

Corporate Governance, Product Market Competition, and Payout Policy^{*}

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Abstract

This paper investigates how the interaction between internal corporate governance and product market competition affects corporate payout. Empirically, existing papers demonstrate that corporate governance has a significantly negative effect on corporate payout; however, we observe that this negative relation is observed only in less competitive (concentrated) markets, and disappears or decreases in more competitive markets. The result suggests that the substitution effect between internal corporate governance and product market competition in the effect on firm value, as suggested in previous literatures, is also valid in payout policy. Our results

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will provide practical and institutional implications regarding the most efficient method of finding optimal internal corporate governance structure given market structures.

Keywords: Corporate governance, Product market competition, Market concentration, Interaction effect, Payout policy

INTRODUCTION

We analyze the effect of the interaction between internal corporate governance and product market competition as external control mechanism on corporate payout policy to extend the existing literature on the subject. Previous studies find that there is a substitution effect between these two corporate control mechanisms on firm value and operating performance. Giroud and Mueller (2011) show that the trading strategy (“hedge portfolio”) in Gompers, Ishii, and Metrick (2003), which comprises a long position in firms with good corporate governance and a short position in firms with weak corporate governance, has a significantly positive abnormal return only in less competitive markets, and not in the more competitive markets. Accordingly, the authors argue that firms in more competitive markets should benefit less from good corporate governance, whereas firms in less competitive markets will benefit relatively more from it. That is, the monitoring function of corporate governance is substituted by product market competition as external corporate governance. Furthermore, this substitution effect is widely observed in various countries as well as in the U.S. (Ammann, Osech, and Schmid 2011; Byun, Lee, and Park 2012).

However, these existing studies do not explain how the interaction effect between internal corporate governance and product market competition would be obtained. We try to provide an approach to answer the question of how internal corporate governance and external control mechanism interact with each other to affect firm value and performance. We conjecture that the interaction between corporate governance and product market competition will be channeled through corporate decisions such as dividend payouts, and eventually affect firm value and performance. The reason for which we focus on corporate payout is because shareholder value and corporate performance are highly affected by this managerial decision. They, along with the raising of capital and investment

decision, are the main financial decisions that engender rewards for shareholders and also decide a firm's sustainability as numerous existing studies have shown (Jensen 1986; Easterbrook 1984; Miller and Rock 1985).

This paper provides another view for the question of how internal corporate governance and external control mechanism interact with each other. Shleifer and Vishny (1997) argue that there is a mutual relationship between internal corporate governance and external control mechanism. They demonstrate that we should not depend on only one factor, but simultaneously consider the environmental factors around the firm as well as the internal firm characteristics in order to efficiently solve the conflict of interests between managers and shareholders. In this regard, since the agency problems could not be solved by only one specific control mechanism, a complex approach considering the interaction among the control mechanisms is vitally needed (Gillan, Hartzell, and Starks 2003).

In order to investigate the effect of the interaction between internal corporate governance and product market competition on corporate payout, governance index measured in Gompers, Ishii, and Metrick (2003) is used here as a proxy for corporate governance, which measures the protection level of shareholder rights. We also use the Herfindahl Hirschman Index¹⁾ (HHI) as a proxy for the level of product market competition, similar to the method found in Giroud and Mueller (2011). After controlling for other firms' characteristics, we find that corporate governance has a significantly negative effect on corporate payout as existing literature such as La Porta et al. (2000) and Chae, Kim, and Lee (2009) shows. In addition, as a main contribution of our paper, we also show that this relation is more strongly observed in less competitive (concentrated) markets, and disappears or decreases in more competitive markets. In another model, we use a dummy that takes a value of one if a firm pays dividend or repurchases shares as a dependent variable, because many firms do not pay dividends or repurchase shares. Using the probit model, we still confirm the same pattern.

1) HHI measures the level of product market competition based on the market concentration, and is a commonly used metric in the economic and corporate finance literature. However, as there is a question on how well this measure reflects the actual level of product market competition, HHI would more adequately be interpreted as a measure of market concentration than market competition.

Additionally, we divide the whole sample into three groups based on the HHI, as in Giroud and Mueller (2011), and examine the effect of internal corporate governance on corporate payout in each group of the sample. We find that the effect of corporate governance on corporate payout decrease consistently with the level of product market competition; i.e. they are small and insignificant in more competitive (concentrated) markets, and large and significant in less competitive markets. To assess the robustness of our results in alternative measures of the internal corporate governance, we use the entrenchment index from Bebchuk, Cohen, and Ferrell (2009) as another proxy for the level of corporate governance. Using this index, we also find a significantly negative effect of corporate governance on corporate payout, whose effect is stronger in less competitive (concentrated) markets than it is in more competitive markets.

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

RELATED LITERATURE AND BANKGROUND

In the agency framework, competitive pressure is regarded as an external control mechanism to discipline the agency problem (Schmidt 1997; Guadalupe and P'erez-Gonz'alez 2005). Typically, in more competitive markets, managers are burdened by high investment risk and bankruptcy cost so that their incentive to maximize the private benefit of control would be mitigated and as a result, the agency problem decreases (Holmstrom 1982; Hart 1983). Furthermore, product market competition leads managers to form an optimal corporate governance structure in order to minimize the transaction cost and production cost. In more competitive markets, since managers face higher turnover sensitivity to performance than in less competitive markets, they perform their best effort to maximize shareholder wealth. Alchian (1950) and Stigler (1958) also argue that managers in more competitive markets have desire to arrange good internal corporate governance as a bonding mechanism in order to minimize the cost of capital in the stock market. Previous studies show that product market competition,

as an external control mechanism, has an influence on managers' corporate decision-making procedures. Bolton and Scharfstein (1990) and Grullon and Michaely (2012) find that in less competitive markets, managers prefer to retain earnings rather than pay out dividends in order to prepare for future competitive threat from potential and incumbent rival firms.

