***	0.0000***	0.0000*	0.0195***	0.0196***
	(5.348)	(6.553)	(2.991)	(3.753)	(5.747)	(6.326)	(2.958)	(3.665)	(3.424)	(1.665)	(3.096)	(3.703)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	206	646	1,697	2,679	206	646	1,697	2,679	206	646	1,697	2,679
R2	0.766	0.646	0.532	0.503	0.777	0.648	0.54	0.509	0.758	0.647	0.534	0.517
F-Statistics	30.74	36.71	31.94	39.69	28.82	36.96	32.63	43.71	29.53	36.94	32.92	43.45
Root MSE	0.0126	0.00841	0.0085	0.00662	0.0123	0.00839	0.00843	0.00658	0.0128	0.0084	0.00848	0.00652
Chi-2 (Mean-Difference)		4.95		6.64		11.25		3.13		0.39		1.06
P-value		0.0261		0.01		0.0008		0.0768		0.5339		0.3027

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 4.2B - CEO incentive-yield spread and bond features

The table presents the results of *H1h* which examines the relationship between CEO incentive and the cost of debt by comparing firm groups based on bond maturity and default probability. The study contrasts two groups: firms rated a low zscore (<1.81) with short maturities on bonds issued (A) with firms rated a low zscore with long maturities (B). And, firms rated a high zscore (>2.99) with shorter maturities (A) vs firms rated a high zscore with longer maturities (B). For each incentive proxy, *vesting equity* (**Model 1-2**), *vesting option* (**Model 3-4**), and *vesting stock* (**Model 5-6**), regression models are run. Additional controls are excluded for brevity purposes. Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

	Vesting Equity				*Vesting Option*				*Vesting Stock*			
	Model (1)		**Model (2)**		**Model (3)**		**Model (4)**		**Model (5)**		**Model (6)**	
Y= Yield Spread	*Low Zscore with ST vs LT*		*High Zscore with ST vs LT*		*Low Zscore with ST vs LT*		*High Zscore with ST vs LT*		*Low Zscore with ST vs LT*		*High Zscore with ST vs LT*	
	A	B	A	B	A	B	A	B	A	B	A	B
Main Independent	-0.0007***	0.0000	0.0000	-0.0001	-0.0018***	-0.0007***	-0.0002	-0.0006***	0.0016***	0.0016***	0.0002	0.0006***
	(3.093)	(0.124)	(0.273)	(1.577)	(3.743)	(2.776)	(1.079)	(4.120)	(2.788)	(4.97)	(0.687)	(3.814)
Constant	0.0411***	0.0505***	0.0331***	0.0333***	0.0348**	0.0481***	0.0325***	0.0317***	0.0407***	0.0443***	0.0325***	0.0314***
	(2.783)	(4.044)	(3.275)	(5.253)	(2.468)	(3.913)	(3.258)	(5.019)	(2.658)	(4.049)	(3.238)	(5.275)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	443	831	617	1,163	443	831	617	1,163	443	831	617	1,163
R2	0.772	0.661	0.638	0.563	0.784	0.669	0.638	0.573	0.776	0.687	0.639	0.571
F-Statistics	36.55	37.43	45.4	33.33	36.46	38.36	45.54	38.18	49.95	42.31	45.57	34.26
Root MSE	0.0116	0.00888	0.00809	0.00667	0.0113	0.00878	0.00808	0.00659	0.0115	0.00854	0.00808	0.00661
Chi-2 (Mean-Difference)		11.47		0.4		11.4		3.14		0.0000		3.51
P-value		0.0007		0.5263		0.0007		0.0763		0.982		0.0611

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

ii. VE encourages lower corporate risk-taking

Tables 5, 6 and 7 present the association results between CEO incentive proxies and proxies of short-term corporate risk taking activities.

[*Insert Table 5, 6 & 7*]

As shown in **Table 5**, the regression coefficients for *vesting equity* and *vesting options* are negative and statistically significant at the 1% level. As indicated by the coefficient of *VE*, a unit change in *VE* corresponds to a 0.6 bp change in *sd(ROA)*. Economically, the effect is equal to an annualized 4% decline in *sd(ROA)*. When *VO* increases by one standard deviation, *sd(ROA)* decreases by 2%. In contrast, for *VS*, an increase in one standard deviation would increase the *sd(ROA)* by approximately 3.14%. Several control variables show negative and statistically significant coefficients. In column 1, ceteris paribus, a one-unit increase in profitability lowers *sd(ROA)* by approximately 74 bp. For economic significance, a standard deviation increase corresponds to about a 77% drop in *sd(ROA)*. A one standard deviation increase in returns causes *sd(ROA)* to decrease by 25%. A one-standard-deviation increase in capital expenditures (R&D expenses) leads to an increase in *sd(ROA)* of 6.5% (7.4%). For firm cash flow, this increases *sd(ROA)* by approximately 8%, while for debt ratio, it increases *sd(ROA)* by approximately 1.3%. Coefficient signs and significance levels for control variables remain consistent across *VO* and *VS* model regressions.

Table 6 shows that the regression coefficients for *vesting equity* and *vesting options* are negative and significant at the 1% level. *VE* implies that a unit change affects the *sd(Return)* by 0.9bps. Economically, one standard deviation increase in VE equals a 14% decline in *sd(Return)*. For *VO*, one standard deviation increases *sd(Return)* by approximately 7%. In contrast, *VS* would see *sd(Return)* rise by approximately 2.2% if the standard deviation rose. However, *VS* is not statistically significant. In terms of control variables, several variables exhibit negative coefficients that are statistically significant. For example, a one standard deviation increase in R&D, profitability, debt ratio, retained earnings, and dividend yield results in a 6%, 5%, 10%, 0.2%, and 3% decrease in *sd(Return)*. One standard deviation increase in sales results in an 8% increase in *sd(Return)*. Across all models' coefficient signs and significance of control variables remain consistent.

Table 7 shows the results of CEO incentive-default regressions using simple controls and comprehensive (additional) controls. In all models, whether they have simple or

comprehensive controls, the regression coefficients for vesting equity and vesting option are negative and statistically significant at the 1% level. In the simple model, column 1A, the coefficient of *VE* implies that a unit change results in a change in *default* by about 4bps. Economically, a one standard deviation increase in *VE* corresponds to a 3.3% decline in risk-taking as measured by *default*. A standard deviation increase in *VO* reduces default by about 27%. As for *VS*, a standard deviation rise causes *default* to increase by approximately 26%. A few variables show negative and statistically significant coefficients. In economic significance, an increase of one standard deviation in *ROA*, *sales growth*, *surplus cash*, and *retained earnings* corresponds to a fall of approximately 8.3%, 1%, 9% and 51% in *default*. With the *quick* and *long-term debt* ratios, *default* increases by approximately 11% and 55%, respectively.

Based on the additional control model, column 1B, a one standard deviation increase in *VE* leads to a 4% decline in *default*. For *VO*, a one standard deviation increase reduces *default* by approximately 7.4%. For *VS*, a one standard deviation rise increases *default* by approximately 4.6%. The coefficient estimates and significance for control variables remain similar to those discussed above for executive and firm-specific controls. For bond-level controls, an increase of one standard deviation in *duration*, *stock BAS*, and *Baa-Aaa spread* will drop 1.4%, 8.4%, and 1% of *default*, respectively. As *analyst coverage* increases by one standard deviation, *defaults* decrease by 5%, while the *10year Treasury rate* and its *volatility* measure decrease *defaults* by 19% and 3%, respectively. For embedded options, a one standard deviation increase in *callable*, *put*, *subordinate*, and *PPP* leads to increases in *default* of approximately 3%, 1%, 9%, and 17.4%, respectively. *Defaults* may also increase by about 6% after a one standard deviation increase in bonds issued. Regardless of whether simple or additional controls are included in the model, coefficient signs and significance remain consistent.

In summary, *H2-4* has been supported by these findings concerning the effect of vesting CEO incentives on corporate risk-taking activity. Vesting equity and options are associated with lower short-term risk-taking while vesting stock is associated with greater risk-taking. The implications for bond investors are that if they feel vesting dampens risk-taking activities by reducing the likelihood of wealth transfer from the bondholder to the shareholder, they would not require the higher premiums.

