What are the Main Channels of the Interaction between Product Market Competition and Corporate Governance that Affect Firm Value?

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Abstract

This paper investigates how the interaction between product market competition and corporate governance affects firm value. We confirm empirically that corporate governance has a significantly negative effect on corporate payout and investment expenditure in non-competitive market only, and that this effect disappears or decreases in a competitive market. These results are robust against alternative measures of corporate governance and product market competition. We conclude that the substitution effect between product market competition and corporate governance on firm value and operating performance observed in existing literature is possibly due to disciplined managerial payout and investment policies.

JEL Classification Code: G30; G35
Key Words: Product market competition, Corporate governance, Payout policy, Investment expenditure, Firm value

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1. Introduction

Previous literature found that corporate governance (hereafter, CG) disciplines the agency problem of managers who may be in the conflict of interests with their shareholders, and solve the information asymmetry between corporate insiders and outside investors. Thus, CG induces managers to make efficient decisions that will maximize shareholder wealth, and contributes to improving firm value and operating performance (Jensen and Meckling, 1976; Jensen, 1986; Weisbach, 1988; Denis, Denis, and Sarin, 1997; Lemmon and Lin, 2003). Meanwhile, product market competition (hereafter, PMC) is also considered as an efficient control device to enforce discipline onto managers. In a competitive market, managers' incentive to pursue the private benefit of control is mitigated by competitive pressure such as high investment risks and bankruptcy costs (Alchian, 1950; Stigler, 1958). Furthermore, the threat of PMC increases management turnover sensitivity to performance, and leads managers to maximize shareholder value (Holmstrom, 1982; Hart, 1983; Schmidt, 1997; Griffith, 2001).

More recently, existing studies have investigated the effect of the interaction between PMC and CG on firm value and operating performance, and have demonstrated the presence of a substitution effect between the two corporate control mechanisms. For example, Giroud and Mueller (2011) show that the trading strategy ("hedge portfolio") of Gompers, Ishii, and Metrick (2003),[1] which comprises long position in firms with good CG and short position in firms with weak CG, has a significantly positive abnormal return only in the non-competitive market. Accordingly, the authors argue that firms in competitive markets should benefit less from good CG, while firms in non-competitive market will benefit relatively more from it. Furthermore, this substitution effect is widely observed in various countries, as well as in U.S. (Ammann, Osech, and Schmid, 2010; Byun, Lee, and Park, 2011)

We extend the existing literature and analyze the effect of the interaction between PMC and CG on corporate payout policy and investment decision-making. Previous studies have found that there was a substitution effect between the two corporate control mechanisms on firm value and operating performance (Giroud and Mueller, 2011; Kim and Lu, 2011), but they did not provide any indication of how this substitution effect disciplines the managers to maximize the shareholder wealth. Motivated by this lacuna, we extend the existing literature by examining which paths of managerial decisions lead to the interaction effect on firm value. If the substitution effect was to be observed in corporate payout and investment expenditure,[2] we can interpret that these two corporate decisions are possibly the main path for the interaction between PMC and CG to affect firm value and operating performance. That is, we conjecture that the substitution effect disciplines those corporate decisions so as to affect shareholder value. In this regard, this paper is the first paper that investigates the interaction effect between external CG and internal CG on corporate decisions.[3]

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[1] Gompers et al. (2003) construct a CG index as a proxy for the protection level of shareholder rights in U.S. firms, using the incidence of 24 corporate provisions. Using this index, they report that firms with good CG earn a significantly higher stock return than those with weak CG, based on abnormal return of hedge portfolio after controlling risk factors (Size, B/M, Beta, and Momentum). From this empirical evidence, they argue that good CG has a positive effect on firm value.

[2] Giroud and Mueller (2011) briefly examines the interaction effect between product market competition and corporate governance on investment activity, but they employ investment activity as proxy for the agency cost and do not focus on the managerial decision making procedures. On the other hand, our analysis is centered on how the interaction between product market competition and corporate governance affect on managers' corporate decision making process. We complete and extend the previous studies by focusing on the incentive that managers have regarding their environment and their following decisions.

[3] Existing literatures that have analyzed the relationship between internal CG and external CG are Shleifer and Vishny (1997), Grosfeld and Tressel (2001), Cremers and Nair (2005), Cremers, Nair, and Peyer (2008), Karuna (2010).

This paper takes a similar stand to the existing literature that searches for the ways in which CG has influence on firm value and operating performance. For instance, Black, Jang, Kim, and Park (2010) analyze the channels of the effect of CG on firm value. They argue that good CG contributes to increase firm value by mitigating the deterioration of shareholder value from related-party transactions, by increasing the investment sensitivity to growth opportunity, and by increasing the payout sensitivity to profitability. Similarly, Dahya, John, and McConnell (2007) report that firms with a higher proportion of independent directors have a higher Tobin's q, and are less likely to engaged in related party transactions. Liu and Lu (2007) show that good CG is associated with lower earnings management, and lower levels of tunneling. Therefore, results in our paper can provide another guidance and broad view for researchers who want to investigate CG effect on shareholder value.

The reason for which we focus on corporate payout policy and investment decision-making is because firm value and corporate performance is highly affected by these two managerial decisions. These two behaviors, along with the raising of capital, are the main financial decisions that bring reward for shareholders and decide a firm's sustainability. Under information asymmetry, managers try to mitigate the conflict of interests between corporate insiders and shareholders (Easterbrook, 1984), and signal the firm's value to external investors by paying dividends in order to decrease the cost of capital (Miller and Rock, 1985). Paying dividends decrease free cash flow that is considered as the main source of the private benefit of control of managers (Jensen, 1986). Proper investment decision-making improves firm value and corporate performance by increasing profitability and contributing to the firm's growth in the long term (McConnell and Muscarella, 1985; Chan, Martin, and Kensinger, 1990; Chung, Wright, and Kedia, 2003). However, if managers overinvest in negative NPV project to pursue the private benefit of control which is proportional to firm size, then this overinvestment could severely exacerbates the shareholder value (Jensen and Meckling, 1976). In sum, these two corporate decision-making is very important in shareholder point of view. We propose that corporate payout policy and investment decision-making may operate as the main channels by which the effect of the interaction between PMC as external control mechanism and CG as internal control mechanism on firm value is enacted.

In order to investigate the effect of the interaction between PMC and CG on corporate payout and investment expenditure, we use the Herfindahl-Hirschman Index (HHI) as a proxy for PMC, similar to the method found in Giroud and Mueller (2011). Calculating the HHI, we divide industries using 48 Fama and French (1997) industry classifications based on all firms in Compustat, as also in Giroud and Mueller (2011), and we compute the market shares of firms using their sales data. Gompers index is here used as a proxy for CG, which measures the protection level of shareholder rights (Gompers et al., 2003). We examine the effect of the interaction between PMC and CG on corporate payout and investment expenditure by using a dummy variable that takes the value of one if a firm is in competitive market (the HHI under the median), and zero otherwise. To confirm this interaction effect more clearly, we also separate samples based on the HHI and run regressions to compare the coefficients of CG variables in each separate sample.

Empirically, CG has a significantly negative effect on corporate payout (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000; Chae, Kim, and Lee, 2009; Zhang, 2011) or investment expenditure (Stein, 1989; Billet, Garfinkel, and Jiang, 2011), but we observe that this relation is valid only in non-competitive market. Additionally, we divide the whole sample into 3 groups based on the HHI as in Giroud and Mueller (2011), and examine the effect of CG on corporate payout or investment expenditure in each group of the sample. We find that the coefficients of CG decrease consistently with the level of PMC, i.e. they are small and insignificant in a competitive market, and large and significant in a non-competitive market. These results support our conjecture on the

substitution effect of PMC and CG on corporate payout policy and investment decision. In sum, we claim that the paths through which interaction between two different control mechanisms have influence on firm value are corporate decision-making about payout and investment.