However, product market competition is suggested to have limitations as a tool for solving information asymmetry and the 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 corporate governance through their board of directors and auditing systems if they want to discipline managers more efficiently (Black, Jang, and Kim 2006; Karuna 2010). Gompers, Ishii, and Metrick (2003) report that firms with good corporate governance, as measured by how well shareholder rights are protected, have a higher stock return, after controlling for other risk factors, than do those firms with weak corporate governance. They also show 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 empirical studies have shown that good corporate governance increases firm value (Mitton 2002; Lemmon and Lin 2003).

Some literature investigates the interaction between external control mechanisms and internal corporate governance. Shleifer and Vishny (1997) argue, for example, that there is a complement effect between corporate governance and external control mechanisms, such as market for corporate control, managerial labor market and product market competition. In other words, the interaction between the two different control mechanisms contributes to a more efficient discipline of management. Cremers and Nair (2005) analyze the effect of interaction between anti-takeover provisions as a proxy for external control mechanism, and institution ownerships as a proxy for internal control mechanism on stock returns. They find evidence that the market for corporate control is effective only when a firm has high institution ownership and vice versa.

Giroud and Mueller (2011) examine the interaction effect of internal corporate governance and product market competition on stock returns in the U.S. They find that a trading strategy based on corporate governance has a positive abnormal return only in less

competitive markets. This implies that there is a substitution effect between these two different control mechanisms. Ammann, Osech, and Schmid (2011) verify the same hypothesis in 14 European countries. They also confirm the presence of the substitution effect between the two corporate control mechanisms. Byun, Lee, and Park (2012) also demonstrates such substitution effect in Korea as a typical emerging market. Kim and Lu (2011) use management ownerships as a proxy for internal corporate governance and argued that the average level of management ownership substitutes product market competition in maximizing shareholder value.

By extending the research conducted in the above literatures, this paper examines what are the channels that induce the effect of this substitution on shareholder wealth by focusing on corporate decision-makings. We analyze the effect of the interaction between internal corporate governance and product market competition on corporate payout policy²⁾ closely related to shareholder wealth. Thus, we conjecture that the effect of corporate governance on corporate payout disappears or decreases as long as product market competition prevents managerial agency problems.

Existing literature shows that good corporate governance could discipline managers to pay either more or less dividends. One story (Outcome model) argues that paying dividends mitigates the overinvestment problems that are caused by managers who pursue their private benefit of control from free cash flow (La Porta et al. 2000). Another story (Substitution model) that would support our conjecture is the difficulty in external financing under information asymmetry. Typically, dividend payout (or share repurchase) is used as a commitment or signaling device under information asymmetry or the conflict of interests between managers and shareholders. Thus, firms with weak corporate governance would pay more dividends to lower the cost of capital, while firms with good corporate governance have less need to do so.

This paper tests the competing hypotheses, 'Outcome model' and 'Substitution model', as previous studies had not been determinate

2) 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 decreases the free cash flow that is considered as the main source of the private benefit of control of managers (Jensen, 1986).

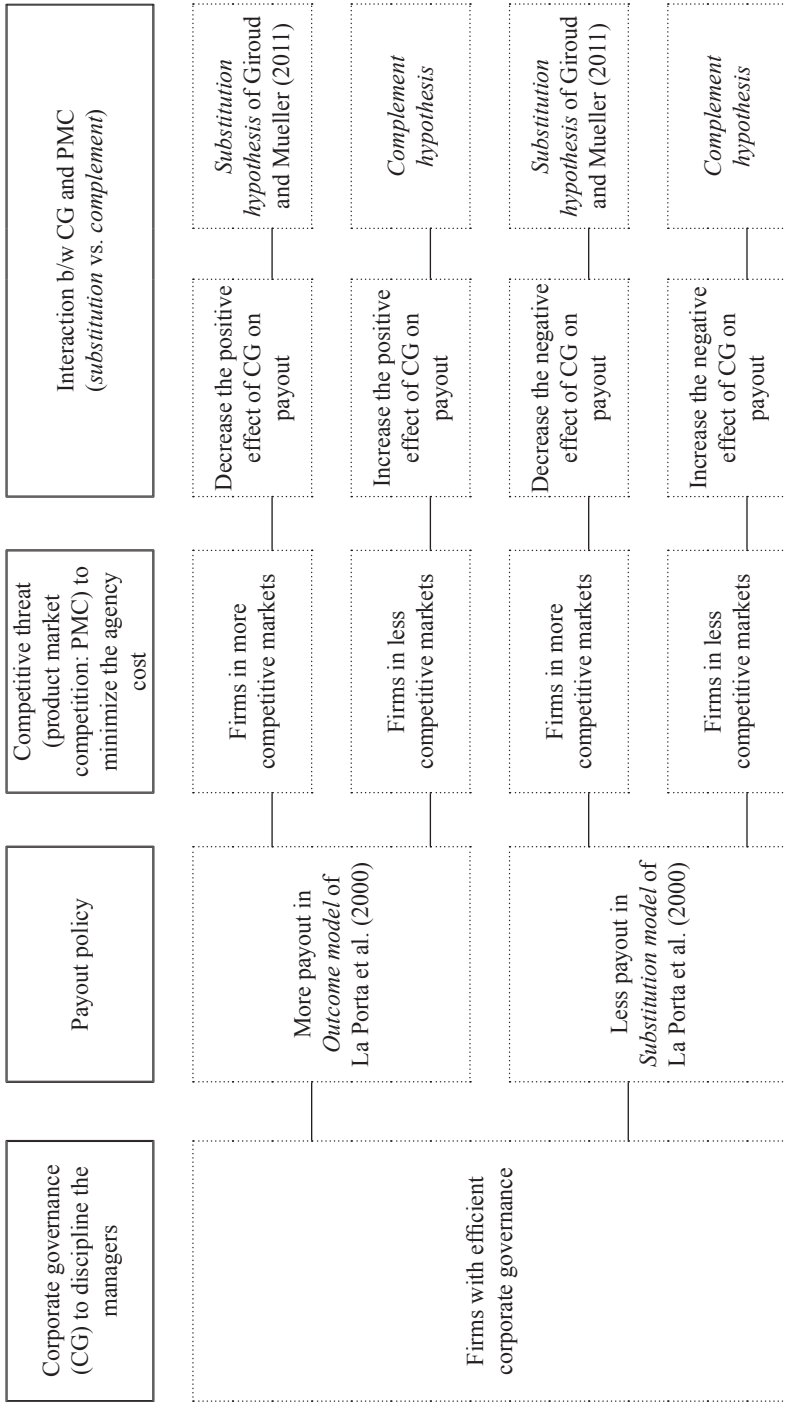


Figure 1. Monitoring effect from the interaction between corporate governance and product market competition