Table 5 - CEO incentive and profit volatility

The table presents the results from the estimation of Equation 3 - *H2*. Dependent variable is the proxy of short-term risk-taking, *profit volatility*. Key variable of interest is the proxies of CEO incentive, *vesting equity* (**Model 1**), *vesting option* (**Model 2**) and *vesting stock* (**Model 3**). Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

Y = std(ROA)	**Model 1** *Vesting Equity (t)*	**Model 2** *Vesting Option (t)*	**Model 3** *Vesting Stock (t)*
Main X	-0.0006***	-0.0002***	0.0004***
	(3.325)	(2.581)	(3.642)
Capital Expenditure	0.0646***	0.0651***	0.0657***
	(5.957)	(5.985)	(6.056)
R&D	0.0738**	0.0746**	0.0717**
	(2.187)	(2.211)	(2.123)
Profitability	-0.7382***	-0.7393***	-0.7387***
	(22.008)	(22.032)	(22.053)
Firm Age	-0.0008**	-0.0009**	-0.0009***
	(2.289)	(2.572)	(2.645)
Market-to-Book	0.0109***	0.0107***	0.0107***
	(10.379)	(10.193)	(10.217)
Surplus Cash	0.0799***	0.0788***	0.0785***
	(6.946)	(6.874)	(6.826)
Returns	-0.2540***	-0.2309***	-0.2257***
	(3.767)	(3.453)	(3.359)
Debt Ratio	0.0134*	0.0144**	0.0149**
	(1.929)	(2.044)	(2.102)
Tangibility	-0.0086***	-0.0082***	-0.0080***
	(4.955)	(4.707)	(4.610)
Sales Growth	-0.0011	-0.0012	-0.0009
	(0.402)	(0.429)	(0.321)
Industry Concentration (HHI)	0.0027*	0.0026*	0.0026*
	(1.937)	(1.854)	(1.842)
CEO Vega[x]	-0.0001	-0.0001	-0.0000*
	(0.898)	(1.559)	(1.892)
CEO Delta	0.0000	0.0000	0.0000
	(0.443)	(0.361)	(0.326)
CEO Age[x]	0.0009	0.0009	0.0009
	(0.27)	(0.167)	(0.134)
CEO Tenure	-0.0001***	-0.0001***	-0.0001***
	(3.314)	(3.381)	(3.452)

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 5. ***continues***

Current Ratio	-0.0001	-0.0002	-0.0001
	(0.602)	(0.289)	(0.135)
Long-Term Debt Ratio	-0.0172**	-0.0186***	-0.0194***
	(2.422)	(2.590)	(2.685)
S&P Quality Ranking	-0.0025***	-0.0025***	-0.0024***
	(4.258)	(4.321)	(4.150)
Constant	0.0230***	0.0201***	0.0190***
	(9.027)	(8.166)	(7.766)
Industry FE	YES	YES	YES
Year FE	YES	YES	YES
Firm S.E Clustering	YES	YES	YES
Observations	12,957	12,957	12,957
R-squared	0.443	0.443	0.443
F	54.05	54	55.22
rmse	0.0193	0.0193	0.0193

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 6 - CEO incentive and stock return volatility

The table presents the results from the estimation of Equation 4 - *H3*. Dependent variable is the proxy of short-term risk-taking, *stock return volatility*. Key variable of interest is the proxies of CEO incentive, *vesting equity* (**Model 1**), *vesting option* (**Model 2**) and *vesting stock* (**Model 3**). Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

Y=SD(Return)	**Model 1** *Vesting Equity (t)*	**Model 2** *Vesting Option (t)*	**Model 3** *Vesting Stock (t)*
Main X	-0.0087***	-0.0028***	0.001
	(7.955)	(4.830)	(1.554)
Capital Expenditure	0.0557	0.0774	0.0628
	(0.86)	(1.176)	(0.947)
R&D	-0.3902***	-0.3608***	-0.3708***
	(3.137)	(2.872)	(2.952)
Profitability	-0.1700***	-0.1696***	-0.1588***
	(2.996)	(2.969)	(2.788)
Firm Age	0.0141***	0.0134***	0.0138***
	(5.668)	(5.431)	(5.499)
Market-to-Book Ratio	0.0029	-0.0031	-0.0036
	(0.658)	(0.714)	(0.821)
Surplus Cash	0.0116	0.0008	0.01
	(0.44)	(0.031)	(0.383)
Debt Ratio	-0.0538***	-0.0606***	-0.0601***
	(5.926)	(6.482)	(6.404)
Sales Growth	0.0529***	0.0522***	0.0491***
	(5.424)	(5.222)	(4.854)
Industry Concentration (HHI)	-0.0068	-0.0091	-0.0067
	(0.425)	(0.570)	(0.422)
Retained Earning	-0.0001***	-0.0001***	-0.0001***
	(2.730)	(3.174)	(3.174)

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 6. ***continues***

Book Price	0.0000	-0.0000**	-0.0000**
	(0.922)	(2.369)	(2.269)
Dividend Yield	-0.0001**	-0.0001	-0.0001
	(2.555)	(1.580)	(1.538)
Vega[x]	-0.0039***	-0.0039***	-0.0039***
	(5.660)	(6.737)	(7.435)
Delta	0.0000	0.0000	0.0000
	(0.158)	(0.006)	(0.128)
Age[x]	-0.0071	-0.0071	-0.0071
	(0.242)	(0.361)	(0.325)
Tenure	0.0012***	0.0011***	0.0012***
	(3.376)	(3.168)	(3.306)
Constant	0.1115***	0.0676***	0.0587***
	(6.028)	(3.724)	(3.226)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Firm S.E Clustering	Yes	Yes	Yes
Observations	15,931	15,931	15,931
R-squared	0.084	0.073	0.07
F	17.09	14.77	15.25
rmse	0.0899	0.0905	0.0906

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 7. CEO incentive and issuing firm credit worthiness

The table presents the results from the estimation of Equation 5 - *H4*. Dependent variable is the proxy of short-term risk-taking, *moody rating*. Key variable of interest is the proxies of CEO incentive, *vesting equity* (**Model 1**), *vesting option* (**Model 2**) and *vesting stock* (**Model 3**). Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The **t** statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

	Model (1)		**Model (2)**		**Model (3)**	
	Vesting Equity		*Vesting Option*		*Vesting Stock*	
Y= Moody Bond	*(Simple Contols)*	*(Additional Controls)*	*(Simple Contols)*	*(Additional Controls)*	*(Simple Contols)*	*(Additional Controls)*
	A	B	A	B	A	B
Main X	-0.0366***	-0.0408***	-0.2710***	-0.0986***	0.2614***	0.0681***
	(2.836)	(5.350)	(18.084)	(8.245)	(15.001)	(4.439)
Residual Rating	-0.9712***	-0.9494***	-0.9574***	-0.9510***	-0.9515***	-0.9515***
	(34.714)	(46.951)	(40.988)	(46.098)	(39.651)	(46.654)
ROA	-17.0734***	-13.8670***	-16.8449***	-14.1600***	-18.4145***	-14.6938***
	(6.841)	(7.350)	(7.521)	(7.622)	(7.601)	(7.909)
Debt Ratio	0.5768	-0.0703	0.6533*	-0.0785	0.8746**	-0.0439
	(1.526)	(0.227)	(1.933)	(0.253)	(2.557)	(0.146)
Quick Ratio	0.4473***	0.1432***	0.2445***	0.1328**	0.2701***	0.1244**
	(6.098)	(2.798)	(3.844)	(2.565)	(4.379)	(2.516)
Long-Term Debt Ratio	4.1041***	3.6743***	3.9335***	3.6576***	3.7381***	3.6084***
	(20.17)	(23.391)	(20.936)	(23.083)	(20.225)	(23.884)
Firm Age	-0.4094***	-0.3124***	-0.3468***	-0.2712***	-0.3295***	-0.2723***
	(6.598)	(8.974)	(7.394)	(7.995)	(6.997)	(8.262)
Negative Income	0.1227	0.0518	0.2310*	0.1146	0.1547	0.0922
	(0.821)	(0.485)	(1.673)	(1.081)	(1.099)	(0.858)
Sales Growth	-0.6194***	-0.4107***	-0.6601***	-0.4290***	-0.6562***	-0.4383***
	(7.771)	(7.826)	(9.550)	(8.127)	(9.580)	(8.505)
Firm Size	-0.3562***	-0.6867***	-0.4577***	-0.6788***	-0.5730***	-0.7049***
	(3.912)	(9.160)	(5.735)	(8.933)	(6.868)	(9.635)
Surplus Cash	-7.4552***	-7.3488***	-7.2956***	-7.0613***	-6.2507***	-6.5734***
	(5.466)	(6.842)	(6.170)	(6.490)	(5.077)	(5.968)
Vega	-0.0004***	-0.0003***	-0.0003***	-0.0003***	-0.0002*	-0.0002**
	(4.544)	(3.378)	(2.765)	(2.759)	(1.732)	(2.493)
Delta	0.0000***	0.0000***	0.0000**	0.0000***	0.0000***	0.0000***
	(3.182)	(2.88)	(2.365)	(2.996)	(3.349)	(3.131)
Age	0.0074	0.0018	0.0093	0.0026	0.0071	0.0012
	(0.92)	(0.323)	(1.273)	(0.457)	(0.923)	(0.202)

