Corporate Lifecycle and CEO Compensation Structure

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Abstract

In this study, we argue that firms would need to adjust CEO compensation incentives at different corporate lifecycle stages. Specifically, we examine a research question of whether the CEOs' compensation structures are influenced by different corporate lifecycle stages. Using the data of the US listed non-financial firms from 2006 to 2014, we find that firms at the young and growth stages prefer to adopt more incentives of equity and pay-for-performance compensation arrangement. In addition, firms at mature and decline stages are more likely to provide cash- or debt-based compensation (pension and deferred compensation) to stabilize their business and operation. Our research is the first to link corporate lifecycle theory from financial decisions to CEOs compensation structure. It also explains why firms transit among different lifecycle stages from the perspectives of CEO compensation incentives.

Keywords: Corporate Governance, CEO Compensation, Corporate Lifecycle.

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1. Introduction

The roles of corporate lifecycle in financial decisions are increasingly important in recent finance and accounting literature. Several recent studies that address lifecycle stages help to explain corporate outcomes and performances[1] by attempting to link the issue of corporate lifecycle to individual attributes. For example, lifecycle stage affects board member composition (Withers, Hillman, and Cannella, 2012) and CEO appointment (Custódio and Metzger, 2014). However, firms' need for varied individual-level skills in different corporate lifecycles has yet to be fully investigated. Therefore, this research adds to this literature by arguing that the corporate lifecycle influences CEOs' skills, compensation structure, and turnover.

Using the data of the US listed non-financial firms from 2006 to 2014 as empirical sample, this study answers the following research question: (1) Whether firms at different lifecycle stages have varied needs for CEOs' individual compensation structure? (2) Do firms transit from other stages back to growth stage if the CEOs are compensated with more performance-sensitive incentives?

Recent research in finance and accounting recognizes that corporate lifecycle theories have important implications for understanding corporate strategies and decisions. For example, corporate lifecycle stages cause different firm value (Anthony and Ramesh, 1992) and performance (DeAngelo et al., 2006, 2010; Dickinson, 2011). Several studies also acknowledge the role of lifecycle in dividend payout policy (Fama and French, 2001; Bulan, Subramanian, and Tanlu 2007; Coulton and Ruddock, 2011). Banyi and Kahle (2014) find that the lifecycle effect for an initial public offering (IPO) cohort increases the likelihood of payout as a firm ages. DeAngelo et al. (2006) propose a lifecycle theory of dividends that suggests that the probability of dividend payout is related to its earnings and capital.

Financing and investing decisions are also a function of lifecycle stages. Berger and Udell (1998) report that different capital structures are optimal at different lifecycle stage. DeAngelo, DeAngelo, and Stulz (2010) find that corporate lifecycle affects decisions related to secondary equity offerings. Owen and Yawson (2010) find a significant relation between the likelihood of becoming a bidder and the lifecycle. In addition, Arikan and Stulz (2016) find that acquisition rate follows a U-shape over lifecycle, falling in the beginning and then

[1] See DeAngelo et al. (2006), DeAngelo et al. (2010), Owen and Yawson (2010), Dickinson (2011), Banyi and Kahle (2014), Hribar and Yehuda (2015), Koh et al. (2015), and Arikan and Stulz (2016).

increasing over time. Koh, Durand, Dai, and Chang (2015) show that the resolution of financial distress is dependent on the lifecycle stage.

The empirical sample are from the US listed non-financial firms from 2006 to 2014, and the measures for identifying lifecycle include firm size and age[2], ratio of retained earnings[3], descriptor composition[4], and cash flow patterns[5]. The information on CEOs compensation is collected from BoardEx and ExecuComp database. Using regression analyses, it is expected to find that CEOs' compensation structures are varied in different corporate lifecycle stages. The empirical evidence shows that firms experiencing corporate lifecycles adjust CEO compensation structure to satisfy their needs at different lifecycle stages.

Specifically, firms at the young and growth stages prefer to adopt more incentives of equity and pay-for-performance compensation arrangement, suggesting that firms at the young and growth stages provide more equity-based incentives for their CEOs to bring greater growth in business and equity price, further increasing the shareholders' value. Therefore, the equity compensation arrangement can be highly aligned with business vision for the young/growth firms. However, in contrast, firms at mature and decline stages are more likely to provide cash- or debt-based compensation (pension and deferred compensation) to stabilize their business and operation.

This study contributes to prior research in the following ways. First, no formal model exists that relates a firm's lifecycle to CEOs compensation. This research is the first to employ the corporate lifecycle concept to extend the understanding of CEO compensation. Our main argument is that CEO compensation is not random.

Second, the empirical findings provide another explanation of why firms transition between different lifecycle stages. This study argues that firms transition to the declining or distressed stage due to the self-dealing behaviors of entrenched CEOs with power over the board. In contrast, firms can transition from the declining or distressed stage back to the growth or mature stage by providing CEO with more incentives in the compensation arrangement.

2. Theory and Lines of Literature

[2] (Klein and Marquardt, 2006; Wasley and Wu, 2006; Desai, Hogan, and Wilkins 2006; Doyle, Ge, and McVay, 2007; Khan and Watts, 2009; Bradshaw, Drake, and Myers, 2011; Caskey and Hanlon, 2013; Arikan and Stulz, 2016)
[3] (DeAngelo et al., 2006, 2010; Owen and Yawson, 2010; Banyi and Kahle, 2014; Hasan et al., 2015)
[4] (Anthony and Ramesh, 1992; Koh et al., 2015)
[5] (Dickinson, 2011, Habiba and Hasan, 2016)

In the following, corporate lifecycle and CEO individual attributes are introduced with the two lines of literatures.

2.1 Corporate Lifecycle

Corporate life cycle theory suggests that firm is like an organic body to progress through many lifecycle stages from birth to decline, and firms' strategies and structures correspond to their different stages of development (Gray and Ariss, 1985; Quinn and Cameron, 1983). Corporate lifecycle model was adopted from biological sciences and incorporated into business research since the 1960s (Van De Ven and Poole, 1995). Chandler (1962) introduces a lifecycle model in which corporate strategies and structures change in different lifecycle stages. Miller and Friesen (1984) classify lifecycle into five stages; birth, growth, maturity, revival and decline, and find significant differences among them in terms of distinct structures, strategies and decision making. Koh et al. (2015) indicate that lifecycle consists of four stages: birth, growth, maturity and decline.

Each stage of the lifecycle has unique properties and demands for organizational structure and strategy and thus a CEO requires an appropriate managerial leadership style to meet the firm's needs at each stage (Adizes, 2004). Dynamic resource-based theory as outlined by Helfat and Peteraf (2003) suggests that corporate lifecycle must incorporate the firm's development, resources, and capabilities over time. Miller and Friesen (1984) show that firms experience changes throughout their lifecycle and that the attributes differ at each stage. Integrating stewardship, agency, and resource-based theories, Lynall, Golden, and Hillman (2003) find that management, structure, and strategy needs vary across lifecycle stages.

Several empirical studies have addressed that corporate lifecycle has important implications for corporate financial decisions. For example, performances differ across different lifecycle stages (DeAngelo et al., 2010). Similarly, firm valuation is determined by its lifecycle stage (Anthony and Ramesh, 1992). DeAngelo et al. (2006, 2010) and Dickinson (2011) recognize that lifecycle stages have important implications for financial performance. In addition, Hribar and Yehuda (2007) find that earnings persistence, profitability, financial structures, cost of capital, and pricing of earnings vary across lifecycle stages.