To assess robustness of our results in alternative specification, we use the Entrenchment index from Bebchuk, Cohen, and Ferrell (2009) as another proxy for the level of CG. Using this index, we also find a significantly negative effect of CG on corporate payout and investment expenditure.[4] More importantly, this effect is stronger in non-competitive markets than it is in competitive markets. In addition, since the measurement method of PMC could bias the results, we also utilize a different measure of PMC, using *Market Size* and *Product Substitutability* (price-cost margin), which is commonly used in industrial organization literature. Still, we have consistent results using different measures of PMC.

The rest of this paper is organized as follows: Section 2 discusses the background and motivation for this study, and develops our hypotheses. Section 3 describes the sample data and provides a definition of variables. Section 4 reports on empirical results, and Section 5 presents our conclusion.

2. Background, Motivation, and Related Literature

In agency framework, since competitive pressure increases the managers' turnover sensitivity to performance, it disciplines managers to do their best efforts to maximize the shareholder value (Hart, 1983; Schmidt, 1997; Griffith, 2001). PMC forces managers to lower their transaction costs, to get a competitive edge, and to arrange the optimal CG of their firm[5] (Alchian, 1950; Stigler, 1958). Furthermore, in a competitive market, managers have a strong incentive to disclose high quality information for minimizing the cost of capital (Holmstrom, 1982). Therefore, PMC operates as an external control mechanism that can mitigate information asymmetry and agency problems.

Previous studies have shown that PMC has influence on managers' corporate decision-making procedures. Bolton and Scharfstein (1990) and Grullon and Michaely (2006) found that in a non-competitive market managers prefer to retain earnings rather than paying out dividends in order to prepare for future competitive threats from potential rival firms. Schumpeter (1943) found a negative relation between PMC and investment expenditure, and showed that firms with market power over a certain level invested actively. Conversely, Fellner (1951) and Scherer (1980) found that PMC has a positive effect on investment expense because firms in a competitive market will have a strong incentive to develop a new product and to take up the competitive edge.

However, PMC has been suggested to have limitations as a tool for solving information asymmetry and agency problems, because in real transactions managers cannot always raise capital or labor at a competitive price (Shleifer and Vishny, 1997). Therefore, firms need to have good internal CG through their board of directors and auditing systems if they want to discipline managers more efficiently (Mitton, 2002; Black, Jang, and Kim, 2006; Karuna, 2010). Gompers et al. (2003) reported that firms with good CG, as measured by how well shareholder rights are protected, have a higher stock return after controlling other risk factors than do those firms with weak CG. They also showed that a low level of protection of shareholder rights is associated with lower profit, lower sales growth, higher capital expenditure, and an increased probability of corporate acquisition. Likewise, various

[4] Bebchuk et al. (2009) argues that the Gompers Index includes too much information, some of which may not have affect on firm value or stock return. Among the 24 corporate provisions of Gompers Index, they therefore select the 6 most influential provisions and construct an Entrenchment Index.

[5] There are also studies that take an opposite view, i.e. that firms in competitive industries are likely to employ managers with high ability due to the threat of PMC, and will allow managers more discretion and authority for making quicker decisions. Therefore, managers with more power under product market competition may be associated with bad internal corporate governance. (Hubbard and Palia, 1995; Christie et al., 2003)

empirical studies have shown that good CG increases firm value (Lemmon and Lin, 2003; Joh, 2003; Beak, Kang, and Park, 2004).

Some literature has investigated the interaction between external control mechanisms and CG. Shleifer and Vishny (1997) argue, for example, that there is a complement effect between CG and external control mechanisms, such as market for control, managerial labor market, and product market competition. In other words, the interaction between the two different control mechanisms contributes to more efficient discipline of management. Grosfeld and Tressel (2001) examined the effect of the interaction between PMC as external control device and CG as internal control device on firm productivity in Poland. They showed that a positive effect of PMC on firm productivity is statistically significant in firms with high ownership concentration, but not in firms with low ownership concentration. Cremers and Nair (2005) analyzed the effect of interaction between anti-takeover provisions as a proxy for external control mechanisms and institution ownerships as a proxy for internal control mechanisms on stock return. They found evidence that the market for corporate control is effective only when a firm has a high institution ownership, and vice versa. Cremers, Nair, and Peyer (2008) analyzed the relationship between the market for corporate control and PMC. They showed that firms in a competitive market defended themselves more successfully against takeover attacks.

Giroud and Mueller (2011) examined the interaction effect of PMC and CG on stock returns in the U.S. They found that a trading strategy based on CG has a positive abnormal return only in non-competitive markets. This implies there is a substitution effect between these two different control mechanisms. Ammann et al. (2010) verified the same hypothesis in 14 European countries. They also confirmed the presence of the substitution effect between the two corporate control mechanisms. Byun et al. (2011) also show such substitution effect in Korea. Kim and Lu (2010) used management ownerships as proxy for CG and argued that the average level of management ownerships substitutes PMC in maximizing the shareholder value.

By extending the research conducted in the above literatures this paper examines what influences the effect of this substitution on firm value. Specifically, we analyze the effect of the interaction between PMC and CG on corporate payout policy and investment decision-making. We conjecture that the effect of CG on corporate payouts disappears or decreases as long as PMC prevents managerial agency problems.

Existing literature shows that good CG could discipline managers to pay either more or less dividends. One story argues that paying dividends mitigates overinvestment problems that are caused by managers who pursue their private benefit of control from free cash flow (La Porta et al., 2000). However, in competitive markets, the discipline effect of CG on corporate payouts disappears or decreases, because managers who face high investment risks and bankruptcy costs do not have a strong incentive to overinvestment.

Another story that would support our conjecture is the difficulty in external financing under information asymmetry. Typically, dividend payout is used as a commitment or signaling device under information asymmetry or the conflicts of interests between managers and shareholders. Thus, firms with weak CG would pay more dividends to lower the cost of capital, while firms with good CG have less need to do so. However, if the product market is competitive enough and therefore disciplines the managers, then the effect that CG has on the dividend payout would be mitigated.

From these two viewpoints, we can claim that the marginal effect of CG on corporate payouts is stronger in non-competitive markets than it is in competitive markets. This hypothesis implies that the substitution effect between PMC and CG comes from disciplining the managerial decision on dividends. Corporate payout can therefore be a main channel through which the effect of interaction between two different control mechanisms on firm value acts. We accordingly draw Hypothesis 1 as

follows.

Hypothesis 1: The effect of CG on corporate payout is stronger in non-competitive product markets than it is in competitive markets.

In addition to corporate payout, our study also considers how managers undertake investment expenditure decisions. Managers have a strong incentive to overinvest, because by doing so they can enjoy more private benefit of control, proportional to the firm size (Jensen, 1986; Stulz, 1988). However, good CG can mitigate overinvestment problems (Gompers et al., 2003; Richardson, 2006; Harford, Mansi, and Maxwell, 2008). Good CG can discipline managers who have incentive to invest in inefficient projects that will increase their private benefit of control, through providing more efficient monitoring and can thus contribute to maximize the shareholder value (Baumol, 1959; Williamson, 1964; Jensen and Ruback, 1983). Stein (1989) argues that a low probability of takeover as proxy for weak CG decreases investment risks burdened on managers, thus managers in firms with weak CG have stronger incentive to overinvest than in firm with good CG. Recently, Billet, Garfinkel, and Jiang (2011) used a hazard model and suggested that strong shareholder governance may deter managers from pursuing large investments.

However, as PMC addresses agency problems, the effect of CG on investment expenditure disappears or decreases. In competitive markets, investment risks and management turnover sensitivity increase, so managers will be likely to choose to invest in efficient and profitable projects. Therefore, the effect of CG on investment expenditure will be stronger in a non-competitive market than it will be in a competitive market. Similar to the case of corporate payout, investment expenditure can therefore be a main path of the substitution effect, and a second hypothesis can be formed as below.

Hypothesis 2: the effect of CG on investment expenditure is stronger in non- competitive product markets than it is in competitive markets.