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 7. ***continues***

	A	B	A	B	A	B
Tenure	0.0199*	0.0256***	0.0139	0.0232***	0.0144	0.0249***
	(1.818)	(4.014)	(1.545)	(3.66)	(1.503)	(3.921)
Industry Concentration (HHI)	1.0924***	0.4486	0.9416***	0.4336	0.7983**	0.3584
	(3.109)	(1.368)	(2.915)	(1.304)	(2.185)	(1.057)
Working Capital	-2.5021***	-2.4474***	-2.0426***	-2.3836***	-1.9953***	-2.2200***
	(4.603)	(5.969)	(4.254)	(5.782)	(4.103)	(5.614)
Retained Earnings	-2.5288***	-2.1355***	-2.5104***	-2.1496***	-2.3428***	-2.1367***
	(22.261)	(22.525)	(24.820)	(22.804)	(21.988)	(23.540)
Price-Book Ratio	0.3792***	0.2016***	0.3450***	0.1930**	0.3661***	0.2095***
	(4.17)	(2.681)	(4.195)	(2.548)	(4.224)	(2.854)
Callable Bonds		0.2346***		0.2487***		0.2508***
		(3.595)		(3.993)		(4.056)
Putable Bonds		0.3153*		0.3488**		0.1714
		(1.697)		(1.974)		(0.942)
Duration		-0.1256**		-0.1475**		-0.1522***
		(2.154)		(2.531)		(2.716)
Issue Amount		0.1608***		0.1286***		0.1355***
		(5.069)		(4.121)		(4.755)
Subordinate Debt		1.6682***		1.6974***		1.7709***
		(12.97)		(13.205)		(13.912)
Rule 144A		1.5552***		1.6188***		1.5648***
		(19.856)		(20.574)		(19.985)
Stock BAS		-0.4712***		-0.4513***		-0.5240***
		(6.343)		(6.230)		(7.224)
Analyst Coverage		-0.2651***		-0.2706***		-0.2929***
		(5.243)		(5.433)		(5.900)
10-year Treasure rate		-44.6708***		-36.3446***		-36.6002***
		(16.542)		(13.454)		(14.589)
Std. (10-year Treasury rate)		-103.0330***		-91.0915***		-92.0331***
		(7.981)		(7.262)		(7.309)
Baa-Aaa spreads		-7.9964*		-9.5881**		-8.5118*
		(1.682)		(1.999)		(1.778)
Constant	16.64***	20.24***	18.01***	19.89***	18.05***	20.02***
	(26.738)	(35.131)	(32.67)	(34.061)	(31.796)	(33.598)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm S.E Clustering	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,051	5,051	5,051	5,051	5,051	5,051
R-squared	0.887	0.949	0.912	0.951	0.911	0.951
F	405.6	572.3	544	577.6	534.3	594.1
rmse	1.186	0.798	1.044	0.781	1.05	0.782

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

3.5.5 Robustness Check

For robustness checks, the right-hand side variables of equation 2 are lagged by one period, and the model is re-run.[95] Tables 8, 8.1 and 8.2 confirm the main findings that lower yield spreads (t+1) are associated with greater amounts of VE compensation (*H1*), especially for younger CEOs (*H1a*), long-serving CEOs (*H1b*), short-term maturity (*H1d*) and low quality (*H1e*) bonds, respectively. For these models, Chi^2 suggests the mean-difference of the regression coefficients is statistically significant.

Table 8 - CEO incentive (t-1) and cost of debt

The table provides results coefficient estimates of yield spread regressed on the proxies of vesting incentives and additional controls lagged by one period (t-1). The table presents the results from the estimation of Equation 2 - *H1*. The proxy of cost of debt, *yield spread*, is regressed on lagged by one period proxies of CEO incentive, *vesting equity* (Model 1), *vesting option* (Model 2) and *vesting stock* (Model 3) and lagged by one period additional controls. Additional controls are excluded for brevity purposes. Each model include Fama-French 49 industry and year effects. The variable definitions are provided in section 5.2.1 **Appendix A**. The *t* statistics (reported in parentheses) are based on heteroscedasticity-consistent standard errors clustered at firm levels. All variables are winsorised at 1st and 99th percentiles.

Y= Yield Spread	**Model 1** *Vesting Equity (t-1)*	**Model 2** *Vesting Option (t-1)*	**Model 3** *Vesting Stock (t-1)*
Main X	-0.0002***	-0.0008***	0.0009***
	(4.090)	(3.934)	(5.085)
Constant	0.0450***	0.0416***	0.0408***
	(7.939)	(7.832)	(7.58)
Industry FE	YES	YES	YES
Year FE	YES	YES	YES
Firm S.E Clustering	YES	YES	YES
N	4,164	4,164	4,164
R2	0.702	0.707	0.707
F-Statistics	153.7	154.7	155.4
Root MSE	0.01	0.01	0.01

***, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively

[95] Using lagged values of the independent variables (VE and controls) in the estimation to control for potential endogeneity problems (Edmans *et al.*, 2017). Robustness check.

Table 8.1 - CEO incentive (t-1) - yield spread and CEO characteristics

The table provides the coefficient estimates of yield spread regressed on the key variable of interests and additional controls are lagged by one period (t-1). The model replicates that which was conducted in Table 4.1.

	Sub-group: Age					
	Model (1)		**Model (2)**		**Model (3)**	
Y= Yield Spread	*Vesting Equity (t-1)*		*Vesting Option (t-1)*		*Vesting Stock (t-1)*	
	A	B	A	B	A	B
Main X	-0.0003***	-0.0001	-0.0009***	-0.0005***	0.0009***	0.0008***
	(4.513)	(0.818)	(3.661)	(2.778)	(4.267)	(4.132)
Constant	0.0453***	0.0450***	0.0407***	0.0436***	0.0401***	0.0426***
	(6.947)	(6.723)	(6.856)	(6.39)	(6.777)	(6.115)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES
N	2,791	1,373	2,791	1,373	2,791	1,373
R2	0.701	0.717	0.706	0.72	0.704	0.723
F-Statistics	107.1	58.97	107.3	59.14	107.2	61.84
Root MSE	0.0104	0.00915	0.0103	0.00911	0.0103	0.00906
Chi-2 (Mean-Difference)		7.55		4.79		0.42
P-value		0.0074		0.0286		0.5182
	Sub-group: Tenure					
	Model (4)		**Model (5)**		**Model (6)**	
	Vesting Equity (t-1)		*Vesting Option (t-1)*		*Vesting Stock (t-1)*	
	A	B	A	B	A	B
Main X	-0.0003***	-0.0002***	-0.0003***	-0.0006***	0.0012***	0.0006***
	(3.423)	(2.939)	(3.423)	(2.832)	(4.289)	(4.426)
Constant	0.0412***	0.0495***	0.0412***	0.0469***	0.0361***	0.0463***
	(6.657)	(7.269)	(6.657)	(6.808)	(6.31)	(6.705)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES
N	1,870	2,294	1,870	2,294	1,870	2,294
R2	0.686	0.722	0.694	0.724	0.694	0.725
F-Statistics	72.95	92.67	72.9	92.98	72.49	94.61
Root MSE	0.0103	0.00984	0.0101	0.00981	0.0101	0.0098
Chi-2 (Mean-Difference)		1.99		6.18		8.96
P-value		0.1585		0.0129		0.0028

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 8.2 - CEO incentive (t-1)-yield spread and bond features

The table presents CEO incentive and the cost of debt are examined by bond characteristics - maturity (**Models 1-3**), credit quality (**Models 4-6**), and the likelihood to default (**Models 7-9**) where the right-hand side of regression are lagged by one-period. The model replicates that which was conducted in Table 4.2.

