

1. Introduction

Under the Jensen and Meckling's (1976) paradigm, the separation of ownership and control incurs agency conflicts. The problem naturally arises because CEOs hold a compensation package designed differently from the incentive structures of equity holders and debt holders. CEOs are not fully motivated due to a small portion of the returns they would take after bearing the entire responsibility for the outcomes they generate. Therefore, they pursue less risk than what shareholders would have, especially when their total wealth is heavily concentrated on the firm. The literature has identified many useful tools and mechanisms through a bulk of studies not only on managerial compensation but also corporate board characters, ownership structure, and disciplines from the takeover market.

Agency conflicts also arise between managers and debt holders when managers increase firm risk to benefit shareholders at the cost of debt holders. Unlike shareholders who accept higher firm risk for higher rate of return, debt holders prefer lower risk via conservative investment and financial policies. The costs resulting from these conflicts are defined as the agency cost of debt.

This project provides a unique angle to examine agency conflicts. We study a relationship between CEO's inside debt and firm's payout policy since both are strongly inter-related to the aforementioned agency problems. First, payout policies help reduce manager-shareholder agency conflicts induced by moral hazard and resolve information asymmetries between managers and external investors (Jensen and Meckling, 1976; Leland and Pyle, 1977; Myers, 1977; Ross, 1977; Haugen and Senbet, 1981), although excessive or unanticipated payouts may also exacerbate manager-debt holder agency conflicts. Second, managers' inside debt (e.g., pension and deferred compensation) has been viewed as an effective tool in mitigating agency conflicts between

managers and debt holders (Sundaram and Yermack, 2007; Edmans and Liu, 2011; Wei and Yermack, 2011; Cassell, Huang, Sanchez, and Stuart, 2012). By the definition of Jensen and Meckling (1976), inside debt represents a fixed obligation for the firm to make future payments to executives. Further, inside debt is typically an unsecured and unfunded liability for the firm. The unsecured and unfunded nature of inside debt exposes managers to the same default risks and insolvency treatment as outside creditors. This aligns managers with debt holders and may cause CEOs to manage their firms conservatively (Edmans and Liu, 2011) and thus inside debt should influence firm's payout policy (Sundaram and Yermack, 2007). The main contribution of this paper is to provide strong evidence on the effect of CEO inside debt on firm payout policy extending other work that links it to firm's investment and financial policies.

Dividend policy should be relevant to CEO inside debt. Anantharaman, Fang, and Gong (2010) find that firms with higher levels of CEO inside debt have lower cost of debt financing and fewer and less restrictive debt covenants. Dividend payouts are known to increase the likelihood of needing external financing in the future. Therefore, firms with higher levels of CEO inside debt compensation may be more likely to pay dividends and pay higher levels of dividends due to lowering borrowing costs and fewer and less restrictive debt covenants should they need to go external markets in the future.

In this paper we investigate the aforementioned relation using a sample of 1,859 firm-year observations from 2006 to 2008. We begin by examining the effect of CEO inside debt holdings on the propensity of cash payout, measured using the likelihood of cash dividend payment. We find that the propensity of dividend payment is increasing in CEO inside debt compensation. We next test the effect of CEO inside debt holdings on the level of cash payout, measured using the dividend payout ratio. We find a positive relation between the level of

dividend payout and CEO inside debt compensation. Overall, our results are consistent with the view that CEO inside debt compensation increases the likelihood and the level of dividend payout. The findings also support a view that CEO inside debt can lower the cost of debt financing, which results in more flexibility in dividend payout.

We also examine whether dividend increases (decreases) have a more positive (negative) valuation effect for firms with higher CEO inside debt. Following Pinkowitz, Stulz, and Williamson (2006), we use a modified version of the Fama and French (1998) valuation regression. We find that dividend increases have a more positive valuation effect for firms with high levels of CEO inside debt relative to those with low levels of CEO inside debt. This result is also consistent with the lower borrowing cost effect of CEO inside debt on dividend payout. Dividend increases generate more value for firms with higher CEO inside debt due to increases in financial flexibility and lower costs of external financing.

Lastly, we examine whether CEO entrenchment is an alternative explanation for the positive relation between the propensity and the level of dividend payout and CEO inside debt. The managerial power view argues that CEO inside debt is a channel of rent extraction for entrenched managers (Gerakos, 2010; Lee and Tang, 2011). Entrenched CEOs use dividend payouts as a protection to avoid discipline from outside investors (Zwiebel, 1996; Fluck, 1999; Allen, Bernardo, and Welch, 2000; Hu and Kumar, 2004). Therefore, CEO entrenchment may also explain the positive relation between CEO inside debt holdings and dividend payout. However, we find that a positive relation between CEO inside debt and payout policy remains after including additional proxies for CEO power. Further, results from a Fama and French (1998) valuation regression do not support CEO entrenchment as an alternative explanation for our results. Overall, we contribute to the literature on dividend payout policy and CEO inside

debt compensation by conducting a comprehensive analysis of the relation between CEO inside debt and dividend payout policy.

We organize the remainder of this paper as follows. We motivate our research, review the literature, and develop our hypotheses in Section 2. We provide an overview of our sample and the data in Section 3. We present our empirical results in Section 4 and provide concluding remarks in Section 5.

2. CEO Inside Debt and Dividend Payout Policy

2.1 Payout policy and agency costs

Dividend policy is regarded as one of the firm's most important decisions and one of the most thoroughly researched areas in the field of finance. The literature provides several explanations for the use of dividends by managers as a means of distributing cash to shareholders, including, agency theory (Jensen and Meckling, 1976), clientele theory, dividend signaling theory (Bhattacharya, 1979; John and Williams, 1985; Miller and Rock, 1985), and life cycle theory (DeAngelo and DeAngelo, 2006).¹

We focus on the use of dividends as a means of reducing agency conflicts between inside managers and external investors. Agency theory argues that shareholders choose financial policy ex ante to minimize agency costs between shareholders and management. Thus, the optimal

¹ Clientele theory concerns itself with the effect that dividends have on shareholders of a firm, or clientele. Under the U.S. tax code, cash dividends are taxed more heavily than capital gains. Therefore, dividend paying firms attract a certain type of shareholders and changes in dividend policy and the stock price reactions that go along with such changes may simply reflect a shift in the firm's clientele. Dividend signaling theory is based on the concept of asymmetric information between insiders and outsiders. It assumes that dividends are used by firms to convey positive information from informed management to uninformed shareholders. Cash dividends are costly to the firm, due to a decrease in retained earnings for investment, and costly to shareholders, because they are taxed as ordinary income. Due to the cost of paying dividends, only profitable companies can afford to pay out dividends, effectively eliminating the ability of less profitable firms to mimic the signaling effect of dividends. Life-cycle theory, posits that the trade-off between retention and distribution of free cash flows evolves over time as profits accumulate and investment opportunities decline. This theory predicts that firms pay fewer dividends when they are at the growth phase because of limited capital, but more dividends when they mature because of the necessity to mitigate the agency costs associated with higher free cash flow.

financial policy trades access to low cost sources of capital, retained earnings, with the agency costs induced by moral hazard. This problem is especially severe in large, slow growing firms, which generate large amounts of free cash flow. In such firms, managers are likely to over-spend their cash flow as investments rather than pay it out to shareholders. Investors are therefore willing to pay a higher price for firms with more responsive management, i.e., those willing to pay out extra cash as dividends to shareholders. Consistent with this prediction, Lang and Litzenberger (1989) show that the stock returns around the announcement of a dividend increase are significantly higher for low Tobin's Q firms (firms with limited positive net present value investment opportunities) relative to high Tobin's Q firms. DeAngelo and Stulz (2006) show that if high-dividend firms had not paid dividends over the past decade they would be debt free and their managers would be totally insulated from capital market discipline. Furthermore, Hu and Kumar (2004) document that managerial entrenchment is a significant predictor of payout policy, over and above internal governance mechanisms, investment opportunities, and monitoring by large shareholders.

The literature on dividend policy primarily links payout policy to agency conflicts between managers and shareholders (agency costs of equity). For instance, the *outcome model* builds on the free cash flow hypothesis of Jensen (1986), which states that shareholders can exercise their legal rights to force firms to pay dividends, reducing the agency costs of equity (La Porta et al., 2000; Mitton, 2004; Bartram, Brown, How and Verhoeven, 2010; Jiraporn, Kim, and Kim, 2011).

However, recent studies also link payout policy to agency conflicts between managers and debt holders (agency costs of debt) by exploring the link between debtholder rights, shareholders rights, and corporate dividend payout. For example, the *substitute model* states that

firms use dividends as a bonding device. Brockman and Unlu (2009) examine the link between country-level creditor rights, the agency costs of debt, and dividend payouts. They argue that creditors require and managers agree to pay lower dividends to substitute for the weak interest alignment between managers and creditors to lessen the agency costs of debt. Utilizing a large sample of 120,507 firm-years from 52 countries from the period 1990 to 2006, Brockman and Unlu (2009) find that both the propensity and the level of dividend payout are positively related to creditor protection. They find that the effect of creditor rights on dividends is stronger than the effect of shareholder rights. Their empirical evidence suggests that agency costs of debt are more relevant in explaining dividends than agency costs of equity. Similarly, Byrne and O'Connor (2012) find that creditors exert the greatest influence on dividend payout policy while creditor rights, shareholder rights, and corporate governance all influence both the propensity and the level of dividend payouts. Overall, these studies suggest that firms balance their policies between the interests of shareholders and debt holders, but that debt holders exert significant influence over dividend payout policy.

