The Economic Effects of Tournament Incentives in CDS Firms

Abstract

In this paper, we evaluate the economic effect of tournament incentives in CDS referenced firms. We find that intra-firm tournament incentives are negatively related to CDS spreads. Our results suggest that tournament incentives reduce credit risk by alleviating the potential for underinvestment when managers are concerned about exacting empty creditors. Further, we find that tournament incentives decrease CDS spreads when product market competition is intense. Taken together, our results suggest that creditors perceive senior manager tournament incentives as a critical determinant of a firm's credit risk, particularly in settings where managerial risk aversion is high.

Key Words: Managerial tournament incentives; Credit risk; Credit default swaps
JEL Classifications: G32, G34, J31

1. Introduction

Recently, a growing stream of literature has focused on evaluating whether intra-firm rank order tournaments are effective in alleviating agency conflicts arising largely because of moral hazard and differences in risk preferences between diversified shareholders and underdiversified risk-averse managers (Kale et al., 2009; and Kini and Williams, 2012). The basic premise underlying this stream of literature is twofold, i.e., that the compensation of one executive affects the incentives of others and that senior managerial incentives shape firm risk-taking behavior (Chava and Purnanandam, 2010; Geczy et al., 2007; Kale et al., 2009; and Kini and Williams, 2012). In a typical intra-firm rank order tournament, the best performer among senior executives wins the tournament and is promoted to the CEO position. The higher pay and prestige that comes with the promotion is expected to motivate senior managers to expend additional effort to increase their likelihood of winning the tournament (Kale et al., 2009). Further, managerial effort level is expected to rise with the size of the prize and the probability of winning the tournament (Kale et al., 2009; Lazear and Rosen, 1981; and Prendergast, 1999). In addition to managerial effort, tournament incentives are expected to promote risk-taking behavior since, in equilibrium, each executive has an incentive to undertake projects riskier than the current portfolio to increase her chances of winning the tournament (Goel and Thakor, 2008). Overall, empirical evidence supports the above described predictions of tournament theory, i.e., that the inherent optionality present in CEO and intra-firm tournaments provide managers with distinct and incremental benefits over option-based compensation incentives to work harder and pursue riskier but value-enhancing firm policies (Coles et al., 2017; Kale et al., 2009; and Kini and Williams, 2012).

Despite the growing literature on the economic impact of managerial tournaments in alleviating agency conflicts between shareholders and managers, their corresponding impact on the agency cost of debt remains an unexplored area of research. Research suggests that the agency cost of debt can increase either when managerial incentives promote underinvestment or alternatively when they are structured to encourage risk-shifting behavior, i.e., undertaking projects that are riskier than the current portfolio (Jensen and Meckling, 1976; Myerrs 1977). As suggested in the literature, rank order tournaments have two distinct

effects on managerial behavior, i.e., motivate them to expend additional effort and promote risk-taking behavior. While the former can be beneficial to both stockholders and bondholders since it reduces the potential for underinvestment and inefficiency, the latter potentially benefits shareholders at the expense of bondholders. Therefore, the net impact of intra-firm tournaments on bondholder value likely depends on whether the benefits from the reduced potential for underinvestment outweigh the costs to them from risk-shifting behavior or vice versa. However, the question as to whether managerial tournament incentives enhance both stockholder and bondholder value or alternatively, facilitate a wealth transfer from bondholders to stockholders remains an unaddressed area of research that is vital to gain an understanding of the overall economic impact of managerial tournaments on the providers of capital.

Central to addressing the above research question requires an evaluation of how managers respond to risk-taking incentives when they are forced to balance the interests of both shareholders and bondholders. Specifically, alternative bondholder governance regimes are likely to differentially influence how managers react to risk taking incentives generated by rank order tournaments. For instance, research suggests that CEOs are less likely to engage in risk shifting and may even reduce firm risk despite the presence of compensation driven risk-taking incentives when they are concerned about default risk or stringent bondholder covenants (Milidonis and Stathopoulos, 2014). Further, managerial risk aversion in levered firms is largely driven by career concerns arising from job security and reputational effects (Amihud and Lev, 1981; Grossman and Hart, 1982; and Hirshleifer and Thakor, 1992). Overall, research suggests that managerial risk preferences are derived from a tradeoff between the positive wealth effects versus the negative career and reputational effect arising from the pursuit of risky policies (Smith and Stulz, 1985; Guay, 1999; and Milidonis and Stathopoulos, 2014). As such, it is important to gain insights as to whether the effectiveness of risk-taking incentives arising from rank order tournaments may be diluted in settings where bondholder power is strong and/or managerial risk aversion is especially high due to career and reputational concerns arising from increased default risk.

Therefore, to gain a more complete picture of the overall economic impact of rank-order tournaments incentives, we attempt to address two related research questions of interest, i.e., whether

tournament incentives positively or negatively affect the value of bondholder claims as well as whether managerial embrace of risk-taking incentives is contingent on the extent of bondholder power. Our study attempts to address these two research questions by examining the impact of senior manager tournament incentives (henceforth *SMTI*) on firm credit risk in the context of Credit Default Swap (CDS) referenced firms. As discussed below, we focus on CDS referenced firms since the CDS market provide us with an ideal platform to evaluate the effectiveness of risk-taking incentives when managers face competing pressure from stockholders as well as bondholders.

The CDS market has demonstrated rapid growth and influence over the past two decades and provides an efficient mechanism to facilitate risk sharing as well as risk transfer (Saretto and Tookes, 2013). Additionally, CDS trading tends to fundamentally reshape the relationship and balance of power between creditors and borrowers that can lead to changes in firm risk, borrowing costs, credit supply, and corporate policy choices (Bolton and Oehmke, 2011; Saretto and Tookes 2013; Li and Tang, 2016; and Subrahmanyam et al., 2014, 2017). Further, the CDS market represents an interesting and unique setting to examine the impact of managerial tournament incentives on the agency cost of debt for several reasons. *First*, research suggests that firm risk and default risk tend to increase after initiation of CDS trading (Saretto and Tookes, 2013; and Subrahmanyam et al., 2014). An increase in firm and/or default risk can simultaneously exacerbate differences in risk preferences between managers and shareholders while more closely aligning risk choices of managers and bondholders. For instance, research suggests that risk shifting becomes even more valuable to shareholders when firm risk and/or default risk is high (Eisdorfer, 2008). On the other hand, CDS trading is likely to further increase managerial risk aversion due to career concerns arising from increased default risk. Therefore, the CDS market provides us with an opportunity to evaluate the effectiveness of tournament incentives in shaping managerial risk behavior when faced with starkly different risk preferences among shareholders, managers, and bondholders. *Second*, research suggests that CDS trading affects lender monitoring incentives as well as their bargaining power over borrowers. These two effects are likely to differentially influence how managers are likely to react to risk-taking incentives. For instance, on the one hand, due to the ability to hedge credit risk, CDS trading leads to an increase in the

credit supply and reduced incentives for bondholders to monitor borrowers (Bolton and Oehmke, 2011; Bolton et al., 2011; Parlour and Winton, 2013; and Subrahmanyam et al., 2017). Weakened lender monitoring provides managers with the greater flexibility to engage in risk shifting behavior preferred by shareholders (Campbello and Matta, 2012; Karolyi, 2013; Parlour and Winton, 2013; and Subrahmanyam et al., 2017). On the other hand, CDS trading allows lenders to gain bargaining power over borrowers and become more exacting in renegotiations, particularly when firms face financial distress, leading to the "empty creditor" problem (Bolton and Oehmke, 2011; and Subrahmanyam et al., 2017). When faced with the possibility of exacting empty creditors, career concerns due to the fallout from inefficient recapitalizations or liquidation can increase managerial risk aversion, which in turn reduces the likelihood of their engaging in risk shifting behavior. Therefore, a focus on the CDS market provides a laboratory to evaluate the extent risk-averse managers can be induced to pursue risky projects when simultaneously facing incentives to increase as well as decrease firm risk from the providers of capital. *Finally*, we focus on the CDS market since research suggests that CDS spreads represent a more efficient measure of firm credit risk relative to alternatives, largely because it is more liquid than the bond market and less sensitive to systematic and liquidity risk (Blanco et al., 2005; Forte and Pena, 2009; Garleanu and Pedersen 2011; and Nashikkar et al., 2011).

In our evaluation of the impact of *SMTI* on bondholder wealth, we initially evaluate whether there is a causal link between *SMTI* and firm credit risk. Drawing from agency theory research, we focus on two aspects of managerial behavior that can influence the extent of agency conflicts with shareholders and bondholders, i.e., preference for the "quiet life (Bertrand and Mullianathan, 2003) and risk aversion (Amihud and Lev, 1981; Coles et al, 2006; Grossman and Hart, 1982; and Smith and Stulz, 1985). Further, as suggested by tournament theory, *SMTI* can be effective in influencing managerial effort level as well as risk-taking propensity. In addition, by examining how the two opposing effects of CDS trading (reduced lender monitoring versus exacting empty creditors) influence the effectiveness of *SMTI* in addressing "quiet life" and risk-taking behavior, we formulate and test two alternative hypothesis on whether a positive or negative causal link runs from *SMTI* to firm credit risk.