Dividend payout policy is also dependent on corporate lifecycle. Fama and French (2001), Grullon, Michaely, and Swaminathan (2002), Bulan et al. (2007), and Banyi and Kahle (2014) acknowledged the role of corporate lifecycle in dividend payout and find that mature firms are more likely to pay dividends as their investment opportunities become smaller. Coulton and Ruddock (2011) also find evidence that dividend payments reflect firm

maturity. In addition, Koh et al. (2015) note that birth, growth and mature are all unlikely to reduce dividends. Furthermore, DeAngelo et al. (2006) use lifecycle theory and address that the probability of paying dividends is positively related to retained earnings and contributed capital.

Corporate lifecycle theory suggests that investment and financing decisions are determined by the change of organizational lifecycle stages. Anthony and Ramesh (1992) explore the market reaction to sales growth and investment in different lifecycle stages. Koberg, Uhlenbruck, and Sarason (1996) also document that the relation between organizational attributes and innovation is moderated by corporate lifecycle. Richardson (2006) suggests that firms are more likely to undertake large investments in the initial lifecycle stage, while, the investments are for maintenance in mature firms. Owen and Yawson (2010) examine the effect of corporate lifecycle on acquisition likelihood, bidding strategy, way of payment, and wealth effects. These evidence addresses the role of corporate lifecycle in decision making for innovation and investment.

Firms in different lifecycle stages are varied in their capability to raise funds. Berger and Udell (1998) and Anthony and Ramesh (1992) show that capital structures and capability to raise funds are varied at different lifecycle stages. Berger and Udell (1998) also argue that young firms typically rely on private equity and debt, whilst mature firms prefer public markets. Hasan, Hossain, Cheung and Habib (2015) also find that the cost of equity is a U-shaped pattern during lifecycle, which is higher in young and decline stages and lower in growth and mature stages.

Cash flows and its corresponding risks are determined by lifecycle stages. Black (1998) examines the changes in operating, investing, and financing cash flows from different lifecycle stages. Liu (2006) suggests that corporate lifecycle plays a crucial role in discretionary accrual, further producing matched discretionary accruals in performance-matched model. Habibar and Hasan (2015) find that risk taking is higher in young and decline stages, and lower in the growth and mature stages. Koh et al. (2015) further show that the lifecycle stages are crucial in resolution of distress. Therefore, the cash flows and their risks have also been linked to lifecycle theory.

Although corporate lifecycle issues had been related to firm-level properties in recent research, to date, little finance and accounting literatures have incorporated the lifecycle concept to individual attributes (Hribar and Yehuda, 2015). Lynall et al. (2003) indicate that mature firms' organization structure are complex due to more managerial discretions, further leading to agency problems. Thus, investigation of corporate lifecycle and linking it to

individual-level characteristics and their potential agency problem is important, but even sparse. This study tends to bridge the gap between corporate lifecycle and CEOs' individual attributes which is less considered in literatures.

2.2 CEO Compensation Arrangement

Current research on compensation focuses on the compensation structure (Bebchuk and Weisbach, 2010) rather than on the compensation level (Hermalin, 2005; Gillan, 2006). Equity-based compensation ties management more closely to the value of equity (Ertugrul and Hegde, 2008). In 1990, only 17% of firms included stock-based pay as part of the compensation arrangement. By 1996, this figure increased to about 80%, and some firms began to compensate with stock-based compensation for nearly 50% of the total compensation (Daily, Certo, and Dalton, 1999). Smith and Stulz (1985) find that shareholders can alleviate the moral hazard conflicts by using stock options or common stock to structure managerial compensation as a convex function of performance. They also suggest that compensation contracts should be designed to bear more risks. Yermack (2004) finds that more than one-half of total incentives come from stock and options.

Debt-based compensation, including pension plans and deferred compensation, comprises a major portion of executive incentives, and future research should address the role of inside debts (Bebchuk and Fried, 2003; Bebchuk and Jackson, 2005; Frydman and Saks, 2010). Wei and Yermack (2011) find that 84% of CEOs hold inside debts. Also, Sundaram and Yermack (2007) indicate that the ratio of pension value to total CEO compensation increased from about one-tenth in the 1950s to about one-third in the 2000s. These statistics still underestimate the pensions negotiated separately in employment contracts or that are derived from different types of formulas. Therefore, based on recent research, compensation arrangements can be decomposed into three criteria: cash-based compensation (cash salary and bonus), equity-based incentives (stock ownership and options), and debt-based benefits (pension and deferred payment). However, how the corporate lifecycle affects the compensation structure, an important individual CEO attribute, lacks empirical research.

3. Hypothesis Development

To explore whether the CEO compensation vary across different stage of the corporate lifecycle, this study refers to prior literature to identify CEO attributes unique to different lifecycle stages. However, this line of research identifies the lifecycle stages in numerous ways. Early studies (Miller and Friesen, 1980; 1984; Baird and Meshoulam, 1988; Drazin and Kazanjian, 1990) adopt four stages: birth, growth, maturity, and revival. Quinn and Cameron (1983) and Smith

et al. (1985) identify their four lifecycle stages as start-up, growth, maturity, and decline. Some research uses a five-stage model. For example, Gort and Klepper (1982) define the life cycle stages as introduction, growth, maturity, shake-out, and decline. This study adopts the commonly used four-stage model to explain the CEO compensation. The following discussion addresses the various individual attributes with the context of corporate lifecycle stages to develop hypotheses.

3.1 First Stage: Birth and Introduction

Firms at birth stage are in the initial stages of operation and struggling to survive against competition from older, more established firms. Lifecycle theory suggests that firms at the birth or introductory stage of the lifecycle are usually dominated by entrepreneurs with highly centralized power systems that are small and informal in structure, have a limited range of product lines, and devote considerable attention to innovation and expansion (Miller and Friesen, 1984). This type of organization typically has an entrepreneurial focus with a risk-taking strategic approach (Koh et al., 2015).

Young firms commonly lack cash, and executive pay in these firms does not include a large proportion of cash-based compensation. Because earnings per share, return on net operating assets, and profit margins of firms in the birth/introductory stage are negative (Dickinson, 2011), young firms with higher growth options are less likely to pay dividends even if their retained earnings are high (Guay and Harford, 2000; Jagannathan, Stephens, and Weisbach 2000; Fama and French, 2001; Grullon et al., 2002; DeAngelo et al., 2006; Coulton and Ruddock, 2011; Banyi and Kahle, 2014). Dodge et al. (1994) finds that firms in the birth stage are more likely to have difficulty attaining sufficient capital. In addition, Hasan et al. (2015) report a higher cost of equity for firms in the introduction stage. Consequently, young firms commonly resort to private equity and debt markets (Berger and Udell, 1998; Barclay and Smith, 2005). Thus, poor earnings and capital needs for investment result in a lack of cash for firms in the birth/introductory stage.

Jovanovic (1982) finds that firms in the introduction stage lack established customers and sufficient information on revenues and costs, resulting in negative operating cash flows. Thus, managerial optimism encourages firms to make investments for expansion (Spence 1977, 1979, 1981), leading to positive financing cash flows and negative investing cash flows (Dickinson, 2011). These firms also face the risk of future growth uncertainty (Pastor and Veronesi, 2003; Habiba and Hasan, 2016). Hribar and Yehuda (2015) note that in early lifecycle stages growth is the main cause of accrual mispricing. Young firms are typically

unknown, undifferentiated, and less noticed by analysts or investors and therefore suffer from substantial information asymmetry (Hasan et al., 2015). Thus, in addition to poor earnings and difficulty raising capital, firms in the birth/introductory stage face many potential cash flow risks.

One way that young firms grow is through acquisition. Richardson (2006) suggests that firms are more likely to undertake relatively larger, growth-oriented investments in the introduction stage. Arikan and Stulz (2016) show that younger firms are more active acquirers, with a 32.5% higher rate of acquisition compared to mature firms. They also have a substantially higher Tobin's Q than mature firms (Pastor and Veronesi (2003). In particular, young firms tend to facilitate growth through diversification, unrelated acquisitions, and cash payment for acquisitions of public firms, and the market reacts positively to such deals. However, young firms spend more on related acquisitions. Owen and Yawson (2010) find that corporate lifecycle is related to a firm's ability to negotiate acquisition deals, suggesting that young firms prefer tender offers in acquisition deals. Therefore, acquisitions appear to be a substitute for capital expenditures and cash holdings for young firms.