2.2. Inside debt compensation as a means to reduce agency costs of debt

Many CEOs in the US hold significant amounts of pay in the form of defined benefit pension plans and deferred compensation (Sundaram and Yermack, 2007; Wei and Yermack, 2011). These forms of executive compensation are defined as inside debt (in the language of Jensen and Meckling (1976)) as this compensation represents fixed obligation for the firm to make future payments to corporate insiders. Inside debt compensation are unsecured and unfunded, exposing CEOs to the same default risks and insolvency treatment as outside creditors. Therefore, CEO inside debt compensation can be used as a vehicle to mitigate the

agency costs of debt (Sundaram and Yermack, 2007; Edmans and Liu, 2011; Wei and Yermack, 2011; Lee and Tang, 2011; Cassell et al., 2012).

Agency costs of debt occur when managers vary the firm's investment policy, payout policy, or capital structure in ways that reallocate wealth from debtholders to stockholders, generally through some increase in the overall risk of the firm (Jensen and Meckling, 1976; Dewatripont and Tirole, 1994). To alleviate the agency costs of debt, Jensen and Meckling (1976) recommend implementing an optimal incentive structure under which the CEO's personal holdings of the firm's debt and equity ratio is similar to the firm's overall capital structure. Based on agency theory, studies on CEO inside debt compensation find that CEOs with higher inside debt holdings prefer less risky investment and financial policies (Cassell et al., 2012). Sundaram and Yermack (2007) find that as the value of a CEO's pension increases relative to the value of her equity holdings, risk taking, as measured by distance-to-default declines. Wei and Yermack (2011) examine stockholder and bondholder reactions to firms' initial reports of their CEOs' inside debt positions in early 2007 when new SEC disclosure rules took effect. The authors find that bond prices rise, equity prices fall, and the volatility of both securities drops upon disclosures by firms where the CEO has a sizeable defined benefit pension or deferred compensation. This suggests that inside debt may reduce firm risk and transfer wealth from equity toward debt. This is also consistent with the idea that investors anticipate less risk taking by managers with higher levels of inside debt.

Several recent studies also find a negative relation between CEO inside debt holdings and the cost of debt (Anantharaman et al., 2010; Chen, Dou, and Wang, 2010; Wang, Xie, and Xin, 2011). When compensation packages of CEOs consist of both inside debt compensation and equity-based compensation, CEO incentives vary with the relative importance of debt versus

equity based compensation in the pay structure (inside leverage of the CEO). The higher a CEO's inside leverage relative to firm leverage (the CEOs' relative leverage), the more closely the CEO's incentives are aligned with debtholders vis-à-vis shareholders and the lesser the degree to which CEO engages in risk-seeking behavior to damage debt holders wealth (Edmans and Liu, 2011). Anantharaman et al., 2010 argues that if debtholders realize the incentive effects of CEO inside debt holdings, firms providing CEOs with higher relative leverage should bear a lower borrowing cost and fewer covenants. Utilizing a sample of private loans originated during 2006-2008, they find that higher CEO relative leverage is associated with lower cost of debt financing and fewer restrictive covenants. Wang et al. (2011) posit that banks demand lower yield spreads and less strict terms on loans to firms where CEOs have large inside debt holdings. Using a sample of 1,280 loan facilities for 676 unique firms originated for the period of 2007 to 2010, they find that banks charge lower yield spreads on loans when CEOs of those firms hold larger inside debt holdings. Empirical evidence also shows that loans to firms providing CEOs with larger inside debt holdings are associated with fewer covenant restrictions. This is consistent with the view that debtholders anticipate lower expropriation risk by firms with larger CEO inside debt holdings. For instance, Chen, Dou, and Wang (2010) find that public debtholders charge lower interest rates to the firms providing CEOs with more inside debt. In addition, they find that the level of CEO inside debt holdings exhibits a negative relation with restrictive debt covenants. In summary, these studies suggest that CEOs with higher inside debt compensation are associated with lower borrowing costs of debt financing and fewer restrictive covenants.

2.3. Testable hypotheses

The *incentive alignment hypothesis* states that CEO inside debt compensation mitigates agency costs of debt by aligning interests of CEOs with those of debtholders. Debtholders recognize the incentive effects of CEO inside debt holdings. Firms providing their CEOs with debt-like compensation bear a lower cost of borrowing and fewer covenants limiting their investing, financing, and payout decisions after debt issuance. Hence, firms have better access to external financing market when CEOs pay packages consist of a substantial amount of inside debt holdings.

Our first hypothesis focuses on the propensity of dividend payout. Agency theory predicts that the optimal dividend payout policy depends on the tradeoff between the marginal benefits from the reduction in agency costs of free cash flow and the marginal costs of using external financing. CEOs have incentives to build reputation capital by restricting dividends if they expect to tap credit markets in the future (John and Nachman, 1985; Long, Malitz, and Sefcik, 1994). Furthermore, dividend decisions for firms that currently pay dividends may also differ from those that do not pay dividends (Allen and Michaely, 2003; Fama and French, 2001). For firms that currently pay dividends, dividend omission is associated with a negative stock price reaction, which increases the costs of external financing for the firm.²

While CEO inside debt compensation reduces agency costs of debt by aligning the CEO's interest with those of debt holders, higher CEO inside debt may also provide firms with better excess to external financial markets. Khurana, Martin, and Pereira (2006) note that poor

² Managers also have an incentive to build a reputation for treating investors fairly in their payout decisions in order to sell equity at higher prices in the future (Shleifer and Vishny, 1997; La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000; Shleifer, 2000; DeAngelo and DeAngelo, 2007). One way to build such a reputation is to pay dividends. To make this mechanism to work, however, a firm must continue paying dividends. Empirical studies indicate that firms view dividends continuation as an important determinant of dividend policy due to asymmetric information and firms that have historically paid dividends will continue to do so (Michaely et al., 1995; DeAngelo and DeAngelo, 2007; Skinner, 2008; Denis and Osobov, 2008). Similarly, Brav et al. (2005) document that managers would prefer to forgo some positive net present value projects rather than omit dividends due to the negative stock price reaction to dividend omission.

financial market development encourages internal cash savings so that firms can avoid expensive external financing. Similarly, we argue that firms with lower CEO inside debt compensation have poor interest alignment between managers and debt holders. As a result, debt holders charge a higher interest rate on loans. Therefore, firms with lower CEO inside debt holdings have incentives to accumulate internal cash holdings in order to avoid expensive external financing. On the other hand, firms awarding CEOs with larger inside debt holdings will be more likely to pay dividends because of inexpensive external financing. This leads to our first hypothesis:

H₁: The propensity of dividend payment is increasing in CEO inside debt holdings.

Our second hypothesis focuses on the level of dividend payment. Dividend paying firms incur the cost of forgoing positive net present value projects or the additional cost of raising external financing when internal cash flows are inadequate for investments. Therefore, a lower dividend payment offers CEOs with more financial flexibility. However, since CEO inside debt holdings provide firms more financial flexibility, firms paying dividends will continue to maintain high dividend levels as external financing. As such, greater CEO inside debt holdings will be associated with higher dividend levels:

H₂: The level of dividend payment is increasing in CEO inside debt holdings.

3. Sample Selection and Data

The Securities and Exchange Commission (SEC) required all firms to expand executive compensation disclosure effective in 2006 fiscal year end. Therefore, 2006 marks the beginning of our sample period because this is the first year that EXECUCOMP reports CEO pension and deferred compensation information.

Our initial sample includes a matched sample of all firms in the COMPUSTAT Annual Industrial file and Center for Research in Securities Prices (CRSP) databases from 2006 to 2008. We exclude all financial and utility firms (SIC code of 4900-4949 and 6000-6999), all leverage buyouts (LBO) firms (stock code 4 in CRSP), and all firms that incorporate abroad (incorporation code 99 in Compustat). We further limit our sample to ordinary common shares (share code 10 or 11 in CRSP). This excludes certificates, Americus trust components, closed-end funds, ADRs, shares of beneficial interest, units, and REITs from analysis. Finally, we delete observations with missing values on common dividends. This results in a COMPUSTAT-CRSP matched sample of 2,791 firm-year observations from 2006 to 2008.

We then match this sample with EXECUCOMP for CEO annual compensation information, and Risk Metrics and Equilar for board of director data. We delete any observations with missing values on CEO pension, deferred compensation, and CEO stock incentives. After deleting observations with missing values for these variables, we have a final matched sample of 1,859 firm-year observations from 2006 to 2008. Our sample is comparable with recent studies on CEO inside debt holdings using the EXECUCOMP database over the period 2006 to 2008 (Cassell et al., 2012; Cen, 2011; Lee and Tang, 2011).