about the relation between corporate governance and dividends. Yet, more recent papers tend to find that firms with poor corporate governance pay more dividends. Thus this paper firstly confirms this relation and then analyzes the effect of product market competition on the relation as a moderating factor. The important point we are focusing on here is that the relation between corporate governance and payout is affected by product market competition regardless of their relationship. If the result shows that corporate governance disciplines managers to increase dividends (Outcome model), then such relation would be weakened in a competitive market as the disciplinary role of corporate governance is replaced by that of product market competition. On the other hand, if the result shows that firms with weak corporate governance pay more dividends to mitigate agency problem caused by weak corporate governance (Substitution model), then those firms with poor corporate governance would pay less dividends in competitive environment as product market competition mitigates such agency problem and thus decrease the needs to pay dividends.

From these two viewpoints, we can claim that the marginal effect of internal corporate governance on corporate payout is stronger in less competitive markets than it is in more competitive markets. This hypothesis implies that the substitution effect between corporate governance and product market competition comes from disciplining the managerial decision on dividends. Corporate payout can therefore be a way through which the effect of interaction between two different control mechanisms on shareholder wealth acts.

DATA AND VARIABLES

Sample selection

Our sample consists of all the firms in the corporate governance database from the Investor Responsibility Research Center (IRRC) that are also present in Compustat. The IRRC collects data on corporate governance provisions from various sources, such as annual reports, proxy statements and SEC 10-Q and 10-K documents. Using these data, Gompers, Ishii, and Metrick (2003) construct a corporate governance index that we utilize in this

study. The IRRC provides this index³⁾ for the years 1990, 1993, 1995, 1998, 2000, 2002, 2004 and 2006 of our sample period. For the intermediate years, we use the indexes from the most recent available year (Giroud and Mueller 2011). 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 Fama and French (1997) industry classification, we require a SIC code in Compustat. Since our industry classification is initially disclosed in 1997, we conjecture that managers and shareholders recognize the competitive pressure in a specific industry based on this industry classification beyond then. Thus, our sample of the empirical analysis is for the years 1997 to 2007. Corporate payout and control variables data are all from Compustat. The final sample consists of 10,052 firm-year observations (1,872 firms).

Definition of variables

Corporate governance. Our proxy of corporate governance is the governance index, as suggested in Gompers, Ishii, and Metrick (2003). This measure is commonly used in corporate governance literature. The index is measured by the sum of 24 anti-takeover provisions (each provision is valued at one point). Thus, a high governance index signifies weak protection level of shareholder rights and vice versa. For interpreting convenience, we use 24 minus governance index as a proxy for corporate governance (*G-index*),⁴⁾ because high governance index means a low level of protection of shareholder rights. Additionally, we also use the entrenchment index developed in Bebchuk, Cohen, and Ferrell (2009) in order to check the robustness of our results. Bebchuk, Cohen, and Ferrell (2009) argues that the governance index in Gompers, Ishii, and Metrick (2003) includes too much information, some of which may not have an effect on firm value or stock returns. Among the 24 corporate provisions of the governance index in Gompers, Ishii, and

3) The sample of IRRC firms, mainly drawn from the S&P 500 and other large corporations, represents over 90% of total market capitalization on NYSE, AMEX and NASDAQ (Jiraporn and Ning, 2006).

4) Various studies use the governance index by Gompers, Ishii, and Metrick (2003) as a proxy for the protection level of shareholder rights, e.g., Giroud and Mueller (2011) and Karuna (2010).

Metrick (2003), they select the six most influential provisions and construct an entrenchment index. As the governance index, we use six minus entrenchment index as the additional proxy for corporate governance for interpreting convenience (*E-index*).

The level of product market competition. Our measure of the level of product market competition is the HHI (Herfindahl-Hirschman Index).⁵⁾ HHI is calculated in the following equation: $HHI_{jt} = \sum_{i=1}^n s_{ijt}^2$, where s_{ijt} is the market share of firm i in industry j in year t . Market shares are calculated from Compustat using the sales data of firms. HHI is computed by the sum of squared market shares in each industry.⁶⁾ We classify industries using the 48 industry classifications devised by Fama and French (1997).⁷⁾ We assign all firms in Compustat to an industry by matching their SIC codes to one of these classifications.⁸⁾ We use them to measure the HHI (*HHI*), as in Giroud and Mueller (2011).

Corporate payout. To measure corporate payout, this paper uses the amount of cash dividend plus stock repurchase⁹⁾ rather than only the cash dividends. Fama and French (2001) demonstrate that increasing number of firms, particularly startup firms, repurchase

5) This paper employs HHI as a proxy for product market competition, but it rather reflects market concentration and has limitations in measuring the actual product market competition. Moreover, HHI based on only domestic companies cannot properly reflect competitive pressure from foreign companies. Although this paper as well as many of previous studies uses HHI, more scrupulous proxies including market size or entry cost need to be needed in the future research to measure the level of product market competition more accurately.

6) HHI is commonly used in economic literature, particularly for studies of industrial organizations; e.g. Tirole (1988) and corporate finance, e.g. Grullon and Michealy (2012), Giroud and Mueller (2011).

7) Fama and French (1997) computed HHI using only publicly traded firms; hence, some studies have used other measures of product market competition 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, 2012). However, we do not use this measure because of the following critical problems: (1) it is computed using only the 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).

8) For a detailed conversion table, please refer to the Appendix in Fama and French (1997).