Koh et al. (2015) note that because birth stage firms' future cash flows and, thus, their ability to survive distress are uncertain, lenders are less likely to lend to them. The lack of cash and debt service inhibits young firms from the designing compensation incentives, and therefore executives are more likely to be paid with stock or options, which rely on future profit. This study argues that under the constraint of limited available cash firms should provide executives with more incentives for future growth and development. Therefore, this study hypothesizes that introductory firms with insufficient cash need non-cash-based incentives to motivate executives to focus on future development, and thus equity-based compensation is more appropriate for the CEOs' compensation arrangement. Therefore, based on Proposition 1a in Wang and Singh (2014, HRMR), firms at the start-up stage pay their CEOs the lowest level of total compensation.

Hypothesis 1a: *CEOs in firms at introduction/young stage are paid with fewer total compensation, compared to other stages.*

Also, Proposition 1b in Wang and Singh (2014, HRMR) suggests that at the start-up stage, stock-based pay will play a major role in CEO total compensation, followed by salary and bonuses, and then benefits.

Hypothesis 1b: *CEOs in firms at introduction/young stage are paid with more equity-based compensation, compared to mature and decline stage.*

Hypothesis 1c: *CEOs in firms at introduction/young stage are paid with more pay-for-performance sensitive compensation, compared to mature and decline stage.*

3.2 Second Stage: Growth

Firms in the growth stage need more external resources for future development. Organizational theory suggests that growth firms with promising development and strong potential typically have insufficient resources (Aboody and Lev, 2000; Barth, Cram, and Nelsonm, 2001; Smith and Watts, 1992). Dickinson (2011) shows that investing cash flows for firms in the growth stage are negative and operating cash flows are positive as profit margins improve due to increasing investment (Spence, 1981; Wernerfelt, 1985). In addition, because growth firms need debt to grow, financing cash flows are positive as they access credit for expansion (Dickinson, 2011). Thus, growth firms are more likely to receive coverage in the business press due to their cash flow needs (Bentley, Omer, and Sharp, 2013). They also voluntarily disclose information, which attracts greater analyst coverage (Lehavy, Li, and Merkley, 2011) and reduces information asymmetry (Bushee Core, Guay, and Hamm, 2010), thus creating more opportunities for future expansion. Hribar and Yehuda (2015) also find a weak relation between free cash flows and total accruals for growth firm. Although revenues increase rapidly at the growth stage, firms have fewer assets in place and higher operating risk. Habiba and Hasan (2016) show that the overall risk-taking is lower at the growth stages.

A high market-to-book ratio reflects profitable investment opportunities for growth firms. The investment is larger at the growth stage as working capital and capitalization accruals increase for operating expansion. However, firms in the growth stage typically have little retained earnings for investment and depend on all their profits and external funds financed by outside equity for investment (Grabowski and Mueller, 1975). Hasan et al. (2015) find that the cost of equity is lower in growth firms, compared to birth/introductory firms. Opler, Pinkowitz, Stulz, and Williamson (1999) find that growth firms carry higher amounts of cash as these firms tend to rely on equity financing (DeAngelo et al., 2010). Because most of the earnings are used for reinvestment to satisfy growth opportunities, growth firms have less cash for compensation arrangement. However, the rapid growth experienced by these firms provides more attractive interest-aligned incentives.

Equity-based compensation such as stock and options mitigate the effects of risk aversion because they provide incentives to adopt risky projects (Hirshleifer and Suh, 1992). Investors view equity-based compensation, especially stock grants, more favorably due to its

monitoring incentive (Bhojraj and Sengupta, 2003). Fich and Shivdasani (2005) indicate that firms with stock option compensation have higher market value and accounting performance. Linn and Park (2005) find that firms with greater investment opportunities compensate more heavily with stock rather than cash, suggesting that equity-based compensation policies attract more investment opportunities to maximize corporate earnings. Therefore, this study hypothesizes that CEOs in growth firms prefer equity-based compensation. Therefore, based on Proposition 2a in Wang and Singh (2014), firms at the growth stage pay their CEOs a higher level of total compensation than do those at the start-up stage.

Hypothesis 2a: *CEOs in firms at growth stage are paid with fewer total compensation, compared to mature and decline stage.*

Hypothesis 2a: *CEOs in firms at growth stage are paid with more total compensation, compared to introduction/young stage.*

Also, Proposition 2b in Wang and Singh (2014, HRMR) suggests that at the growth stage, stock-based pay will play the most important role in total CEO compensation, followed by bonuses and salary, and then benefits.

Hypothesis 2c: *CEOs in firms at growth stage are paid with more equity-based compensation, compared to mature and decline stage.*

Greater sensitivity of CEOs' wealth to their firm's stock price provides incentives to improve future performance. Stock awards are intended to align the incentives of executives and shareholders, thereby making executives more likely to monitor management. To the extent that the stock market is efficient, changes in performance are reflected in stock prices. Morck et al. (1988) find that equities owned by individuals are positively associated with firm performance, consistent with Fich and Shivdasani (2005) that firms with option plans compensation have higher market values and profitability.

Hypothesis 2d: *CEOs in firms at growth stage are paid with more pay-for-performance sensitive compensation, compared to mature and decline stage.*

3.3 Third Stage: Mature

Because mature firms are profitable and engage in more complex in decision-making across different business activities, multidimensional managerial capabilities are necessary. Mature firms focus on the smooth functioning of business in well-defined markets (Miller and Friesen, 1984). As the company moves through the mature stage, they accumulate sufficient profits and have higher retained earnings and cash positive operating flows (Hribar and Yehuda, 2015). However, mature firms demonstrate lower growth rates as profitable

investment opportunities diminish and competition from the product market arises (Grabowski and Mueller, 1975). Several studies suggest that firms with high retained earnings are more mature and profitable and thus are more likely to pay dividends (Fama and French, 2001; DeAngelo et al., 2006; 2010; Coulton and Ruddock, 2011; Banyi and Kahle, 2014). Also, the declining rate of reinvestment of mature firms leaves excess cash, which is paid out to shareholders (Grullon et al., 2002).

Mature firms also face several potential problems. For example, Banyi and Kahle (2014) find that the investment opportunities of firms at the mature stage become smaller, which results in declining investment opportunities (Grullon et al., 2002). Richardson (2006) suggests that the investments of mature firms are more likely to be geared toward maintenance of assets in place. Therefore, mature firms typically tend to raise outside capital by relying on debt either to overcome financial difficulties or to attractive new investment opportunities, such as acquisition deals (DeAngelo et al., 2010). Thus, the challenge of mature firms is how to allocate these excess resources to reinvest in future growth.

Risk concerns in mature firms can be effectively reduced if the governance practices are appropriate. Al-Hadi et al. (2015) show that the risk committee in mature firms plays a significant role in improving market risk disclosures. Mature firms have a longer history in the market and are better known by investors, which improves information transparency and lowers risk-taking and the cost of capital (Easley and O'Hara, 2004; Habiba and Hasan, 2016; Hasan et al., 2015).