Our final sample does not include 453 firms which have zero debt or missing debt. This may raise a question if CEO inside debt compensation does not matter for all-equity firms. Sundaram and Yermack (2007) argue that the incentive impact of debt and equity holdings of CEOs depends on the capital structure of the firm. When a firm has debt and equity in its capital structure, then the CEO tends to shift risk from shareholders to debtholders if the CEO has only equity holdings in the firm. Compensating CEOs with pension and deferred compensation aligns interests of CEOs with that of debtholders which in turn, reduces agency costs of debt. CEO

inside debt compensation impacts on decision-making by CEOs only when firm has debt in the capital structure. Therefore, CEO inside debt compensation does not matter for all-equity firms as risk shifting from shareholders to debtholders by CEOs does not happen for these firms.

3.1. Variable descriptions

Our primary dependent variable is dividend payout. Our primary independent variable is CEO inside debt holdings. We also include several additional control variables that are related to both payout policy and CEO inside debt holdings. Table 1 describes the construction of the variables and data sources in more detail. All continuous variables are winsorized at upper and lower 1% of the sample distribution to address potential problems associated with extreme observations.

[Insert Table 1 about here]

3.1.1. Dividend payout

We measure the propensity of cash dividends using an indicator variable equal to one for firm i in year t if the firm has positive cash dividends on common stock, and zero otherwise. We measure the level of cash dividends using the dividend payout ratio, which is calculated as cash dividends on common stock scaled by market value of equity (Fenn and Liang, 2001).

3.1.2. CEO inside debt holdings

Our primary explanatory variable is CEO inside debt holdings. Following prior literature on CEO inside debt holdings (e.g., Cassell et al., 2012), we use two measures for CEO inside debt holdings: 1) the CEO to firm debt/equity ratio³ and 2) an indicator variable equal to 1 when

³ We note that our hypotheses may raise questions regarding the effect of managerial stock incentives and borrowing cost as managers receive significant amount of their pay in the form of stock and options. Studies linking managerial ownership with cost of borrowing find a positive relation between managerial ownership and borrowing costs (Ortiz-Molina, 2006). Our main explanatory variable is CEO to firm debt/equity ratio (CEO's debt-to-equity ratio scaled by firm's debt-to-equity ratio). Thus, managerial stock incentives are in the denominator of this measure of CEO inside debt holdings. This indicates a negative relation between borrowing cost and our measure of CEO inside debt.

the CEO to firm debt/ equity ratio is greater than one. The first measure, the CEO to firm debt/equity ratio, is calculated as the CEO's debt/equity ratio scaled by the firm's debt to equity ratio. The CEO's debt/ equity ratio is calculated as CEO inside debt holdings scaled by CEO equity holdings. CEO inside debt holdings are calculated as the sum of the present value of accumulated pension benefits and deferred compensation. CEO equity holdings are calculated as the value of both stock and stock options held by the CEO, where the value of stock is calculated by multiplying the number of shares held by the stock price at the firm's fiscal year end and the value of option is calculated by multiplying the total option delta (using the Black-Scholes (1973)) by the stock price at the firm's fiscal year end. Firm debt is the sum of current and long-term debt. Firm equity is the product of shares outstanding and the stock price at the firm's fiscal year end. Our second measure is an indicator variable equal to 1 when the CEO to firm debt/ equity ratio is greater than 1 (i.e. the CEO is more levered than the firm), and zero otherwise.

3.1.3. Control variables

We include several additional control variables to proxy for various firm specific factors that may motivate and influence dividend payout policy. The Life cycle explanation of dividend policy argues that dividends are more likely to be paid by mature firms with fewer valuable investment opportunities than young firms with abundant positive NPV projects (Fama and French, 2001; Grullon et al., 2002; and DeAngelo and DeAngelo, 2006). We use retained earnings scaled by total assets to measure the life-cycle stage of the firm (DeAngelo, et al. 2006). In addition, we control for profitability, growth opportunities, firm size, cash balances, and previous dividend status. Profitability is measured by return on assets (ROA), which is calculated as earnings before extraordinary items plus interest and income statement deferred tax (if available), all scaled by total assets (Fama and French, 2001). Growth opportunities are

measured by sales growth rate, which is calculated as the 1-year change in sales divided by the previous year's sales level. Firm size is calculated as the logarithm of total assets. Cash holdings are calculated as cash scaled by total assets. Also, we use a lagged dividend dummy as a proxy for the previous dividend status when we examine the impact of CEO inside debt on the probability and level of dividend payout of dividend payout in Logit and Tobit regressions.

3.2. Descriptive statistics

Table 2 presents summary statistics for the full sample. Panel A of Table 2 reports descriptive statistics. The mean (median) dividend payout ratio is 0.016 (0.006). We find that the mean (median) CEO debt/equity ratio is 0.280 (0.078). This suggests that CEO equity holdings are larger than CEO inside debt holdings for the majority of our sample firms. However, the average CEO holds more than \$5 million in inside debt, suggesting that inside debt holdings are nontrivial our sample CEOs. The CEO to firm debt/equity ratio shows a similar distribution with mean (median) values of 0.684 (0.296). The mean (median) CEO to firm debt/equity ratio >1 is 0.2399 (0.0000) indicating that CEO's debt-to-equity ratio is less than firm's debt-to-equity ratio for the majority of our sample firms.

[Insert Table 2 about here]

Panel B of Table 2 provides the distribution of the sample firms across years. Our sample firms are evenly distributed from 2006 to 2008. Panel C of Table 2 reports the industry classification (by two-digit SIC codes) across our sample. Our sample firms are from a broad spectrum of industries.

Panel D of Table 2 reports Pearson correlations for our variables of interest and our primary dependent variables. Consistent with the hypothesized relationships, we find a positive and significant relation between the propensity of cash dividends (divdummy) and each measure

of CEO inside debt holdings (CEO to firm debt/equity ratio and CEO to firm debt/equity ratio >1). Similarly, we find a positive and significant relation between the level of cash dividends (dividend payout ratio) and each measure of CEO inside debt holdings (CEO to firm debt/equity ratio and CEO to firm debt/equity ratio >1).

4. Empirical Results

We examine the effect of CEO inside debt compensation on dividend payout policy in this section. We begin by employing multivariate regressions of dividend payout policy on CEO inside debt compensation. We then report results of a Fama and French (1998) valuation regression to examine whether dividend increases (decreases) have a more positive (negative) valuation effect for firms with higher CEO to firm debt/equity ratios.

4.1. Effect of CEO inside debt holdings on the propensity of dividend payout

We begin by examining the effect of CEO inside debt compensation on the propensity of dividend payout. Table 3 reports results of logit regressions with controls for industry and year, fixed effect. Standard errors are clustered at firm level. The dependent variable, *divdummy*, is an indicator equal to one if the firm pays dividends in a given year, and zero otherwise. Models 1, 2, and 3 report results for the full sample where the main explanatory variable is the first measure of CEO inside debt holdings, CEO to firm debt/equity ratio. Models 4, 5, and 6 include the alternative measure of CEO inside debt holdings, CEO to firm debt/equity >1 .

The estimated coefficients on CEO to firm debt/equity ratio are positive and significant in models 1 and 2. This supports H_1 , which predicts that the propensity of dividend payout is increasing in CEO inside debt holdings. Our conclusions are unchanged using an alternative proxy for inside debt in Models 4 and 5. The estimated coefficients on CEO to firm debt/equity

>1 are positive and significant. Dividend decisions may also differ for firms with different dividend status in the past year. Therefore, in Models 3 and 6 we include a lagged dividend dummy as a proxy for the previous years' dividend status. The estimated coefficients on CEO to firm debt/equity ratio and CEO to firm debt/equity ratio>1 remain positive and significant. We continue to find support for H_1 . The propensity of dividend payout is increasing in CEO inside debt holdings.

[Insert Table 3 about here]

4.2. Effect of CEO inside debt holdings on the level of dividend payout

Next, we examine the effect of CEO inside debt holdings on the level of dividend payout. Table 4 reports results of Tobit regression with controls for industry and year fixed effect. Standard errors are clustered at firm level. The dependent variable, dividend payout ratio, is left censored at zero. Models 1, 2, and 3 report results for the full sample where the main explanatory variable is the first measure of CEO inside debt holdings, CEO to firm debt/equity ratio. Models 4, 5, and 6 include the alternative measure of CEO inside debt holdings, CEO to firm debt/equity>1.

The estimated coefficients on CEO to firm debt/equity ratio are positive and significant coefficient on in Models 1 and 2. This supports H_2 , which predicts that the level of dividend payment is increasing in CEO inside debt holdings. Again, our conclusions are unchanged using an alternative proxy for inside debt in Models 4 and 5. The estimated coefficients on CEO to firm debt/equity >1 are positive and significant.