9) We use the dollar volume of share repurchase (Dittmar, 2000).

stock as corporate payout. Grullon and Michaely (2002) also argue that stock repurchase substitutes for dividends gradually. Cash dividend and stock repurchase data are sourced from Compustat, and we measure the corporate payout ratio, which is the corporate payout scaled by the market value of the equity ($Payout/ME$). We also use other formulae, such as corporate payout scaled by the book value of equity ($Payout/BE$), total assets ($Payout/Total\ assets$), sales ($Payout/Sales$) or net incomes ($Payout/Net\ income$), in order to check the robustness of our results. On the other hand, analyzing the propensity to pay dividends may provide a more robust conclusion because an analysis of the payout ratio requires a model for estimating the “optimal” payout ratio for a given firm (Jiraporn, Kim, and Kim 2011). Focusing on the propensity to pay dividends thus allows us to sidestep any potential bias that may appear when using an imprecise model for the optimal dividend payout (Officer 2007; Jo and Pan 2009). Thus, we consider the payout dummy that equals one if the firms pay dividend or declare the stock repurchase in year, or 0 otherwise, as the additional dependent variable.

Control variables. To control the size effect, we include a natural log of total assets (*Size*) in the model. We use return on assets as a proxy for the level of firm profitability (*ROA*). DeAngelo, DeAngelo, and Stulz (2006) argue that dividends are paid usually by mature and established firms. They consider earned/contributed capital mix as the proxy for the firm maturity, because mature firms can have large cumulative profits. Consistent with financial life-cycle theory as they argued, the probability of paying dividends tends to increase with the earned/contributed capital mix. We include the retained earnings-to-total assets ratio as a proxy for the earned/contributed capital mix (RE/TA). Firms facing high cash-flow uncertainty are likely to pay low dividends and keep earnings inside the firm in anticipation of funding shortfalls (Chay and Suh 2009). We use the stock return volatility as the proxy for the cash-flow uncertainty faced by a firm ($SRVOL$). This variable is defined as the standard deviation of monthly stock returns over the most recent two years. Firms with many investment opportunities have large cash requirement and may pay low dividends. Our proxy for investment opportunity is the market-to-book ratio ($M/B\ ratio$), defined as the book value of common equity divided by common shares outstanding, and multiplied by the stock price (Harford

Table 1. Descriptive Statistics

This table shows the descriptive statistics. Panel A presents the sample distribution by year. Panel B shows the summary statistics of the variables. Panel C presents the correlation matrix among the variables. Payout/ME is computed by dividend plus stock repurchase divided by the market value of equity. Payout/BE is computed by dividend plus stock repurchase divided by the book value of equity. Payout/Total asset is computed by dividend plus stock repurchase divided by total assets. Payout/Sales is computed by dividend plus stock repurchase divided by sales. Payout/Net income is computed by dividend plus stock repurchase divided by net income. HHI is the Herfindahl Hirschman index calculation based on Fama and French (1997) 48 industry classification. Governance index (Governance) is 24 minus the governance index in Gompers, Ishii, and Metrick (2003). Entrenchment index is 6 minus Entrenchment index in Bebchuk, Cohen, and Ferrell (2009). Total assets is the book value of assets. Profit is net income on total assets. RE/TA is the ratio of retained earnings to total assets. SRVOL is the standard deviation of monthly stock returns over the most recent two years including the current fiscal year. M/B ratio is the market-to-book ratio [(book value of assets + market value of equity – book value of equity)/book value of assets]. Investment is computed by CAPEX plus R&D expense divided by total assets. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel A: Sample distribution by year

Year	N	Percent
1997	705	7.01
1998	926	9.21
1999	892	8.87
2000	847	8.43
2001	730	7.26
2002	915	9.10
2003	991	9.86
2004	1,106	11.00
2005	1,040	10.35
2006	1,003	9.98
2007	897	8.92
Total	10,052	100.00

1999). As alternative proxy for investment opportunity, we use the investment expenditures. To measure investment expenditure, we use capital expenditure (CAPEX) and research & development (R&D) expense data obtained from Compustat (Cho 1998). We measure the investment expenditure ratio, which is capital expenditure plus R&D expenses scaled by the total assets (*Investment*).

Table 1. (continued)

Panel B: Summary statistics						
	N	MEAN	MEDIAN	STD.DEV	MAX	MIN
<i>Payout/ME</i>	10,052	0.0332	0.0187	0.0507	1.2550	0.0000
<i>Payout/BE</i>	10,052	0.1147	0.0430	0.2969	7.4295	0.0000
<i>Payout/Asset</i>	10,052	0.0449	0.0193	0.0713	0.9997	0.0000
<i>Payout/Sales</i>	10,052	0.0479	0.0187	0.0862	1.5067	0.0000
<i>Payout/Net income</i>	10,052	0.6837	0.3734	1.0249	9.9619	0.0000
<i>HHI</i>	10,052	0.0593	0.0452	0.0679	0.7847	0.0204
<i>G-index</i>	10,052	14.9881	15.0000	2.6664	23.0000	5.0000
<i>E-index</i>	10,052	3.8463	4.0000	1.3036	6.0000	0.0000
<i>Size (million dollars)</i>	10,052	5,893	1,288	23,997	795,337	7
<i>Profit</i>	10,052	0.0549	0.0581	0.0960	1.3112	-0.9653
<i>RE/TA</i>	10,052	0.2749	0.2896	0.3306	1.0739	-0.9992
<i>SRVOL</i>	9,834	0.1165	0.1012	0.0668	1.9336	0.0169
<i>M/B ratio</i>	10,052	2.0350	1.6616	1.2025	9.8649	0.2582
<i>Investment</i>	10,052	0.0875	0.0696	0.0712	0.9647	0.0000