Similarly, governance practices are highly emphasized in mature firms as their organizational structures and the decision-making are complex. Jensen (1986) notes that the shareholder–manager conflict is particularly severe in firms with a large free cash flow, which can be used for managerial excessive perks and benefits. This phenomenon is more pronounced in mature firms. Lynall et al. (2003) note that the more complex business size and organizational structure of mature firms allows for more managerial discretions. In addition, mature firms typically attract a broader range of stakeholders, such as suppliers, customers, analysts, and regulators, necessary to bargain for low-cost raw materials and the profitable distribution of goods and services (Wallace and Naser, 1996). Because share ownerships are extremely diversified, the board of directors has less monitoring power to discipline management. Therefore, agency problems in this stage are more likely to occur, particularly for firms with less external monitoring practices and a weak board. Shyu and Chen (2009) argue that managers of mature firms pursue diversification to avert personal employment risk instead of capturing their private benefits. Based on agency theory, Arikan

and Stulz (2016) suggest that mature firms' cash flow is greater than their internal growth opportunities, causing management to become highly entrenched via free cash flows, and the pursuit of future growth is at the cost of shareholders (Jensen, 1986). Because the governance mechanism is more crucial and decision-making is more complex, this study argues that mature firms undergoing executive turnover are more likely to appoint a CEO with specialized skill in corporate governance, legal issues, and sustainability in an attempt to move the firm back to the growth stage.

Because mature firms have stable earnings and are profitable, excess cash is more available compared to other lifecycle stages. Operating cash flows in mature firms are positive as they decrease investments and maintain capital; in addition, their profit margins are larger from increasing investment efficiency (Spence 1977, 1979, 1981; Jovanovic, 1982; Wernerfelt 1985; Dickinson, 2011). Dickinson (2011) argues that mature firms begin to service debt and distribute cash or repurchase equity to shareholders, resulting in negative financing cash flows.

Excess cash can also be used for value-destroying investments. Hribar and Yehuda (2015) show that when a firm reaches a steady state, changes in working capital accruals and cash from operations exhibit a negative relation as capital expenditures mainly serve replacement purposes. Koh et al. (2015) suggest that mature firms are less likely to take on innovative or risky strategies. Because mature firms have substantially lower Tobin's Q, they are expected to undertake fewer acquisitions and prefer to use cash as mode of payment (Arikan and Stulz, 2016). Owen and Yawson (2010) find that the corporate lifecycle of mature firms is positively related to the probability of a deal being negotiated but negatively related to tender offers as they are willing to engage actively in merger and acquisition negotiations. Thus, firms are more likely to make wealth-destroying acquisitions when they are mature (Arikan and Stulz, 2016). Because sufficient earnings and lack of profitable reinvestment are significant attributes of mature firms, the compensation arrangement in which executives are paid with more cash can help to reduce potential problems associated with excess cash. This study therefore hypothesizes that cash-based compensation is more prevalent for CEOs of mature firms. Therefore, based on Proposition 3a in Wang and Singh (2014), firms at the maturity stage pay their CEOs the highest level of total compensation.

Hypothesis 3a: *CEOs in firms at mature stage are paid with more total compensation, compared to other stages.*

Also, Proposition 3b in Wang and Singh (2014) suggests that at the maturity stage, bonuses will play a more important role in total CEO compensation, followed by stock-based pay and benefits, and then salary.

Hypothesis 3b: *CEOs in firms at mature stage are paid with more cash-based compensation, compared to other stages.*

3.4 Fourth Stage: Decline

Declining firms are characterized of poor earnings and lack of cash. Jensen (1986) suggests that, based on the agency theory, firms acquire and diversify later in their lifecycle as firm's valuable growth opportunities declines over time. The declining stage is typically characterized by falling sales and earnings and increasing unutilized production capacity (Hribar and Yehuda, 2015). Dickinson (2011) finds evidence that this stage is associated with negative earnings per share, return on net operating assets, and profit margin, making investment in these firms less attractive. Banyi and Kahle (2014) also note that older firms are likely to pay dividends even if retained earnings are low. Thus, the cost of equity is higher in the declining stage (Hasan et al. 2015).

Also, declining firms face challenges not only in poor performance and earnings but also in the decision to replace incapable management. Lynall et al. (2003) argue that the agency problem is more severe for declining firms because the business organization structure is more complex. For example, the control–ownership separation and the control–earnings deviation in declining firms are particularly significant due to ownership diversification. Denis and Kruse (2000) find that turnover in top executive positions is more likely following performance declines.

In addition, declining firms are burdened with reducing earnings and a shortage of cash. Wernerfelt (1985) points out that relatively lower growth rates in the declining stage lead to decreasing prices, further decreasing operating cash flows (Dickinson, 2011). Dickinson argues that declining firms have little need to make new investments and existing investments produce cash flows at a diminishing rate. Therefore, the value of declining firm derives primarily from existing assets. In this stage, firms may even liquidate assets to service existing debt and to support operations, resulting in positive investing cash flow. Hribar and Yehuda (2015) find that when timing issues are a potential source of the mispricing, accrual mispricing is subsumed by cash flow mispricing. Overall, risk-taking is higher in the declining stage (Habiba and Hasan, 2015).

Most reinvestment decisions in declining firms are typically made reluctantly. Davis and Stout (1992) and Owen and Yawson (2010) note that older firms suffer from

organizational inertia, making them increasingly rigid and prohibiting their active role in adapting to changes. Declining firms are less likely to make acquisition deals due to such inertia (Davis and Stout, 1992; Shimizu and Hitt, 2005). Miller and Friesen (1984) show that firms in decline prefer to make acquisitions to acquire growth opportunities as their growth is stagnant and they suffer from low profitability, further shifting their focus on raising more funds from existing operations (Thietart and Vivas, 1984). Also, older firms are more likely to negotiate with target firms to raise more potential growth opportunity than they currently need (Owen and Yawson (2010). Because older firms make inefficient, value-destroying acquisitions to benefit managers (Arikan and Stulz, 2016), markets react negatively to the acquisition deals (Koh et al., 2015; Arikan and Stulz, 2016).

Because firms in decline face increased risks, inside debt compensation performs an important alignment role between managers and creditors by reducing excessive risk-taking incentives. When CEOs receive more pension benefits, managerial agency risk for bondholders declines (Grossman and Hart, 1982) and bond covenants are fewer (Anantharaman, Fang, and Gong, 2013; Chava, Kumar, and Warga, 2010). In addition, inside debt strengthens the interest alignment by reducing debtholder demand for accounting conservatism (Lafond and Roychowdhury, 2008). Wang, Xie, and Xin (2010) note that creditors offer more attractive and less restrictive terms on loans to firms whose CEOs have higher leverage. Chen, Dou, and Wang (2011) find that inside debt is negatively related to accounting conservatism and a lower cost of debt. In addition, Anantharaman et al. (2013) find that inside debt holdings reduces debt covenant restrictions.

Managerial effort can be improved by substituting inside debt for equity-based incentives, which is particularly important when bankruptcy is likely or when the influence of managerial effort on liquidation values is high. Dewatripont and Tirole (1994) suggest that inside debt aligns managers with debtholders in bad states. Therefore, inside debt can provide better benefits than bonuses because it reduces the possibility of bankruptcy. In addition, inside debt compensation is payable after CEOs leave the firm and the firm is still stable. Sundaram and Yermack (2007) suggest that pensions act as a critical determinant of CEO turnover, and, in most cases, CEOs are much more likely to retire once their pensions become fully payable. Gerakos (2007) also finds that pension entitlements are provided in firms with growth options. Because declining firms are burdened by reduced earnings and a shortage of cash, cash-based or equity-based compensation may not provide sufficient incentives for executives. Therefore, this study argues that debt-based compensation can align the CEOs'

interests with maintaining firm survival. Therefore, this study argues that debt-based compensation can align the CEOs' interests to maintain the companies surviving.