[Insert Table 4 about here]

Lastly, in models 3 and 6 we include a lagged dividend dummy as a proxy for the previous years' dividend status. While the estimated coefficients on CEO to firm debt/equity ratio and CEO to firm debt/equity ratio > 1 are positive they are not significant.

4.3. Effect of dividend increases (decreases) on valuation effect for firms with higher CEO to firm debt/equity ratio

We now examine whether dividend increases (decreases) have a more positive (negative) valuation effect for firms with higher CEO to firm debt/equity ratio. We employ the Fama and French (1998) valuation regression. This regression has been used in many studies examining valuation effects⁴ and is well suited for our purpose as it accounts for cross-section variations in firm value. Following Pinkowitz, Stulz, and Williamson (2006), we use the modified version of the Fama and French (1998) valuation regression by replacing the two year change in value of variables by one year change in value of variables. The basic regression specification is as follows:

$$\begin{aligned}
 V_{i,t} = & \beta_0 + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dA_{i,t} + \beta_5 dA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \\
 & \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \\
 & \beta_{15} dV_{i,t+1} + \varepsilon_{i,t},
 \end{aligned} \tag{1}$$

where all variables are scaled by total assets to control for heteroskedasticity (see Pinkowitz, Stulz, and Williamson, 2003; and Brockman and Unlu, 2009). X_t is the level of variable X in fiscal year t scaled by total assets in year t. dX_t is the change in variable X from year t-1 to year t scaled by total assets in year t ($(X_t - X_{t-1})/A_t$). dX_{t+1} is the change in variable X from year t

⁴ This regression has been used in many studies examining valuation effect. Pinkowitz and Williamson (2005) use this model to analyze the determinants of the value of cash for domestic firms. Pinkowitz, Stulz, and Williamson (2003) use this model to investigate the valuation effect of cash and dividends for firms in countries with different level of investor protection. Dittmar and Mahrt-Smith (2007) use this model to show that cash is worth less when agency problems between insiders and outsiders are greater. Brockman and Unlu (2009) use this model to test whether dividend reductions (increases) are value increasing (decreasing) for firms in countries with poor creditor rights.

to year $t+1$ scaled by total assets in year t $((X_{t+1} - X_t)/A_t)$. Firm value is measured by the market value of the firm, which is calculated as the sum of market value of equity and total liabilities at fiscal year end. The independent variables include earnings (E), total assets (A), research and development expenditures (RD), interest expense (I), common dividends (D), and total value of the firm value for year $t+1$ (V_{t+1}). Earnings are calculated as earnings before extraordinary items, plus interest expense, plus income statement deferred taxes and investment tax credit (if available). A is the book value of total assets. RD is R&D expenditures and is set to zero when missing. I is the interest expense. D is the cash dividends paid to common stock. V is firm's common stock price multiply shares outstanding at the end of fiscal year, plus preferred stock, plus total book liabilities, minus balance sheet deferred taxes and investment tax credit (if available), where preferred stock is taken to be, in order and as available, redemption value, liquidating value, or par value. Notice that this model includes next-period variables to absorb changes in expectations. The primary variable of interest in our study is the contemporaneous relation between firm value and dividends ($D_{i,t}$). This directly measures the valuation effect of current dividends on firm.

Table 5 reports the results using a modified version of the Fama and French (1998) valuation regression model. We allow the coefficient estimates and intercept to vary with inside debt in order to estimate how dividends have a different valuation effect for firms with different levels of inside debt. More specifically, in each fiscal year, we create a dummy variable with a value of one for firms with a CEO to firm debt/equity ratio above median and zero otherwise. This dummy variable is further interacted with all the independent variables as well as the constant. Therefore, the coefficient estimates on the interaction term are the additional valuation effect of dividends for firms with relative inside debt ratio above median. If higher inside debt

increases the firm's financial flexibility by offering better access to external financing market, dividend increases should generate more value for firms with higher relative inside debt ratio. Larger dividend payouts increase the likelihood of external financing and the external financing is less costly for firms with higher inside debt. Following Fama and French (1998), we estimate the equation using the Fama-MacBeth (1973) methodology. Models 1 and 2 do not include industry effects, while Model 3 and 4 include industry effects.

[Insert Table 5 about here]

The estimated coefficient for high inside debt firms in Model 2 is positive and significant (10.1649). While the estimated coefficient for low inside debt firms is also positive and significant (3.6462) in Model 1, the positive valuation effect is significantly greater for high inside debt firms relative to low inside debt firms. Our results are similar in Models 3 and 4 which include firm fixed effects. Overall, our results suggest that dividend changes have a more positive valuation effect for firms with higher level of inside debt than firms with a lower level of inside debt.

4.4 Robustness tests

4.4.1. CEO entrenchment hypothesis

In this section we first examine whether the positive relation between the propensity and level of cash dividends and CEO inside debt holdings can be explained by CEO entrenchment. Powerful CEOs are associated with more negotiation and control power over their boards, and therefore, are more likely to influence their compensation structure. The managerial power view argues that CEO inside debt is a channel of rent extraction for entrenched managers (Gerakos, 2010; Lee and Tang, 2011). Entrenched CEOs use dividend payouts as a protection to avoid discipline from outside investors (Zwiebel, 1996; Fluck, 1999; Allen, Bernardo, and Welch,

2000; Hu and Kumar, 2004). Therefore, an alternative explanation for our result is that CEO entrenchment explains the positive relation between CEO inside debt and dividend payout.

We present the results of modified version of Fama and French (1998) valuation model in Table 5. We find that dividend changes are positively related to firm value for firms with higher levels of inside debt than firms with lower levels. If CEO entrenchment were to be the explanation, we should find negative valuation effect for dividend increases, as such activities are motivated by self interests from entrenched CEOs. The empirical evidence presented in Table 5, however, suggests the opposite. Still, we cannot rule out CEO entrenchment as an explanation for the positive relation between the propensity and level of dividend payout and CEO inside debt holdings.

However, in order to test whether the entrenchment hypothesis is an alternative explanation for our findings, we include proxies for CEO power in the previous logit and tobit regression model. We include CEO tenure, measured as the number of years the CEO has been CEO. Longer CEO tenure may increase the level of managerial influence over the board (Finkelstein and Hambrick, 1989). CEOs with longer tenures may also be entrenched and are more likely to be risk averse (Berger, Ofek, and Yermack, 1997; Coles, Daniel, and Naveen, 2006). CEO-chair duality is a dummy variable equal to one if the CEO holds the title of CEO and COB (chairman of the board), and zero otherwise. When the CEO also chairs the board, agency problems are potentially more severe because power may be concentrated in the CEO over the board of directors (Jensen, 1993; Goyal and Park, 2002). Managers have more power in larger boards because it is easier for CEO to control the board, and individual board members are less likely to be held accountable (Jensen, 1993; Yermack, 1996; and Core, Holthausen, and Larcker, 1999). Therefore, we include board size, measured as the number of directors serving

on the board. Fama and Jensen (1983) argue that independent directors are likely to have an incentive to ensure the effective running of a company. Therefore, CEOs in the firms with more independent boards are less likely to be entrenched. We classify independent directors as non-employees, or affiliated (e.g., former employees, family members of employees, or those with business relations with the firm either personally or through his or her main employer). The percentage of independent directors is calculated as the number of independent directors scaled by the total number of directors on the board.

We begin by examining the effect of CEO inside debt compensation on the propensity of dividend payout by including all proxies for CEO power as described above. Table 6 reports results of logit regression with control for industry and year fixed effects. Standard errors are clustered at firm level. The dependent variable, *divdummy*, is an indicator equal to one if the firm pays dividends in a given year, and zero otherwise. Models 1, 2, and 3 report results for the full sample where the main explanatory variable is the first measure of CEO inside debt holdings, CEO to firm debt/equity ratio. Models 4, 5, and 6 include the alternative measure of CEO inside debt holdings, CEO to firm debt/equity > 1.

[Insert Table 6 about here]

The estimated coefficients on board size and CEO-chairman duality are positive and significant in models 1, 2, 3, and 4. This suggests that more powerful or entrenched CEOs are more likely to pay dividends. However, the estimated coefficients on CEO to firm debt/equity ratio also remain positive and significant in models 1, 2, 4, and 5. This suggests that CEO entrenchment cannot fully explain the positive relation between CEO inside debt holdings and the propensity of dividend payout.

Next, we examine the effect of CEO inside debt holdings on the level of dividend payout including all proxies for CEO power. Table 7 reports results of Tobit regression with control for industry and year fixed effect. Standard errors are clustered at firm level. The dependent variable, dividend payout ratio, is left censored at zero. Models 1, 2, and 3 report results for the full sample where the main explanatory variable is the first measure of CEO inside debt holdings, CEO to firm debt/equity ratio. Models 4, 5, and 6 include the alternative measure of CEO inside debt holdings, CEO to firm debt/equity > 1.

[Insert Table 7 about here]

Again, the estimated coefficients on board size are positive and significant in all six models. This supports the managerial entrenchment hypothesis. However, the estimated coefficients on CEO to firm debt/equity ratio also remain significant in all six models. CEO entrenchment cannot fully explain the positive relation between CEO inside debt holdings and the level of dividend payout. In summary, results from Table 6 and Table 7 suggest that CEO inside debt has significant influence on the propensity and the level of dividend payout after controlling for managerial power.