The first, which we refer to as *Bondholder Alignment Hypothesis*, is based on the premise that the exacting empty creditor effect dominates the reduced lender monitoring effect in CDS referenced firms. Further, rational managers recognize incentives for powerful creditors who are less concerned about default risk, to play hardball during renegotiations that in turn could lead to the imposition of career-related and reputational costs on managers. Consequently, managers are less likely to engage in risk shifting despite *SMTI*, in order to reduce the risk of having to engage in negotiations with exacting creditors. On the other hand, under this hypothesis, *SMTI* can be effective in motivating managers to avoid the "quiet life" behavior and reduce the problem of underinvestment. Specifically, underinvestment can result in reduced cash flows that can increase the risk of managers having to engage in renegotiations with exacting empty creditors. Therefore, *SMTI* are expected to motivate managers to pursue the optimal level of investment and efficiency and win the tournament through efficiency gains rather than risk shifting. As such under this hypothesis, creditors are likely to view *SMTI* favorably, thereby suggesting a *negative* relation between *SMTI* and firm credit risk as measured by CDS spreads. On the other hand, the alternative *Inefficient Bondholder Contracting Hypothesis* is based on the premise that the reduced credit monitoring effect dominates the exacting creditor effect in CDS referenced firms. Consequently, under this hypothesis, the combination of reduced creditor monitoring and *SMTI* encourages managers to engage in risk shifting behavior and potential transfer of cash flows from bondholders to stockholders. Consequently, bondholders are likely to perceive an increase in firm risk when managers compete to win rank order tournaments. Therefore, under the *Inefficient Bondholder Contracting Hypothesis*, we would expect a *positive* relation between *SMTI* and firm credit risk.

Next, to provide additional support for our hypotheses, we examine the direction of the relation between *SMTI* and credit risk in settings that differ in terms of the extent of shareholder versus bondholder power and consequently the extent of managerial risk aversion. For instance, in situations where managers are especially concerned about exacting empty creditors, their risk aversion will be higher relative to situations where the firm is on a strong financial footing and bondholders exert limited influence. Specifically, we evaluate the direction of the relation between *SMTI* and credit risk when internal

governance is strong and product market risk is high. Focusing initially on governance, strong shareholder control and oversight makes it likely that the firm is efficiently managed, pursuing the optimal level of investment, and demonstrating strong financial performance. In such situations, since the potential for renegotiations with bondholders is low, managers are unlikely to be concerned about exacting empty creditors and consequently less risk averse. Further, the combination of strong shareholder control and weak lender monitoring increases pressure on management to respond to *SMTI* and pursue risk-shifting behavior preferred by shareholders. Therefore, we should expect a positive relation between *SMTI* and credit risk in well-governed firms. On the other hand, when shareholder control is weak, the impact of *SMTI* on credit risk will likely depend on whether the exacting empty creditor effect dominates the reduced monitoring effect or vice versa.

Similarly, research suggests that product market competition increases managerial conservatism, reduces the value of firm growth options, puts pressure on margins, and leads to higher financing constraints (Fresard and Valta, 2016; Grenadier, 2002; Leahy, 1993; and Valta, 2012). In such environments, the probability of renegotiations with exacting empty bondholders is likely to be high, thereby increasing managerial risk aversion. Consequently, in highly competitive product markets, career and reputational concerns make it unlikely that managers would respond to *SMTI* by increasing firm risk. On the other hand, managers are likely to attempt to win the tournament through efficiency gains and strong financial performance. As such, bondholders are likely to view the role of *SMTI* favorably, thereby suggesting a negative link between *SMTI* and credit risk in highly competitive product markets.

In order to test our hypotheses on the causal link between *SMTI* and CDS spreads, as well as their relation under alternative governance and product market regimes, we develop and test several empirical specifications to evaluate whether a causal link runs between *SMTI* and firm credit risk as measured by CDS spreads. In all our *SMTI* specifications, we control for the CEO effect by including measures of CEO performance-based incentives. Further, to alleviate concerns regarding endogeneity, we conduct a battery of tests. Specifically, we estimate regression specifications using lagged tournament incentive variables as well as instrumented two-stage least square regressions. Overall, consistent with the *Bondholder Alignment*

Hypothesis, we find a negative relation between our proxy for SMTI and CDS spreads. Further, the relation is statistically as well as economically significant. On average, a one standard deviation increase in *SMTI* lowers CDS spreads by 1.58 to 1.96 basis points. Finally, the negative relation between *SMTI* and CDS spreads occurs is strengthened in settings where the exacting empty creditor effect dominates, i.e., in highly competitive product markets. Further, our results suggest that stronger shareholder control does not ensure the managerial pursuit of risk shifting in settings where managerial risk aversion is high to begin with. Overall, our results suggest that *SMTI* can reduce firm risk by motivating managers to work harder and more efficiently and alleviate the underinvestment problem.

Our paper attempts to make several contributions to the literature. A growing stream of literature has attempted to analyze the determinants of CDS spreads (Callen et al., 2009; Cao et al., 2010; Batta, 2011; Kim et al., 2013; Tang et al., 2015; and Zhang et al., 2009). We add to this literature by evaluating whether and how competition among senior managers can influence CDS spreads. In addition, our study adds to the literature on rank order tournaments by providing a more complete picture of its economic impact on the providers of firm . Specifically, we extend research on the benefits of tournament incentives beyond shareholders to also include bondholders. In addition, we provide initial evidence to suggest that in settings where managerial risk aversion is high, *SMTI*, while effective in inducing extra managerial effort and efficiency, is unable to bring about a closer alignment of risk preferences between managers and shareholders. Finally, research on tournament theory has largely been silent on whether and how governance quality and product market risk influence the effectiveness of *SMTI* in aligning the risk preferences of shareholders with that of managers. We address this issue by evaluating the link between *SMTI* and CDS spreads under alternative governance and product market competition regimes.

The rest of this paper is organized as follows. In the next section, we provide a discussion of theory and hypothesis development. In section 3 we describe our data, variables of interests, and instruments. In section 4, we discuss our empirical results. Finally, the paper concludes in section 5.

2. Theoretical Discussion and Hypotheses Development

In this section, we provide a theoretical discussion on the potential causal link between *SMTI* and credit risk in CDS firms and develop our two alternative hypotheses. In addition, we evaluate the impact of governance quality and product market competition on the link between *SMTI* and credit risk. As such, in section 2.1, we develop two alternative hypotheses on the link between *SMTI* and credit risk. In section 2.2 (section 2.3), we evaluate whether and how governance quality (product market competition) influences the link between *SMTI* and credit risk.

2.1. *Senior Manager Rank Order Tournaments and Credit Risk in CDS firms*

In a typical rank order tournament, executives compete for the tournament prize which is a promotion to the next level. Such a promotion comes with higher pay and prestige that in turn motivates managers to expend additional effort to increase the likelihood of winning the promotion (Kale et al., 2009). Further, research suggests that an agent's effort increases with the size of the promotion prize and the probability of winning the tournament (Kale et al., 2009; Lazear and Rosen, 1981; and Prendergast, 1999). If each senor senior executive has the same assessment of the likelihood of promotion to CEO, then the firm can generate greater effort from them by increasing the size of the promotion prize, i.e., pay gap between the CEO and the senior executives (Bognanno, 2001). In addition to motivating managers to expend additional effort, competition among managers can also promote risk-taking behavior. For instance, Goel and Thakor (2008) model the link between tournament incentives and risk-taking behavior under the assumption that senior executives have a priori, similar level of ability. Their model predicts that in equilibrium, each executive has an incentive to undertake projects riskier than the current portfolio to increase their chance of winning the tournament. Further, the selected level of risk-taking by senior executives will increase with the size of the promotion prize.

Empirical evidence has largely supported the predictions of tournament theory models. For instance, Kale et al. (2009), using the pay gap between the CEO and senior VPs in the firm (firm pay gap) as a proxy for intra-firm tournament incentives, find that firm pay gap induces managers to expend

additional effort that in turn leads to superior firm performance. Similarly, Kini and Williams (2012) find that the channels through which firm pay gap induces managers to pursue value-enhancing but risky policies include increased R&D spending, higher leverage, and greater firm focus. In addition, Coles et al. (2017) find that competition among CEOs to secure the highest paying job in the industry motivates them to pursue risky but value-enhancing policies. Similarly, Huang et al. (2017) find that CEO tournaments increase the market value of firm liquidity, largely by providing incentives to CEOs to aggressively deploy firm cash holdings to build market share gains. Overall, the above-described stream of research suggests that corporate tournaments provide incentives that lead CEOs as well as other senior managers to pursue risky but value-enhancing corporate policies.

Despite the growing literature on the economic impact of managerial tournaments in alleviating agency conflicts between shareholders and managers, their corresponding impact on bondholder value remains an unexplored area of research. There are at least two relevant avenues of inquiries that need to be pursued to gain insights on the economic impact of managerial tournaments on bondholders. Specifically, the first is related to the question as to whether tournament incentives enhance both stockholder and bondholder value or alternatively, facilitate a wealth transfer from bondholders to shareholders. Research on the agency cost of debt suggests that a wedge can occur between the interests of shareholders and bondholders when managers are given incentives to take on negative NPV projects favored by shareholders (Myers 1977) or pursue projects that are riskier than the current portfolio (Jensen and Meckling, 1976). Further, the managerial pursuit of risky investments is referred to as risk shifting or asset substitution and it benefits shareholders by allowing them to capture the upside gains from risk-taking while disproportionately imposing costs of failed projects on bondholders (Jensen and Meckling, 1976). Similarly, within an options framework, since equity holdings represent a call option that is in the money when asset value exceeds debt claims, the managerial pursuit of riskier policies increases the value of equity while reducing the value of debt claims (Merton, 1974). As suggested in the literature, rank order tournaments have two distinct effects on managerial behavior, i.e., motivate them to expend additional effort and promote risk-taking behavior. While the former effect can be beneficial to bondholders since it

can reduce the potential for underinvestment and inefficiency, the latter benefits shareholders at the expense of bondholders. Therefore, the overall impact of intra-firm tournaments on bondholder value is likely to depend on whether the positive effect of increased managerial effort outweighs the negative effect of their risk-shifting behavior or vice versa.[1]

The second related avenue of inquiry that remains unaddressed in the tournament theory literature is whether managers differentially react to risk-taking incentives under alternative bondholder governance regimes and/or risk settings. For instance, in the context of compensation based incentives, research suggests that in settings where managerial risk aversion is especially high such as firms with high leverage and/or default risk, CEOs are less likely to engage in risk shifting and can even reduce firm risk despite the presence of risk-taking incentives (Milidonis and Stathopoulos, 2014). Overall, the literature on compensation based incentives suggests that managerial risk preferences are derived from a tradeoff between the positive wealth effects versus the negative risk aversion effect arising from their pursuit of risky policies (Guay, 1999; Milidonis and Stathopoulos, 2014; and Smith and Stulz, 1985). Further, managerial risk aversion in levered firms is largely driven by career concerns arising from job security and reputational concerns (Amihud and Lev, 1981; Grossman and Hart, 1982; and Hirshleifer and Thakor, 1992). As such, it is important to gain insights into how managers react to risk-taking incentives from managerial tournaments in situations where bondholders have bargaining power and consequently can impose career costs on managers if they pursue risk-shifting behavior that benefits shareholders at their expense.