Hypothesis 4a: *CEOs in firms at decline stage are paid with more debt-based compensation, compared to other stages.*

3.5 Transition to Distress or Revival

Firms typically transition from one stage of lifecycle to the next. A firm that moves toward and then away from default is thought of as experiencing a revival. Lifecycle theory provides management with guidelines and identification parameters to assess the transition of the firm from one stage to the next. Structural changes can cause firms to move across different lifecycle stages non-sequentially (Dickinson, 2011). Such transition from one lifecycle stage to another in subsequent periods can be cyclical in nature, and firms can maintain a position at different lifecycle stages. Firms can also move directly into decline or distress, regardless of their current lifecycle stage. Wruck (1990) argues that financial distress, default, and bankruptcy make up one of the lifecycle stages.

Entrenched executives with power over the board of directors can influence corporate decision-making. Harford and Li (2007) and Harford, Humphery-Jenner, and Powell (2012) explore how and why entrenched managers expropriate from acquisition investment and find that entrenched managers avoid acquisitions that reduce their level of entrenchment. Also, Brick, Palmona, and Wald (2006) and Core, Holthausen, and Larcker (1999) find that CEOs have excessive levels of pay when they have relatively more power over the board. Entrenched managers seek to avoid additional monitoring. Shleifer and Vishny (1989) note that entrench managers make the firm more costly to replace them, and Harford et al. (2012) find that entrenched managers are more likely to use cash to avoid several benefits from equity transaction. Therefore, entrenched CEOs' higher power and lack of monitoring negatively affect their firms. Therefore, this study hypothesizes that executives with self-dealing attributes in firms across lifecycle stages will cause the firm to transition into distress.

Hypothesis 5a: *Firms are more likely to transit from other stages to distress stage if the entrenched CEOs acquire self-serving benefits from their boards.*

Distressed firms are faced with unique challenges that require support from the board of directors and executives. Firms in distress have a propensity to reduce dividends to preserve funds to ensure the survival and/or revival of the firm (DeAngelo and DeAngelo, 1990; Mueller, 1972), thereby reducing their attractiveness to investors. Koh et al. (2015) suggest that distressed mature firms are less likely to raise equity than firms at other lifecycle stages

as they are less likely to have investment opportunities and willing investors (Mueller, 1972). Thus, distressed firms encounter problems related to funding and operation that require more capable CEO skills.

Thus, there are several problems of funding and operation in distress firms and should rely on more incentives. Proposition 4a in Wang and Singh (2014) indicates that for those CEOs holding office prior to the decline stage, they will earn the same level of total compensation as those counterparts at the growth stage. Proposition 4c also notes that at the decline stage, stock-based pay will play a major role in total compensation for those CEOs holding office prior to the decline stage, followed by benefits and bonuses, and then salary. Proposition 4b further suggests that for those CEOs hired during the decline stage, they will earn the same level of total compensation as those counterparts at the maturity stage; while Proposition 4d notes that at the decline stage, stock-based pay will play a major role in total compensation for those CEOs hired during the decline stage, followed by bonuses, benefits and then salary. Therefore, we hypothesize that CEO compensation structures play a crucial role in firms transiting different life cycle stages.

Hypothesis 5b: *Firms will transit from distress stage back to growth or mature stage if the CEOs are provided with more compensation incentives.*

4. Data Selection and Research Methodology

To explore CEO's compensation arrangement in different lifecycle stages, this study adopts regression models in which the CEO's individual compensation are regressed by corporate organisation lifecycle stages. The data, variables, and proposed regression models are specifically identified, followed by the expected findings and further development of this research.

4.1 Data Selection Procedure

The original sample of this research focused on the U.S. publicly listed corporations from 2006[6] to 2013. We gathered CEO individual compensation components: salary and bonus, option granted and shares held information, pension and deferred compensation and characteristics of individual from the ExecuComp. Accounting and firm characteristics are gathered from Compustat, and the stock returns information are from CRSP. ExecuComp provides the top

[6] We start the sample period from 2006 because the pension and deferred compensation for executive compensation are required to disclose after this year.

executives characteristics and compensation information for S&P 1500 firms. The financial (SIC codes 6000-6999) and utility (SIC codes 4900-4999) firms were removed from the sample because of different accounting report standard for those companies. We also dropped the observations with missing accounting, firm, stock returns, CEO compensation and the lifecycle stage information. The primary sample size between the sample period is 15230. After eliminating financial firms, utility firms, and missing value, the final sample size is 7009 observations[7]. Table 1, panel A reports the sample selection procedure. Panel B provides the sample distribution across years. In 2006, there are only 155 firms, which is slightly lower than other years. The main reason of smaller size in this year is because there were many missing value in CEO's pension and deferred compensation data. As SEC expended the compensation disclosure requirement in 2006, ExecuComp maybe did not collect those information on time.

4.2 The Regression Model

The objective of this study is focused on the impact of different lifecycle stages to CEO compensation components. The primary model is as follows:

$$CEO\ Compensation_{i,t} = \alpha + \beta_1 LifeCycle_{i,t} + \sum_{k=1}^{K} \gamma_k CEO_{k,i,t} + \sum_{r=1}^{R} \delta_r FIRM_{r,i,t} \qquad (1)$$

Where dependent variable *CEO Compensation* measures the CEO compensation components, such as cash based compensation ratio, equity-based compensation ratio and debt-based compensation ratio. *LifeCycle* is the variable identified the organisation lifecycle stage in the firm, *CEO* is a vector of K variables characterising the CEO characteristics, and FIRM is a vector of R variables formulating the accounting and firm characteristics. Both CEO and FIRM vectors are control variables in this study. Subscripts i and t reflect firm and year, respectively.

The dependent variables, CEO compensation, are comprised by three major component ratios. The measurements of compensation component ratio in each firm are as follows:

$$Cash-based\ Compensation: CashComp = \frac{(Salary+bonus)}{Total\ Compensation}$$

$$Equity-based\ Compensation: EquityComp = \frac{(options\ value + shares\ value)}{Total\ Compensation}$$

$$Debt-based\ Compensation: DebtComp = \frac{(pension + deferred\ compensation)}{Total\ Compensation}$$

Where total compensation of a CEO is the sum of salary, bonus, granted option value, shareholding value, pension and deferred compensation. We use logarithm of total compensation (*TotalComp*) to test hypotheses. The value of share held by the CEO is calculated

[7] There are several methods of lifecycle stages identification, therefore the actual final sample size are different under different lifecycle measurements.

by the number of shares held (including restricted shares) times by the share price at the firm's fiscal year end. The granted option value is measured by using Black and Schole (1973) option pricing model. The details of option granted valuation are provided by appendix 1 (?). In addition, we also incorporate two compensation related measurements in our study: CEO debt to equity ratio (*DE*) and CEO pay for performance ratio (*PP*). CEO debt to equity ratio is measured as sum of CEO pension and deferred compensation divided by CEO option value and shares held value. CEO pay for performance ratio is CEO option value divided by total compensation.

Corporate lifecycle stage is difficult to be identified as adjacent stages would be composite of distinct but overlapping stages. Recent finance and accounting literatures tend to use unique attributes and theory to address different corporate lifecycle stages, such as use firm size and age to identifying lifecycle (e.g. Bhattacharya et al., 2004; Khan and Watts, 2009; DeAngelo et al., 2010; Arikan and Stulz, 2016); use ratio of retained earnings (e.g., DeAngelo et al., 2006, 2010; Banyi and Kahle, 2014; Hasan et al., 2015); use descriptor composition (Anthony and Ramesh, 1992; Koh et al., 2015) or use net cash flow patterns (Dickinson, 2011; Habiba and Hasan, 2016). In this research, we focused on using descriptor composition to identify firm's lifecycle[8]. Following Anthony and Ramesh (1992) and Koh et al. (2015), four descriptors (annual dividends scaled by income, percentage of sales growth, capital expenditure as a proportion of a firm value, and the age of the firm) are used to classified firms into four lifecycle stages: birth, growth, maturity and decline. The details of measuring each descriptor in each firm are as follows:

$$Annual\ dividend\ as\ a\ percentage\ of\ income\ (DP)\text{: } DP_t = \left(\frac{DIV_t}{IBED_t}\right) \times 100$$

$$Percent\ sales\ growth\ (SG)\text{: } SG_t = \left(\frac{SALES_t}{SALES_{t-1}}\right) \times 100$$

$$Capital\ expenditure\ to\ firm\ value\ (CEV)\text{: } CEV_t = \left(\frac{CE_t}{VALUE_t}\right) \times 100$$

$$Age\ of\ the\ firm\ (Age)$$

Where DIV_t is the common dividends for a firm in year t, $IBED_t$ is the income before extraordinary items and discontinued operations in year t. $SALES_t$ is the net sales in year t, CEt is the capital expenditure in year t, $VALUE_t$ is the market value of equity plus book value of debt in year t and AGE_t is the number of years where information is available for the firm on CRSP/Compustat in year t.