4.4.2. Non-linear relation between firm leverage and CEO inside debt

Cen (2011) finds a non-linear relation between firm leverage and CEO inside debt using a sample of 1947 firms for the period 2006 to 2008. In particular, Cen (2011) finds that inside debt initially increases with the firm leverage and CEO inside debt holdings are negatively associated with the firm leverage after the firm leverage reaches a certain level. Cen (2011) suggests that CEO risk aversion may be one of the underlying reasons for the quadratic relation between firm leverage and CEO inside debt holdings. When CEO inside debt is much higher than firm

leverage, the CEO becomes extremely risk-averse and reserves cash rather than paying. Accordingly, there is negative relation between the propensity and level of dividend and squared CEO to firm debt equity ratio.

Table 8 reports results of logit regression with control for industry and year fixed effect. Standard errors are clustered at firm level. The dependent variable, *divdummy*, is an indicator equal to one if the firm pays dividends in a given year, and zero otherwise. Models 1, 2, and 3 report results for the full sample where the main explanatory variable is the first measure of CEO inside debt holdings, CEO to firm debt/equity ratio. The negative and significant estimated coefficients on CEO to firm debt/equity ratio squared in Models 1, 2, and 3 indicate that the propensity of dividend payout is decreasing for firms with substantial high CEO inside debt holdings relative to firm leverage.

[Insert Table 8 about here]

Table 9 reports results of Tobit regression with control for industry and year fixed effect. Standard errors are clustered at firm level. The dependent variable, dividend payout ratio, is left censored at zero. Models 1, 2, and 3 report results for the full sample where the main explanatory variable is the first measure of CEO inside debt holdings, CEO to firm debt/equity ratio. Again, the negative and significant estimated coefficients on squared CEO to firm debt/equity ratio in Models 1, 2, and 3 indicate that the level of dividend payout is decreasing for firms with substantially high CEO inside debt relative to firm leverage. In summary, results from Table 8 and 9 suggest that the propensity and the level of dividend payout decrease for firms with substantial high CEO inside debt holdings relative to firm leverage as in Cen (2011).

[Insert Table 9 about here]

5. Conclusion

We examine the effect of CEO inside debt compensation on dividend payout policy. Dividends may alleviate agency conflicts between managers and shareholders. However, unexpected dividends may also exacerbate agency conflicts between debt holders and shareholders. CEO inside debt compensation mitigates the agency conflicts between debtholders and shareholders by aligning the interests of CEOs with those of debtholders. Firms awarding CEOs with larger inside debt bear a lower cost of borrowing and fewer restrictive covenants as debtholders recognize incentives of CEO debt-like compensation and anticipate lower expropriation risk. This suggests that firms with larger CEO inside debt will be more likely to pay dividends and maintain higher dividend payouts because they are subject to lower external financing constraints.

We find that that the propensity and the level of dividend payout are positively associated with CEO inside debt holdings for a sample of 1,859 firm-year observations for the period 2006 to 2008. Using a modified version of Fama and French (1998) valuation regression model, we find that dividend changes are more positively related to firm value for firms with higher level of CEO inside debt relative to lower levels of CEO inside debt.

Lastly, we document that the CEO entrenchment hypothesis cannot explain the positive relation between CEO inside debt compensation and the likelihood and the level of dividend payout policy. While empirical studies document that CEO inside debt compensation is a channel of rent extraction for entrenched managers and that entrenched CEOs tend to pay more dividends as a protection to avoid discipline from outside investors, we fail to find evidence consistent with this view.

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Table 1
Definition of Variables

This table reports the definitions of the dependent variables and independent variables used in the analysis.

Dependent Variable	Definition and Data Source
Dividend payout dummy	A dummy variable that equals one if the regular cash dividend on common stocks (DATA21) from Compustat is positive in a given fiscal year, and zero otherwise. Data source: Compustat.
Dividend payout ratio	The regular cash dividends on common stocks scaled by market value of equity = $(DATA21/DATA25*DATA199)\times 100$. Data source: Compustat.
Independent Variable	Definition and Data Source
CEO to firm debt/equity ratio	The natural log of 1 plus the ratio of CEO's debt-to-equity ratio to the firm's debt-to-equity ratio. CEO's inside debt is calculated as sum of the present value of accumulated pension benefits (PENSION_VALUE_TOT) and deferred compensation (DEFER_BALANCE_TOT). CEO equity includes the value of both stock and stock options, where the value of stock is calculated as the number of shares multiply by the stock price at the end of firm's fiscal year, and the value of options is calculated as the total option delta (calculated based on Black-Scholes (1973) option valuation formula) multiply by the stock of price at the end of firm's fiscal year. Firm's debt is the sum of current and long-term debt and firm's equity is the product of shares outstanding and the stock price at the end of firm's fiscal year. Data source: Execucomp, CRSP, Compustat.
CEO to firm debt/equity ratio>1	A dummy variable with a value of one if CEO to firm debt/equity ratio is larger than one and zero otherwise
Earned equity to common equity	Calculated for firms with positive book equity and equals retained earnings divided by total book value of common equity = $DATA36/DATA60$. Data source: Execucomp.
ROA	Earnings before extraordinary items plus interest and income statement deferred tax, scaled by total assets = $(DATA18+DATA15+DATA50)/DATA6$. Data source: Compustat.
Sales growth rate	The change on sales divided by the previous year's sales level = $\Delta Data12/DATA12_{t-1}$. Data source: Compustat.
Firm size	The logarithm of total assets = $LN(DATA6)$. Data source: Compustat.
Cash holdings	Cash scaled by total assets= $DATA1/DATA6$. Data source: Compustat.
CEO tenure	Log of the number of years the executive has served as CEO. Data source: Execucomp.
Board size	Log of the number of directors on the board. Data source: RiskMetrics and Equilar.
Percentage of independent directors	The number of independent directors who are not related to the company scaled by the total number of directors on the board. Data source: RiskMetrics and Equilar.
Duality	A dummy variable that equals to one if CEO is also the chairman of the board. Data source: Execucomp

Table 2
Descriptive statistics and correlations

This table presents descriptive statistics and correlations. Variables include the regular cash dividends on common stocks scaled by market value of equity (Dividend payout ratio), a dummy variable that equals one if regular cash dividends on common stock is positive in a given fiscal year (Dividend payout dummy), the sum of the present value of accumulated pension benefits and deferred compensation (CEO inside debt holdings), the product of number of shares held by the CEO and the stock price at the firm's fiscal year end (CEO stock holdings), the product of the total option delta (calculated based on Black-Scholes (1973) option formula) by the stock price at the firm's fiscal year end (CEO option holdings), the natural log of 1 plus the ratio of CEO's debt-to-equity ratio (CEO to firm debt/equity ratio), a dummy variable that equals one if CEO to firm debt/equity ratio is larger than one and zero otherwise (CEO to firm debt/equity ratio > 1), retained earnings divided by total book value of common equity (Earned equity to common equity), earnings before extraordinary items plus interest and income statement deferred tax, scaled by total assets (ROA), the change on sales divided by the previous year's level (Sales growth rate), total assets (Firm size), cash scaled by total assets (Cash holdings), the number of years the executive has served as CEO (CEO tenure), the number of directors on the board (Board size), the number of directors who are not related to the company scaled by the total number of directors on the board (Percentage of independent directors), a dummy variable that equals to one if CEO is also the chairman of the board (Duality). Detailed definitions of all variables are reported in Table 1. Data are obtained from COMPUSTAT, CRSP, Equilar, EXECUCOMP, and RiskMetrics and consist of 1,859 firm-year observations from 2006 to 2008. Panel A reports descriptive statistics. Panel B reports the sample distribution by year. Panel C reports the sample distribution by industry. Panel D reports pairwise correlation of primary variables. Correlations significant at 5% or better are marked with stars.