Panel C: Correlation

	<i>Payout/ME</i>	<i>HHI</i>	<i>G-index</i>	<i>E-index</i>	<i>Size</i>	<i>Profit</i>
<i>HHI</i>	0.0340***					
<i>G-index</i>	-0.0691***	0.0194*				
<i>E-index</i>	-0.0196**	0.0374***	0.7271***			
<i>Size</i>	0.1007***	0.0357***	-0.1762***	-0.0199**		
<i>Profit</i>	0.2033***	0.0289***	-0.0319***	0.0313***	0.1388***	
<i>RE/TA</i>	0.1823***	0.0470***	-0.0330***	0.0593***	0.0591***	0.4732***
<i>SRVOL</i>	-0.1847***	-0.0906***	0.1633***	0.0706***	-0.3332***	-0.3354***
<i>M/B ratio</i>	-0.0777***	-0.0515***	0.0820***	0.1190***	-0.0141	0.3242***
<i>Investment</i>	-0.0889***	-0.0868***	0.0890***	0.0368***	-0.1407***	-0.1317***
	<i>RE/TA</i>	<i>SRVOL</i>	<i>M/B ratio</i>			
<i>SRVOL</i>	-0.3603***					
<i>M/B ratio</i>	0.1253***	0.0037				
<i>Investment</i>	-0.1562***	0.2303***	0.2793***			

Descriptive statistics

Table 1 presents the descriptive statistics for our sample firms. Panel A shows the year-by-year sample distribution. The final

sample consists of 10,052 firm-year observations. Panel B presents the summary statistics of our variables. *Payout/ME* averages 0.0332 (0.0187 median) and *Payout/BE* averages 0.1147 (0.0430 median). These payout ratios are similar to the ones that were reported in Chae, Kim, and Lee (2009). *HHI*, which is measured based on Fama and French (1997) 48 industry classifications, averages 0.0593 (0.0452 median). *G-index* computed by 24 minus the governance index in Gompers, Ishii, and Metrick (2003) averages 14.9881 (15.0000 median). On average, sample firms have total assets of 5,893 million U.S. dollars. The average profitability (*ROA*) is equal to 0.6981, and the average retained earnings-to-total assets ratio (*RE/TA*) is 0.2749. The stock return volatility (*SRVOL*) averages 0.1165 and the *M/B ratio* (market-to-book ratio) averages 2.0350. *Investment*, as alternative proxy for the investment opportunity, averages 0.0875.

Panel C shows the correlations among the variables. *HHI* and corporate payout is positively correlated at the 1% significance level. It means that firms in a less competitive (concentrated) market pay high dividend and share repurchase. *G-index* and corporate payout (*Payout/ME*) is negatively correlated at the 1% significance level. It implies that firms with good corporate governance lower the dividend and share repurchase. Managers at firms with poor corporate governance want to commit themselves from not generating agency problems, namely as a bonding mechanism (Easterbrook 1984).

EMPIRICAL RESULTS

Table 2 shows the results of the univariate tests. Various exiting literatures find that dividend (or stock repurchase) payers and non-payers have different firm characteristics (Fama and French 2001; DeAngelo, DeAngelo, and Stulz 2006). Table 2 displays the descriptive statistics depending on whether the firm is a dividend payer or a nonpayer. We report non-parametric and t-test statistics on the differences in the means of the dividend and non-paying firms, the null hypothesis being that there is no difference between them. The mean of *HHI* in dividend paying firms is 0.0616, but that in non-divided paying firms is 0.0521. The difference in the average of measures for the level of product market competition is statistically significant. These results show that dividend paying

Table 2. Univariate tests

This table shows firm characteristics by dividend (or stock repurchase) payers and non-payers. HHI is the Herfindahl Hirschman index calculation based on Fama and French (1997) 48 industry classification. G-index (Governance) is 24 minus the governance index in Gompers, Ishii, and Metrick (2003). E-index is 6 minus Entrenchment index in Bebchuk, Cohen, and Ferrell (2009). Size is the natural log of the book value of assets. Profit is net income on total assets. RE/TA is the ratio of retained earnings to total assets. SRVOL is the standard deviation of monthly stock returns over the most recent two years including the current fiscal year. M/B ratio is the market-to-book ratio [(book value of assets + market value of equity – book value of equity)/book value of assets]. Investment is computed by CAPEX plus R&D expense divided by total assets. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Non-payers			Payers			Difference (p-value)	
	N	Mean	Median	N	Mean	Median	t-statistics	z-statistics
<i>HHI</i>	2,397	0.0521	0.0435	7,655	0.0616	0.0453	0.0000***	0.0000***
<i>G-index</i>	2,397	15.6550	16.0000	7,655	14.7792	15.0000	0.0000***	0.0000***
<i>E-index</i>	2,397	3.9487	4.0000	7,655	3.8142	4.0000	0.0000***	0.0000***
<i>Size</i>	2,397	20.4655	20.4072	7,655	21.3534	21.1856	0.0000***	0.0000***
<i>Profit</i>	2,397	-0.0122	0.0246	7,655	0.0758	0.0658	0.0000***	0.0000***
<i>RE/TA</i>	2,397	0.0353	0.1140	7,655	0.3500	0.3393	0.0000***	0.0000***
<i>SRVOL</i>	2,330	0.1626	0.1441	7,504	0.1022	0.0926	0.0000***	0.0000***
<i>M/B ratio</i>	2,397	1.9532	1.5194	7,655	2.0606	1.7098	0.0001***	0.0000***
<i>Investment</i>	2,397	0.1074	0.0833	7,655	0.0813	0.0670	0.0000***	0.0000***

firms are more in less competitive (concentrated) markets than in competitive markets. It can be interpreted that managers in less competitive markets pay more dividends and repurchase shares to mitigate the potential agency costs generated by the lack of competitive pressure from the product market. The mean of *G-index* and *E-index* in dividend paying firms is 14.7792 and 3.8142, but that in non-dividend paying firms is 15.6550 and 3.9487, respectively. The difference in the average of governance variables is statistically significant at the one percent level. These results are consistent with that in La Porta et al. (2000), which suggests that firms with weak corporate governance have a strong incentive to pay more dividends in order to minimize the cost of capital to their external investors. Dividend paying firms are larger and more profitable than non-dividend-paying firms. The tendency to pay dividends is strongly associated with the company's earned/contributed equity mix. The ratio of retained earnings to total assets (*RE/TA*) is significantly

higher for dividend payers. Firms with a low earned/contributed capital mix are more likely to be in the capital infusion stage and thus cannot afford to pay dividends, while firms with a high earned/contributed capital mix tend to be mature firms with large cumulative profits and thus are likely to pay dividends (DeAngelo, DeAngelo, and Stulz 2006). The proxy for cash flow uncertainty (*SRVOL*) is significantly higher in non dividend paying firms. Firms facing high cash-flow uncertainty are likely to pay low dividends and keep earnings inside the firm in anticipation of funding shortfalls (Chay and Suh 2009). The *M/B ratio* as proxy for the investment opportunity is higher in dividend payers. Investment expenditure (*Investment*) is lower in dividend paying firms than in non dividend paying firms.