The CDS market represents an interesting and unique setting to evaluate the impact of managerial tournament incentives on the agency cost of debt for several reasons. *First*, research suggests that firm risk and default risk tend to increase after initiation of CDS trading (Saretto and Tookes, 2013; and

[1] Under the option framework, the value of equity can be considered as a call option on residual assets. We argue that senior manager tournament incentives (*SMTI*) has two effects: increase value of assets (*V*) through enhanced managerial efforts, as well as increase the value of call option by promoting risk-taking behavior. The impact of *SMTI* on the value of debt (*D*), can be expressed as *D* = value of assets (*V*) – value of call option.

Subrahmanyam et al., 2014). An increase in firm risk and default risk can simultaneously bring about an alignment of risk preferences between managers and bondholders while exacerbating differences in risk preferences between managers and shareholders. For instance, research suggests that risk shifting becomes even more valuable to shareholders when firm risk and/or default risk is high (Eisdorfer, 2008). On the other hand, CDS trading is likely to further increase managerial risk aversion due to career concerns arising from default risk. Therefore, the CDS market provides us with an opportunity to evaluate the effectiveness of tournament incentives in shaping managerial risk behavior when faced with starkly different risk preferences of shareholders, managers, and bondholders. *Second*, research suggests that CDS trading affects lender monitoring incentives as well as their bargaining power over borrowers. These two effects differentially impact how managers are likely to react to risk-taking incentives. For instance, on the one hand, due to the ability to hedge credit risk, CDS trading leads to an increase in the credit supply and reduced incentives for bondholders to monitor borrowers (Bolton and Oehmke, 2011; Bolton et al., 2011; Parlour and Winton, 2013; and Subrahmanyam et al., 2017). Weakened lender monitoring provides managers with the greater flexibility to engage in risk shifting behavior preferred by shareholders (Campbello and Matta, 2012; Karolyi, 2013; Parlour and Winton, 2013; and Subrahmanyam et al., 2017). On the other hand, Bolton and Oehmke (2011) suggest that CDS allows lenders to gain bargaining power over borrowers and become more exacting in renegotiations, particularly when firms face financial distress. Debt renegotiation can occur either due to reduced firm cash flows or borrowers strategically underreporting cash flows to divert them to shareholders (Subrahmanyam et al., 2017). Since creditors are protected from default losses, they are motivated to aggressively bargain with borrowers, particularly in situations involving financial distress. In fact, the risk of default becomes a real possibility when exacting creditors buy more CDS protection than justified by their risk exposure, leading to what is referred to as the exacting empty creditor problem (Subrahmanyam, et al., 2017). When faced with the possibility of exacting empty creditors, career concerns due to the fallout from inefficient recapitalizations or liquidation are likely to motivate managers to avoid risk shifting and instead pursue more conservative policies that are likely to reduce the likelihood of renegotiations. In line with this argument, Subrahmanyam et al. (2017)

find evidence to indicate that CDS firms increase their liquidity when managers are concerned about exacting empty creditors.

Therefore, a focus on the CDS market provides a laboratory to evaluate the extent risk-averse managers can be induced through rank order tournaments to pursue risky projects when bondholders are able to exert influence over managerial actions. On the one hand, the "reduced bondholder monitoring effect" provides managers with the flexibility and incentives to engage in risk shifting behavior preferred by shareholders. On the other hand, the "exacting empty creditor" effect motivates managers to adopt conservative policies that reduce the likelihood of having to engage in renegotiations with powerful creditors. Consequently, CDS protection can act as a device that allows creditors to extract cash flows due to them from borrowers (Bolton and Oehmke, 2011). Overall, the net effect of these two opposing incentives will likely determine how managers react to risk-taking incentives and consequently the impact of *SMTI* on firm credit risk. We, therefore, develop two alternative hypotheses that take into consideration both the reduced monitoring effect as well as the exacting empty creditor effect in analyzing the relation between *SMTI* and firm credit risk. Specifically, we evaluate the extent these two aspects of CDS trading influence the potential impact of *SMTI* on two non-mutually exclusive aspects of managerial behavior, i.e., preference for the "quiet life", and risk aversion (Amihud and Lev, 1981; Bertrand and Mullainathan, 2003; and Holmstrom and Milgrom, 1987). Figure 1 presents the linkages between *SMTI* and firm credit risk for CDS referenced firms. We argue that the relation between *SMTI* and credit risk is differentially influenced by the two central consequences of CDS trading, i.e., reduced creditor monitoring incentives and the presence of exacting empty creditors.

---Insert Figure 1---

Our first hypothesis, which we refer to as *Bondholder Alignment Hypothesis,* is based on the premise that the exacting creditor effect dominates over the reduced lender monitoring effect in CDS referenced firms. As such, we argue that in the presence of exacting bondholders, managers are likely to strike a balance between shareholder and bondholder interests when reacting to *SMTI*. Consequently, under this hypothesis, managers are motivated by *SMTI* to expend additional effort and increase firm efficiency

and performance to avoid dealing with exacting empty creditors rather than take advantage of reduced creditor monitoring to engage in risk shifting behavior preferred by the shareholder. Specifically, in the absence of *SMTI*, managers may not only be risk averse but also prefer to pursue the "quiet life" behavior as described in Bertrand and Mullainathan (2003) and underinvest relative to firm growth opportunities. Avoidance of the pursuit of positive NPV projects not only reduces shareholder value but also can adversely impact bondholders if they were to receive proceeds from the rejected projects (Myers, 1977). Additionally, underinvestment can result in reduced cash flows that can lead to renegotiation with powerful bondholders, who due to default protection, may be willing to play hardball and push the firm into financial distress. As such, under this hypothesis, we would expect that due to career concerns and reputational costs arising from the potential for poor outcomes from renegotiations with exacting empty creditors, managers are likely to avoid actions that increase the likelihood of renegotiations with bondholders. Consequently, *SMTI* is likely to motivate managers to attempt to win the tournament by increasing firm efficiency and performance rather than through risk-shifting behavior that in turn could increase default risk. Therefore, under this hypothesis, bondholders are likely to view *SMTI* favorably, thereby reducing their perception of firm risk. As such, we predict that:

H1: SMTI are negatively related to CDS spreads.

On the other hand, under the alternative *Inefficient Bondholder Contracting Hypothesis*, we argue that the reduced monitoring effect dominates over the exacting empty creditor effect in CDS firms. In such an environment, *SMTI* can be effective in motivating managers to win the tournament by pursuing risk-shifting behavior preferred by shareholders. Specifically, *SMTI* can encourage managers to shift resources away from less risky avenues of investment with a collateral value such as capital investments and reallocate them towards riskier avenues such as R&D investments and/or leverage increasing acquisitions. Consistent with this notion, Kini and Williams (2012) find that firm pay gap is positively associated with R&D investments but not capital expenditures. As such, under the *Inefficient Bondholder Contracting Hypothesis*, *SMTI* coupled with reduced monitoring incentives on the part of creditors provide managers with incentives to win the tournament by pursuing risky investment behavior favored by shareholders but

not bondholders. Therefore, under this hypothesis, we would expect a positive relation between *SMTI* and firm credit risk.

H1A: SMTI are positively related to CDS spreads.

2.2. *Impact of Internal Governance Quality on Link between SMTI and Credit Risk*

Next, we evaluate whether the relation between *SMTI* and credit risk is influenced by the extent of shareholder control and oversight over management. While a vast literature has focused on the impact of various internal governance metrics on shareholder value, relatively less attention has been paid to their impact on bondholder wealth. The limited research in this area largely suggests that depending on the specific governance mechanism, stronger shareholder control increases the cost of debt (Chava et al., 2008; Cremers et al., 2007; and Klock et al., 2005). Further, this research stream suggests that the positive relation between internal governance metrics and the cost of debt is a consequence of shareholders being well positioned to ensure that managers pursue policies preferred by them even if they impose costs on bondholders.

In the context of tournament theory, it is, however, an open question as to whether the impact of generating competition among managers on bondholder value or the extent managers consider bondholder interests when reacting to shareholder provided risk-taking incentives is dependent on the extent of shareholder control. We argue that in well-governed firms, the benefits from additional managerial effort arising from SMTI is limited since the potential for "quiet life" behavior, underinvestment, or inefficiency is less likely. Therefore, the cost to bondholders from SMTI encouraging risk shifting behavior outweigh the benefits from it reducing the potential for underinvestment. Further, creditors, recognizing their reduced incentives to monitor the firm and weak bargaining power, will expect managers to pursue risky investment preferred by shareholders when provided with *SMTI*. As such, in line with the *Inefficient Bondholder Contracting Hypothesis*, we predict:

H2: SMTI are positively related to CDS spreads in well-governed firms.

In the context of weakly governed firms, however, it is not clear as to whether the benefit of reduced potential for underinvestment would dominate the cost of increased risk-taking or vice versa. For instance, on the one hand, in line with *Bondholder Alignment Hypothesis*, managers are likely to be predominately concerned about having to engage in renegotiations with exacting creditors when considering the downside of pursuing risky corporate policies preferred by shareholders. Therefore, tournament incentives are likely to motivate managers to work harder and more efficiently to improve firm performance rather than pursue risk-shifting behavior. Consequently, we would expect *SMTI* to be negatively related to CDS spreads in weakly governed firms. On the other hand, in line with the *Inefficient Bondholder Contracting Hypotheses*, if the reduced bondholder monitoring incentive effect dominates the exacting empty creditor effect, managerial risk aversion is likely to decline. Therefore, *SMTI* can bring about an alignment in the risk preferences of managers with that of shareholders leading to an increase in firm credit risk in weakly governed firms. Overall, whether *SMTI* lead to an increase or decrease in CDS spreads in weakly governed firms is an empirical question that we address later in this paper.