3. Data

3.1 Sample selection

Our sample consists of all the firms in the CG database from the Investor Responsibility Research Center (IRRC) that also are present in Compustat. We exclude firms in the financial industry (SIC code 6000-6999) and the utility industry (SIC codes 4900-4999), because these industries are subject to additional regulations and have different accounting information. To match firms to industries, we require there to be a SIC code in Compustat. The data used are from 1997 to 2007. Corporate payout, investment expenditure, and control variables data are all from Compustat. Panel A in Table 1 displays sample distribution and mean of the HHI (the level of PMC) in each industry assorted by Fama and French (1997) industry classification. Panel B shows the year-by-year distribution of our final sample. The final sample consists of 8,982 firm-year observations.

[Insert Table 1 Here]

3.2 Definition of variables

Our proxy of CG is the Gompers index[6] as suggested in Gompers et al. (2003). This index is measured by the sum of 24 anti-takeover provisions (each provision is valued at one point). Thus, a

[6] Various studies use the CG index by Gompers et al. (2003) proxy for the protection level of shareholder rights, e.g., Giroud and Mueller (2011), and Karuna (2011).

high Gompers index signifies that there is a weak protection level of shareholder rights and vice versa. The IRRC provides this index for the years 1995, 1998, 2000, 2002, 2004, and 2006 of our sample period. For the intermediate years, we used the indexes from the most recent available year (Giroud and Mueller, 2011). For robustness checking, we also used the Entrenchment Index developed in Bebchuk et al. (2009). This index selects the six most influential anti-takeover provisions provided by Gompers et al. (2003) and uses them to calculate the protection level of shareholder rights.

Our measure of PMC is the HHI (Herfindahl-Hirschman Index). HHI is calculated in the following equation:

$$\boldsymbol{HHI_{jt} = \sum_{i=1}^{n} s_{ijt}^2}$$

where s_{ijt} is market share of firm i in industry j in year t. Market shares are calculated from Compustat using the sale data of firms. HHI is computed by the sum of squared market shares in each industry.[7] We classify industries using the 48 industry classifications devised by Fama and French (1997).[8] We assign all firms in Compustat to an industry by matching their SIC codes to one of these classifications.[9] We also use them to measure the HHI (Giroud and Mueller, 2011). For robustness checking, we compute *Market Size* and *Product Substitutability* as proxies for the level of PMC (Carlton and Perloff, 1994; Demsetz, 1997; Karuna, 2010). *Market Size* reflects the density of consumers in a given market or industry. This measure assumes that when a market demand for a product increases at any given price, sales of that product will increase as well. As *Market Size* increases, therefore product market competition will also increase. *Market Size* is computed by the sum of sales of firms in each industry classification (again using Fama and French, 1997). *Product Substitutability* is the price-cost margin in a given industry (Karuna, 2007). Consistent with prior studies, we calculate the price–cost margin as sales divided by operating costs, in each industry classified by Fama and French (1997) industry classifications. Low price-cost margins are associated with high levels of substitutability, and vice versa. The greater the intensity of price competition due to higher substitutability is, the smaller the price–cost margin is. We compute industry sales and operating costs by the sum of either industrial sales or operating costs, respectively, for firms in a given industry classification.[10]

To measure corporate payout,[11] this paper uses the amount of cash dividend plus stock repurchase[12] rather than only cash dividends. Fama and French (2001) demonstrate that increasing number of firms, especially startup firms, repurchase stock as corporate payout. Grullon and Michael

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[7] HHI is commonly used in economic literature, especially for studies of industrial organizations, e.g. Tirole (1988) and corporate finance, e.g. Grullon and Michealy (2006), Giroud and Mueller (2011). This measure is also routinely used by government agencies, e.g. in the Horizontal Merger Guideline in the U.S.

[8] Fama and French (1997) computed HHI using only publicly traded firms, so some studies have used other measures of PMC provided by the Census Bureau (North American Industry Classification System). The Census Bureau computes HHI from public and private firms in the U.S (Grullon and Michealy, 2006). However, we do not use this measure because of following critical problems: (1) it is computed using only at maximum 50 high market share firms in each industry, (2) it is only available for the manufacturing industry (3) it is provided only every five years, (4) it is not compatible with the Fama and French (1997) industry classifications. (Giroud and Mueller, 2011)

[9] A detailed conversion table is referred to Appendix in Fama and French (1997)

[10] These alternative measures for the level of PMC regard market structure are endogenous, unlike the HHI.

[11] Unlike Giroud and Mueller (2011), our regressions include endogenous variables which are payout and investment decisions, so we need to control the endogeneity problem. In order to control this problem, we estimate the same empirical model using firm-fixed effect analysis (Himmelberg, Hubbard and Palia, 1999) and find the similar results as reported. Therefore, we can confirm that the effect of endogeneity problem on our hypotheses is not crucial.

[12] We use the dollar volume of share repurchase (Dittmar, 2000).

(2002) also argue that stock repurchase substitutes for dividends gradually. Cash dividend and stock repurchase data are sourced from Compustat, and we also measure the corporate payout ratio, which is the corporate payout scaled by the book value of the equity (*Payout/BE*). For our robustness check, we use other formulae such as corporate payout scaled by the market value of equity (*Payout/ME*), total assets (*Payout/TA*), or net incomes (*Payout/N*I).

To measure investment expenditure, we use capital expenditure and research &development (R&D) expense data obtained from Compustat (Cho, 1998; Chung, Wright, and Kedia, 2003). We measure the investment expenditure ratio, which is capital expenditure plus R&D expenses scaled by the book value of equity (*Investment/BE*). For robustness checking, we also calculated capital expenditure plus R&D expenses scaled by the market value of equity (*Investment/ME*), total assets (*Investment/TA*), or net income (*Investment/NI*).

[Insert Table 2 Here]

3.3 Descriptive statistics

Table 3 presents summary statistics for our sample firms. The payout/BE averages 0.1387 (0.0547 median) and the payout/ME ratio averages 0.0368 (0.0224 median). These payout ratios are similar to the ones that were reported in Chae et al. (2009). The investment/BE ratio averages 0.1994 (0.1467 median) and the investment/ME ratio averages 0.0752 (0.0527 median). Since high HHI implies a non-competitive market, we convert this measure into 1-HHI for convenience. 1-HHI, which measured based on Fama and French (1997) industry classifications, averages 0.9394 (0.9547 median). The *CGI* (Corporate Governance Index) computed by 24 minus the Gompers index averages 14.9153 (15.0000 median).

On average, sample firms have total assets of 6.4 billion US dollars. The average leverage ratio (long-term debt + short-term debt /the book value of equity) is equal to 0.6981 and the average profitability (ROA) is 0.0765. The *B/M* (book-to-market ratio) averages 0.4602 (0.3880 median). *Risk*, as a proxy for the volatility of firms' profitability, averages 0.0495 (0.0284 median).

[Insert Table 3 Here]

4. Empirical results

4.1 Univariate tests

Table 4 shows the results of univariate tests. To do this, we firstly divide the whole sample into two groups based on their median levels of *CGI*, and then compare the average of corporate payout and investment expenditure for each group.

In Panel A, it is shown that firms with weak CG pay more dividends and repurchase more stocks than do firms with good CG (difference: 0.0368, t=4.47). This result is consistent with La Porta et al. (2000) and suggests that firms with weak CG have a strong incentive to pay more dividends to minimize the cost of capital to their external investors. (Easterbrook, 1984)

Additionally, in order to examine the effect of CG on corporate payout depending on the level of PMC, we divide each firm in our sample based on the median of their HHI into non-competitive market (those with results over the median) and competitive market (those under the median). Then, for each separate sample group, we compute the difference in the average corporate payout based on the level of CG. The difference in the average of corporate payouts is statistically insignificant in firms in the competitive market. However, in a non-competitive market, firms with weak CG pay more dividends and repurchase more stocks than do firms with good CG. The difference of averages of corporate payout between these two groups of firms is statistically significant (difference: 0.0631, t=4.98).

To investigate in more detail whether the effect of CG on corporate payout changes according to the level of PMC, we use the Difference in Difference (DiD) method. The difference of the marginal effect of CG between non-competitive markets and competitive markets is statistically significant (DiD: -0.0562, t=-3.42). This result suggests that the marginal effect of CG on corporate payout is stronger in non-competitive markets.