This paper examines the effect of the interaction between product market competition and corporate governance on corporate payout using the multivariate test in order to analyze the effect of firm-specific variables on corporate payout. The large number 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 with a censored dependent variable. In order to alleviate inter-personal/intra-group correlation in residuals, serial correlation and heteroscedasticity in the panel data, we use robust standard errors for testing the significance in the coefficients.

$$Payout_{it} = \beta_0 + \beta_1 G - index_{it} + \beta_2 G - index_{it} * Competitive_{it} + \beta_3 Competitive_{it} + \gamma_j X_{it} + e_{it}$$

$Payout_{it}$ 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 repurchase by the market value of equity, total assets or net income and use these as dependent variables. We use the governance index in Gompers, Ishii, and Metrick (2003) as a proxy for the level of corporate governance. As firms in which shareholder rights are weakly protected have a high governance index, we use 24 minus the governance index (*G-index*) for convenience purposes. *Competitive* is a dummy that takes value of one if the firm has *HHI* lower than the median; that is, firms with the value of one in this variable are in more competitive markets. We use an interaction variable between *G-index* and *Competitive* to examine the effect of the interaction

between corporate governance and product market competition on corporate payout. Furthermore, we include the natural log of *HHI* to control the direct effect of product market competition on corporate payout in our model (Grullon and Michealy 2006). X_{it} is the vector of control variables. We control firm characteristics, such as firm size (*Size*), profitability (*Profit*), company's earned/contributed equity mix (*RE/TA*), cash flow uncertainty (*SRVOL*), and investment opportunity (*M/B ratio*, *Investment*).

In corporate governance literatures, researchers commonly face the endogeneity problem. In our paper, failing to control the unobserved industry effect could result in heterogeneity bias in the pooled least-squares estimates (Giroud and Mueller 2011). To solve the endogeneity problem, the simultaneous equation or instrument variable approach can be used. However, it is difficult to find a variable having an exogenous relationship with the two endogenous variables, and the selection of an instrument variable can be an arbitrary decision of a researcher. To such an extent, discovering the solution for the endogeneity problem can be another research question. To control this endogeneity problem at minimum, we examine the approach using fixed effects in order to control the unobserved heterogeneity. In this regression, we cluster the observations at the industry level¹⁰⁾ as firms within an industry are connected in some way, while firms across industries are independent of each other (Giroud and Mueller 2011). Additionally, we control the year fixed effects.

Table 3 shows the results of the above empirical model. In Model (1) of Panel A, we estimate the effect of corporate governance on corporate payout. It is found that *G-index* has a significantly negative effect on corporate payout. This result suggests that firms with weak corporate governance have a strong incentive to pay more dividends or repurchase shares in order to minimize the cost of capital from external investors. Chae, Kim, and Lee (2009) and Zhang (2011) find similar empirical results from the U.S. data. The natural log of

10) When we employ industry classification used in computing the proxies for the level of product market competition to control the industry effect, a multicollinearity problem can occur. Thus, we generate the industry dummy variables using the sectors of Global Industry Classification (GIC) provided in Compustat. In the unreported results, we use Fama and French (1997) 48 industry classifications in order to control the industry effect and obtain the same results.

HHI has a significantly positive effect on corporate payout.¹¹⁾ This result means that firms in less competitive (concentrated) markets are more likely to pay dividends or repurchase stocks. In Model (2), we estimate the effect of corporate governance on corporate payout after controlling for the firm characteristics. *G-index* has a significantly negative effect on corporate payout as in Model (1), but the coefficient of the natural log of *HHI* is statistically insignificant.

In Model (3) and (4), we add the interaction variable between *G-index* and *Competitive* dummy, and find that *G-index* has a statistically negative effect on corporate payout (coefficient: -0.0030 and -0.0018, $t=-9.48$ and -6.07).¹²⁾ The magnitude is higher than that in Model (1) and (2); this result implies that the effect of corporate governance on corporate payout is stronger in less competitive (concentrated) markets. On the other hand, the interaction variable has a significantly positive effect on corporate payout (coefficient: 0.0011 and 0.0015, $t=2.22$ and 3.02). The sum of the coefficient of *G-index* and the interaction variable (-0.0019 and -0.0003) shows the marginal effect of corporate governance on corporate payout in more competitive markets. This effect is lower than that in less competitive markets. Therefore, we interpret this result as to state that the interaction between corporate governance and product market competition can affect corporate payout that is closely related to shareholder wealth.

As control variables, *Size*, *Profit*, and *RE/TA* all have a significantly positive effect on corporate payout (Dittmar 2000;

11) Inconsistent with the result of this paper, Grullon and Michaely (2012) find that firms in competitive environment pay more dividends. The main reason for the difference in the results may come from the different samples as Grullon and Michaely (2012) use only manufacturing companies, while the sample of this paper consists of all the listed firms. They use HHI that is provided by Census of Manufacturers (SIC code interval 2000-3990), but this measure does not cover all the firms that pay dividends, as well as is provided only once in five years. Using only manufacturing firms may not be enough for the analysis, as the variation in the level of product market competition is not large enough within the manufacturing industry. However, this paper overcomes such limits by including all the other industries, except financial industry.

12) To test the hypothesis that product market competition influences the corporate governance, and payout policy is changed accordingly, we obtain the predicted value of corporate governance from the first-stage model that examines relation between product market competition and *G-index*. Then, we investigate the effect of the predicted value on corporate payout in the second-stage model. The result shows that predicted value of corporate governance does not have significant effect on dividends, so the hypothesis is rejected.