2.3. *Impact of Product Market Competition on Link between SMTI and Credit Risk*

A growing stream of research suggests that product market competition plays an important role in shaping managerial incentives and behavior. For instance, research suggests that product market competition can substitute for managerial incentives since the higher risk of financial distress and potential loss of benefits of control in highly competitive markets can motivate managers to exert effort and pursue value-enhancing policies (Grossman and Hart, 1983; and Holmsrom, 1982;). Similarly, research suggests that by increasing information available to monitor and evaluate managers, product market competition can substitute or complement internal governance mechanisms in imposing discipline and oversight (Giroud and Mueller, 2010; Guadalupe and Perez-Gonzalez, 2010; Hart, 1983; Holmstrom, 1982; and Nalebuff and Stiglitz, 1983). Overall, the above research suggests that competition is beneficial to shareholders as well as bondholders as it exerts discipline over managers and provides them with incentives to exert effort and pursue value-enhancing policies.

On the other hand, research suggests that product market competition can adversely affect the value of bondholder claim and increase credit risk. For instance, since competitive product markets are typically characterized by intense competition, shorter product life cycles, arrival of new entrants, higher predation risk, shrinking profit margins and diminishing returns to firm growth opportunities (Haushalter et al., 2007; Kovenock and Phillips, 1997; and Zingales, 1998), bondholders face increased risks arising from greater probability of failure and lower recovery rates in liquidation. Consistent with the notion that product market competition adversely affects credit risk, empirical evidence indicates a positive relation between product market competition and bank loans (Valta, 2012) as well cost of public debt (Platt, 2015).

Since the impact of product market competition on managerial behavior can have positive as well as negative implications for bondholders, its impact on the link between *SMTI* and credit risk remains ambiguous. We, therefore, attempt to evaluate whether and how the competitive environment of the firm influences the link between *SMTI* and CDS spreads. A growing stream of literature suggests that product market competition increases managerial conservatism (Fresard and Valta, 2016; Grenadier, 2002; Leahy, 1993; and Valta, 2012). Further, research suggests that product market competition can depress the overall level of investment as well as shift avenues of investment to less risky options, largely as a consequence of higher uncertainty exacerbating financing frictions, depressing profit margins, and reducing the value of growth options relative to assets in place (Fresard and Valta, 2016; Grenadier, 2002; Leahy, 1993; and Valta, 2012). As such, the probability of depressed cash flows and potential for having to engage in renegotiations with exacting bondholders is likely to be high when firms face significant competitive threats. Therefore, in highly competitive product markets, the exacting empty creditor effect is likely to dominate the reduced lender monitoring effect, thereby further increasing managerial risk aversion. Thus, even when provided with risk-taking incentives, managers are more likely to avoid risk-taking or even reduce risk and instead attempt to win the tournament by increasing firm efficiency and performance. Consequently, despite the presence of SMTI, bondholders expect managers to avoid risk-shifting behavior and instead focus on efficiency and performance. We therefore predict:

H3: SMTI are negatively related to CDS spreads in highly competitive product markets.

3. Sample Description and Variable Selection

3.1. Sample Description

Our sample consists of all firms that have CDS trading against their debt during the period 2001-2009 and are included in the ExecuComp, Center for Research in Security Prices (CRSP), and Compustat databases. Following Saretto and Tookes (2013), we obtain CDS data from Bloomberg, including all single-name CDS quotes written on U.S. entities and denominated in U.S. dollars.[2] We specifically focus on five-year senior CDS contracts as they are the most widely traded and liquid contracts in the U.S. market (Tsai et al., 2016).

Our managerial compensation data is obtained from ExecuComp which includes U.S. firms that are in the S&P 500, S&P mid-cap 400, and S&P small-cap indices. We include all firm-years that have an identifiable CEO in ExecuComp and exclude utility and financial firms (Standard Industrial Classification (SIC) codes between 4900 – 4999 and 6000 – 6999, respectively). ExecuComp provides data on total executive compensation (TDC1) as well as the various components of total compensation such as salary, bonus, stock awards, and option grants. The value of option grants in ExecuComp prior to 2005 are computed on the basis of the Black and Scholes model while post-2005, they are based on values reported by the company. We follow the methodology in Kini and Williams (2012) to deal with this change to ensure that the computation of all our ExecuComp variables is consistent throughout our entire sample period. We use the information on ExecComp to compute the variables *Pay gap*, *CEO vega* and *CEO delta* which are described in detail in the next section.

Further, we obtain information on firm-specific financial variables from Compustat and stock return data from CRSP. We match CDS data with ExcuComp, Compustat and CRSP using firm names and CIK codes and exclude observations with missing financial data. Our final sample consists of 503 firms with 2,765 firm-year observations, from the fiscal year 2001 to 2009. All dollar-denominated variables are

[2] Other providers of CDS data include CreditTrade, GFI, and Markit Group.

inflation-adjusted to 2003 dollars using the consumer price index. Further, all the continuous variables are winsorized at their 1% and 99% values.

3.2. Description of Main Variables

In this section, we discuss the main variables used in our study. A description of each variable and its measurement is provided in the Appendix.

3.2.1. Measures of Senior Manager Tournament Incentives (SMTI) and CEO Performance Incentives

In line with Kale et al. (2009) and Kini and Williams (2012), we estimate senior manager tournament incentives as the difference between firm CEO compensation and median VP compensation. Therefore, the variable *Pay gap* is our proxy for *SMTI* with a higher value providing each senior executive with greater incentives to win the tournament and capture the CEO position.

In line with Kini and Williams (2012), we control for the CEO performance-based incentives that capture the extent of their alignment with shareholders (*CEO delta*) as well as risk-taking incentives (*CEO vega*). We, therefore, construct the CEO total portfolio delta and total portfolio vega. As suggested in the literature, *CEO delta* represents the increase in a CEO's portfolio wealth for a $1.0 change in shareholder wealth while *CEO vega* is the dollar increase in a CEO's portfolio for a 0.01 increase in the standard deviation of the stock returns (Coles et al., 2017; and Kini and Williams, 2012). Further, the variable *CEO delta* is constructed as the weighted average of the delta of a CEO's stock and option holdings, while *CEO vega* is the vega of a CEO's option holdings. We follow the methodology in Coles et al. (2006) to value options for the delta and vega calculations and they are both adjusted for inflation by scaling to 2003 dollars.

3.2.2. Measures of CDS Pricing and Determinants of CDS Spreads

We use CDS spreads as a measure of bondholder's perception of credit risk. Recent research suggests that CDS spreads can be used to infer the firm cost of debt and represents a more efficient measure of credit risk than other alternatives (Blanco et al., 2005; Garleanu and Pedersen, 2011; and Nashikkar et al., 2011). For instance, CDS spreads are related to corporate default risk and less affected by systematic risks such as interest rate risk. Tang and Yan (2010) find that firm-level determinants of default risk account

for a major portion of individual credit spreads, while macroeconomic variables are directly responsible for a lesser portion. In addition, unlike corporate bonds, CDS contracts do not have contractual features such as coupons, embedded options, covenants, and guarantee and therefore are not affected by heterogeneity in these features. Further, the CDS market is more liquid than the bond market; hence CDS quotes are less affected by liquidity risk and more efficient in processing information. Finally, there is evidence that changes in CDS spreads anticipate changes in bond yields (Blanco et al., 2005; Forte and Pena, 2009; and Norden and Weber, 2004, 2009). Therefore, in line with Bhat et al. (2014) and Tang et al. (2015), our dependent variable is the logarithm of CDS spread, which is the average CDS spread over the 45 days period after the fiscal year-end.

Further, drawing from the literature, we identify and include widely recognized determinates of CDS spreads as control variables in our empirical specifications. Specifically, we control for macroeconomic conditions by including interest rate swap rate, term slope, and CDS index (*Log (CDX)*) (e.g. Tang et al., 2015; and Tsai et al., 2016). We additionally control for various aspects of firm characteristics that have been shown to proxy for the company's overall financial viability such as firm size (*Log Total Assets*), stock volatility, return on assets, leverage, loss indicator, and operating cash flow (e.g. Callen et al., 2009; and Tsai et al., 2016). We also include the S&P long-term credit rating to control for the overall financial distress risk of the underlying firm. Finally, drawing from Tang et al., (2015), we control for the effect of various aspects of the strength of internal controls such as foreign operations, merger and acquisitions, restructuring, and material weakness (all indicator variables) on CDS pricing. A description of all the above variables and their measurements are provided in the Appendix.

3.2.3. Governance and Product Market Competition Measures

Since we are interested in how governance quality and the extent of product market competition condition the relation between *SMTI* and CDS spreads, we identify measures that proxy for various facets of internal governance mechanisms as well as product market competition. Focusing first on governance measures, we identify two alternative proxies for governance quality; (1) *G-Index* as in Gompers et al. (2003) and (2) *E-Index* as in Bebchuk et al. (2008). The G-Index data was obtained from the RiskMetrics

Governance Legacy database and it comprises of 24 antitakeover provisions in the firm's charter as reported by the Investor Responsibility Research Center (IRRC). Each of the 24 antitakeover provisions is coded as a dummy variable that takes on the value one if the firm has adopted it in its charter and zero otherwise. As such, the G-index takes on a value of 0-24 depending on the number of antitakeover provisions adopted by the firm. Higher values of the G-Index indicate weaker shareholder control. Our second proxy for governance quality is the E-index developed by Bebchuk et al. (2008). They argue that not all 24 provisions of the G-Index are relevant for valuation and suggest that only six of these are of significance (staggered boards, shareholder bylaw amendment restrictions, shareholder charter amendment restrictions, supermajority requirements for mergers, poison pills, and golden parachutes). Therefore, the E-Index is a combination of these six governance provisions and range in value from 0-6 with a higher value indicating weaker shareholder control.