In Panel B, it is shown that firms with weak CG disburse more capital and R&D expenditure than do firms with good CG (difference: 0.0274, t=4.43). This result coincides with those of Stein (1989) and Gompers et al. (2003).

Similar to the findings for corporate payout, the difference in the average of investment expenditure is statistically insignificant between the two groups of firms in a competitive market. However, in non-competitive markets, firms with weak CG spend more capital and R&D expenditure than do firms with good CG. The difference of the average of investment expenditure between these two types of firms is statistically significant (difference: 0.0463, t=5.00). Moreover, the difference of the marginal effect of CG on capital and R&D expenditure between firms in non-competitive markets and competitive markets is statistically significant (DiD: -0.0398, t=-3.27). This result implies that the marginal effect of CG on investment expenditure changes depending on the level of PMC.

In sum, the substitution effect between PMC and CG on firm value suggested in existing literatures is also observed in our study for corporate payout and investment expenditure. This is consistent with Hypotheses 1 and 2. We thus can interpret corporate payout and investment expenditure as being the main paths of the substitution effect on firm value.

[Insert Table 4 Here]

4.2 Multivariate tests

4.2.1 Effects of the interaction between PMC and CG on corporate payout

Main results

This paper examines the effect of the interaction between PMC and CG on corporate payout using multivariate test in order to consider the effect of firm-specific variables on corporate payout. Large numbers of firms do not pay dividends or repurchase stocks, thus they have zero corporate payout (Grullon and Michealy, 2006). Therefore, we use the Tobit model[13] with a censored dependent variable,

$$Payout_{it} = \beta_0 + \beta_1 CGI_{it} + \beta_2 CGI_{it} * Competition_{it} + \beta_3 Competition_{it} + \gamma_j X_{it} + e_{it},$$

where $payout_{it}$ is the sum of the cash dividends and stock repurchase divided by the book value of the equity of firm *i* in year *t*. Additionally, we divide cash dividends and stock repurchases by the market value of equity, total assets or net income and use these as dependent variables. We use Gompers index (Gompers et al., 2003) as a proxy for the level of CG. As firms in which shareholder rights are weakly protected have a high Gompers index, we use 24 minus the Gompers index (*CGI*) for convenience. *Competition* is dummy that takes value of one if a firm has the HHI lower than the median, so firms with the value of one in this variable are in a competitive market. We use an interaction variable between *CGI* and *Competition* to examine the effect of the interaction between PMC and CG on corporate payout. Furthermore, we include *Competition* to control for a direct effect of PMC on corporate payout in our model (Grullon and Michealy, 2006).

X_{it} is the vector of control variables. We control for firm characteristic such as firm size (*Size*),

[13] Refer to Wooldridge (2002), Greene (2003).

leverage (*Leverage*), profitability (*Profit*), growth rates (*B/M*), and the volatility of firms (*Risk*) (Dittmar, 2000; Allen and Michaely, 2002; Grullon and Michealy, 2006). To control for a size effect, we include a natural log of total assets in the model. To control for firms' capital structure, we use a debt ratio, defined as long-term debt plus short-term debt, scaled by the book value of equity. We use return on assets as a proxy for the level of firm profitability. Our proxy for growth opportunity is the book-to-market ratio, defined as the book value of common equity divided by common shares outstanding, multiplied by stock price (Harford, 1999). To control for firms' specific risks, we use a standard deviation of return on assets over the previous five years. We also control for industry fixed effects and year fixed effects. In order to alleviate inter-personal/intra-group correlation in residuals, serial correlation and heteroscedasticity in panel data, we use robust standard errors for testing the significance in coefficients.

Table 5 shows the results of the above empirical model. In Model (1), we estimate the effect of CG on corporate payout after controlling for firm characteristics. It is found that *CGI* has a significantly negative effect on corporate payouts (coefficient: -0.0071, t=-4.79). This result suggests that firms with weak CG have a strong incentive to pay more dividends, in order to minimize the cost of capital from external investors. Chae et al. (2009) and Zhang (2011) found similar empirical results from U.S. data.

In Model (2) we add the interaction variable between *CGI* and *Competition* dummy and the *Competition* dummy, and find that *CGI* has a statistically negative effect on corporate payout (coefficient: -0.0123, t=-5.90). The magnitude and statistical significance is higher than that in Model (1), and this result implies that the effect of CG on corporate payout is stronger in a non-competitive market. On the other hand, the interaction variable has a significantly positive effect on corporate payout (coefficient: 0.0106, t=3.94). The sum of the coefficient of *CGI* and the interaction variable (-0.0017) shows the marginal effect of CG on corporate payouts in a competitive market. This effect is lower than that in non-competitive markets. This result is consistent with our Hypothesis 1. Therefore, we interpret this result as meaning that the interaction between PMC and CG affects firm value through managerial decisions about corporate payout.

To confirm this relationship more clearly, we divide our sample into two groups based on the median of the HHI and re-estimate the effect of CG on corporate payout in each group. In Model (3), we use firms in competitive markets, which have the HHI lower than the median. The effect of *CGI* on corporate payout here is statistically insignificant. However, in Model (4), for firms in non-competitive markets with HHI over the median, *CGI* has a significantly negative effect on corporate payouts (coefficient: -0.0132, t=-5.55). This result is also consistent with Hypothesis 1. The last row shows a difference in the coefficients of *CGI* for each separate sample and a statistical significance.[14] Differences in coefficients of *CGI* between competitive markets and non-competitive markets are statistically significant at a 1% confidence level, meaning that the effect of *CGI* on corporate payout is stronger in non-competitive markets.

As control variables, *Size*, *Leverage*, and *Profit* all have a significantly positive effect on corporate payout (see: Dittmar, 2000; Grullon and Michealy, 2006). *B/M* and *Risk* have a significantly negative effect on corporate payout.

When using different measures for corporate payout in order to check for robustness as were previously specified, we found results similar to those of Panel A. The alternative results are shown in Panel B.

[Insert Table 5 Here]

[14] We use an asymptotic t-ratio measured by $(\widehat{\beta_a} - \widehat{\beta_b})/\sqrt{(stderr_a^2 + stderr_b^2)}$, where $\widehat{\beta_x}$ and $stderr_x$ are, respectively, the coefficient estimate for CGI in separate sample *x* and its standard error.

Same approach as Giroud and Mueller (2011)

Additionally, we used the same model specification as Giroud and Mueller (2011) and Ammann et al. (2010), which is as follows:

$$Payout_{it} = \beta_0 + \beta_1 CGI_{it} * High_{it} + \beta_2 CGI_{it} * Median_{it} + \beta_3 CGI_{it} * Low_{it} + \beta_4 High_{it} + \beta_5 Median_{it} + \gamma_j X_{it} + e_{it}$$

We divide our sample based on the level of HHI into three groups and estimate the effect of CG on corporate payout in each sample. *High* is a dummy variable that takes the value of one if a firm has HHI in the lowest tertile, *Median* is a dummy that takes the value of one if a firm has HHI in the median tertile, and *Low* is a dummy that takes the value of one if a firm has HHI in the highest tertile. Using interaction variables between *CGI* and these dummy variables, we find monotonic effect of CG on corporate payout in the level of PMC as was the case in Giroud and Mueller (2011). Other variables are same as in the previous empirical model.

Table 6 shows the results of the above empirical model. In Model (1), the coefficient of the interaction variable between *CGI* and *High* is statistically insignificant, while interaction variables between *CGI* and *Median* (t=-3.62) and between *CGI* and *Low* (t=-4.91) have a significantly negative effect on corporate payout. Since the coefficients and statistical significance of these interaction variables increase monotonically with the level of HHI, the substitution effect between PMC and CG is valid for corporate payout policy. This supports our Hypothesis 1. In Models (2)-(4), we use different measures of corporate payout as shown in Table 5, and results are similar to those from Model (1).