	Sub-group: Bond Maturity					
	Model (1)		**Model (2)**		**Model (3)**	
Y= Yield Spread	*Vesting Equity (t-1)*		*Vesting Option (t-1)*		*Vesting Stock (t-1)*	
	A	B	A	B	A	B
Main X	-0.0003***	-0.0001*	-0.0009***	-0.0006***	0.0008**	0.0008***
	(3.112)	(1.843)	(2.856)	(4.312)	(2.359)	(6.668)
Constant	0.0441***	0.0458***	0.0401***	0.0435***	0.0422***	0.0420***
	(6.437)	(6.594)	(6.868)	(6.428)	(6.787)	(6.282)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES
N	1,117	2,226	1,117	2,226	1,117	2,226
R2	0.723	0.64	0.728	0.646	0.725	0.648
F-Statistics	44.12	81.34	44.22	83.63	44.21	85.36
Root MSE	0.0105	0.00817	0.0104	0.00809	0.0104	0.00807
Chi-2 (Mean-Difference)		3.71		2.18		0
P-value		0.054		0.139		0.953

	Sub-group: Credit quality bond					
	Model (4)		**Model (5)**		**Model (6)**	
Y= Yield Spread	*Vesting Equity (t-1)*		*Vesting Option (t-1)*		*Vesting Stock (t-1)*	
	A	B	A	B	A	B
Main X	-0.0004***	-0.0001	-0.0009***	-0.0003**	0.0006**	0.0005***
	(3.004)	(1.265)	(3.306)	(2.257)	(2.115)	(3.795)
Constant	0.1083***	0.0194***	0.1040***	0.0184***	0.1061***	0.0177***
	(8.768)	(3.474)	(8.617)	(3.282)	(8.566)	(3.184)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES
N	1,181	2,983	1,181	2,983	1,181	2,983
R2	0.668	0.532	0.672	0.535	0.667	0.537
F-Statistics	75.71	45.29	74.76	45.12	73.04	45.81
Root MSE	0.011	0.00739	0.0109	0.00737	0.011	0.00735
Chi-2 (Mean-Difference)		8.17		8.24		0.06
P-value		0.0043		0.0041		0.8002

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Table 8.2. ***continues***

	Sub-group: Default probability								
Y= Yield Spread	**Model (7)** *Vesting Equity (t-1)*			**Model (8)** *Vesting Option (t-1)*			**Model (9)** *Vesting Stock (t-1)*		
	A	B	C	A	B	C	A	B	C
Main X	-0.0004**	-0.0003***	-0.0001	-0.0011***	-0.0008***	-0.0003**	0.0014***	0.0008***	0.0004**
	(2.374)	(2.887)	(0.878)	(3.005)	(3.010)	(2.029)	(3.553)	(4.234)	(2.355)
Constant	0.0595***	0.0442***	0.0364***	0.0527***	0.0412***	0.0354***	0.0514***	0.0400***	0.0349***
	(5.786)	(7.172)	(5.026)	(5.486)	(7.006)	(4.869)	(5.249)	(7.144)	(4.827)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm S.E Clustering	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	1,098	1,396	1,478	1,098	1,396	1,478	1,098	1,396	1,478
R2	0.716	0.694	0.64	0.725	0.699	0.642	0.726	0.698	0.643
F-Statistics	52.88	61.55	43.77	52.63	61.65	44	53.5	64.37	44.27
Root MSE	0.0116	0.00922	0.00821	0.0114	0.00914	0.00818	0.0114	0.00915	0.00818
Chi-2 (Mean-Difference)			6.77			14.85			16.6
P-value			0.0339			0.0006			0.000

****, **, and * correspond to significance at the 1, 5, and 10 per cent levels, respectively.

Chapter Four - CONCLUSIONS

This chapter concludes our essays one and two. The study was motivated by current debates about executive pay and the alignment of interests between executives and owners. A critical point to note is that significant attention has been paid to the issue of excessive pay in the literature, but far less attention has been paid to the significant and pervasive concern of "how" CEOs are paid. In this dissertation, we examined two types of CEO compensation. Our first essay examined the inside debt compensation offered to executives at large companies and whether debt holdings affected their management style and myopia. The findings provided insights from within the company (from the bondholders). The second essay considered vesting equity incentives and short-term risk-taking with implications to how bond market investors perceive incentive effects. These results give us a perspective from outside the firm, from the investor's perspective.

The purpose of section 4.1 is to summarize the hypotheses and the results presented in topics one and two. We then discussed limitations and implications for future research in section 4.2.

4.1 REVIEW OF HYPOTHESES AND MAJOR FINDINGS

The table below summarizes essay one's research objectives and hypotheses.

Essay One: To investigate the effect of CEO 'Inside Debt' (ID) on the myopic nature of a firm's decisions	
H1: *There is a negative association between CEO ID and small earnings decline.*	
H2: *There is a negative association between CEO ID and future myopia (t+1).*	
Sub-hypotheses	
A: *The CEO ID-Myopia association is stronger for young CEOs.*	***B:*** *The CEO ID-Myopia association is stronger for longer-tenured CEOs.*
H3: *There is a negative association between CEO ID and yield spread.*	
Sub-hypotheses	
A: *The CEO ID-Myopia association is stronger for long-term bonds.*	***B:*** *The CEO ID-Myopia association is stronger for long-term bonds.*

Debt compensations and the effect on the myopic nature of firms have received very little attention. ID, however, may mitigate some of the risks and wealth shifting problems caused by equity-like pay between the executive, shareholders, and bondholders. The reason is two-fold: (1) a payoff structure similar to a put option, and (2) the vulnerability of debt securities to bankruptcy and liquidation. There are three questions addressed in this study: (1) Can ID curb managers' tendency to act in myopic ways in tight situations where it is easy to do so? (2) Will future myopia (t+1) be reduced through ID incentives? And (2) can bondholders identify the benefits of ID incentives in risk reduction and respond by lowering their risk premium on bonds issued? This study revealed three main findings. First, CEOs with higher ID are less likely to engage in myopic behaviour, especially when the company is facing difficult circumstances (e.g., a small earnings decline). Second, ID holdings are associated with lower future myopia (t+1), which is more pronounced in young and long-serving CEOs. Career prospects are a big concern for young CEOs. Also at risk is their reputation as "quality managers" and their ability to manage in the foreseeable future and the effects of firm performance on future benefits. Lastly, bondholders perceive ID holding as a mechanism to reduce risk appetite, thus becoming more confident their interests will be protected. Higher ID

holdings are associated with lower yield spreads, indicating bondholders' greater trust in corporate management. And these results are more pronounced for bonds categorized as high-risk investments (e.g., higher-rated and longer-term bonds).

The table below provides the research objectives and hypotheses for essay two.

Essay Two: To investigate the incentive effect of CEOs Vesting Equity (VE) on the cost of debt	
H1: *There is a negative association between CEO incentives and the cost of debt.*	
Sub-hypotheses	
A: *The CEO incentives-cost of debt association is stronger for young CEOs.*	***B****: The CEO incentives-cost of debt association is stronger for short-tenure CEO.*
C: *The CEO incentives-cost of debt association is stronger for young and short tenure CEOs.*	***D:*** *The CEO incentives-cost of debt association is stronger for short-term bond maturity.*
E: *The CEO incentives-cost of debt association is stronger for high yield bonds.*	***F:*** *The CEO incentives-cost of debt association is stronger for distressed firms.*
G: *The CEO incentives-cost of debt association is stronger for high yield -short-term bonds.*	***H:*** *The CEO incentives-cost of debt association is stronger for distressed - short-term bonds.*
H2. *There is a negative association between CEO incentives and risk-taking proxies.*	

Equity compensation has traditionally been examined to align managers' interests with those of shareholders and to examine how effective it is from a shareholder's viewpoint. This study provides further evidence that VE might also affect bondholders, important stakeholders for firms. First, vesting equity incentives lower the cost of debt. While bond prices are determined by the future risks expected to be borne by bondholders, bondholders seem to perceive CEOs with higher VE holdings as having less incentive to take risks. However, bondholders respond differently to each component of VE. The cost of debt is lower for VO, especially in firms with younger CEOs, short-tenured CEOs, short maturity bonds, firms with low credit ratings, and low z-score firms with short maturities. The cost of debt tends to be higher for VS. As the return or flow of investment for creditors (e.g., bonds) is fixed by nature, creditors prefer to take less risk (e.g., pursue only lower-risk projects). Investors may assume

VOs, upon vesting, may motivate managers to hold shares for a short period, therefore managing stock price volatility. This would be beneficial to debt holders. Bondholders may anticipate that VS, once vested, will provide managers with a greater incentive to sell the stock for profit; however, once the stock is traded, those managers will lose their short-term incentives. Second, vesting equity incentives lowers profit volatility, return volatility, and default risk. The negative association between VO and risk-taking remains; however, the risk-taking activities increase for VS. These results indicate that bond investors would not require higher premiums if vesting dampens risk-taking activities.