[8] We also robustly tested the results by using other three methods.

After calculating the four descriptors for each year and for each sample firm, the median value of prior five years' data (from current year to the five previous years) of firm-year descriptors are grouped based on the two digits Standard Industry Classification (SIC) codes as industries are varied in their dividend payment, sales growth, capital expenditure and age. Anthony and Ramesh (1992) claims that this approach can control the industry effects. The median values of the firm-year descriptors for each industry are further split into quartiles by lifecycle category, given a score of 1 for introduction stage if the median values are less than the first quartile, 2 for growth stage if the median values are between the first and the second quartile, 3 for mature stage if the median values are between the second and the third quartile, and 4 for decline stage if the median value are above the third quartile. Next, the scores are tallied for each firm-year median values and all observations are further split into quartiles again for categorizing into a lifecycle classification based on the quartiles. A firm under first quartile is classified as a young firm (*Young*), under second quartile is classified as a growth firm (*Growth*), under third quartile is classified as a mature firm (*Mature*) and under fourth quartile is classified as a decline firm (*Decline*).

We controlled both CEO characteristics and economic effects as both have significant impact to CEO compensation structure from past literature (e.g. Smith and Watts, 1992; Core, 1997; Elloumi and Gueyie, 2001; Chhaochharia and Grinstein, 2009). CEO characteristics[9] included Committee dummy and CEO age. *Committee* is a dummy variable equals one if the CEO is a member in the compensation committee and zero otherwise. CEO age (*Age*) is the logarithm of the age of CEO. For firm characteristics, we controlled cash surplus ratio (*Cash*: sum of net cash flow without depreciation expenses divided by total assets), dividend payout ratio (*Div*: sum of dividend paid and repurchase divided by net income), Investment ratio (*Invest*: property, plant and equipment), leverage ratio (*Lev*: long term debt divided by total assets), R&D expenses ratio (*RD*: research and development expenditures divided by net sales), Market to book ratio (*MB*: the market value of equity divided by the book value of assets) and volatility (*Vol:* the standard deviation of the monthly stock returns over the fiscal year). The year and industry effects are controlled by year dummies and two-digit industry dummies, respectively. All regression examined by clustered robust standard errors at the firm level.

5. Results

[9] The other two variables: CEO duality and gender, were dropped from the model. Because large majority of the CEOs are not serving as director on the board and are male.

5.1 Descriptive Statistics and correlations

Table 2 reports the descriptive statistics for the sample of firms. In CEO compensation, average total compensation across the sample period is around US$88 million. The median level of the total compensation is slightly lower than mean value, which is $20 million. This shows that certain companies provided very high total compensation to their CEO. If we classified the CEO compensation into three components: cash-based, equity-based and debt-based. Average equity-based compensation is around $82 million, which is composed 90% of the total compensation. Cash-based compensation is only $1 million on average and another $5 million on average is debt-based compensation. This shows that companies provided large number of options and shares to CEO as an incentive in their compensation package. The average CEO debt to equity ratio is around 30%. However, the median value of the CEO debt to equity ratio is just 3.4%. This means few companies provided very high debt-based compensation with very little equity-based compensation to their CEO. The average equity options to total compensation is 28.7%. This shows that companies usually offer certain percentage of options as incentive to CEO, this amount is relatively smaller than the shares held by CEO.

For CEO characteristics, there are 97.1% of CEOs in the sample sit in the compensation committee. The average age of CEOs is 55 years old, the median age is 56 years old, which is very close to the average age. For firm characteristics, average cash surplus is 5.9%, the average dividend payout ratio is 15.5%, the fixed assets investment is averagely around 51.5% of total assets, the leverage ratio is 18%, the average ratio of research and development expenses to net sales is 4.9%, the average market to book ratio is 1.308 and finally, the volatility is 2.8% for our sample.

Table 3 illustrates the discrepancy statistics among different lifecycle stages and CEO compensation components. Compare to the firms in the mature and decline stages, the younger firms usually have lower CEO total compensation, averagely $60 million. For firms in mature or decline stages, the average total compensation is more than $100 million. The equity-based compensation comprised highest proportion across four lifecycle stages, that more than 75% of the compensation are options and shares. Younger firms usually provide higher proportion of equity-based compensation in CEO's compensation packages compared with other three stages. This proportion is gradually decreased from young to decline stages. However, the debt-based compensation is gradually increased across those four stages.

Table 4 shows the Pearson correlation matrix of the main variables. The correlation among independent variables are not high. That the possible multicollinearity issue can be avoided. The correlation among firms under different lifecycle stages and CEO compensation

components are closed to the hypotheses prediction. For example, young firm has lower CEO total compensation compared to firms in other lifecycle stages as the young firm dummy is negative correlated to total compensation at the 1% level. This partially confirmed **H1a** that firms at young stage are paid with fewer total compensation to their CEO, compared to other stages.

5.2 Regression results

We run fixed-effect panel OLS regression with year and industry dummies. The dependent variables are the CEO compensation components: total compensation, cash-based compensation, equity-based compensation, debt-based compensation, CEO debt to equity ratio and pay for performance measurement. We test those CEO compensation components on different lifecycle stages dummies with CEO and firm characteristics control variables. We also control year and industry effect by adding year and industry dummies.

Table 5 presents the OLS regression results for the hypotheses. Model 1-3 illustrates the CEO compensation package in the younger firms. In model 1, CEO total compensation is negative but not significant related to young firm dummy, which does not support H1, that CEOs in firms at introduction/young stage are paid with fewer total compensation, compared to other stages. We have also tested the sample separately, by testing young firms and firms at other stages, respectively[10]. When we tested young and growth firms, young and mature firms and young and decline firm separately, we found that only mature firms have higher CEO total compensation compared to the young firms after controlled CEO and firm characteristics. The plausible reason is the definition of young firm in the literature usually focused on the firm that is just established and usually small. However, in our study, the sample that we gathered is coming from S&P1500. They are usually well established and relatively large. Although the results are not statistically significant in certain sub-samples, the negative relationship can partially illustrate and support the hypothesis, especially CEOs in mature firms can get higher total compensation than CEOs in young firms. In Model 2 and Model 3, the results show that young firm dummy is positively significant correlated to CEO equity-based compensation and pay for performance at least at the 5% level. These results support H1b and H1c, that CEOs in firms at introduction/young stage are paid with higher equity-based compensation and more pay-for-performance sensitive compensation, compared to firms at mature and decline stage. As younger firms need more money for future investment and establishment, they are preferring to offer non-cash-based incentives to top executives in order to increase the

[10] The detail results of different sub-sample are available based upon request.

performance. The managerial ownership and option like compensation to top executives can enhance the company's share value because part of their wealth tied to the performance of the firm.