Panel A: Summary Statistics

	N	Mean	Std.Dev	Min	P25	Median	P75	Max
Dividend dummy	1859	0.576	0.494	0.000	0.000	1.000	1.000	1.000
Dividend payout ratio	1859	0.016	0.061	0.000	0.000	0.006	0.019	1.670
CEO inside debt holdings (\$ Millions)	1859	5.881	11.923	0.000	0.035	1.483	6.733	142
CEO stock holdings (\$ Millions)	1859	54.756	318	0.000	2.291	7.547	20.649	9204
CEO option holdings (\$ Millions)	1859	17.659	31.548	0.000	1.921	7.177	19.748	380.55
CEO debt/equity ratio (\$ Millions)	1859	0.280	0.552	0.000	0.001	0.078	0.3158	4.1236
CEO to firm debt/equity ratio	1859	0.684	1.071	0.000	0.005	0.296	0.956	10.765
CEO to firm debt/equity ratio >1	1859	0.2399	0.4271	0.000	0.000	0.000	0.000	1.0000
Earned equity to common equity	1859	0.528	1.166	-6.291	0.296	0.671	0.952	2.826
ROA	1859	0.061	0.093	-0.435	0.042	0.075	0.105	0.256
Sales growth rate	1859	0.110	0.196	-0.447	0.016	0.085	0.164	1.338
Firm size	1859	7.810	1.413	3.980	6.801	7.688	8.750	10.821
Cash holdings	1859	0.1080	0.117	0.001	0.024	0.064	0.154	0.711
CEO tenure	1859	8.212	6.717	1.000	3.000	6.000	11.000	37.000
Percentage of independent directors	1144	0.783	0.111	0.385	0.714	0.800	0.888	1.000
Board size	1144	9.433	2.126	4.000	8.000	9.000	11.000	18.000
Duality	1144	0.558	0.497	0.000	0.000	1.000	1.000	1.000

Table 2 (Continued)

Panel B: Sample distribution by year

Year	Frequency	Percent
2006	567	30.5
2007	725	39
2008	567	30.5
Total	1,859	100

Panel C: Sample distribution by industry

Two-digit SIC		Frequency	Percent
20	Food and Kindred Products	74	3.98
26	Paper and Allied Products	49	2.64
27	Printing and Publishing	38	2.04
28	Chemicals & Allied Products	177	9.52
33	Primary Metal Industries	42	2.26
35	Industrial & Commercial Machinery & Computer Equip.	147	7.91
36	Electronic & Other Electrical Equip. & Components Except Computer Equip.	137	7.37
37	Transportation Equip.	62	3.34
38	Measuring Analyzing Controlling Inst.; Photographic Medical & Optical Goods	136	7.32
48	Communications	39	2.1
50	Wholesale Trade- Durable Goods	58	3.12
58	Eating and Drinking Places	43	2.31
59	Miscellaneous Retail	45	2.42
73	Business Services	143	7.69
Industries with less than 2% of sample representation		669	35.99
Total		1,859	100

Table 2 (Continued)

Panel D: Correlations

	1	2	3	4	5	6	7	8
1 Divdummy								
2 Dividend payout ratio	0.2239 (0.0000)							
3 CEO to firm debt/equity ratio	0.2069 (0.0000)	0.0025 (0.0125)						
4 CEO to firm debt/equity ratio>1	0.2341 (0.0000)	0.0158 (0.0466)	0.7222 (0.0000)					
5 Earned equity to common equity	0.3198 (0.0000)	-0.0516 (0.0260)	0.1240 (0.0000)	0.1635 (0.0000)				
6 ROA	0.1541 (0.0000)	-0.0718 (0.0020)	0.1336 (0.0000)	0.1533 (0.0000)	0.3854 (0.0000)			
7 Sales growth rate	-0.1394 (0.0000)	-0.0918 (0.0001)	-0.0478 (0.0393)	-0.0517 (0.0257)	0.0007 (0.9774)	0.2191 (0.0000)		
8 Firm size	0.3395 (0.0000)	0.0564 (0.0149)	0.0618 (0.0076)	0.1026 (0.0000)	0.1770 (0.0000)	0.1268 (0.0000)	-0.0025 (0.9146)	
9 Cash holdings	-0.2424 (0.0000)	-0.0661 (0.0043)	0.0551 (0.0175)	0.0066 (0.7752)	-0.1968 (0.0000)	-0.0147 (0.5261)	-0.0161 (0.4881)	-0.1883 (0.0000)

Table 3
Effect of CEO inside debt compensation on the propensity of dividend payout

The table reports results of logit regression estimates of the propensity of dividend payout. All models control for industry and year fixed effect, where industry is defined based on Fama and French 49 industry classification. The dependent variable is a dummy variable with a value of one if the dividend payout is positive in a given year, and zero otherwise (Dividend payout dummy). The two main independent variables are two measures to proxy CEO inside debt holdings: CEO to firm debt/equity ratio, and a dummy variable with a value of one if CEO to firm debt/equity ratio is larger than one and zero otherwise (CEO to firm debt/equity ratio>1). Control variables are retained earnings divided by total book value of common equity (Earned equity to common equity), earnings before extraordinary items plus interest and income statement deferred tax, scaled by total assets (ROA), the change on sales divided by the previous year's sales level (Sales growth rate), total assets (Firm size), and cash scaled by total assets (Cash holdings). Detailed definitions of all variables are reported in Table 1. Sample period is 2006 - 2008. Models 1, 2, and 3 report results where the main explanatory variable is the first measure of CEO inside debt holdings (CEO to firm debt/equity ratio) while models 4, 5, and 6 report results where the main explanatory variable is the second measure of CEO inside debt holdings (CEO to firm debt/equity ratio>1). Models 3 and 6 are based on prior dividend payers and include the lagged dividend dummy as a proxy for the previous years' dividend status. The *t*-statistics are reported in parentheses. Superscripts *, ** and *** indicate levels of significance of 10%, 5%, and 1%, respectively.

	Dependent Variable = Dividend Payout Dummy					
	(1)	(2)	(3)	(4)	(5)	(6)
CEO to firm debt/equity ratio	0.5019*** (7.57)	0.4111*** (3.88)	0.2478*** (2.61)			
CEO to firm debt/equity ratio>1				1.1915*** (8.63)	1.0150*** (4.80)	0.6935** (2.12)
Earned equity to common equity		0.8187*** (4.92)	0.3156* (1.75)		0.8009*** (4.78)	0.3201* (1.78)
ROA		1.4207 (1.49)	4.1560*** (2.74)		1.3519 (1.47)	4.0595*** (2.67)
Sales growth rate		-1.4448*** (-3.79)	-0.8892 (-1.13)		-1.4151*** (-3.81)	-0.8681 (-1.10)
Firm size		0.5509*** (7.56)	0.4319*** (3.24)		0.5531*** (7.65)	0.4406*** (3.29)
Cash holdings		-2.9206*** (-2.66)	-0.7301 (-0.67)		-2.5322** (-2.44)	-0.5773 (-0.52)
Lagged dividend dummy			7.2595*** (17.63)			7.2621*** (17.64)
Constant	-0.2244 (-0.58)	-4.6805*** (-5.94)	-9.0091*** (-6.30)	-0.2925 (-0.74)	-4.7655*** (-6.13)	-9.1872*** (-6.30)
Industry and year fixed effect	YES	YES	YES	YES	YES	YES
N	1819	1819	1819	1819	1819	1819
Pseudo R2	0.1401	0.2977	0.8354	0.1422	0.2957	0.8358

Table 4
Effect of CEO inside debt compensation on the level of dividend payout

The table reports results of Tobit regression estimates of the level of dividend payout. All models control for industry and year fixed effect, where industry is defined based on Fama and French 49 industry classification. The dependent variable is the dividend payout ratio, censored from below at 0 (Dividend payout ratio). The two main independent variables are two measures to proxy CEO inside debt holdings: CEO to firm debt/equity ratio, and a dummy variable with a value of one if CEO to firm debt/equity ratio is larger than one and zero otherwise (CEO to firm debt/equity ratio > 1). Control variables are retained earnings divided by total book value of common equity (Earned equity to common equity), earnings before extraordinary items plus interest and income statement deferred tax, scaled by total assets (ROA), the change on sales divided by the previous year's sales level (Sales growth rate), total assets (Firm size), and cash scaled by total assets (Cash holdings). Detailed definitions of all variables are reported in Table 1. Sample period is 2006 - 2008. Models 1, 2, and 3 report results where the main explanatory variable is the first measure of CEO inside debt holdings (CEO to firm debt/equity ratio) while models 4, 5, and 6 report results where the main explanatory variable is the second measure of CEO inside debt holdings (CEO to firm debt/equity ratio > 1). Models 3 and 6 are based on prior dividend payers and include the lagged dividend dummy as a proxy for the previous years' dividend status. The *t*-statistics are reported in parentheses. Superscripts *, **, and *** indicate levels of significance of 10%, 5%, and 1%, respectively.