[Insert Table 6 Here]

Alternative specifications

Model (1) in Table 7 shows the results by the same analysis as in Table 5 using the Entrenchment index as a proxy for CG. *CGI* has significantly negative effect on corporate payout only in a non-competitive market, (t=-2.62). Differences in the coefficients of *CGI* between the separate samples are statistically significant at the 5% confidence level. This result is also consistent with Hypothesis 1. In addition, we retry the same analyses as shown in Table 5 employing different proxies for PMC, namely *Market Size* and *Product Substitutability*. In Models (3) and (4) from Table 7, it is shown that when using *Market Size*, *CGI* has a significantly negative effect on corporate payout in both separate sample sets. However, the coefficient of the *CGI* of the non-competitive market sample is higher than that for the competitive market, and the difference in these coefficients is statistically significant at the 5% confidence level. This result means that the effect of *CGI* on corporate payout is changed by the level of PMC. In Models (5) and (6), using *Product Substitutability*, the coefficient of *CGI* is higher for firms in non-competitive markets and the difference of coefficients between the sample sets is statistically significant at the 10% confidence level. These results evidence the robustness of our results, further reinforcing the presence of a substitution effect between PMC and CG on corporate payouts.

[Insert Table 7 Here]

4.2.2 The effect of the interaction between PMC and CG on investment expenditure

Main results

To examine the effect of the interaction between PMC and CG on investment expenditure, we use a

Tobit model.[15] In this model, we also use robust standard errors in order to test for significance in coefficients.

$$Investment_{it} = \beta_0 + \beta_1 CGI_{it} + \beta_2 CGI_{it} * Competition_{it} + \beta_3 Competition_{it} + \gamma_j X_{it} + e_{it}$$

$Investment_{it}$ is the sum of capital expenditure and R&D expenses divided by the book value of the equity of firm *i* in year *t*. Additionally, we divide the sum of capital expenditure and R&D expenses by the market value of equity, total assets or net income for robustness checking. X_{it} is a vector of control variables (Cho, 1998; Chung et al., 2003) which is the same as in the Table 5.

Table 8 shows the results of the above empirical model. In Model (1), we estimate the effect of CG on investment expenditure after controlling for firm characteristics. *CGI* has a significantly negative effect on investment expenditure (coefficient: -0.0023, t=-2.39). This result coincides with the argument that good CG mitigates the possibility of overinvestment by managers (Baumol, 1959; Williamson, 1964). Gompers et al. (2003) also reported this pattern, using U.S. data.

In Model (2) adding the interaction variable between *CGI* and *Competition* dummy and *Competition* dummy, *CGI* has a statistically negative effect on investment expenditure (coefficient: -0.0054, t=-3.94). The magnitude of the coefficient and its statistical significance are higher than those found in Model (1), which means that the effect of CG on investment expenditure is stronger in non-competitive markets. However, the interaction variable has a significantly positive effect on investment expenditure (coefficient: 0.0063, t=3.74). This result is consistent with Hypothesis 2, and implies that CG has a positive effect on investment expenditure in competitive markets. Managers have a strong incentive to increase investment expenditure in competitive markets for several reasons: (i) as a manager assumes higher default and predatory risks, potential overinvestment problems can be reduced (La Porta et al., 2000) (ii) firms have more incentive to increase their market share by investing in new products in competitive markets than they do in non-competitive markets (Fellner, 1951; Scherer, 1980) and (iii) managers are more likely to maximize the productivity sensitivity to investment by minimizing costs (Nickell, 1996). In competitive markets, good CG therefore supports managers' investment decisions. In sum, investment seems to be the way through which interaction between PMC and CG influence firm value.

To confirm and further understand this relationship, we divide our sample into two groups, based on the median of HHI and re-estimate the effect of CG on investment expenditure. In Model (3), using firms in competitive markets, i.e. those with a HHI below the median, the effect of *CGI* on investment expenditure is statistically insignificant. However, in Model (4), for firms in non-competitive markets, *CGI* has a significantly negative effect on investment expenditure (coefficient: -0.0061, t=-4.60). The last row shows the difference between the coefficients of *CGI* in each separate sample and statistical significances. Difference (competition minus non-competition) is statistically significant at the 1% confidence level, meaning that the effect of *CGI* on investment expenditure is stronger in non-competitive markets. These results are consistent with our Hypothesis 2. As control variables, *Size*, *Leverage*, *Profit*, and *Risk* have significantly positive effects, whereas *B/M* has a significantly negative effect on investment expenditure.

For robustness checking, we use different measure of investment expenditure as described earlier. Panel B shows the results of using these variables as dependent variables. The results are similar to those shown in panel A. These results evidence the robustness of our results.

[Insert Table 8 Here]

[15] Using OLS method, results are similar to reported results.

Same approach as Giroud and Mueller (2011)

We also use the model of Giroud and Mueller (2011) and Ammann et al. (2010). Definitions of variables are same as the model used in Table 6.

$$Investment_{it} = \beta_0 + \beta_1 CGI_{it} * High_{it} + \beta_2 CGI_{it} * Median_{it} + \beta_3 CGI_{it} * Low_{it} + \beta_4 High_{it} + \beta_5 Median_{it} + \gamma_j X_{it} + e_{it}$$

Table 9 shows the results of the above empirical model. In Model (1), the interaction variable between *CGI* and *High* is statistically insignificant. The coefficient of interaction variables between *CGI* and *Median* is also insignificant. However, interaction variables between *CGI* and *Low* (t=-3.68) have a significantly negative effect on investment expenditure. This result suggests that CG has negative effect on investment expenditure only in non-competitive markets, supporting Hypothesis 2. In Models (2)-(4), we use other measures of investment expenditure as in Table 8, but the results are similar to those of Model (1).

[Insert Table 9 Here]

Alternative specifications

Table 10 shows results estimated by the same analysis as in Table 8 but using the Entrenchment index as a proxy for CG. Here, *CGI* has a significantly negative effect on corporate payout only in non-competitive markets, (t=-5.47) while the effect is insignificant in competitive markets. Difference in the coefficients of *CGI* between the separate samples is statistically significant at the 1% confidence level. This result is also consistent with Hypothesis 1. In addition, we use the same analyses as in Table 10 but employing *Market Size* and *Product Substitutability* as proxies for PMC. In Models (3) and (4), when using *Market Size*, *CGI* has a significantly negative effect on investment expenditure only in non-competitive markets. The difference of the coefficients of *CGI* between the separate samples is also statistically significant at the 5% confidence level. This result implies that the effect of *CGI* on investment expenditure changes according to the level of PMC. In Models (5) and (6), using *Product Substitutability*, *CGI* has a significantly negative effect on investment expenditure only in non-competitive markets. The difference of the coefficients of *CGI* between the separate samples is also statistically significant at a 1% confidence level. These results evidence the robustness of our results, and reinforce the fact that there is a substitution effect between PMC and CG on investment expenditure.

[Insert Table 10 Here]

5. Conclusion

This paper examines the effect of the interaction between PMC and CG on corporate payout policy and investment decision-making. Existing literature shows that PMC (as an external control mechanism) substitutes CG (as an internal control mechanism), thus the marginal effect of CG on firm value is stronger in non-competitive markets than it is in competitive markets. Extending this argument, this paper investigates how this substitution effect affects managerial decision-making related to corporate payouts and investment expenditures. In other words, we analyze the paths through which the interaction between PMC and CG has influence upon firm value and operating performance.

Our findings were that CG has a negative effect on corporate payouts. However, this effect decreases or disappears in a competitive market, while it is strong in non-competitive market. This pattern is also present in investment expenditure: only in competitive markets, firms with weak CG increase their investment expenditure. This suggests that the role of CG in regulating managerial

decisions is mitigated by competitive pressure. From our findings, we interpret that corporate payout and investment expenditure are the main channels of interaction between the two different control mechanisms on firm value that have been suggested in existing literature.

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<Table 1> Sample distribution

This table shows the sample distribution. The sample is from 1997 to 2007. We use the 48 industry classification of Fama and French (1997).