Model 4 to 7 represents the CEO compensation package in the growth firms. We grouped three sub-sample together: growth, mature and decline firms, the result shows that the growth firm dummy is negative but not significant different to CEO total compensation. This result does not support H2a. Also, when we test whether CEOs in firms at growth stage are paid with more total compensation compared to introduction/young stage, the result also not supported. The predicted sign is correct but not significant. However, we re-tested H2a by separate it as two-subsamples: growth and mature and growth and decline, we found that CEOs in firms at growth stage received less total compensation compared to the CEOs at mature firms, but received higher total compensation compared to CEOs at decline firms after controlled CEO and firm effects. Both are statistically significant at the 5% level. This is the reason why we may not get a significant result for H2a. For model 6, the growth firm dummy is statistically positive significant related to CEOs equity-based compensation when we test growth, mature and decline firms together. This result supports H2c, that CEOs in firms at growth stage are paid with more equity-based compensation, compared to CEOs in firms at mature and decline stage. However, CEOs pay-for-performance sensitive compensation has no significant but positive relation to the growth firm dummy, which does not support H2d. If we separate tested H2d by pooling growth and mature firms, and growth and decline firms, respectively, CEOs in firms at growth stage have higher option like compensation compared to CEOs in firms at decline stage. This implies that firms in growth stage provided higher stock incentives partially higher option like incentives to their CEO.

In model 8, the result indicates that mature firms provided higher total compensation to their CEO compared to other counterparts. The mature firms have high and stable profit, and usually have more experience in their industry. The investment need is relatively lower than firms under young and growth stage. Therefore, they have more money to offer. Model 9 and 10 illustrates the CEO compensation package in firms at decline stage. Confirmed H4a and b, CEOs in firms at decline stage are paid with more debt-based and cash-based compensation, compared to CEOs in firms at other stages.

For the control variables, we summarize those factors under different CEO compensation components. The remuneration committee dummy is positive and significant related to CEO total compensation in some models. This implies that CEO sit at the remuneration committee increases his/her own total compensation. Older CEO has higher total compensation, this

confirmed by CEO age is positively significantly correlated to CEO total compensation at the 1% level. Older CEO also has higher proportion of debt-based compensation, but lower proportion of equity-based and cash-based compensation. For firm characteristics, higher cash surplus and market-to-book ratio increase CEOs total compensation, equity-based and option like compensation, but decrease cash-based and debt-based compensation. Dividend is positively significant related to CEO total compensation but negatively significant correlated to equity-based and option like compensation in some models. Higher investment decreases CEO total compensation, equity-based and option like compensation, but increases cash and debt-based compensation. Higher proportion of leverage ratio increases CEO total compensation, equity-based, pay-for-performance and debt-based compensation, but decreases cash-based compensation in majority of models. For the research and development expenses, companies spend more money in R&D decrease total compensation and proportion of debt-based compensation paid to CEOs, but increase the proportion of equity-based and option like compensation that the CEOs received. Finally, higher volatility increases the risk associated to the firm, it has significantly negative impact to CEO's compensation package at the 1% level. Only proportion of CEO's cash-based compensation is positively associated with stock volatility. That if stock price is volatile, higher cash-based compensation can be a safer way to secure the salary level of the CEOs.

6. Conclusion

In this study, we argue that firms would need to adjust CEO compensation incentives at different corporate lifecycle stages. Specifically, we examine a research question of whether the CEOs' compensation structures are influenced by different corporate lifecycle stages. Using the data of the US listed non-financial firms from 2006 to 2014, we find that firms experiencing corporate lifecycles adjust CEO compensation structure to satisfy their needs at different lifecycle stages. Specifically, firms at the young and growth stages prefer to adopt more incentives of equity and pay-for-performance compensation arrangement, suggesting that firms at the young and growth stages provide more equity-based incentives for their CEOs to bring greater growth in business and equity price, further increasing the shareholders' value. Therefore, the equity compensation arrangement can be highly aligned with business vision for the young/growth firms. However, in contrast, firms at mature and decline stages are more likely to provide cash- or debt-based compensation (pension and deferred compensation) to stabilize their business and operation. Our research is the first to link corporate lifecycle theory

from financial decisions to CEOs compensation structure. It also explains why firms transit among different lifecycle stages from the perspectives of CEO compensation incentives.

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Table 1 Sample selection and distribution

	Observations	
Panel A. Sample selection		
Primary sample	15230	
Less: Financial and utility companies	(3513)	
Missing value for CEO compensation	(3726)	
Missing value for accounting and stock information	(412)	
Missing value from measuring lifecycle stages under Koh et al.'s (2015) approach.	(570)	
Final Sample	7009	
Panel B. Sample distribution across years		
Year	Observations	Percent
2006	155	2.21%
2007	1087	15.51%
2008	1054	15.04%
2009	937	13.37%
2010	900	12.84%
2011	1038	14.81%
2012	974	13.89%
2013	864	12.33%

Table 2 Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	25%	Median	75%
CEO Compensation						
Total compensation (in million $)	7009	88.467	871.01	8.510	20.474	50.881
Cash-based compensation (in million $)	7009	1.028	1.684	0.599	0.831	1.077
Equity-based compensation (in million $)	7009	82.198	870.254	6.509	16.377	41.772
Debt-based compensation (in million $)	7009	5.240	13.128	0	0.558	4.446
Debt-equity ratio	7009	0.302	2.848	0	0.034	0.232
Pay for performance ratio	7009	0.287	0.232	0.093	0.239	0.436
CEO Characteristics						
Committee	7009	0.971	0.167	1	1	1
CEO age	7009	55.66	6.897	51	56	60
Firm Characteristics						
Cash surplus	7009	0.059	0.081	0.023	0.061	0.103
Dividend	7009	0.155	0.467	0	0	0.254
Investment	7009	0.515	0.374	0.216	0.409	0.745
Leverage	7009	0.180	0.172	0.008	0.157	0.277
R&D	7009	0.049	0.086	0	0.006	0.059
Market to book ratio	7009	1.308	1.036	0.622	1.029	1.659
Volatility	7009	0.028	0.014	0.019	0.025	0.034

Table 3 Discrepancy Table

	Young	Growth	Mature	Decline	Distress
Cash-based Compensation (%)	0.083	0.086	0.079	0.069	0.108
Equity-based compensation (%)	0.854	0.822	0.799	0.760	0.738
Debt-based compensation (%)	0.063	0.092	0.122	0.171	0.153
Total Compensation (in million $)	60.010	53.089	134.427	104.400	129.954