Table 3. Determinants of corporate payout

This table shows the multivariate results for the effect of the interaction between product market competition and corporate governance on corporate payout using the Tobit model. Payout/ME is computed by dividend plus stock repurchase divided by the market value of equity. Payout/BE is computed by dividend plus stock repurchase divided by the book value of equity. Payout/Total assets is computed by dividend plus stock repurchase divided by total assets. Payout/Sales is computed by dividend plus stock repurchase divided by sales. Payout/Net income is computed by dividend plus stock repurchase divided by net income. More competitive market includes firms with a HHI lower than the median. Less competitive market includes firms with a HHI higher than the median. G-index is 24 minus the governance index in Gompers, Ishii, and Metrick (2003). Competitive is a dummy that takes a value of one if a firm is in a more competitive market (firms with HHI lower than the median). Size is the natural log of the book value of assets. Profit is net income on total assets. RE/TA is the ratio of retained earnings to total assets. SRVOL is the standard deviation of monthly stock returns over the most recent two years including the current fiscal year. M/B ratio is the market-to-book ratio [(book value of assets + market value of equity – book value of equity)/book value of assets]. Investment is computed by CAPEX plus R&D expense divided by total assets. Industry effect is an industry dummy variable based on the sectors of Global Industry Classification (GIC) provided in Compustat. Year effect is the year dummy variable. The numbers in the square brackets are t-statistics computed by the robust standard error. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel A: Payout/ME				
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	0.0271*** [3.62]	-0.0446*** [-3.02]	0.0115 [1.13]	-0.0421*** [-2.64]
<i>G-index</i>	-0.0024*** [-9.80]	-0.0010*** [-4.33]	-0.0030*** [-9.48]	-0.0018*** [-6.07]
<i>G-index*</i>			0.0011** [2.22]	0.0015*** [3.02]
<i>Competitive</i>			-0.0115 [-1.55]	-0.0200*** [-2.83]
<i>Log(HHI)</i>	0.0051*** [4.85]	-0.0013 [-1.26]	0.0087*** [5.78]	0.0001 [0.09]
<i>Size</i>		0.0043*** [8.53]		0.0042*** [8.49]
<i>Profit</i>		0.3637*** [14.04]		0.3647*** [14.03]

Table 3. (continued)

Panel A: Payout/ME				
	Model (1)	Model (2)	Model (3)	Model (4)
<i>RE/TA</i>		0.0247*** [7.15]		0.0249*** [7.19]
<i>SRVOL</i>		-0.1647*** [-4.62]		-0.1646*** [-4.65]
<i>M/B ratio</i>		-0.0137*** [-14.77]		-0.0137*** [-14.76]
<i>Investment</i>		-0.0227** [-2.15]		-0.0239** [-2.26]
Industry effect	No	Yes	No	Yes
Year effect	No	Yes	No	Yes
N	10,052	9,826	10,052	9,826
Pseudo R ²	-0.00711	-0.174	-0.00793	-0.175

Panel B: Alternative measures for corporate payout

	Payout/BE	Payout/ Total assets	Payout/Sales	Payout/ Net income
	Model (1)	Model (2)	Model (3)	Model (4)
<i>G-index</i>	-0.0101*** [-6.23]	-0.0019*** [-5.01]	-0.0017*** [-3.70]	-0.0376*** [-5.51]
<i>G-index*</i> <i>Competitive</i>	0.0099*** [4.21]	0.0018*** [3.12]	0.0030*** [4.25]	0.0340*** [3.59]
<i>Competitive</i>	-0.1607*** [-4.61]	-0.0247*** [-3.04]	-0.0395*** [-3.92]	-0.4608*** [-3.22]
Intercept	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
N	9,826	9,826	9,826	9,826
Pseudo R ²	0.267	-0.378	-0.350	0.0524

DeAngelo, DeAngelo, and Stulz 2006; Grullon and Michealy 2012). As expected, *SRVOL*, *M/B ratio*, and *Investment* have a significantly negative effect on corporate payout (Rozeff 1984; Chay and Suh 2009). In Panel B, we use differently scaled corporate payout variables to check for the robustness of our results and find similar results to those in panel A.

In table 4, we investigate whether the interaction effect between corporate governance and product market competition affects managers' decision to distribute cash to their shareholders (the likelihood of corporate payout) using logistic regression. It can be argued that examining the tendency to pay dividends may yield a more robust conclusion since an analysis of the payout ratio requires a model for estimating the "optimal" payout ratio for a given firm (Jiraporn, Kim, and Kim 2011). Focusing on the propensity to pay dividends thus allows us to sidestep any potential bias introduced when we use an imprecise model for the optimal dividend payout (Officer 2007; Jo and Pan 2009). Dependent variable is the payout dummy that equals one if the firm pays dividend or declares the stock repurchase in year, or 0 otherwise. Interesting variables are *G-index* and the interaction variable between *G-index* and *Competitive*. *G-index* has a statistically negative effect. On the other hand, the interaction variable has a significantly positive effect on corporate payout, similar to the results in table 3.

We augment the previous analysis by examining the interaction effect between corporate governance and product market competition on the decision to increase distributed cash to shareholders (change in payouts > 0). This analysis reflects the dynamic change of corporate payout policy. Dependent variable (change in payout > 0) is a dummy variable that equals to one if the firm increases its dividend or stock repurchase from year $t-1$ to t , or 0 otherwise. Given the nature of these dependent variables, we estimate the regression parameters using a logistic regression. Table 5 reports the results from this analysis. Consistent with the results in table 3, the marginal effect of *G-index* on the probability of increase in payout is higher in less competitive (concentrated) markets, than that in more competition markets. These results mean that the substitution effect between corporate governance and product market competition is valid for the corporate payout policy

We use the same model specification as Giroud and Mueller (2011) to test the robustness of our results. We divide our sample based on the level of *HHI* into three groups and estimate the effect of corporate governance on corporate payout in each sample. *High* is a dummy variable that takes value of one if a firm has *HHI* in the lowest tertile, *Median* is a dummy that takes value of one if a firm has *HHI* in the median tertile and *Low* is a dummy that takes value of one if a firm has *HHI* in the highest tertile. Using interaction