Panel A: By industry

Industry	HHI	N	Industry	HHI	N
Agriculture	0.1573	23	Shipbuilding, Railroad Equipment	0.1908	25
Food Products	0.0539	271	Defense	0.7407	51
Candy and Soda	0.1886	23	Precious Metals	0.1011	13
Alcoholic Beverages	0.1441	54	Nonmetallic Mining	0.1133	44
Tobacco Products	0.3813	26	Coal	0.0940	16
Recreational Products	0.4396	57	Petroleum and Natural Gas	0.0535	423
Entertainment	0.0488	110	Utilities	0.0113	880
Printing and Publishing	0.0478	156	Telecommunications	0.0231	233
Consumer Goods	0.0753	226	Personal Services	0.0453	111
Apparel	0.0603	193	Business Services	0.0320	965
Healthcare	0.0712	144	Computers	0.0737	333
Medical Equipment	0.0423	284	Electronic Equipment	0.0306	549
Pharmaceutical Products	0.0519	342	Measuring and Control Equipment	0.0572	216
Chemicals	0.0441	349	Business Supplies	0.0447	238
Rubber and Plastic Products	0.0436	77	Shipping Containers	0.1006	63
Textiles	0.0928	56	Transportation	0.0332	305
Construction Materials	0.0487	244	Wholesale	0.0522	411
Construction	0.0535	110	Retail	0.0348	816
Steel Works, Etc.	0.0450	184	Restaurants Hotel, Motel	0.0487	252
Fabricated Products	0.1210	25	Banking	0.0214	419
Machinery	0.0325	453	Insurance	0.0295	582
Electrical Equipment	0.1609	129	Real Estate	0.0612	17
Automobiles and Trucks	0.0943	213	Trading	0.0621	358
Aircraft	0.1750	94	Miscellaneous	0.1967	82

Panel B: By year

Year	N	Percent
1997	658	7.33
1998	844	9.40
1999	817	9.10
2000	778	8.66
2001	608	6.77
2002	744	8.28
2003	840	9.35
2004	986	10.98
2005	949	10.57
2006	925	10.30
2007	833	9.27
Total	8,982	100.00

<Table 2> Definition of Variables

This table provides the definitions of variables we use in this study.

Variables	Definitions
Payout/BE	(Dividend+Stock repurchaes)/the book value of equity
Payout/ME	(Dividend+Stock repurchaes)/market value of equity
Payout/TA	(Dividend+Stock repurchaes)/total asset
Payout/NI	(Dividend+Stock repurchaes)/net income
Investment/BE	(CAPEX+R&D Expense)/the book value of equity
Investment/ME	(CAPEX+R&D Expense)/market value of equity
Investment/TA	(CAPEX+R&D Expense)/total asset
Investment/NI	(CAPEX+R&D Expense)/net income
HHI	Herfindahl-Hirschman index calculating based on Fama and French (1997) industry classifications
Market Size	Market size of industry based on industry sales
Product Substitutability	Price-cost margin computed by industry sales divided by operating costs in a given industry
Competition	Dummy that takes value of one if a firm is in competitive market based on the HHI lower than the median, Market Size higher than the median, or Product Substitutability lower than the median.
High	Dummy that takes value of one if the HHI of firm is the lowest tertile
Median	Dummy that takes value of one if the HHI of firm is the median tertile
Low	Dummy that takes value of one if the HHI of firm is the highest tertile
CGI	Gompers index-24 or Entrenchment index-6
Size	Log (Total assets)
Leverage	(Long-term debt+Short-term debt)/the book value of equity
Profit	Net income/total asset
B/M	The book value of common equity/(Common shares outstanding*stock price)
Risk	The latest 5 year standard deviation of net income on asset

<Table 3> Summary Statistics

This table shows summary statistics of our variables. Payout/BE is computed by dividend plus stock repurchase divided by the book value of equity. Payout/ME is computed by dividend plus stock repurchase divided by the market value of equity. Payout/TA is computed by dividend plus stock repurchase divided by total assets. Payout/NI is computed by dividend plus stock repurchase divided by net income. Investment/BE is computed by CAPEX plus R&D expense divided by the book value of equity. Investment/ME is computed by CAPEX plus R&D expense divided by market value of equity. Investment/TA is computed by CAPEX plus R&D expense divided by total assets. Investment/NI is computed by capital expenditure plus R&D expenses divided by net income. 1-HHI is one minus Herfindahl-Hirschman index (HHI) calculating based on the Fama and French (1997) Industry Classification. Market Size is industry market size, based on industry sales. Product Substitutability is the price-cost margin, which is computed by industry sales divided by operating costs for a given industry. 24-G-index is 24 minus Gompers index (Gompers et al., 2003).6-E-index is six minus Entrenchment index in Bebchuk et al. (2009). Total assets is the book value of assets. Leverage is long-term debt plus short-term debt divided by the book value of equity. Profit is net income on total assets. B/M is the book value of common equity divided by common shares outstanding multiplied by stock price. Risk is the latest 5 year standard deviation of net income on asset.

	N	MEAN	MEDIAN	STD.DEV	MAX	MIN
Payout/BE	8,982	0.1387	0.0547	0.3882	9.5338	0.0000
Payout/ME	8,982	0.0368	0.0224	0.0510	1.2550	0.0000
Payout/TA	8,982	0.0509	0.0249	0.0756	1.0763	0.0000
Payout/NI	8,982	0.7185	0.4486	0.9716	9.7964	0.0000
Investment/BE	8,982	0.1994	0.1467	0.2879	9.7854	0.0000
Investment/ME	8,982	0.0752	0.0527	0.1026	4.9657	0.0000
Investment/TA	8,982	0.0820	0.0677	0.0608	0.6512	0.0000
Investment/NI	8,982	1.5508	1.0650	1.5604	9.9992	0.0000
HHI	8,982	0.0606	0.0453	0.0707	0.7847	0.0204
Market Size (one thousand million)	8,982	581.5333	452.6751	583.3020	3,216.3987	4.9943
Product Substitutability	8,982	1.1837	1.1733	0.0899	1.6614	0.9547
24-G-index	8,982	14.9153	15.0000	2.6916	23.0000	5.0000
6-E-index	8,982	3.8441	4.0000	1.3152	6.0000	0.0000
Total assets (one thousand million)	8,982	6.4223	1.4371	25.3089	795.3370	0.0074
Leverage	8,982	0.6981	0.3843	1.9809	72.1564	0.0000
Profit	8,982	0.0765	0.0652	0.0557	1.3112	0.0005
B/M	8,982	0.4602	0.3880	0.3368	5.4786	0.0070
Risk	8,982	0.0495	0.0284	0.0825	1.5428	0.0006

<Table 4> Univariate tests: Difference in Difference method

This table shows the results of univariate testing for differences of corporate payout and investment expenditure according to PMC and CG, using a Difference-in-Difference method. Weak CG includes firms with a 24-G-index lower than the median. Good CG includes firms with a 24-G-index greater than the median. Competitive includes firms with a HHI lower than the median. Non-competitive includes firms with a HHI higher than the median. Corporate payout is dividend plus stock repurchase divided by the book value of equity. Investment expenditure is capital expenditure plus R&D expense divided by the book value of equity. The numbers in square brackets are the number of samples. t-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Corporate payout			
	Weak CG	Good CG	Difference test
Total	[N=4,293]	[N=4,689]	0.0368***
	0.1579	0.1211	(4.47)
Competitive	[N=1,975]	[N=2,487]	0.0069
	0.1310	0.1240	(0.70)
Non-competitive	[N=2,318]	[N=2,202]	0.0631***
	0.1809	0.1178	(4.98)
Difference in Difference			-0.0562***
			(-3.42)

Panel B: Investment expenditure			
	Weak CG	Good CG	Difference test
Total	[N=4,293]	[N=4,689]	0.0274***
	0.2137	0.1863	(4.43)
Competitive	[N=1,975]	[N=2,487]	0.0065
	0.1970	0.1905	(0.84)
Non-competitive	[N=2,318]	[N=2,202]	0.0463***
	0.2278	0.1815	(5.00)
Difference in Difference			-0.0398***
			(-3.27)