Overall, the thesis sheds light on the role of ID in CEO choice and the effect of VE incentives on corporate risk-taking. As shown in essays 1 and 2, both types of CEO compensation align the executive with bondholder interests. In Essay 1, CEO ID reduces myopic decision-making, leading to lower future myopia (t+1) and risk-taking. In essay 2, the CEO VE incentive has a dampening effect on company risk perception, influencing bond pricing. There is, however, no optimal pay scheme, and care must be taken when designing it.

4.2 LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

The limitations of the research are summarized as follows:

1. The results of the study are confined to US-based corporations only. Future research should investigate whether these results hold for firms in other countries to understand better the relationship between ID and Corporate Executive Behavior (Essay One) and VE and Cost of Debt (Essay Two).
2. In essay two, the study uses the VE constructed by Edmans et al. (2017) to measure short-term price concerns. Additionally, they compute and include two other measures: (1) stocks that vested by the end of year t, and (2) unvested securities. It would be interesting to study how bond investors perceive and value bonds in light of these other incentives.

As shown in the first and second essays, ID and VE effectively align the interests of executives and debtholders (both inside and outside bondholders). Here are some implications for future research:

1. In determining managerial incentives, policymakers often focus on the pay level; however, it is the structure of pay rather than the level that matters. Essay one indicates

that ID plays an important role in curbing myopia-like behaviours. Our study has implications for policymakers considering whether to include inside equity or inside debt in total compensation packages.

2. Essay two demonstrates that VE also helps executives align their interests with bondholders by reducing the risks they face. The findings become relevant in discussions concerning equitable pay compensations that align managers with shareholders' and bondholders' interests.

Chapter Five: APPENDIXES

5.1 ESSAY ONE APPENDIX

5.1.1 Appendix A: Dependent & Independent Variables

Variable Name	Description and Source
Panel A: Dependent Variables	
Earnings Decline (1/0)	Indicator variable equals one if the firm cuts earnings or R&D relative to the prior year; zero otherwise. *Source:* Compustat
Extent Realised Myopia (*GMM)*	The continuous *Myopia* measure the extent of firms managed myopically. *Myopia* is t+1 to break up endogeneity with the right side of variables. We use the GMM estimation approach to identify myopic firms that concurrently exhibit greater-than-normal profitability, less-than-normal marketing expenditure, and less-than-normal spending on R&D. The methodology followed combines the paper of Mizik & Jacobson, 2007; Mizik, 2010 and Braam et al. (2015). *Source:* Compustat
Bond Yield Spread	Interpolated yield to Treasury bond yield. Winsorised at the 1% tails. *Source:* SDC (at-issue bonds), TRACE & Mergent FISD (seasoned bonds), St. Louis Federal Reserve (interpolated Treasury rates).
Panel B: Main Independent Variable	
Relative Debt	The ratio of executives inside leverage to firm leverage. CEO inside leverage (IDH) is calculated as the sum of the present value of deferred and accumulated pension benefits reported in Execucomp. The value of CEO inside equity holdings (*EH*) is the fair value of stock holdings, including restricted stock holdings and option holdings, determined using Black and Scholes (1973) option valuation model. The firm leverage (*FD/FE*) is the ratio of the sum of current and long-term debt (*FD*) and the market value of equity (*FE*). $Relative\ debt = \frac{\left(\frac{IDH}{EH}\right)}{\left(\frac{FD}{FE}\right)}$. *Source*: ExecuComp
Relative Deferred	The executives' relative debt ratio considers only deferred compensation (*ID*) and the firm debt-to-equity ratio. $Relative\ deferred = \frac{\left(\frac{ID}{EH}\right)}{\left(\frac{FD}{FE}\right)}$ *Source*: ExecuComp
Relative Pension	The executives' relative debt ratio considers only pension benefit (*IP*) and firm debt-to-equity ratio. $Relative\ pension = \frac{\left(\frac{IP}{EH}\right)}{\left(\frac{FD}{FE}\right)}$. *Source*: ExecuComp

Panel C: Control Variables

Controls for incentive to be myopic

Prior change in R&D (PCRD)	The logged difference between $R\&D_{T-1}$ and $R\&D_{T-2}$. *Source:* Compustat
Change in Industry R&D intensity (CIRD)	The logged difference of the total R&D for all firms by SIC code (excluding firm) is scaled by total sales for all firms by SIC code (excluding firm) for the current and prior year. $(R\&D_t /Sales_t)/(R\&D_{t-1} /Sales_{t-1})$. *Source:* Compustat
CCAPEX	The change in capital expenditure per share (30/54)
CSALES	The change in sales per share (15/54)
Firm Size	The measure of firm assets relative to firm's market value: Market equity value + pref.stock+debt total/total asset ((199*25+130+9+34)/6). *Source:* Compustat
DEG	Indicator variable equals one if the firm has lower (more negative) values, the firm is further away from earning goal; zero otherwise *Source.* Compustat
Leverage	The measure of firm assets er relation le a firm's market value: Market equity value + pref.stock+debt total/total asset ((199*25+130+9+34)/6). *Source:* Compustat
Free Cash Flow	The cash is left over after the company pays for its operating expenditures. ($USMil) Source*:* Compustat
Tobins Q	The measure of firm assets in relation to a firm's market value: Market equity value + pref.stock+debt total/total asset ((199*25+130+9+34)/6). *Source.* Compustat

Controls for realised myopia

Firm Size (Log)	Natural log total assets. *Source:* Compustat
CEO Tenure	Logged Time served as Executive (=year1-datebecame). *Source:* ExecuComp
CEO Age	Logged Current Executive's age. *Source:* Compustat
Firm Age	Logged Number of years since the listing date (datadate-begdate)/365. *Source:* CRSP Header File
ROA	Net income is divided by the total asset. *Source:* Compustat
Sales Growth	Two-year geometric growth in Sales, calculated as (Sale/Salemin2) *(1/3)-1. *Source:* Compustat
Leverage	Book value of total debt scaled by asset total. (DLTT+DLC)/AT. *Source:* Compustat
Book to Market	The market value of the total asset is scaled by the asset total. (AT-CEQ+(PRCC_F*CSHO))/AT. *Source:* Compustat
Capex	Logged Capital expenditure scaled by asset total. (CAPX/AT). *Source:* Compustat
R&D Spending	Logged Total R&D expenditure. *Source:* Compustat

Tangibility	The asset total scales net fixed assets (Property, Plant, and equipment). (PPE/AT) ($US. Million). *Source*: Compustat
Liquidity Constraint	The indicator variable equals one if Operating CF (OCF) is negative; zero otherwise. *Source:* Compustat
Tax Loss Indicator	Indicator variable equals one if the firm exhibits a Tax Loss Carried forward (TLCF) reported for that year; zero otherwise. *Source:* Compustat
CEO's Vega/Delta ratio	The sensitivity of CEO option wealth (granted exercisable and un-exercisable options plus current option awards) to a 1% change in stock volatility, based on the method of Guay (1999), scaled by the sensitivity of a dollar change in equity wealth associated with a 1% change in the firm's stock price. *Source:* ExecuComp
Cash compensation (Log+1)	Log of Total Cash Compensation. *Source:* ExecuComp
Market Leverage	Logged Total debt scaled by the market value of Equity (DLTT+DLC)/(CSHO*PRCC_F). *Source:* Compustat
Market Return	The average cumulative market-adjusted return (CAR) for market performance from event month 1 to event month 12. *Source:* CRSP
Cash Surplus	Natural Logged amount of cash available to finance new projects scaled by total assets. OANCF - DPC + XRD) / AT. *Source:* ExecuComp