In the context of product market competition, we evaluate the impact of both firm- and industry-based measures of competition. Our firm based measure of competition is the variable *Product market fluidity* developed by Hoberg et al. (2014). Specifically, *Product market fluidity* measures the change in firms' product space due to moves made by rivals in the firms' product markets (Hoberg et al., 2014). For instance, the competitive threats posed to a firm due to entry by rivals is captured by the *Product market fluidity* measure. We obtain data on *Product market fluidity* for our sample firms from the Hoberg-Phillips Data Library where it is constructed from the product description section of the firm's 10-K reports. A higher value of product market fluidity indicates greater competitive threats faced by firms in their product markets.

In terms of industry-based measures of competition, we use three alternative proxies that have been widely used in the literature. These include variants of the HHI index such as; a) *HHI* index computed from Compustat segment data, b) *Fitted HHI* computed using the two-step method of Hoberg and Phillips (2010) to compute sales based Herfindahl ratios for each three-digit SIC code, and c) *TNIC HHI* which is calculated based on text-based network industry classification by Hoberg and Phillips (2016).

3.2.4. Discussion of Endogeneity and Instruments

Since our measure of *SMTI, i.e., Pay gap, is* potentially endogenous, we seek to identify two relevant and valid instruments to over-identify the model. In selecting our instruments, we draw from the literature on tournament-based incentives to identify instruments that can potentially meet both relevance and validity criteria. To satisfy the relevance criteria, our selected instruments should be correlated with *Pay gap* after controlling for all other second stage regressors. Additionally, our instruments should satisfy the exclusion criteria and consequently impact the dependent variable only through their effect on *Pay gap*. In the discussion below, we describe our instruments and provide an economic justification for their inclusion.

Our first instrument is drawn from Kini and Williams (2012) and represents the number of non-CEO executives a firm list in ExecuComp (*Number of vice presidents within each firm*). Kale et al. (2009) argue that if the number of VPs is higher, then the probability of any given VP winning the tournament is lower, thereby resulting in a higher pay gap to compensate for the lower probability of succession. In addition, we have no reason to expect firm credit risk to be influenced by the number of VPs in the firm. As such, our first instrument is *Number of vice presidents within each firm* and its mean (median) value in our sample is 4.34 (4.00). In line with Coles et al. (2017), our second instrument is based on the number of higher paid CEOs in the same industry as the sample firm (*Number of higher paid CEOs within each industry*) and is expected to be negatively related to *Pay gap*. The mean (median) value of *Number of higher-paid CEOs within each industry* in our sample is 19.13 (12.00).

4. Empirical results

4.1. Univariate Results

The univariate statistics for our main variables of interest are reported in Table 1. The variable *Pay gap* has a mean (median) value of $5.55 million ($3.65 million). The corresponding mean (median) values in Kini and Williams (2012) are $3.03 million ($1.42 million). The difference is likely because CDS

referenced firms in our sample are larger in size relative to non-CDS firms in ExecuComp.[3] Further, our sample has a mean (median*) CEO delta* of $0.68 million ($0.37 million) and a mean (median) *CEO vega* of $0.46 million ($0.28 million). In terms of product market competition variables, the mean (median) value of *Product market fluidity* for our sample firms is 5.90 (5.20). In terms of industry-based measures of product market competition, the mean (median) values of the *HHI* index, *Fitted HHI*, and *TNIC HHI* are 0.26 (0.20), 0.07 (0.06), and 0.22 (0.16), respectively.

---Insert Table 1---

In Table 2, we report the industry distribution of our sample (based on Fama-French 12 industry classification, excluding utilities and financial companies). The largest number of CDS firms are from manufacturing while the smallest number is drawn from the consumer durables sector. In addition, we report the mean values of our main variables of interest, i.e., *CDS spread*, *Pay gap*, CEO compensation incentives (*CEO delta* and *CEO vega*), *Equity volatility*, *Leverage ratio*, and *Return on assets* segmented by industry. The results suggest that CDS spreads are substantially higher for the Consumer Durables sector relative to other industry groups. The lowest CDS spreads are for the Healthcare, Medical Equipment, and Drugs sector.

---Insert Table 2---

Next, we examine the univariate relation between *CDS spread* and *Pay gap*. We segment our sample of firm-years based on *Pay gap* quintiles. The results reported in Figure 2 suggest that CDS spreads largely decline across *Pay gap* quintiles, pointing to a negative relation between *SMTI* and CDS spreads. In the section below, we address the relation between these two variables in a multivariate context. Our multivariate specifications include OLS regressions as well as instrumented 2SLS regressions.

---Insert Figure 2---

[3] Martin and Roychowdhury (2015), Du et al. (2017), among others, document that CDS trading is more prevalent for companies with larger assets.

4.2. Multivariate Analysis of the Relation between SMTI and CDS Spreads

To test our hypotheses, we estimate a pooled regression of CDS spreads on our proxy of *SMTI (Pay gap)* and other control variables, as follows:

$$Log(CDS\ spread_{i,t}) = \alpha + \gamma_1 Log(Pay\ gap_{i,t}) + \gamma_2 CEO\ delta_{i,t} + \gamma_2 CEO\ vega_{i,t} + Other\ control\ variables + industry\ fixed\ effects + year\ fixed\ effects + \varepsilon_{i,t} \quad (1)$$

Where the dependent variable, *Log(CDS spread$_{i,t}$)*, is the logarithm of the average CDS spread for firm i over the [+1 day, +45 day] window after the fiscal year end t. Our key independent variable of interest is *Log(Pay gap$_{i,t}$)*, which is the logarithm of the difference between the CEO's total compensation and the median VP's total compensation for firm i in year t. In addition, we include CEO compensation based incentives (*CEO vega* and *CEO delta*) as controls. In terms of additional control variables, we include four groups of variables as described earlier that capture aspects such as firm characteristics, financial distress measures, macroeconomic variables, and measures of strength of internal controls. Finally, we include industry and year fixed effects to account for any invariant industry factors and time trends. While we report results with industry based on the Fama-French 30 industry classification scheme (Fama and French, 1997), our results are qualitatively similar with industry defined on the basis of two-digit SIC codes.

The results of estimating various specifications of Equation (1) are reported in Table 3. The first three models are OLS specifications while models 4 and 5 represent the 2SLS specification with results of both first and second stage regressions reported. In model 1, we control for macroeconomic factors and in model 2 and 3 we additionally include control variables associated with financial viability and strength of internal control mechanisms respectively. In all three OLS models, the coefficient of *Log(Pay gap)* is negative and significant. Further, focusing on the 2SLS model, the results indicate that both our instruments meet relevance and validity conditions. For example, our instruments are individually significant at the 1% level in the first-stage regressions. The first-stage F-statistic for the endogenous variable is greater than 10 and significant at the 1% level, and the Anderson-Rubin Wald F-statistic for joint relevance is 4.961 and significant at the 1% level, pointing to the relevance of the chosen instruments. Further, the main variable

of interest *Log(Pay gap*) is negative and significant in the second stage regression. In addition, among control variables, the coefficients of *Swap rate*, *Term slope*, *Return on assets*, *Operating cash flows*, *Foreign operations indicator*, and *Credit rating* are negative and significant. On the other hand, CDS spreads are positively related to stock volatility, leverage ratio, financial statement restatements, and going concern opinion issued by their auditors. The signs and significance of the control variables are largely consistent with the existing literature.

---Insert Table 3---

Overall, both OLS and 2SLS models provide consistent evidence to indicate a negative relation between *Pay gap* and CDS spreads. As such, the *Bondholder Alignment Hypothesis* (hypothesis 1) is supported. Our results are consistent with the argument that *SMTI* not only provide managers with incentives to work harder and improve asset utilization but also alleviates the potential for underinvestment. Further, our evidence is supportive of the argument that despite being provided with risk-taking incentives, managers concerned about default triggered by exacting empty creditors, avoid engaging in risk shifting behavior.

4.3. The Impact of Governance Quality and Product Market Competition

In this section, we explore whether the effect of *SMTI* on credit risk varies with the extent of shareholder control and product market rivalry facing the firm. First, we examine whether a company's internal governance regime affects the relation between *SMTI* and CDS spreads. For each governance measure, we create sub-samples to distinguish between firms with strong versus weak shareholder control. Specifically, for our first governance measure (*G-Index*), firms with *G-index* above the median are assigned to the weak shareholder control group while those with values below the median are in the strong shareholder control group. Similarly, with our second measure, we segment firms into two groups based on whether the *E-Index* is below (strong shareholder control) or above the median.

The results are reported in Table 4. While the governance metric in models 1-2 is the *G-Index*, models 3-4 deploy *E-Index* as the governance metric. Further, the relation between *SMTI* and CDS spreads

in well governed (weakly governed) firms is evaluated in models 1 and 3 (2, and 4). Focusing initially on well-governed firms (models 1 and 3), the results suggest that the coefficient of the variable *Log(Pay gap)* is negative but insignificant in both models. As such, hypothesis 2 is not supported and we do not find evidence to suggest that *SMTI* increase firm credit risk in the well-governed firm. On the other hand, in the context of weak shareholder control (models 2 and 4), the coefficient of *Log(Pay gap)* is negative but significant only in the case of G-Index. Overall, our results suggest that internal governance quality does not materially affect the link between *SMTI* and firm credit risk.

---Insert Table 4---

Next, we investigate whether the link between *SMTI* and the pricing of CDS is influenced by the extent of competitive threats faced by the firm. As discussed earlier, we consider four key measures of the extent of product market rivalry faced by firms (*Product market fluidity*, *HHI*, *Fitted HHI*, and *TNIC HHI*). Each year, we sort the cross-section of firms into two subsamples based on these four measures of product market competition. For instance, using *Product market fluidity* as the measure of competition, each firm-year we assign firms into the strong (weak) rivalry group based on whether *Product market fluidity* is above (below) the median. Similarly, for each of our three HHI based measures, we segment firms into the strong (weak) product market group if the relevant HHI index is below (above) the median. We then perform panel regressions with high versus low competition subsamples. The results are reported in Table 5.