<Table 5> Effect of the interaction b/w PMC and CG on corporate payout

This table shows results of OLS regressions. The dependent variable is corporate payout, and the explanatory variable is interaction between PMC and CG. Payout/BE is computed by dividend plus stock repurchase divided by the book value of equity. Payout/ME is computed by dividend plus stock repurchase divided by the market value of equity. Payout/TA is computed by dividend plus stock repurchase divided by total assets. Payout/NI is computed by dividend plus stock repurchase divided by net income. Competitive includes firms with a HHI lower than the median. Non-competitive includes firms with a HHI higher than the median. CGI is 24 minus Gompers index. Competition is a dummy that takes the value of one if a firm is in a competitive market (firms with HHI lower than the median). Size is the natural log of the book value of assets. Leverage is long-term debt plus short-term debt divided by the book value of equity. Profit is net income divided by total assets. B/M is the book value of common equity divided by common shares outstanding multiplied by stock price. Risk is the latest 5 year standard deviation of net income on asset. The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Main results

	Payout/BE			
	Total	Total	Competitive	Non-competitive
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-0.2836***	-0.2002***	-0.2625***	-0.3001***
	[-3.80]	[-2.64]	[-2.75]	[-2.66]
CGI	-0.0071***	-0.0123***	-0.0015	-0.0132***
	[-4.79]	[-5.90]	[-0.80]	[-5.55]
CGI*Competition		0.0106***		
		[3.94]		
Competition		-0.1708***		
		[-4.29]		
Size	0.0130***	0.0129***	0.0097**	0.0167***
	[4.55]	[4.52]	[2.37]	[4.11]
Leverage	0.0671***	0.0669***	0.0736***	0.0610***
	[13.07]	[13.06]	[4.18]	[9.73]
Profit	1.8070***	1.8121***	1.3995***	2.1621***
	[7.74]	[7.75]	[9.30]	[4.64]
B/M	-0.1439***	-0.1446***	-0.1157***	-0.1812***
	[-7.33]	[-7.33]	[-5.57]	[-5.06]
Risk	-0.3161***	-0.3164***	-0.4069***	-0.1455
	[-4.45]	[-4.44]	[-4.48]	[-1.06]
Industry effect	yes	yes	yes	yes
Year effect	yes	yes	yes	yes
N	8,982	8,982	4,462	4,520
Pseudo R^2	0.1820	0.1830	0.2280	0.1730

Competitive vs. Non-competitive	0.0117***
(Difference in coefficients)	[3.86]

Panel B: Other specification measure of corporate payout

	Payout/ME			Payout/TA			Payout/NI		
	Total	Competitive	Non-competitive	Total	Competitive	Non-competitive	Total	Competitive	Non-competitive
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
Intercept	-0.0517***	-0.0684***	-0.0515***	-0.0464***	-0.0703***	-0.0474**	0.0254	-0.4382	0.0624
	[-4.46]	[-4.02]	[-3.60]	[-2.76]	[-3.11]	[-2.06]	[0.11]	[-1.34]	[0.22]
CGI	-0.0020***	-0.0009**	-0.0018***	-0.0021***	-0.0006	-0.0019***	-0.0341***	-0.0079	-0.0313***
	[-6.66]	[-2.50]	[-6.16]	[-5.33]	[-1.35]	[-4.63]	[-5.46]	[-1.23]	[-4.98]
CGI*Competition	0.0012**			0.0016***			0.0274***		
	[2.52]			[2.76]			[3.16]		
Competition	-0.0176**			-0.0240***			-0.3994***		
	[-2.54]			[-2.81]			[-3.12]		
Control variables	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effect	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	8,982	4,462	4,520	8,982	4,462	4,520	8,982	4,462	4,520
Pseudo R^2	-0.0499	-0.0485	-0.0566	-0.1700	-0.1640	-0.1910	0.0208	0.0159	0.0313
Competitive vs. Non-competitive (Difference in coefficients)		0.0009** [1.97]			0.0013** [2.13]			0.0234*** [2.61]	

<Table 6> Effect of the interaction b/w PMC and CG on corporate payout: Giroud and Mueller (2011) approach

This table shows results of OLS regressions using same method in Giroud and Mueller (2011). Dependent variable is corporate payout, and explanatory variable is interaction between PMC and CG. Payout/BE is computed by dividend plus stock repurchase divided by the book value of equity. Payout/ME is computed by dividend plus stock repurchase divided by market value of equity. Payout/TA is computed by dividend plus stock repurchase divided by total asset. Payout/NI is computed by dividend plus stock repurchase divided by net income. CGI is 24 minus Gompers index. High is dummy that takes value of one if a firm has HHI in the lowest tertile. Median is dummy that takes value of one if a firm has a HHI in the median tertile. Low is dummy that takes value of one if a firm has in the highest tertile. As control variables (not reported), Size is natural log of the book value of assets. Leverage is long-term debt plus short-term debt divided by the book value of equity. Profit is net income on total assets. B/M is the book value of common equity divided by common shares outstanding multiplied by stock price. Risk is the latest 5 year standard deviation of net income on asset. The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Payout/BE	Payout/ME	Payout/TA	Payout/NI
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-0.2158***	-0.0541***	-0.0507***	-0.0688
	[-2.72]	[-4.51]	[-2.94]	[-0.29]
CGI*High	-0.0007	-0.0009**	-0.0004	-0.0020
	[-0.28]	[-2.24]	[-0.70]	[-0.26]
CGI*Median	-0.0079***	-0.0013***	-0.0016***	-0.0320***
	[-3.62]	[-2.80]	[-2.87]	[-4.52]
CGI*Low	-0.0121***	-0.0019***	-0.0019***	-0.0278***
	[-4.91]	[-5.39]	[-4.13]	[-3.50]
High	-0.1789***	-0.0167**	-0.0227**	-0.3681**
	[-3.50]	[-2.16]	[-2.22]	[-2.26]
Low	-0.0524	-0.0069	-0.0029	0.0674
	[-1.15]	[-0.80]	[-0.28]	[0.43]
Control variables	yes	yes	yes	yes
Industry effect	yes	yes	yes	yes
Year effect	yes	yes	yes	yes
N	8,982	8,982	8,982	8,982
Pseudo R^2	0.1830	-0.0498	-0.1700	0.0208

<Table 7> Effect of the interaction b/w PMC and CG on corporate payout: Robustness checking

This table shows results of OLS regressions. Explanatory variable is interaction between PMC and CG. Dependent variable is Payout/BE which is dividend plus stock repurchase divided by the book value of equity. CGI is 24 minus Gompers index or 6 minus Entrenchment index. Competitive includes firms in competitive market based on Market Size or Product Substitutability. Market Size is market size of industry based on industry sales. Product Substitutability is price-cost margin computed by industry sales divided by operating costs in a given industry. Industry classification is based on Fama and French (1997). As Control variables (not reported), Size is natural log of the book value of assets. Leverage is long-term debt plus short-term debt divided by the book value of equity. Profit is net income on total assets. B/M is the book value of common equity divided by common shares outstanding multiplied by stock price. Risk is the latest 5 year standard deviation of net income on asset. The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Entrenchment index		Market Size		Product Substitutability	
	Competitive	Non-competitive	Competitive	Non-competitive	Competitive	Non-competitive
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Intercept	-0.3056***	-0.5323***	-0.3189***	-0.2371**	-0.4400***	-0.1018
	[-3.59]	[-4.55]	[-3.38]	[-1.99]	[-5.61]	[-0.82]
CGI	0.0033	-0.0105***	-0.0045**	-0.0106***	-0.0046***	-0.0108***
	[0.89]	[-2.62]	[-2.35]	[-4.42]	[-3.36]	[-3.68]
Control variables	yes	yes	yes	yes	yes	yes
Industry effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
N	4,462	4,520	4,461	4,521	4,499	4,483
Pseudo R^2	0.228	0.170	0.184	0.192	0.314	0.157
Competitive vs. Non-competitive (Difference in coefficients)	0.0138** [2.53]		0.0061** [1.98]		0.0061* [1.90]	