Controls for Bond yield spread

Residual Rating	Proxy for default risk. The residual Moody rating is predicted to determine yield spread model specification issues for each relative debt, deferred, and pension and the controls variables. *Source:* FISD Issues
MWCP	Binary variable equals one if the bond should identify as a make-whole call provision or make-whole callable with a fixed-priced call in the final third of the bond's life, and zero otherwise. *Source:* SDC Platinum (at-issue bonds), TRACE & Mergent FISD (Seasoned Bonds).
FPCP	Binary variable equals one if the bond has a fixed-price call provision that is callable immediately, with call protection, or with make-whole call protection, and zero otherwise.
Modified duration (Log)	Log Modified duration, calculated using SAS'DURP call function (using the time to maturity, coupon, yield to maturity). *Source:* SDC Platinum (at-issue bonds), TRACE & Mergent FISD (Seasoned Bonds).
Offering Amount (Log)	Logged par value of debt initially issued (in millions) on the issue date. *Source:* Principal amount (SDC) or offering_amt (FISD Issues)

Sub-ordinated Bond	Binary variable equals one if the bond should classify as senior subordinate, subordinate, or junior. *Source:* SDC Platinum (at-issue bonds), TRACE & Mergent FISD (Seasoned Bonds).
Privately Placed Bond	A binary variable equal to one of the Bond is identified as Rule 144A or privately placed and zero otherwise. *Source:* Rule 144A (SDC) or parsed from issue_name (FISD Issues)
Firm Size (Log)	Log of total assets (AT). *Source:* Compustat
Debt Ratio	Total interesting-bearing debt divided by the total asset ((DLC_DLTT)/AT). *Source:* Compustat
Market-to-book	Total liabilities plus equity market capitalisation divided by total assets (AT-CEQ + (PRCCF×CSHO) / AT). *Source:* Compustat
Sales Growth (prior 3 years)	Five-year geometric growth in sales ending the year the bond is issued or the year of the bond transaction. *Source:* Compustat
Profits	Operating income before depreciation divided by total assets (OIBDP/AT) *Source:* Compustat
Std (Profit)	The standard deviation of *Profit* of the prior five years before bond issuance or transaction year. *Source:* Compustat
Negative Earnings	Binary variable equal to one if the firm reported negative earnings and zeroed otherwise. *Source:* Compustat
Tangibility	Property, plant, and equipment (PPENT) scaled by total assets (AT). *Sources:* Compustat
Stock BAS	The average of the daily bid-ask spread over the prior year to the bond issue or transaction date using the methodology of Chung and Zhang (2014). *Source:* CRSP
Number of Analysts	The number of analysts estimates for the sample firm. *Source:* I/B/E/S
Yield Curve Slope	The difference in yield curve slope between the 10yr Treasury rate and 6-month Treasury date on the bond offering or transaction date. *Source:* St Louise Federal Reserve data repository (FRED)
10-year Treasure rate	10-year treasury rate on the bond offering date. *Source:* FRED
Std (10-year Treasury rate)	The standard deviation of the monthly *10-year Treasury rate* for the prior 6 months. *Source:* FRED
Baa-Aaa spread	The difference between Moody's Seasoned Baa Corporate Bond Yield and Aaa Corporate bond Yield. *Source:* FRED

5.1.2 Appendix B: Variance inflation factor (VIF)

Below are the VIFs for *relative debt* and other predictors. The VIF tables for *relative deferred* and *pension* provide similar means but have been omitted for brevity.

Panel A: Small Earnings Decline-ID	**VIF**
Leverage (11)	2.38
Tobins Q (13)	2.35
DEG (10)	1.61
Free Cash Flow (12)	1.55
Firm Size (9)	1.43
CSALES (8)	1.39
Relative Debt (2)	1.37
CCAPEX (7)	1.25
PCRD (5)	1.06
CIRD (6)	1.00
Mean VIF	1.54

Panel B: Myopia-ID	**VIF**
Firm Size (5)	4.85
Research&Dev. Exp. (14)	4.17
Tangibility (15)	2.58
Market Leverage (20)	2.17
CAPEX (13)	2.09
Cash Surplus (22)	2.03
Leverage (11)	1.89
Book-to-Market (12)	1.83
ROA (9)	1.81
Liquidity Constraint (16)	1.51
Cash Compensation (19)	1.45
Firm Age (8)	1.28
CEO Tenure (6)	1.27
CEO Age (7)	1.24
CEO Vega/Delta Ratio (18)	1.24
Relative Debt (2)	1.2
Sales Growth (10)	1.2
Market Return (21)	1.05
Tax Loss indicator (17)	1.04
Mean VIF	1.89

Panel C. Yield spread-ID	**VIF**
Firm Size (Log) (11)	3.66
Offering Amount (Log) (8)	2.41
Market-to-book (13)	2.36
Fixed-Price Call (6)	2.31
Profits (15)	2.21
Make-whole Call (5)	2.09
Number of Analysts (20)	1.72
Privately Placed Bond (10)	1.68
Bond rates spread (24)	1.54
Std.10yr rate (23)	1.52
Negative Earnings (17)	1.39
10-year Treasure rate (22)	1.39
Debt Ratio (12)	1.36
Relative Debt (2)	1.31
Stock BAS (19)	1.28
Std. of Profits (16)	1.27
Modified duration (Log) (7)	1.23
Tangibility (18)	1.23
Sales Growth (14)	1.18
Yield Curve Slope (21)	1.18
Sub ordinated Bond (9)	1.04
Mean VIF	1.68

5.1.3 Appendix C: Marginal effects for logit model

The estimated coefficients using marginal effect command in Stata for Table 4 – Logit model are shown below. Note: lrelativedebtW is "Relative debt", lrelativedefW = "Relative deferred", lrelativepensionW = "Relative pension", PCRD_1W = "Pcrd", CIRDpW = "Cird", chng_CAPXW = "CCapx", chng_SALESW = "CSales", firmsizeW = "Firm Size", DIST_d = "DEG", LleverageW = "Leverage", FCFW = "Free cash flow" and tobinsqW = "Tobins q".

```
Average marginal effects                                    Number of obs = 4,641
Model VCE: Robust

Expression: Pr(indicator), predict()
dy/dx wrt:  lrelativedebtW PCRD_1W CIRDpW chng_CAPXW chng_SALESW firmsizeW DIST_d LleverageW FCFW tobinsqW
```

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
lrelativedebtW	-.0183046	.0063406	-2.89	0.004	-.0307319	-.0058773
PCRD_1W	.0191748	.0157106	1.22	0.222	-.0116174	.0499671
CIRDpW	1.698382	.5968997	2.85	0.004	.5284802	2.868284
chng_CAPXW	-.0416416	.0109283	-3.81	0.000	-.0630606	-.0202225
chng_SALESW	-.008769	.0011964	-7.33	0.000	-.0111138	-.0064241
firmsizeW	-2.58e-06	8.24e-07	-3.13	0.002	-4.19e-06	-9.65e-07
DIST_d	.0549787	.0085848	6.40	0.000	.0381527	.0718046
LleverageW	.1336235	.0306754	4.36	0.000	.0735009	.1937461
FCFW	-.6752529	.0303884	-22.22	0.000	-.734813	-.6156928
tobinsqW	-.0211718	.0046462	-4.56	0.000	-.0302781	-.0120654

```
Average marginal effects                                    Number of obs = 4,641
Model VCE: Robust

Expression: Pr(indicator), predict()
dy/dx wrt:  lrelativedefW PCRD_1W CIRDpW chng_CAPXW chng_SALESW firmsizeW DIST_d LleverageW FCFW tobinsqW
```

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
lrelativedefW	-.0102376	.0071315	-1.44	0.151	-.0242151	.00374
PCRD_1W	.0195943	.0157575	1.24	0.214	-.0112897	.0504783
CIRDpW	1.673911	.5987599	2.80	0.005	.5003632	2.847459
chng_CAPXW	-.0420346	.0109793	-3.83	0.000	-.0635536	-.0205156
chng_SALESW	-.0087429	.0011944	-7.32	0.000	-.0110838	-.0064019
firmsizeW	-2.76e-06	8.52e-07	-3.24	0.001	-4.43e-06	-1.09e-06
DIST_d	.0539764	.0086279	6.26	0.000	.037066	.0708868
LleverageW	.1484047	.0309279	4.80	0.000	.0877871	.2090223
FCFW	-.6815777	.0303893	-22.43	0.000	-.7411396	-.6220158
tobinsqW	-.0209744	.0046374	-4.52	0.000	-.0300635	-.0118853