	Dependent Variable = Dividend Payout Ratio					
	(1)	(2)	(3)	(4)	(5)	(6)
CEO to firm debt/equity ratio	0.8227*** (3.18)	0.7516*** (3.16)	0.7193*** (2.96)			
CEO to firm debt/equity ratio > 1				2.3188*** (3.81)	1.9040*** (3.34)	1.8389*** (3.16)
Earned equity to common equity		0.4552 (0.86)	0.4541 (0.86)		0.4223 (0.80)	0.4223 (0.80)
ROA		0.3899 (0.11)	0.6192 (0.17)		0.4326 (0.12)	0.6604 (0.18)
Sales growth rate		-6.2955*** (-2.68)	-6.0933** (-2.54)		-6.2958*** (-2.68)	-6.0862** (-2.54)
Firm size		1.1614*** (3.45)	1.1527*** (3.31)		1.1568*** (3.45)	1.1501*** (3.31)
Cash holdings		-9.4899*** (-2.67)	-9.2260** (-2.54)		-9.0002*** (-2.61)	-8.7669** (-2.49)
Lagged dividend dummy			0.1203 (0.99)			0.1181 (0.97)
Constant	-2.9627 (-1.32)	-11.2693*** (-2.84)	-11.4170*** (-2.90)	-3.2230 (-1.44)	-11.4163*** (-2.88)	-11.5777*** (-2.93)
Industry and year fixed effect	YES	YES	YES	YES	YES	YES
N	1859	1859	1850	1859	1859	1850
Pseudo R2	0.0191	0.0324	0.0324	0.0197	0.0325	0.0326
Log pseudo likelihood	-4223.5998	-4166.4562	-4143.6387	-4221.1092	-4165.9245	-4142.965
Observations left censored	787	787	782	787	787	782

Table 5
CEO inside debt compensation and dividends valuations

This table presents the regression results of dividend valuation effect for firms with different level of CEO to firm debt/equity ratio using Fama and MacBeth (1973) methodology. Sample period is 2006-2008. Due to data limitation on Compustat, our sample size is reduced to 1,756 firm-year observations. Model (1) does not include industry fixed effect. Model (2) includes industry fixed effect. Industry is defined based on Fama and French 49 industry classification. X_t is the level of variable X in fiscal year t scaled by total assets in year t . dX_t is the change in variable X from year $t-1$ to year t scaled by total assets in year t ($(X_t - X_{t-1})/A_t$). dX_{t+1} is the change in variable X from year t to year $t+1$ scaled by total assets in year t ($(X_{t+1} - X_t)/A_t$). The independent variables include earnings (E), total assets (A), research and development expenditures (RD), interest expense (I), common dividends (D), and total value of the firm value for year $t+1$ (V_{t+1}). Earnings is calculated as earnings before extraordinary items, plus interest expense, plus income statement deferred taxes and investment tax credit (if available). A is the book value of total assets. RD is $R\&D$ expenditures and is set to zero when missing. I is the interest expense. D is the cash dividends paid to common stock. V is the market value of the firm calculated by multiplying firm's common stock price by shares outstanding at the end of fiscal year, plus preferred stock, plus total book liabilities, minus balance sheet deferred taxes and investment tax credit (if available), where preferred stock is taken to be, in order and as available, redemption value, liquidating value, or par value. The t -statistics are reported in parentheses. Superscripts *, ** and *** indicate levels of significance of 10%, 5%, and 1%, respectively.

	(1)			(2)		
	Low inside debt	High inside debt	T-statistics of difference	Low inside debt	High inside debt	T-statistics of difference
E_t	4.6939** (5.90)	5.9766*** (7.83)	3.54*	4.9118** (7.54)	6.3236** (7.99)	2.15
dE_t	-0.7234** (-8.81)	-1.2191** (-8.31)	-0.62	-0.8676*** (-12.94)	-0.5101*** (-12.59)	-0.42
dE_{t+1}	2.7133** (6.22)	2.7639** (6.77)	0.12	2.6066** (7.90)	2.8856** (7.60)	0.63
dA_t	-0.1185 (-1.18)	-0.1508 (-2.84)	-0.22	-0.1142 (-0.86)	-0.1043 (-1.11)	0.05
dA_{t+1}	0.5425 (2.03)	0.3894 (2.31)	-0.54	0.4723 (1.77)	0.3650 (1.99)	-0.35
RD_t	2.2629 (1.00)	1.0845 (1.88)	-1.00	2.7776 (1.00)	2.0750 (1.55)	-1.00
dRD_t	-1.4804 (-0.99)	0.5394* (3.23)	3.28*	-1.8358 (-1.48)	-0.6791 (-1.88)	0.45
dRD_{t+1}	3.2567** (6.56)	4.672** (7.95)	4.38*	3.5346** (5.98)	4.0981** (6.57)	3.67*
I_t	-11.9382** (-4.85)	-10.9564** (-5.45)	1.50	-12.1352** (-4.65)	-9.1252** (-5.60)	3.35*
dI_t	5.7181 (1.74)	2.836 (1.44)	-0.34	7.1414* (3.76)	3.4812* (4.10)	-0.41
dI_{t+1}	1.9543 (1.05)	5.083* (4.15)	3.99*	3.1171 (1.71)	3.8132 (1.98)	0.15
D_t	3.6462* (3.74)	10.1649*** (11.23)	6.57**	3.7857** (8.49)	7.5211*** (9.56)	3.58*
dD_t	-2.5831 (-1.66)	-3.2279 (-2.11)	-0.17	-2.4977 (-1.60)	-2.7078 (-2.10)	-0.06
dD_{t+1}	-1.4148 (-1.05)	1.7829* (3.98)	4.01*	-1.8234 (-1.22)	-3.7663 (-1.99)	0.49
dV_{t+1}	-0.2719 (-1.05)	-0.4989 (-1.56)	-2.63	-0.2646 (-1.00)	-0.4659 (-1.94)	-2.48
Constant	1.4259*** (19.97)	1.1132*** (15.67)	-14.30***	1.5759*** (10.63)	1.3306*** (9.81)	-3.99*
Industry fixed effect	NO			YES		
N	1756			1756		
r2	0.5380			0.6141		

Table 6

Effect of CEO inside debt compensation on the propensity of dividend payout including proxies for CEO power in regression models

The table reports results of logit regression estimates of the propensity of dividend payout. All models control for industry and year fixed effect, where industry is defined based on Fama and French 49 industry classification. The dependent variable is a dummy variable with a value of one if the dividend payout is positive in a given year, and zero otherwise (Dividend payout dummy). The two main independent variables are two measures to proxy CEO inside debt holdings: CEO to firm debt/equity ratio, and a dummy variable with a value of one if CEO to firm debt/equity ratio is larger than one and zero otherwise (CEO to firm debt/equity ratio>1). The independent variables to proxy for CEO power are: the number of years the CEO has served as CEO (CEO tenure), the number of directors serving on the board (Board size), the number of independent directors scaled by the total number of directors on the board (Percentage of independent directors), and a dummy variable that equals to one if CEO is also the chairman of the board (Duality). Other Control variables are retained earnings divided by total book value of common equity (Earned equity to common equity), earnings before extraordinary items plus interest and income statement deferred tax, scaled by total assets (ROA), the change on sales divided by the previous year's sales level (Sales growth rate), total assets (Firm size), and cash scaled by total assets (Cash holdings). Detailed definitions of all variables are reported in Table 1. Sample period is 2006 - 2008. Models 1, 2, and 3 report results where the main explanatory variable is the first measure of CEO inside debt holdings (CEO to firm debt/equity ratio) while models 4, 5, and 6 report results where the main explanatory variable is the second measure of CEO inside debt holdings (CEO to firm debt/equity ratio>1). Models 3 and 6 are based on prior dividend payers and include the lagged dividend dummy as a proxy for the previous years' dividend status. The *t*-statistics are reported in parentheses. Superscripts *, ** and *** indicate levels of significance of 10%, 5%, and 1%, respectively.

	Dependent Variable = Dividend Payout Dummy					
	(1)	(2)	(3)	(4)	(5)	(6)
CEO to firm debt/equity ratio	0.4053*** (5.31)	0.4537*** (4.51)	-0.0135 (-0.08)			
CEO to firm debt/equity ratio>1				0.9711*** (5.11)	0.9475*** (3.78)	-0.2446 (-0.53)
CEO tenure	-0.0098 (-0.85)	-0.0044 (-0.27)	-0.0572** (-2.05)	-0.0096 (-0.83)	-0.0043 (-0.26)	-0.0583** (-2.10)
Board size	0.3786*** (8.82)	0.2192*** (3.53)	0.2529* (1.91)	0.3656*** (8.65)	0.2075*** (3.39)	0.2632* (1.93)
Percentage of independent directors	0.0058 (0.01)	-0.2627 (-0.28)	-0.3600 (-0.17)	0.0437 (0.06)	-0.2433 (-0.26)	-0.3552 (-0.17)
Duality	0.5643*** (3.48)	0.4391** (1.99)	1.3245** (2.55)	0.5541*** (3.42)	0.4354** (1.98)	1.3539*** (2.63)
Earned equity to common equity		0.9000*** (4.18)	0.5187 (0.66)		0.8704*** (3.99)	0.5079 (0.65)
ROA		1.2663 (0.81)	2.8502 (0.88)		1.5750 (1.01)	3.0306 (0.92)
Sales growth rate		-1.7082*** (-3.59)	-1.4565 (-1.29)		-1.6682*** (-3.68)	-1.5024 (-1.31)
Firm size		0.3584*** (3.56)	0.1059 (0.37)		0.3645*** (3.64)	0.0963 (0.34)
Cash holdings		-2.7677** (-2.00)	-2.4260 (-1.27)		-2.4661* (-1.91)	-2.4693 (-1.29)
Lagged dividend dummy			8.4521*** (12.05)			8.5014*** (12.00)
Constant	-3.5649*** (-4.06)	-4.9996*** (-4.31)	-7.5667*** (-2.78)	-3.5095*** (-3.99)	-5.0108*** (-4.42)	-7.5407*** (-2.81)
Industry and year fixed effect	YES	YES	YES	YES	YES	YES
N	1109	1109	1109	1109	1109	1109
Pseudo R2	0.2415	0.3276	0.8819	0.2382	0.3205	0.8820