---Insert Table 5---

The link between *SMTI* and CDS spreads in highly competitive (weakly competitive) product markets are evaluated in models 1, 3, 5, and 7 (2, 4, 6, and 8), respectively. In three of the four specifications where product market rivalry is intense, the coefficient of *Log(Pay gap)* is negative and significant. On the other hand, while the coefficient of *Log(Pay gap)* is negative in all four models where the competitive rivalry is weak, the result is significant only in one specification. Overall, consistent with hypothesis 3, we find a stronger negative association between *SMTI* and CDS spreads for firms facing strong product market competition. Our results are consistent with the argument that in settings where managerial risk aversion is high, they do not increase firm risk despite risk-taking incentives. Further, our results are consistent with

the argument that creditors view *SMTI* as value-enhancing in highly competitive markets since it helps alleviate the potential for underinvestment.

4.3. Robustness Tests

In this section, we conduct several robustness tests. Specifically, we focus on the extent the probability of winning the tournament influences the link between *SMTI* and CDS spreads. Prior studies document that a higher probability of winning the prize increases the incentive effect of a given prize in managerial tournaments (e.g., Kini and Williams, 2012). Therefore, we expect a stronger association between *SMTI* and CDS spreads when the probability of winning the tournament is high and vice versa if it is low. We, therefore, focus on two unique situations about the CEO position that differentially impacts the probability of other senior managers winning the tournament. The first is related to whether a CEO turnover event has occurred recently. In line with Kini and Williams (2012) who argue that the turnover of an old CEO signals the end of one tournament and the start of another, we consider the probability of a senior manager winning the tournament to be low if a new CEO has recently been appointed. In such situations, *SMTI* may not be as effective in shaping managerial risk choices. We, therefore, expect that the link between *SMTI* and CDS spreads to be weaker or insignificant in firm-years with CEO turnovers. By the same token, we would expect the link between *SMTI* and CDS to be stronger in firm-years without CEO turnovers.

Alternatively, we consider another atypical situation, i.e., whereby the current CEO is likely to retire as a proxy for the probability of winning the rank order tournament. Senior managers' perception regarding the probability of winning the tournament when the current CEO is close to retirement can be shaped in two different ways. On the one hand, when the current CEO is close to retirement, senior managers may believe that the probability of winning the tournament is high since they expect the position to become available soon. Consequently, the tournament incentive effects should be stronger for these firm years. On the other hand, CEOs who are near retirement age are unlikely to be strong candidates for another CEO position in the industry. Consequently, their presence may lower senior manager assessment of their

likelihood of winning the tournament due to the expectation that the current CEO may stay in the position until retirement which could be years away. Therefore, whether the presence of a CEO near retirement age increases or decreases senior manager perception regarding their probability of winning the tournament and consequently the impact on firm credit risk is an empirical question which we address below.

To test the incentive effects of managerial tournaments in the above described atypical settings, we construct two different sets of subsamples. The first sub-sample set is constructed to evaluate the effect of CEO turnover on the link between *SMTI* and CDS spreads. Therefore, we create a dummy variable that takes on the value 1 if a CEO turnover occurred in a firm-year and zero otherwise. Next, we segment our sample into two sub-groups, one that includes firm-years with no CEO turnover and the other with firm years where a CEO turnover has occurred. Similarly, our second set of sub-samples is constructed to evaluate the impact of CEOs near retirement age on the link between *SMTI* and CDS spreads. Therefore, we construct a dummy variable that takes on the value 1 in firm years where the CEO age is greater than or equal to 65 years and zero otherwise. In line with Coles et al. (2017), we assume that CEOs who are 65 years or older are close to retirement. We then segment our sample of firms into two groups with the first group consisting of firm-years where the CEO is younger than 65 years and the other containing firm years where the CEO is 65 years or older. For each of the above described four sub-samples, we estimate Equation (1). The results are reported in Table 6. The results reported in Column 1 (Column 2) are for the sub-sample that excludes (includes) CEO turnover years. Similarly, the results in Column 3 (Column 4) are for the sub-sample that excludes (includes) firm-years with CEOs near retirement age.

---Insert Table 6--

The results in Columns 1 and 2 indicate that the incentive effects of *SMTI* are weaker for the firm-years where CEO turnover has occurred. The coefficient of *Log(Pay gap)* is much larger for firm years without CEO turnover events and is also significant. On the other hand, the coefficient of *Log(Pay pap)* while negative, is insignificant in the CEO turnover sub-sample. Therefore, our results suggest that bondholders do not expect *SMTI* to materially influence managerial behavior when a CEO turnover has recently occurred and therefore the effect of intra-firm tournament incentives is weak. Similarly, comparing

results in Columns 3 and 4 suggest that tournament incentives are only effective in shaping credit risk for the sub-sample that did not include retiring CEOS. As such, our results suggest that the effectiveness of *SMTI* in influencing firm credit risk is reduced when senior managers perceive the probability of their winning the tournament to be low either due to a recent CEO turnover or expected retirement of a current CEO.

5. Conclusion

Recent research suggests that rank order intra-firm tournaments provide senior managers with incentives to work hard and pursue risky but value-enhancing corporate policies that are favored by shareholders. Providing managers with incentives to pursue riskier policies, however, can adversely affect bondholder value. Despite the growing body of research that has examined the impact of generating competition among managers on shareholder wealth, their effect on bondholder's wealth remains an unexplored area of research. In addition, the question as to whether the effectiveness of risk-taking incentives arising from rank order tournaments may be diluted in settings where bondholders exert influence remains unaddressed in the literature. This study attempts to fill a gap in tournament theory by examining the impact of *SMTI* on firm credit risk through two alternative hypotheses. In addition, we examine the extent internal governance quality and competitive threats faced by the firm influence the link between *SMTI* and credit risk. We evaluate these relationships in the context of the CDS market where bondholders are in a stronger position to exert influence over managerial behavior.

In line with our *Bondholder Alignment Hypothesis*, we find that *SMTI* are negatively related to CDS spreads. Our results are supportive of the argument that *SMTI* benefit bondholders by inducing managers to work harder and pursue the optimal level of investment, without engaging in risk shifting behavior. Further, our results suggest that rank order tournaments do not motivate excessive risk-taking on the part of management when bondholders have the potential to influence managerial behavior. We, however, find that internal governance quality does not materially influence the effect of *SMTI* on firm credit risk. On the other hand, in terms of the competitive environment of the firm, our results suggest that

SMTI are negatively related to firm credit risk in competitive markets. Our results are supportive of the argument that competition further increases managerial risk aversion and consequently reduces the likelihood of their pursuing risky corporate policies preferred by shareholders even when provided with risk-taking incentives.

Overall, our study indicates that rank order managerial tournaments not only have the potential to benefit shareholders but can also enhance bondholder value by reducing the probability of underinvestment. Further, *SMTI* are beneficial to bondholders when they have strong bargaining power and managerial risk aversion is particularly high. Finally, our results suggest that the managers take into consideration monitoring incentives as well as the bargaining power of bondholders in determining the extent of risk to pursue when provided with risk-taking incentives by shareholders.

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Appendix Variable Definition

Variables	Definition
Dependent variable	
CDS spread	Average CDS spreads in the 45 days subsequent to the filing dates in year t
Log(CDS spread)	The natural logarithm of *CDS spread* in year t.
Independent variables	
Pay gap	The difference between the CEO's total compensation and the median VP's total compensation in year t.
CEO vega	A CEO's total portfolio vega, or her increase in option-wealth for a 0.01 standard deviation increase in stock volatility in year t.
CEO delta	A CEO's total portfolio delta, and is computed as her dollar increase in wealth for a 1% increase in stock price in year t.
Macroeconomic variables	
Swap rate	Five-year interest rate swap rate for the month of the filing date in year t.
Term slope	The difference (in percentage points) between the ten-year constant Treasury rate and the two-year constant Treasury rate at the month of the filing dates in year t.
Log(CDX)	The natural logarithm of CDX, which is the average CDX index spreads in the 45 days subsequent to filing dates in year t.
Accounting and market-based firm characteristics	
Equity volatility	The standard deviation of stock returns during year t
Log(Total assets)	The natural logarithm of total assets in year t.
Leverage ratio	Total liabilities divided by total assets in year t.
Market to book ratio	Market to book ratio at the end of year t.
Profit margin	Income before interests and taxes divided by total assets in year t.
Loss indicator	1 if the company reported a loss in year t, and 0 otherwise.
Return on assets	Income before extraordinary items divided by total assets in year t.
Operation cash flow ratio	Operating cash flow divided by total assets in year t.
Receivable and inventory ratio	Accounts receivable plus inventories, divided by total assets in year t.
Foreign operations indicator	1 if the company has foreign transactions in year t, and 0 otherwise.
Merger indicator	1 if the company has merger and acquisition activity in year t, and 0 otherwise.
Restructuring indicator	1 if the company has restructuring charges in year t, and 0 otherwise.
Material weakness indicator	1 if the company discloses an internal control material weakness in year t, and 0 otherwise.
Restatement indicator	1 if the company announces a restatement in year t, and 0 otherwise.
Going concern indicator	1 if the company received a going concern modified opinion in year t, and 0 otherwise.
Unqualified opinion indicator	1 if the company received an unqualified audit opinion in year t, and 0 otherwise.
Missing material weakness	1 if data on material weakness is missing in year t, and 0 if available.
Credit rating	Numerical scores of the S&P ratings, ranging from 1 to 21. A higher numerical score reflects higher rating. The entire spectrum of ratings is as follows: AAA = 21, AA+ = 20, AA = 19, AA− = 18, A+ = 17, A = 16, A− = 15, BBB+ = 14, BBB = 13, BBB− = 12, BB+ = 11, BB = 10, BB− = 9, B+ = 8, B = 7, B− = 6, CCC+ = 5, CCC = 4, CCC− = 3, CC = 2, D = 1.