Average marginal effects Number of obs = 4,641
Model VCE: Robust

Expression: Pr(indicator), predict()
dy/dx wrt: lrelativepensionW PCRD_1W CIRDpW chng_CAPXW chng_SALESW firmsizeW DIST_d LleverageW FCFW tobinsqW

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
lrelativepensionW	-.0338367	.0093654	-3.61	0.000	-.0521925	-.0154809
PCRD_1W	.0174623	.0155988	1.12	0.263	-.0131108	.0480354
CIRDpW	1.784777	.6046956	2.95	0.003	.5995954	2.969959
chng_CAPXW	-.041805	.0109459	-3.82	0.000	-.0632586	-.0203514
chng_SALESW	-.0088871	.0012135	-7.32	0.000	-.0112655	-.0065087
firmsizeW	-2.53e-06	8.20e-07	-3.09	0.002	-4.14e-06	-9.23e-07
DIST_d	.0553179	.0085504	6.47	0.000	.0385593	.0720764
LleverageW	.14127	.0303198	4.66	0.000	.0818443	.2006958
FCFW	-.671419	.0304536	-22.05	0.000	-.731107	-.611731
tobinsqW	-.022093	.0047573	-4.64	0.000	-.031417	-.0127689

5.2 ESSAY TWO APPENDIX

5.2.1 Appendix A: Dependent & Independent Variables

Variable Name	Description and Source
Panel A: Dependent Variable	
Bond Yield Spread	Interpolated yield to Treasury bond yield. *Source:* SDC (at-issue bonds) and St. Louis Federal Reserve (interpolated Treasury rates).
STD(ROA)	Proxy for short-term risk-taking. Annualized standard deviation of returns on assets computed from quarterly firm-year data: $\sigma(ROA)$. Source: CRSP
STD (Returns)	The standard deviation of annualized stock returns computed from daily firm-year return data. *Source*: CRSP
Default Risk	Moody's bond letter rating converted to numerical equivalents, ranging from 1 ("Aaa") to 21 ("C"). *Source:* SDC (at-issue bonds)
Panel B: Main Independent Variable	
Vesting Equity	The log of the aggregate dollar changes in the value of vesting options plus vesting stock. Manually computed. *Source:* ExecuComp $$Vesting\ Equity_{it} = Vesting\ Option_{it} + Vesting\ Stock_{it}$$
Vesting Option	The log of options, converted to share equivalents, scheduled to vest. The delta of an option is calculated using the Black Scholes Option Valuation formula. *Source:* Execucomp and Equilar $$Vesting\ Option_{it} = [(UnvestedOptions_{t-1} + NewlyAwardedOption_t - UnvestedOptions_t) \times Delta_{it}] \times Closing\_Price_{it}$$
Vesting Stock	The shares vesting in a given year multiplied by the stocks Delta. $$[a]\ Vesting\ Stock_{it} = [Shrs\_Vest\_Num_{it} \times Delta_{it}] \times Closing\_Price_{it}$$
Panel C: Controls for Bond yield spread analyses (n=7011)	
Residual Rating	The predicted residual of Moody's Rating regressed on the proxy for incentive and a set of controls. Proxy for default risk. *Source*: Mergent FISD
MWCP	Binary variable equals one if the bond identifies as make-whole call provision or make-whole callable with a fixed-priced call in the final

	third of the bond's life, and zero otherwise. *Source:* SDC Platinum (at-issue bonds)
FPCP	Binary variable equals one if the bond has a fixed-price call provision that is callable immediately, with call protection, or with make-whole call protection, and zero otherwise. *Source:* SDC Platinum
Modified duration	Logged Modified duration, calculated using SAS'DURP call function (using the time to maturity, coupon, yield to maturity). *Source:* SDC Platinum, TRACE & Mergent FISD
Offering Amount	Logged Principal issued on the issue date. *Source:* SDC Platinum & Mergent FISD
Sub-ordinated Bond	Binary variable equals one if the bond is classified as a senior subordinate, subordinate, or junior and 0 otherwise. *Source:* SDC Platinum, TRACE & Mergent FISD
PPB	Binary variable equals one if the Bond includes Rule 144A provision and 0 otherwise. *Source:* SDC Platinum & Mergent FISD
Firm Size (Log)	Log of total assets (AT). *Source:* Compustat
Debt Ratio	Total interesting-bearing debt divided by the total asset ((DLC_DLTT)/AT), *Source:* Compustat
Tobin's Q	The measure of firm assets in relation to a firm's market value: (Market equity value + pref.stock+debt total/total. *Source*. Compustat
Sales Growth	Three-year geometric growth in sales ending the year of the bond is issued or the year of the bond transaction. *Source:* Compustat
Profits	Operating income before depreciation divided by total assets (OIBDP/AT) *Source:* Compustat
Std (Profit)	The standard deviation of Profit of the prior five years before bond issuance or transaction year. *Source:* Compustat
Negative Earnings	Binary variable equals one if the firm reported negative earnings and 0 otherwise. *Source:* Compustat
Tangibility	Property, plant, and equipment (PPENT) scaled by total assets (AT). *Source:* Compustat
Stock BAS	The average of the daily bid-ask spread over the prior year to the bond issue or transaction date using the methodology of Chung and Zhang (2014). *Source*: CRSP
Analyst Coverage	The number of analysts estimates for the sample firm. *Source*: I/B/E/S
Yield Curve Slope	The difference in yield curve slope between the 10yr Treasury rate and 6-month Treasury date on the bond offering or transaction date. *Source:* St Louise Federal Reserve data repository (FRED)
10-year Treasure rate	10-year treasury rate on the bond offering date. *Source*: FRED
Std (10-year Treasury rate)	The standard deviation of the monthly 10-year Treasury rate for the prior 6 months. *Source:* FRED
Baa-Aaa spread	The difference between Moody's Seasoned Baa Corporate Bond Yield and Aaa Corporate bond Yield. *Source:* FRED
Maturity	The number of years until the bond matures. *Source:* SDC Platinum

Panel D: Determinants of Risk-Taking incentives (*computed using firm-quarterly data****)***	
Capital Expenditure	Annualized CAPX/AT. *Source:* Compustat
R&D	Annualized XRD/AT. *Source:* Compustat
Return on Asset	Annualized IB/AT. *Source:* Compustat
Firm Age	Logged firm age since. *Source:* Execucomp
Market-Book	Annualized PRCC*CSHO) +(AT-CEQ)/AT. *Source:* Compustat
Surplus Cash	Annualized (OANCFY- (DPCY+XRDQ))/ATQ. *Source:* Compustat
Return	Annualized average return. *Source*: CRSP
Debt Ratio	Annualized total interesting-bearing debt divided by the asset total ((DLC_DLTT)/AT). *Source:* Compustat
Tangibility	Annualized Net property, plant and equity scaled by asset total (PPENT/AT). *Source:* Compustat
Sales Growth	Annualized Logged growth in Sales. *Source:* Compustat
HHI	Herfindahl-Hirschman Index to proxy market concentration and competitiveness
CEO Vega	CEO pays sensitivity to the underlying stock price. *Source:* Execucomp
CEO Delta	CEO pay sensitivity to the volatility of the underlying stock price. *Source:* Execucomp
CEO Age	The age of the CEO. *Source:* Compustat
CEO Tenure	Number of years they have been CEO. *Source:* Compustat
Current Ratio	Annualized ACT/LCT. *Source:* Compustat
Long-term Debt	Annualized DLTT/AT. *Source:* Compustat
S&P Quality Ranking	S&P Quality Ranking letter rating converted to numerical equivalents, ranging from 1 to 8, where 1 = high-quality ranking company and 8 = lower ranked company. *Source:* Compustat
Working Capital	Annualized (ACT-LCT)/AT. *Source:* Compustat
Retained Earnings	Annualized RE/AT. *Source:* Compustat
Price-Book Ratio	Annualized CEQ/(CSHO*PRCC_F). *Source:* Compustat
Divident yield	Annualized dividend per share scaled by market value equity
Callable Bonds	Binary variable equals one if Bond includes a callable provision and 0 otherwise
Puttable Bonds	Binary variable equals one if Bond includes a put provision and 0 otherwise
Issue Amount	The logged par value of debt initially issued or offered (offerring_amt).
High yield	Binary variable equals one if the Moody's rating is lower than Baa3 and 0 otherwise
Issuer Credit	*Altman Z-score* is the financial ratio-based measure of proximity to bankruptcy; computed according to Altman (1968)

5.2.2 Appendix B: Step-by-Step Measure of *Vesting Equity*

We follow a three-step- procedure to compute the main independent variable, $Vesting\ Equity_{it}$, the aggregate price sensitivity of vesting stock and vesting option. To construct $Vesting\ Equity_{it}$, the inputs required are sourced from Equilar, S&P Execucomp, Centre for Research in Security Prices (CRSP), Compustat and Federal Resource Economic Data. The matched issue-years sample covers the period 20001-2017. ***Appendix A*** provides the variable description.