Table 4 Correlation between Main Variables

	2	3	4	5	6	7	8	9	10 Dividend
1. Total compensation	-0.69***	0.34***	0.10***	-0.024**	-0.08	0.03**	0.19***	0.32***	0.09***
2. Cash-based compensation		-0.51***	-0.11***	0.016	-0.11***	-0.04**	-0.09***	-0.32***	-0.07***
3. Equity-based compensation			-0.79***	-0.25***	0.25***	0.007	-0.08***	0.23***	-0.04***
4. Debt-based compensation				0.27***	-0.21***	0.02	0.16***	-0.04***	0.10***
5. Debt to equity ratio					-0.07***	0.005	0.04**	-0.06***	-0.001
6. Pay for performance						-0.021*	-0.17***	0.13***	-0.08***
7. Committee							0.007	0.04**	0.02*
8. CEO age								-0.04***	0.05***
9. Cash surplus									0.09***
	11	12	13	14	15	16	17	18	19 Decline
1. Total compensation	-0.02**	0.08***	-0.11***	0.24***	-0.38***	-0.06***	-0.06***	0.02**	0.09***
2. Cash-based compensation	0.08***	-0.007	0.05***	-0.24***	0.38***	0.02	0.03***	-0.001	-0.05***
3. Equity-based compensation	-0.16***	-0.12***	0.13***	0.32***	-0.17***	0.14***	0.04***	-0.02**	-0.15***
4. Debt-based compensation	0.13***	0.14***	-0.18***	-0.31***	-0.06***	-0.17***	-0.07***	0.03***	0.21***
5. Debt to equity ratio	0.04***	0.02	-0.04***	-0.06***	0.06***	-0.03***	0.01	0.001	0.01
6. Pay for performance	-0.18***	-0.07***	0.21***	0.26***	-0.09***	0.02*	0.01	0.006	-0.04***
7. Committee	0.02	-0.007	-0.03**	-0.01	-0.03**	-0.03***	-0.01	0.004	0.04***
8. CEO age	0.09***	0.04***	-0.08***	-0.07***	-0.06***	-0.05***	-0.01	0.01	0.04***
9. Cash surplus	-0.08***	-0.14***	-0.15***	0.44***	-0.28***	-0.01	-0.04***	-0.04***	0.09***
10.Dividend	0.05***	0.04***	-0.08***	0.05***	-0.16***	-0.12***	-0.09***	0.009	0.20***
11 Investment		0.17***	-0.29***	-0.17***	0.09***	0.06***	-0.01	0.01	-0.05***
12 Leverage			-0.19***	-0.29***	0.04***	-0.03**	-0.03**	0.02**	0.03***
13. R&D				0.25***	0.06***	-0.002	0.06***	0.005	-0.07***
14. Market to book ratio					-0.24***	0.02	-0.002	-0.05***	0.03***
15. Volatility						0.09***	0.07***	0.008	-0.17***
16. Young							-0.32***	-0.33***	-0.33***
17. Growth								-0.34***	-0.34***
18. Mature									-0.34***

Significance is indicated by ***, ** and * for the 1%, 5%, and 10% levels, respectively.

Table 5 Fixed-effect Panel OLS regression on CEO compensation, lifecycle stages and control variables

Hypothesis	H1a	H1b	H1c	H2a	H2b	H2c	H2d	H3	H4a	H4b
	Totalcomp	Equitycomp	PP	Totalcomp	Totalcomp	Equitycomp	PP	Totalcomp	Cashcomp	Debtcomp
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Young	-0.031 (0.033)	0.818 (0.005)***	0.015 (0.006)**							
Growth				-0.044 (0.034)	0.01 (0.039)	0.045 (0.005)***	0.008 (0.006)			
Mature								0.111 (0.033)***		
Decline									0.014 (0.003)***	0.064 (0.004)***
Committee	0.160 (0.081)**	0.004 (0.016)	-0.0008 (0.017)	0.147 (0.101)	0.145 (0.104)	0.027 (0.017)	-0.01 (0.019)	0.161 (0.082)*	-0.018 (0.01)*	-0.002 (0.01)
Age	2.040 (0.120)***	-0.07 (0.019)***	-0.229 (0.024)***	2.151 (0.144)***	1.834 (0.154)***	-0.071 (0.019)***	-0.295 (0.025)***	2.038 (0.120)***	-0.087 (0.01)***	0.148 (0.013)***
Cash	2.297 (0.227)***	0.233 (0.043)***	0.039 (0.046)	2.292 (0.256)***	2.422 (0.314)***	0.188 (0.039)***	0.127 (0.047)***	2.307 (0.228)***	-0.219 (0.026)***	-0.031 (0.026)
Div	-0.008 (0.034)	-0.007 (0.006)	-0.031 (0.006)***	-0.032 (0.037)	0.129 (0.064)**	-0.011 (0.005)**	-0.033 (0.006)***	-0.006 (0.034)	-0.0001 (0.003)	0.007 (0.005)
Invest	-0.261 (0.054)***	-0.057 (0.01)***	-0.085 (0.011)***	-0.223 (0.064)***	-0.254 (0.076)***	-0.059 (0.01)***	-0.088 (0.011)***	-0.264 (0.054)***	0.021 (0.006)***	0.039 (0.006)***
Lev	1.065 (0.108)***	0.008 (0.017)	0.054 (0.019)***	1.007 (0.123)***	1.337 (0.144)***	0.002 (0.017)	0.094 (0.020)***	1.067 (0.108)***	-0.056 (0.02)***	0.055 (0.012)***
RD	-0.750 (0.209)***	0.198 (0.034)***	0.274 (0.045)***	-1.020 (0.23)***	-0.439 (0.298)	0.176 (0.032)***	0.293 (0.047)***	-0.756 (0.209)***	0.025 (0.022)	-0.192 (0.02)***
MB	0.269 (0.020)***	0.034 (0.003)***	0.04 (0.004)***	0.236 (0.024)***	0.368 (0.027)***	0.04 (0.003)***	0.033 (0.004)***	0.271 (0.02)***	-0.016 (0.0015)***	-0.022 (0.002)***
Vol	-40.357 (1.603)***	-1.500 (0.322)***	-1.466 (0.304)***	-41.61 (1.898)***	-37.89 (2.11)***	-1.506 (0.313)***	-1.415 (0.308)***	-40.416 (1.589)***	3.384 (0.211)***	-1.667 (0.213)***
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistics	47.79***	22.71***	18.87***	43.28***	27.72***	25.53***	22.50***	49.57***	14.76***	34.78***
Adj R^2	0.3211	0.2268	0.1945	0.3433	0.3554	0.2436	0.2095	0.3222	0.2595	0.2178
MSE	1.153	0.165	0.194	1.152	1.1061	1.667	0.203	1.1522	0.267	0.1435
N	7009	5256	5256	5311	3441	5321	5321	7009	7009	7009
Sample	Whole sample	Young, Mature and Decline	Young, Mature and Decline	Growth, Mature and Decline	Young and Growth	Growth, Mature and Decline	Growth, Mature and Decline	Whole sample	Whole sample	Whole sample

Appendix 2 Summary of variable definition

	Variable	Definition
Life cycle Stage	Young firm (*Young*)	A dummy variable equals one if company is classified as a young firm and zero otherwise.
	Growth firm (*Growth*)	A dummy variable equals one if company is classified as a growth firm and zero otherwise.
	Mature firm (*Mature*)	A dummy variable equals one if company is classified as a mature firm and zero otherwise.
	Decline firm (*Decline*)	A dummy variable equals one if company is classified as a decline firm and zero otherwise.
	Distress firm (*Distress*)	A dummy variable equals one if a firm experienced two consecutive years of falling distance-to-default and zero otherwise.
CEO Compensation	Total compensation (*TotalComp*)	Logarithm of the sum of salary, bonus, stock awards, options grant, pension, and deferred compensation
	Cash-based compensation (*CashComp*)	The ratio of sum of salary and bonus to total compensation
	Equity-based compensation (*EquityComp*)	The ratio of sum of stock awards and options grant to total compensation. Stock Award is the value of stock held by CEOs (including unvested restricted stock). Options Grant is the aggregate value of stock options granted to the executive during the year as valued using Black-Scholes methodology.
	Debt-based compensation (*DebtComp*)	The ratio of sum of pension and deferred compensation to total assets
	Debt-equity ratio (*DE*)	The ratio of debt-based compensation to equity-based compensation
	Pay for performance (*PP*)	The ratio of option grant to total compensation
CEO Characteristics	Committee (*Committee*)	A dummy variable equals one if the CEO is a member in the compensation committee
	CEO age (*Age*)	Logarithm of the age of CEO
Firm Characteristics	Cash surplus (*Cash*)	The ratio of sum of net cash flow with deduction of depreciation expenses to total assets
	Dividend (*Div*)	The ratio of sum of dividend paid and repurchase to net income
	Investment (*Invest*)	The ratio of property, plant and equipment to total assets
	Leverage (*Lev*)	The ratio of long term debt to total assets
	R&D (*RD*)	The ratio of research and development expenditures to net sales
	Market to book ratio (*MB*)	The ratio of the market value of equity to the book value of assets
	Volatility (*Vol*)	The standard deviation of the monthly stock returns over the fiscal year