<Table 8> Effect of the interaction b/w PMC and CG on investment expenditure

This table shows results of OLS regressions. Dependent variable is investment expenditure, and explanatory variable is interaction between PMC and CG. Investment/BE is computed by capital expenditure plus R&D expense divided by the book value of equity. Investment/ME is computed by capital expenditure plus R&D expense divided by market value of equity. Investment/TA is computed by capital expenditure plus R&D expense divided by total asset. Investment/NI is computed by capital expenditure plus R&D expense divided by net income. CGI is 24 minus Gompers index. Competition is dummy that takes value of one if a firm is in competitive market (firms with a HHI lower than the median). Size is natural log of the book value of assets. Leverage is long-term debt plus short-term debt divided by the book value of equity. Profit is net income on total assets. B/M is the book value of common equity divided by common shares outstanding multiplied by stock price. Risk is the latest 5 year standard deviation of net income on asset. The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Panel A: Main results

	Investment/BE			
	Total	Total	Competitive	Non-competitive
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	0.2621***	0.3101***	0.1225**	0.3679***
	[6.28]	[6.93]	[2.05]	[6.43]
CGI	-0.0023**	-0.0054***	0.0011	-0.0061***
	[-2.39]	[-3.94]	[0.94]	[-4.60]
CGI*Competition		0.0063***		
		[3.74]		
Competition		-0.0935***		
		[-3.55]		
Size	0.0041**	0.0040**	0.0044**	0.0030
	[2.44]	[2.42]	[2.25]	[1.21]
Leverage	0.0947***	0.0946***	0.0933***	0.0957***
	[7.76]	[7.76]	[8.09]	[4.92]
Profit	0.2586***	0.2618***	0.2788**	0.2575***
	[3.67]	[3.71]	[2.39]	[3.26]
B/M	-0.0882***	-0.0883***	-0.0604***	-0.1144***
	[-8.71]	[-8.65]	[-3.92]	[-8.39]
Risk	0.1648***	0.1642***	0.1014**	0.2629***
	[4.07]	[4.06]	[2.55]	[3.03]
Industry effect	yes	yes	yes	yes
Year effect	yes	yes	yes	yes
N	8,982	8,982	4,462	4,520
Pseudo R^2	1.8400	1.8450	6.3450	1.1880

Competitive vs. Non-competitive	0.0072***
(Difference in coefficients)	[4.05]

Panel B: Other specification measure of investment expenditure

	Investment/ME			Investment/TA			Investment/NI		
	Total	Competitive	Non-competitive	Total	Competitive	Non-competitive	Total	Competitive	Non-competitive
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
Intercept	0.0659***	-0.0445*	0.1310***	0.2241***	0.1595***	0.2620***	4.6481***	3.3690***	5.3807***
	[3.24]	[-1.66]	[4.87]	[18.87]	[8.98]	[16.45]	[14.39]	[7.90]	[12.04]
CGI	-0.0019***	0.0001	-0.0023***	-0.0006**	0.0007**	-0.0009***	-0.0100	0.0185**	-0.0159**
	[-4.06]	[0.17]	[-4.87]	[-2.28]	[2.10]	[-3.18]	[-1.34]	[2.36]	[-2.06]
CGI*Competition	0.0019***			0.0013***			0.0260**		
	[2.71]			[3.24]			[2.47]		
Competition	-0.0213**			-0.0161***			-0.2911*		
	[-2.03]			[-2.71]			[-1.85]		
Control variables	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry effect	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	8,982	4,462	4,520	8,982	4,462	4,520	8,982	4,462	4,520
Pseudo R^2	-0.1480	-0.1560	-0.1920	-0.0882	-0.0702	-0.1230	0.0771	0.0795	0.0812

Competitive vs. Non-competitive (Difference in coefficients)	0.0024*** [3.36]	0.0015*** [3.68]	0.0344*** [3.13]

<Table 9> Effect of the interaction b/w PMC and CG on investment expenditure: Giroud and Mueller (2011) approach

This table shows results of OLS regressions using same method as Giroud and Mueller (2011). The dependent variable is investment expenditure, and the explanatory variable is the interaction between PMC and CG. Investment/BE is computed by capital expenditure plus R&D expenses divided by the book value of equity. Investment/ME is computed by capital expenditure plus R&D expense divided by the market value of equity. Investment/TA is computed by capital expenditure plus R&D expense divided by total assets. Investment/NI is computed by capital expenditure plus R&D expense divided by net income. CGI is 24 minus Gompers index. High is a dummy that takes the value of one if a firm has a HHI in the lowest tertile. Median is a dummy that takes the value of one if a firm has a HHI in the median tertile. Low is a dummy that takes the value of one if a firm has a HHI in the highest tertile. As Control variables (not reported), Size is the natural log of the book value of assets. Leverage is long-term debt plus short-term debt divided by the book value of equity. Profit is the net income on total assets. B/M is the book value of common equity divided by common shares outstanding multiplied by stock price. Risk is the latest 5 year standard deviation of net income on assets. The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Investment/BE	Investment /ME	Investment/TA	Investment/NI
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	0.3284***	0.0737***	0.2255***	4.6618***
	[6.59]	[3.43]	[18.68]	[14.09]
CGI*High	0.0005	-0.0004	0.0005	0.0046
	[0.41]	[-0.65]	[1.29]	[0.46]
CGI*Median	0.0000	0.0001	0.0005	0.0133
	[0.03]	[0.11]	[1.46]	[1.49]
CGI*Low	-0.0071***	-0.0024***	-0.0008**	-0.0100
	[-3.68]	[-4.05]	[-2.48]	[-1.13]
High	-0.1232***	-0.0249*	-0.0173**	-0.1148
	[-3.52]	[-1.71]	[-2.37]	[-0.58]
Low	-0.1019***	-0.0359***	-0.0171**	-0.3565*
	[-2.79]	[-3.21]	[-2.41]	[-1.94]
Control variables	yes	yes	yes	yes
Industry effect	yes	yes	yes	yes
Year effect	yes	yes	yes	yes
N	8,982	8,982	8,982	8,982
Pseudo R^2	1.8470	-0.1480	-0.0880	0.0770

<Table 10> Effect of the interaction b/w PMC and CG on investment expenditure: Robustness checking

This table shows results of OLS regressions. Explanatory variable is interaction between PMC and CG. Dependent variable is Investment/BE computed by capital expenditure plus R&D expense divided by the book value of equity. CGI is 24 minus Gompers index or six minus Entrenchment index. Competition is a dummy that takes value of one if a firm is in competitive market based on Market Size or product substitutability. Market Size is market size of industry based on industry sales. Product Substitutability is price-cost margin computed by industry sales divided by operating costs in a given industry. Industry classification is based on Fama and French (1997). As Control variables (not reported), Size is natural log of the book value of assets. Leverage is long-term debt plus short-term debt divided by the book value of equity. Profit is net income on total assets. B/M is the book value of common equity divided by common shares outstanding multiplied by stock price. Risk is the latest 5 year standard deviation of net income on asset. The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Entrenchment index		Market Size		Product Substitutability	
	Competitive	Non-competitive	Competitive	Non-competitive	Competitive	Non-competitive
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Intercept	0.1576***	0.2955***	0.2914***	0.1568***	-0.0651	0.4439***
	[3.03]	[5.71]	[5.24]	[2.70]	[-1.15]	[7.26]
CGI	-0.0032	-0.0136***	-0.0004	-0.0046***	0.0009	-0.0055***
	[-1.27]	[-5.47]	[-0.33]	[-3.42]	[0.95]	[-3.20]
Control variables	yes	yes	yes	yes	yes	yes
Industry effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
N	4,462	4,520	4,461	4,521	4,499	4,483
Pseudo R^2	6.348	1.190	4.459	1.377	-1.976	1.017

Competitive vs. Non-competitive	0.0104***	0.0041**	0.0064***
(Difference in coefficients)	[2.91]	[2.27]	[3.26]