Appendix Variable Definition Continued

Corporate Governance and Product Market Competition Variables	
G-Index	Corporate governance index of Gompers et al. (2003), ranging from 1 to 24. The G-Index comprises 24 corporate governance provisions related to the companies' anti-takeover protection.
E-Index	Entrenchment index of Bebchuk et al. (2008), ranging from 1 to 6. The E-Index comprises six provisions include: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirement for mergers and charter amendments.
Product market fluidity	The degree of competitive environment and product market condition for a firm, based on Hoberg et al. (2014).
HHI	Herfindahl index.
Fitted HHI	Fitted Herfindahl index of Hoberg and Phillips (2010).
TNIC HHI	Herfindahl index calculated based on text-based network industry classification of Hoberg and Phillips (2016).
Instrumental Variables	
Number of vice presidents within each firm	The number of non-CEO executives that a firm lists in ExecuComp.
Number of higher-paid CEOs within each industry	The total number of CEOs with higher total compensation in each industry.

Table 1
Summary Statistics

The sample includes all public companies that are covered by ExecuComp and have CDS outstanding against their debts from 2001-2009. CDS quotes are from Bloomberg terminal, CEO compensation data are from ExecuComp, firm accounting data and S&P credit rating are obtained from Compustat North America.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
CDS spread	2,484	1.855	0.726	4.690	0.029	125.737
Pay gap	2,484	5554.640	3645.940	5610.410	12.335	30828.920
CEO delta	2,484	680.452	373.616	862.397	0.000	4723.640
CEO vega	2,484	457.136	277.615	490.579	0.000	2172.380
Swap rate	2,484	4.117	4.310	0.872	2.160	5.600
Term slope	2,484	1.180	1.220	0.883	-0.140	2.590
Log(CDX)	1,733	4.177	3.848	0.730	3.199	5.579
Equity volatility	2,484	0.087	0.076	0.052	0.000	0.564
Log(Total assets)	2,484	22.778	22.669	1.100	19.989	25.665
Leverage ratio	2,484	0.270	0.251	0.148	0.001	0.720
Loss indicator	2,484	0.162	0.000	0.369	0.000	1.000
Return on Assets	2,484	0.045	0.053	0.092	-1.311	0.431
Operation cash flow ratio	2,484	0.106	0.103	0.066	-0.411	0.414
Foreign operations indicator	2,484	0.360	0.000	0.480	0.000	1.000
Merger indicator	2,484	0.097	0.000	0.297	0.000	1.000
Restructuring indicator	2,484	0.518	1.000	0.500	0.000	1.000
Material weakness indicator	2,484	0.028	0.000	0.166	0.000	1.000
Receivable and inventory ratio	2,484	0.247	0.231	0.154	0.008	0.888
Restatement indicator	2,484	0.058	0.000	0.235	0.000	1.000
Going concern indicator	2,484	0.003	0.000	0.057	0.000	1.000
Unqualified opinion indicator	2,484	0.324	0.000	0.468	0.000	1.000
Missing material weakness	2,484	0.684	1.000	0.465	0.000	1.000
Credit rating	2,484	12.842	13.000	3.657	0.000	21.000
G-Index	2,359	9.921	10.000	2.463	3.000	16.000
E-Index	2,325	2.515	3.000	1.292	0.000	6.000
Product market fluidity	2,425	5.902	5.204	3.284	0.413	24.700
HHI	2,484	0.256	0.196	0.208	0.012	1.000
Fitted HHI	1,331	0.069	0.057	0.036	0.035	0.224
TNIC HHI	2,475	0.218	0.158	0.178	0.026	1.000
Number of vice presidents within each firm	2,484	4.341	4.000	0.819	2.000	10.000
Number of higher-paid CEOs within each industry	2,484	19.128	12.000	21.983	0.000	167.000

Table 2

Distribution of CDS Firms by Industry

This table provides the industry distribution of the CDS sample (based on Fama-French 12 industry classification excluding utilities and financial companies). The mean values of *CDS spread*, *Pay gap*, CEO compensation incentive variables (*CEO delta* and *CEO vega*), *Equity volatility*, *Leverage ratio*, and *Return on assets* are reported by industry.

Industry	# of Firms	*CDS spreads*	*Pay gap*	*CEO delta*	*CEO vega*	*Equity volatility*	*Leverage ratio*	*Return on assets*
Consumer Non-Durables	51	1.26	5328.42	705.80	461.91	6.94%	0.29	5.62%
Consumer Durables	16	4.80	3627.58	316.00	165.57	9.74%	0.24	1.94%
Manufacturing	78	1.55	4545.22	513.35	331.86	9.18%	0.25	4.86%
Energy	44	1.46	7490.63	794.93	462.69	9.47%	0.25	6.87%
Chemicals and Allied Products	33	1.64	4276.08	513.72	403.83	7.34%	0.27	5.17%
Business Equipment	56	1.75	6127.82	793.24	541.73	9.76%	0.19	2.86%
Telephone and TV Transmission	30	2.27	9510.28	973.08	705.28	9.19%	0.43	0.34%
Wholesale, Retail, and Services	61	2.03	5325.48	716.57	458.77	9.32%	0.25	4.86%
Healthcare, Medical Equipment, and Drugs	47	0.98	5987.11	899.14	665.17	7.29%	0.26	6.88%
Other	65	2.77	4986.78	608.41	414.52	9.04%	0.33	2.90%

Table 3
Senior Manager Tournament Incentives and CDS Spreads

This table presents results of OLS regressions for the following model:

$$Log(CDS\ spread)_{i,t} = \alpha + \gamma_1 Log(Pay\ gap)_{i,t} + \gamma_2 CEO\ delta_{i,t} + \gamma_2 CEO\ vega_{i,t} + Other\ control\ variables + industry\ fixed\ effects + year\ fixed\ effects + \varepsilon_{i,t}$$

The dependent variable *Log(CDS spread)* is the natural logarithm of average CDS spread in the 45 days subsequent to the filing dates in year t. *Log (Pay gap)* is the natural logarithm of *Pay gap* which is the difference between the CEO's total compensation and the median VP's total compensation in year t. All other variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. t-statistics adjusted for firm and year clustering are presented below. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Specification	OLS			2SLS	
	Macroeconomic variables	Plus firm characteristics	Plus additional accounting variables	1st Stage	2nd Stage
Dependent Variable		*Log(CDS spread)*		*Log (Pay gap)*	*Log(CDS spread)*
	(1)	(2)	(3)	(4)	(5)
Log(Pay gap)	-0.099***	-0.053**	-0.053**		-0.111***
	(-3.83)	(-2.14)	(-2.23)		(-3.12)
CEO delta	0.000	-0.000*	-0.000*	0.000	-0.000
	(0.78)	(-1.83)	(-1.77)	(0.22)	(-1.04)
CEO vega	-0.001***	-0.000***	-0.000***	0.001	-0.001***
	(-10.66)	(-3.81)	(-3.53)	(0.91)	(-2.81)
Swap rate	-0.221***	-0.081**	-0.090**	0.095*	-0.092*
	(-3.73)	(-2.01)	(-2.05)	(1.91)	(-1.73)
Term slope	-0.285***	-0.186*	-0.207**	-0.221	-0.236***
	(-7.16)	(-1.85)	(-2.26)	(-1.42)	(-3.00)
Log(CDX)	0.6589***	0.681***	0.689***	0.734***	0.680***
	(8.19)	(7.69)	(8.10)	(3.92)	(7.05)
Stock volatility		4.987***	4.758***	-0.426	4.334***
		(8.26)	(7.99)	(-0.73)	(7.42)
Log(Total assets)		-0.001	0.002	0.014	0.019
		(-0.02)	(0.03)	(0.49)	(0.63)
Leverage ratio		1.404***	1.452***	-0.048	1.186***
		(8.01)	(7.96)	(-0.37)	(6.29)
Loss indicator		0.126	0.106	-0.071	0.145**
		(1.51)	(1.24)	(-0.91)	(2.20)
Return on assets		-1.300***	-1.248***	0.265	-0.956***
		(-3.84)	(-3.23)	(0.71)	(-2.71)
Operation cash flow ratio		-1.976***	-1.818***	-0.241	-1.933***
		(-6.12)	(-5.56)	(-0.64)	(-5.02)
Credit rating		-0.119***	-0.120***	-0.006	-0.124***
		(-8.14)	(-8.71)	(-0.84)	(-8.80)
Foreign operations indicator			-0.032	0.028	-0.056
			(-0.92)	(0.68)	(-1.36)
Merger indicator			-0.032	-0.085	-0.036
			(-0.50)	(-1.36)	(-0.59)
Restructuring indicator			0.051**	0.068*	0.057
			(2.07)	(1.70)	(1.46)
Material weakness indicator			0.093	-0.129	0.059
			(1.10)	(-0.99)	(0.64)
			0.350**	0.001	0.302*

Receivable and inventory ratio			(2.14)	(0.01)	(1.67)
Restatement indicator			0.136***	-0.085	0.104
			(4.36)	(-1.15)	(1.59)
Going concern indicator			0.766***	0.277	0.688*
			(3.97)	(1.21)	(1.88)
Unqualified opinion indicator			-0.006	0.042	-0.020
			(-0.10)	(1.02)	(-0.57)
Missing material weakness			-0.096*	-0.082	-0.135
			(-1.91)	(-0.76)	(-1.17)
Log(Number of vice presidents within each firm)				0.040**	
				(2.20)	
Log(Number of higher-paid CEOs within each industry)				-0.654***	
				(-22.50)	
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Std. Dev. cluster on years	Yes	Yes	Yes	Yes	Yes
Std. Dev. cluster on firms	Yes	Yes	Yes	Yes	Yes
Number of Observations	1,732	1,732	1,732	1,668	1,625
R^2	0.453	0.781	0.785	0.584	0.780
Anderson-Rubin Wald F-statistic for joint relevance				4.961***	
First-stage F-statistics				206.0***	.