Table 7

Effect of CEO inside debt compensation on the level of dividend payout including proxies for CEO power in regression models

The table reports results of Tobit regression estimates of the level of dividend payout. All models control for industry and year fixed effect, where industry is defined based on Fama and French 49 industry classification. The dependent variable is the dividend payout ratio, censored from below at 0 (Dividend payout ratio). The two main independent variables are two measures to proxy CEO inside debt holdings: CEO to firm debt/equity ratio, and a dummy variable with a value of one if CEO to firm debt/equity ratio is larger than one and zero otherwise (CEO to firm debt/equity ratio > 1). The independent variables to proxy for CEO power are: the number of years the CEO has served as CEO (CEO tenure), the number of directors serving on the board (Board size), the number of independent directors scaled by the total number of directors on the board (Percentage of independent directors), and a dummy variable that equals to one if CEO is also the chairman of the board (Duality). Control variables are retained earnings divided by total book value of common equity (Earned equity to common equity), earnings before extraordinary items plus interest and income statement deferred tax, scaled by total assets (ROA), the change on sales divided by the previous year's sales level (Sales growth rate), total assets (Firm size), and cash scaled by total assets (Cash holdings). Detailed definitions of all variables are reported in Table 1. Sample period is 2006 - 2008. Models 1, 2, and 3 report results where the main explanatory variable is the first measure of CEO inside debt holdings (CEO to firm debt/equity ratio) while models 4, 5, and 6 report results where the main explanatory variable is the second measure of CEO inside debt holdings (CEO to firm debt/equity ratio > 1). Models 3 and 6 are based on prior dividend payers and include the lagged dividend dummy as a proxy for the previous years' dividend status. The *t*-statistics are reported in parentheses. Superscripts *, ** and *** indicate levels of significance of 10%, 5%, and 1%, respectively.

	Dependent Variable = Dividend Payout Ratio					
	(1)	(2)	(3)	(4)	(5)	(6)
CEO to firm debt/equity ratio	0.7082*** (2.63)	0.6583** (2.36)	0.4867* (1.88)			
CEO to firm debt/equity ratio > 1				1.5618*** (2.74)	1.4573** (2.20)	1.0243* (1.67)
CEO tenure	-0.0667 (-1.13)	-0.0404 (-0.76)	-0.0422 (-0.81)	-0.0685 (-1.16)	-0.0415 (-0.78)	-0.0434 (-0.83)
Board size	0.8758*** (3.44)	0.5661*** (2.77)	0.4989** (2.58)	0.8630*** (3.42)	0.5552*** (2.76)	0.4918*** (2.58)
Percentage of independent directors	0.3830 (0.16)	-1.2329 (-0.52)	-1.2125 (-0.53)	0.3655 (0.15)	-1.2504 (-0.53)	-1.2308 (-0.54)
Duality	1.0712* (1.95)	0.6835 (1.27)	0.6007 (1.18)	1.0820** (1.97)	0.6913 (1.28)	0.6114 (1.20)
Earned equity to common equity		-0.4954 (-0.36)	-0.6301 (-0.46)		-0.5425 (-0.40)	-0.6626 (-0.48)
ROA		8.1091 (1.37)	8.7577 (1.48)		8.4568 (1.43)	9.0542 (1.53)
Sales growth rate		-9.8048** (-2.56)	-8.5991** (-2.38)		-9.8993*** (-2.58)	-8.6737** (-2.39)
Firm size		0.6307* (1.83)	0.6190* (1.84)		0.6371* (1.85)	0.6235* (1.87)
Cash holdings		-9.4789** (-2.17)	-8.4368** (-2.05)		-9.2277** (-2.14)	-8.2500** (-2.03)
Lagged dividend dummy			0.9402* (1.87)			0.9400* (1.88)
Constant	-12.8691*** (-2.78)	-11.6029** (-2.54)	-11.4434** (-2.52)	-12.7440*** (-2.77)	-11.5283** (-2.54)	-11.3824** (-2.51)
Industry and year fixed effect	YES	YES	YES	YES	YES	YES
N	1144	1144	1142	1144	1144	1142
Pseudo R2	-2793.847	-2773.67	0.0346	0.0223	0.0294	0.0345
Log pseudo likelihood	0.0224	0.0295	-2757.9984	-2794.167	-2773.8706	-2758.221
Observations left censored	435	435	433	435	435	433

Table 8

Effect of CEO inside debt compensation on the propensity of dividend payout with quadratic term of CEO relative leverage in regression models

The table reports results of logit regression estimates of the propensity of dividend payout. All models control for industry and year fixed effect, where industry is defined based on Fama and French 49 industry classification. The dependent variable is a dummy variable with a value of one if the dividend payout is positive in a given year, and zero otherwise (Dividend payout dummy). The main independent variable is a measure to proxy CEO inside debt holdings: CEO to firm debt/equity ratio. All models include the quadratic term of CEO relative leverage (CEO to firm debt/equity ratio squared) as an independent variable. Control variables are retained earnings divided by total book value of common equity (Earned equity to common equity), earnings before extraordinary items plus interest and income statement deferred tax, scaled by total assets (ROA), the change on sales divided by the previous year's sales level (Sales growth rate), total assets (Firm size), and cash scaled by total assets (Cash holdings). Detailed definitions of all variables are reported in Table 1. Sample period is 2006 - 2008. Model 3 is based on prior dividend payers and includes the lagged dividend dummy as a proxy for the previous years' dividend status. The *t*-statistics are reported in parentheses. Superscripts *, ** and *** indicate levels of significance of 10%, 5%, and 1%, respectively.

Dependent Variable = Dividend Payout Dummy			
	(1)	(2)	(3)
CEO to firm debt/equity ratio	1.3464*** (10.85)	0.9273*** (5.68)	0.5509** (2.38)
CEO to firm debt/equity ratio squared	-0.1719*** (-7.74)	-0.0933*** (-4.13)	-0.0576** (-2.08)
Earned equity to common equity		0.7851*** (4.80)	0.3091* (1.72)
ROA		1.0676 (1.18)	4.0799*** (2.65)
Sales growth rate		-1.3840*** (-3.65)	-0.8464 (-1.07)
Firm size		0.5300*** (7.14)	0.4226*** (3.13)
Cash holdings		-2.6635** (-2.38)	-0.5650 (-0.51)
Lagged dividend dummy			7.2337*** (17.57)
Constant	-0.4541 (-1.13)	-4.6362*** (-6.01)	-9.0504*** (-6.31)
Industry and year fixed effect	YES	YES	YES
N	1819	1819	1819
Pseudo R2	0.1731	0.3082	0.836

Table 9
Effect of CEO inside debt compensation on the level of dividend payout with quadratic term of CEO relative leverage in regression models

The table reports results of Tobit regression estimates of the level of dividend payout. All models control for industry and year fixed effect, where industry is defined based on Fama and French 49 industry classification. The dependent variable is the dividend payout ratio, censored from below at 0 (Dividend payout ratio). The main independent variable is a measure to proxy CEO inside debt holdings: CEO to firm debt/equity ratio. All models include the quadratic term of CEO relative leverage (CEO to firm debt/equity ratio squared) as an independent variable. Control variables are retained earnings divided by total book value of common equity (Earned equity to common equity), earnings before extraordinary items plus interest and income statement deferred tax, scaled by total assets (ROA), the change on sales divided by the previous year's sales level (Sales growth rate), total assets (Firm size), and cash scaled by total assets (Cash holdings). Detailed definitions of all variables are reported in Table 1. Sample period is 2006 - 2008. Model 3 is based on prior dividend payers and includes the lagged dividend dummy as a proxy for the previous years' dividend status. The *t*-statistics are reported in parentheses. Superscripts *, **, and *** indicate levels of significance of 10%, 5%, and 1%, respectively.

Dependent Variable = Dividend Payout Ratio			
	(1)	(2)	(3)
CEO to firm debt/equity ratio	2.5052*** (3.81)	1.7365*** (3.39)	1.6612*** (3.18)
CEO to firm debt/equity ratio squared	-0.3212*** (-3.02)	-0.1860** (-2.56)	-0.1776** (-2.45)
Earned equity to common equity		0.4129 (0.78)	0.4136 (0.78)
ROA		-0.1390 (-0.04)	0.1171 (0.03)
Sales growth rate		-6.1620*** (-2.64)	-5.9652** (-2.51)
Firm size		1.0985*** (3.35)	1.0919*** (3.23)
Cash holdings		-9.0776*** (-2.59)	-8.8443** (-2.47)
Lagged dividend dummy			0.1194 (0.99)
Constant	-3.5761 (-1.59)	-11.1158*** (-2.84)	-11.2627*** (-2.89)
Industry and year fixed effect	YES	YES	YES
N	1859	1859	1850
Pseudo R2	0.0216	0.0332	0.0332
Log pseudo likelihood	-4212.8544	-4162.9608	-4140.4458
Observations left censored	787	787	782