Step 1: Equation [a] computes the total amount of vesting restricted stocks for the firm, *i*, and year, *t*.

$$[a]\ Vesting\ Stock_{it} = [Shrs\_Vest\_Num_{it} \times\ Delta\ _{it}]\ \times Closin\_Price_{it}$$

SHRS_VEST_NUM is the number of restricted shares vested during the year, and PRCC_F is the close stock price at fiscal year-end. Implicit assumptions suggest the delta or 'price risk' for the underlying security is 1, which suggests that a dollar increase in the stock share price translates to the option's value. Equation $[a]\ Vesting\ Stock_{it}$ measures the price-sensitivity measures of the shares scheduled to vest.

Step 2: Equation [b] identifies the options, converted to share equivalents, scheduled to vest:

$$[b]\ Vesting\ Option_{it} = [(UnvestedOptions_{t-1} + NewlyAwardedOption_t - UnvestedOptions_t) \times\ Delta\ _{it}]\ \times Closing\_Price_{it}$$

Where OPT_UNEX_UNEXER_NUM is the aggregate number of unexercised options held by the executive at fiscal year-end that were not vested, *Unvested Options.* OPTION_AWARDS_NUM is the total number of new options awarded over the year, *NewlyAwardedOption.* The option $Delta\ _{it}$ **must be converted to share-equivalents** before computing equation [b]; hence, the Black-Scholes Model of pricing option $[c]$ is used:

$$[c]\ \ C = S_0 N(d_1) - Xe^{-r(T)} N(d_2)$$

Where, S_0 is the current price of the underlying asset (PRCC_F); X is the strike or exercise price for option (EXPRIC); r is the annual Black Scholes risk-free rate (BS_Rf); y is the dividend

yield paid out; σ is the Black Scholes volatility of returns of the underlying assets (BS_Volatility); and. T is the time to maturity for the option. These values are inputs for $N(d_1)$ and $N(d_2)$, see below:

$$d_1 = \frac{\left[ln\left(\frac{S_0}{X}\right) + \left(r - y + \frac{\sigma^2}{2}\right)(T)\right]}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

Where $N(d_1)$ is the option delta measuring the changing rate of the option price in response to the stock price change; and $N(d_2)$ the probability option will be exercised. Both are the cumulative probability distribution functions for a normal distribution. The cumulative probability for $N(d_1)$ will always be larger than $N(d_2)$ because of $\sigma\sqrt{T}$. The difference becomes more significant for longer-term options. The variable of interest used in $Vesting\ Option_{it}$ equation is $N(d_1)$ which is $Delta_{it}$.

Measuring Delta ($N(d_1)$). Our dataset provides an incomplete Black-Scholes value inputs *Volatility, yield,* and *risk-free rate* until 2016. To compute missing observations, we obtain these variables:(1) the exercise price of the option (EXPRIC); (2) the expiration date of the option grant (EXDATE); (3) the close stock price at fiscal year-end (PRCC_F); (4) annual return; (5) dividends per share pay ex-date (DVPXS_F); and (6) the risk-free rate (RF). We following the descriptions in Execucomp of how the Black Scholes values are computed:

(1) *BS_Volatility* – the annualized volatility of returns over a rolling window of 60 months (5 years).
(2) *BS_Yield* – the annualized average dividend yield over a rolling window of 36 months (3 years).
(3) *BS_Rf* – the annualized daily risk-free rates.

Equation $[b]$ $Vesting\ Option_{it}$ measures the price-sensitivity measures of vesting options.

Step 3: Combines Equations [a] and [b] to compute the aggregate price-sensitive measures of stock and options that vest in the given year. As seen below:

$$Vesting\ Equity_{it} = Vesting\ Stock_{it} + Vesting\ Option_{it}$$

5.2.3 Appendix C: Variance inflation factor (VIF)

Panel A: Yield Spread-CEO Incentive	**VIF**
10yr Treasure rate (22)	2.86
Firm Size (11)	2.23
MWCP (5)	2.07
Stock BAS (19)	2.02
Profitability (15)	1.96
Analyst Coverage (20)	1.89
FPCP (6)	1.86
Offering Amount (8)	1.83
Tobins Q (13)	1.81
Baa-Aaa spreads (24)	1.52
Privately Placed Bond (10)	1.50
Std. (10yr Treasury rate) (23)	1.37
Yield Curve Slope (21)	1.37
Negative Earnings (17)	1.33
Sub-ordinated Bond (9)	1.21
Std (Profitability) (16)	1.20
Tangibility (18)	1.19
Debt Ratio (12)	1.17
Sales Growth (prior 3 years) (14)	1.15
Modified duration (7)	1.14
Vesting Equity (2)	1.12
Mean VIF	1.61

Panel B: SD(ROA)-CEO Incenitve	**VIF**
Long-Term Debt Ratio (21)	3.25
Debt Ratio (12)	3.11
Tangibility (13)	2.36
Surplus Cash (10)	2.11
Capital Expenditure (5)	2.1
Profitability (7)	2.09
R&D (6)	1.95
Market-to-Book (Log) (9)	1.85
CEO Vega (16)	1.45
CEO Delta (17)	1.35
Vesting Equity (2)	1.31
CEO Tenure (19)	1.28
Current Ratio (20)	1.27
CEO Age (18)	1.26
S&P Quality Ranking (22)	1.23
Sales Growth (14)	1.19
Firm Age (Log) (8)	1.17
Industry Concentration (HHI) (15)	1.11
Returns (11)	1.04
Mean VIF	1.71

Panel C: SD(Return)-CEO Incenitve	**VIF**
Earnings-Price Ratio (14)	5.23
Book Price (15)	3.52
Dividend Yield (16)	3.17
Surplus Cash (10)	2.11
Profitability (7)	2.07
Market-to-Book (Log) (9)	1.87
R&D (6)	1.84
CEO Vega (17)	1.7
CEO Delta (18)	1.37
Vesting Equity (2)	1.33
CEO Tenure (20)	1.28
CEO Age (19)	1.25
Debt Ratio (11)	1.21
Sales Growth (12)	1.2
Firm Age (Log) (8)	1.19
Industry Concentration (HHI) (13)	1.08
Capital Expenditure (5)	1.08
Mean VIF	1.91

Panel D: Default-CEO Incenitve	**VIF**
Long-Term Debt Ratio (8)	8.84
Working Capital (19)	7.93
Firm Size (12)	7.48
Retained Earnings (20)	5.69
Sales Growth (11)	5.62
Quick Ratio (7)	4.48
10yr Treasure rate (30)	2.67
Debt Ratio (6)	2.65
ROA (5)	2.47
CEO Vega (14)	2.04
Stock BAS (28)	2.02
Analyst Coverage (29)	1.96
Issue Amount (25)	1.86
Surplus Cash (13)	1.74
CEO Delta (15)	1.71
Negative Income (10)	1.62
Baa-Aaa spreads (32)	1.48
Callable Bonds (22)	1.42
Privately Placed Bonds (27)	1.42
CEO Tenure (17)	1.38
Std. (10yr Treasury rate) (31)	1.38
Firm Age (9)	1.3
CEO Age (16)	1.28
Price-Book Ratio (21)	1.23
Vesting Equity (2)	1.17
Subordinate Debt (26)	1.17
Duration (24)	1.17
Industry Concentration (18)	1.14
Putable Bonds (23)	1.03
Mean VIF	2.67

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