Table 4

Senior Manager Tournament Incentives and CDS Spreads Conditional on Governance Regimes

This table presents results of OLS regressions for the following model, using subsamples formed by shareholder control environment:

$$Log(CDS\ spread)_{i,t} = \alpha + \gamma_1 Log(Pay\ gap)_{i,t} + \gamma_2 CEO\ delta_{i,t} + \gamma_2 CEO\ vega_{i,t} + Other\ control\ variables + industry\ fixed\ effects + year\ fixed\ effects + \varepsilon_{i,t}$$

We create sub-samples to distinguish between firms with strong versus weak shareholder control, measured by the *G-index* (Models 1 and 2), and *E-Index* (Models 3 and 4). The dependent variable *Log(CDS spread)* is the natural logarithm of average CDS spread in the 45 days subsequent to the filing dates in year t. *Log(Pay gap)* is the natural logarithm of *Pay gap* which is the difference between the CEO's total compensation and the median VP's total compensation in year t. All other variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. t-statistics adjusted for firm and year clustering are presented below. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: *Log(CDS Spread)*	*G-Index*		*E-Index*	
	< Median Strong Governance	> Median Weak Governance	< Median Strong Governance	> Median Weak Governance
	(1)	(2)	(3)	(4)
Log(Pay gap)	-0.022	-0.067*	-0.039	-0.029
	(-0.73)	(-1.91)	(-1.62)	(-0.96)
CEO delta	-0.000*	0.000	-0.000	0.000
	(-2.52)	(0.10)	(-1.47)	(0.36)
CEO vega	-0.000***	-0.000**	-0.000***	-0.000**
	(-3.57)	(-2.04)	(-3.17)	(-2.47)
Additional Controls Used in Table 3	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Std. Dev. cluster on years	Yes	Yes	Yes	Yes
Std. Dev. cluster on firms	Yes	Yes	Yes	Yes
Number of Observations	784	852	796	816
R^2	0.797	0.780	0.815	0.765

Table 5
Senior Manager Tournament Incentives and CDS Spreads Conditional on Product Market Competition

This table presents results of OLS regressions for the following model, using subsamples formed by product market competition:

$$Log(CDS\ spread)_{i,t} = \alpha + \gamma_1 Log(Pay\ gap)_{i,t} + \gamma_2 CEO\ delta_{i,t} + \gamma_2 CEO\ vega_{i,t} + Other\ control\ variables + industry\ fixed\ effects + year\ fixed\ effects + \varepsilon_{i,t}$$

We create sub-samples by the extent of product market rivalry faced by firms, measured by *Product market fluidity* (Models 1 and 2), *HHI* index (Models 3 and 4), *Fitted HHI* index (Models 5 and 6), and *TNIC HHI* index (Models 7 and 8). The dependent variable *Log(CDS spread)* is the natural logarithm of average CDS spread in the 45 days subsequent to the filing dates in year t. *Log (Pay gap)* is the natural logarithm of *Pay gap* which is the difference between the CEO's total compensation and the median VP's total compensation in year t. All other variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. t-statistics adjusted for firm and year clustering are presented below. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: *Log(CDS spread)*	*Product market fluidity*		*HHI*		*Fitted HHI*		*TNIC HHI*	
	>Median High Competition	< Median Low Competition	< Median High Competition	>Median Low Competition	< Median High Competition	>Median Low Competition	< Median High Competition	>Median Low Competition
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Pay gap)	-0.046**	-0.055	-0.041**	-0.053	-0.030	-0.044*	-0.074***	-0.041**
	(-2.22)	(-1.57)	(-2.36)	(-1.31)	(-1.35)	(-1.76)	(-2.69)	(-2.07)
CEO delta	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.000
	(-1.10)	(-1.10)	(-0.59)	(-1.22)	(-0.43)	(-0.29)	(0.67)	(-1.45)
CEO vega	-0.000***	-0.000	-0.000***	-0.000*	-0.000***	-0.000*	-0.000***	-0.000
	(-3.13)	(-1.00)	(-2.71)	(-1.67)	(-4.53)	(-1.77)	(-4.55)	(-0.60)
Additional Controls Used in Table 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Std. Dev. cluster on years	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Std. Dev. cluster on firms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	828	863	843	889	323	317	865	860
R^2	0.794	0.798	0.787	0.796	0.793	0.815	0.786	0.796

Table 6
Senior Manager Tournament Incentives and CDS Spreads Conditional on Probability of Winning

This table presents results of OLS regressions for the following model, using subsamples formed by the probability of VPs winning the tournament:

$$Log(CDS\ spread)_{i,t} = \alpha + \gamma_1 Log(Pay\ gap)_{i,t} + \gamma_2 CEO\ delta_{i,t} + \gamma_2 CEO\ vega_{i,t} + Other\ control\ variables + industry\ fixed\ effects + year\ fixed\ effects + \varepsilon_{i,t}$$

We create sub-samples based on whether it is a new CEO or not in Models 1 and 2, and whether the CEO is older than 65 or not in Models 3 and 4. Models 5 and 6 considers both situations. The dependent variable *Log(CDS spread)* is the natural logarithm of average CDS spread in the 45 days subsequent to the filing dates in year t. *Log (Pay gap)* is the natural logarithm of *Pay gap* which is the difference between the CEO's total compensation and the median VP's total compensation in year t. All other variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% and all dollar-value variables are expressed in 2003 dollars. t-statistics adjusted for firm and year clustering are presented below. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable:	New CEOs		Close to Retirement	
Log(CDS spread)	Exclusion of New CEOs	New CEOs	Exclusion of CEOs Older Than 65	CEOs Older Than 65
	(1)	(2)	(3)	(4)
Log(Pay gap)	-0.051**	-0.014	-0.058***	-0.005
	(-2.12)	(-0.14)	(-2.87)	(-0.13)
CEO delta	-0.001***	0.001*	-0.000	0.001
	(-2.79)	(1.71)	(-1.58)	(1.47)
CEO vega	-0.001***	-0.001**	-0.001***	-0.001***
	(-3.46)	(-2.16)	(-3.00)	(-3.15)
Additional Controls Used in Table 3	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Std. Dev. cluster on years	Yes	Yes	Yes	Yes
Std. Dev. cluster on firms	Yes	Yes	Yes	Yes
Number of Observations	1,694	39	1,579	154
R^2	0.788	0.910	0.783	0.897

Figure 1
Linkage between *SMTI* and Credit Risk for CDS Referenced Firms

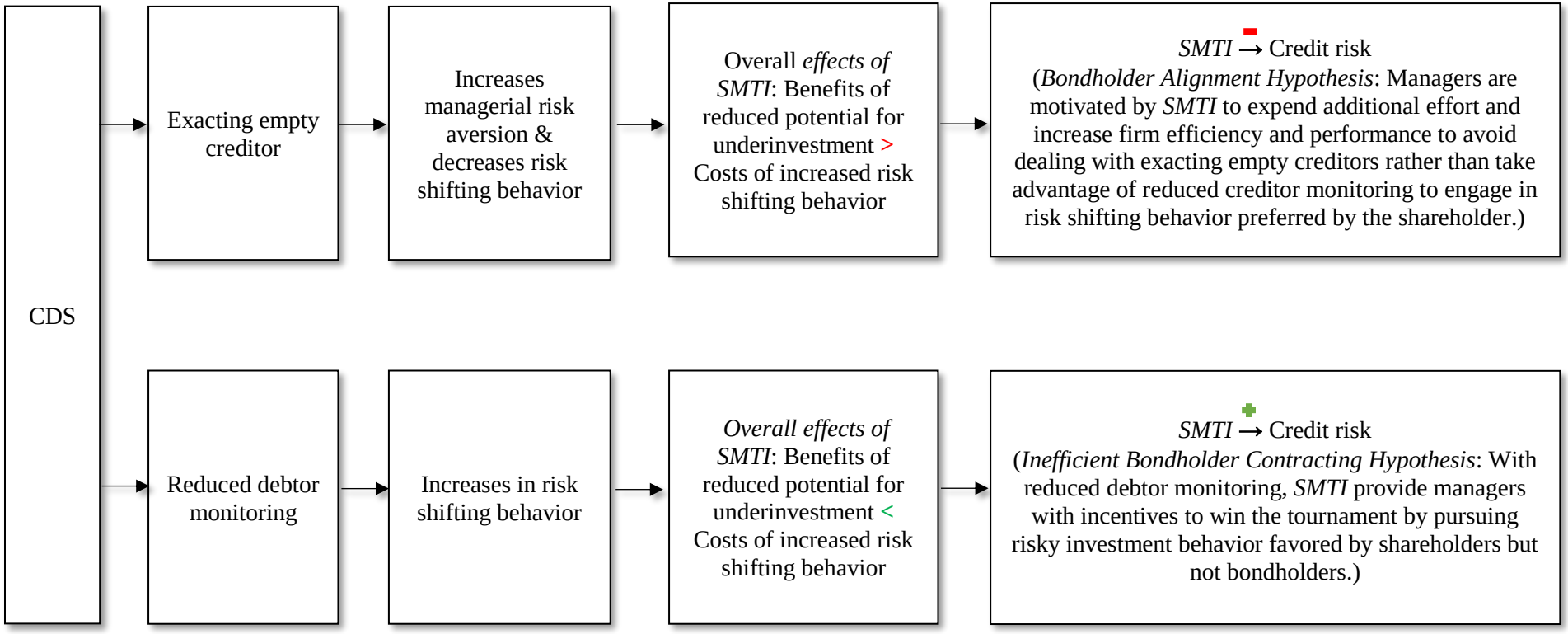

Figure 2
Average CDS Spreads Partitioned by Pay Gap

This figure presents the average *CDS spread* partitioned by *Pay gap* quintiles. *CDS spread* is the average CDS spread in the 45 days subsequent to the filing dates in year t. *Pay gap* is the difference between the CEO's total compensation and the median VP's total compensation in year t.