Table 4. Determinants of the likelihood of corporate payout

This table shows the multivariate results for the effect of the interaction between product market competition and corporate governance on the likelihood of corporate payout using the Probit model. Dependent variable is the payout dummy that equals one if the firms pay dividend or declare the stock repurchase in year, or 0 otherwise, and the explanatory variable is the interaction between corporate governance and product market competition. The definitions of other variables are same as those in table 4. The numbers in the square brackets are t-statistics computed by the robust standard error. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Payout (dividend + stock repurchase) > 0 (payout dummy)			
	Model (1)	Model (2)	Model (3)	Model (4)
<i>Intercept</i>	0.6653*** [3.59]	-2.9464*** [-5.92]	0.3140 [1.17]	-2.9528*** [-5.49]
<i>G-index</i>	-0.0745*** [-14.20]	-0.0417*** [-6.40]	-0.0883*** [-11.58]	-0.0664*** [-7.16]
<i>G-index* Competitive</i>			0.0251** [2.37]	0.0463*** [3.67]
<i>Competitive</i>			-0.2738* [-1.68]	-0.6275*** [-3.22]
<i>Log(HHI)</i>	0.1912*** [7.09]	0.0440 [1.35]	0.2734*** [6.86]	0.1063** [2.27]
<i>Size</i>		0.1979*** [12.17]		0.1972*** [12.11]
<i>Profit</i>		7.4750*** [14.39]		7.5092*** [14.33]
<i>RE/TA</i>		1.0472*** [12.63]		1.0553*** [12.67]
<i>SRVOL</i>		-4.5096*** [-4.05]		-4.4828*** [-4.02]
<i>M/B ratio</i>		-0.1140*** [-5.15]		-0.1157*** [-5.22]
<i>Investment</i>		-0.5929** [-2.08]		-0.6228** [-2.18]
Industry effect	No	Yes	No	Yes
Year effect	No	Yes	No	Yes
N	10,052	9,825	10,052	9,825
Pseudo R ²	0.0229	0.330	0.0241	0.331

Table 5. Determinants of the likelihood of payout increase

This table shows the multivariate results for the effect of the interaction between product market competition and corporate governance on the likelihood of the change in corporate payout using the Probit model. Dependent variable (Change in payout > 0) is the dummy variable that equals to one if the firms increase their dividend or stock repurchase from year t-1 to t, or 0 otherwise, and the explanatory variable is the interaction between corporate governance and product market competition. The definitions of other variables are same as those in table 4. The numbers in the square brackets are t-statistics computed by the robust standard error. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Change in payout (dividend + stock repurchase) > 0 (payout increase dummy)			
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-0.3612** [-2.19]	-1.6318*** [-5.03]	-0.4328* [-1.87]	-1.4533*** [-4.02]
<i>G-index</i>	-0.0273*** [-5.68]	-0.0131** [-2.51]	-0.0413*** [-6.04]	-0.0299*** [-4.06]
<i>G-index* Competitive Competitive</i>			0.0272*** [2.81]	0.0337*** [3.32]
			-0.3495** [-2.39]	-0.4922*** [-3.22]
<i>Log(HHI)</i>	0.0695*** [2.92]	-0.0018 [-0.07]	0.1102*** [3.34]	0.0104 [0.29]
<i>Size</i>		0.0726*** [6.84]		0.0724*** [6.82]
<i>Profit</i>		4.1056*** [12.38]		4.1284*** [12.41]
<i>RE/TA</i>		0.2703*** [4.94]		0.2756*** [5.02]
<i>SRVOL</i>		-2.8740*** [-6.86]		-2.8582*** [-6.78]
<i>M/B ratio</i>		-0.0437*** [-2.78]		-0.0444*** [-2.82]
<i>Investment</i>		-0.2391 [-1.02]		-0.2590 [-1.10]
Industry effect	No	Yes	No	Yes
Year effect	No	Yes	No	Yes
N	10,052	9,825	10,052	9,825
Pseudo R ²	0.00314	0.0857	0.00390	0.0866

Table 6. Giroud and Mueller (2011)'s approach

This table shows the multivariate results for the effect of the interaction between product market competition and corporate governance on the corporate payout (Tobit model) and likelihood of the corporate payout (Probit model) using the Giroud and Mueller (2011)'s approach. High is dummy that takes a value of one if a firm has HHI in the lowest tertile. Median is a dummy that takes a value of one if a firm has a HHI in the median tertile. Low is dummy that takes a value of one if a firm is in the highest tertile. The definitions of other variables are same as those in table 4. The numbers in the square brackets are t-statistics computed by the robust standard error. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Payout/ME		Payout (dividend + stock repurchase) > 0 (payout dummy)	
	Model (1)	Model (2)	Model (3)	Model (4)
<i>G-index*High</i>	-0.0588*** [-6.65]	-0.0116 [-1.07]	-0.0019*** [-4.62]	-0.0001 [-0.25]
<i>G-index*Median</i>	-0.0870*** [-9.43]	-0.0534*** [-4.87]	-0.0023*** [-4.70]	-0.0012** [-2.41]
<i>G-index*Low</i>	-0.0738*** [-7.98]	-0.0649*** [-5.76]	-0.0026*** [-7.05]	-0.0019*** [-5.28]
<i>High</i>	-0.4204** [-2.11]	-0.8454*** [-3.52]	-0.0158* [-1.90]	-0.0248*** [-3.21]
<i>Median</i>	0.2046 [1.02]	-0.2539 [-1.07]	-0.0011 [-0.12]	-0.0087 [-0.99]
Intercept	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes
Industry effect	No	Yes	No	Yes
Year effect	No	Yes	No	Yes
N	10,052	9,825	10,052	9,826
Pseudo R ²	0.0228	0.331	-0.00756	-0.175

variables between *G-index* and these dummy variables, we find a monotonic effect of corporate governance on corporate payout in the level of product market competition, as was in the case in Giroud and Mueller (2011). Table 6 shows the results of the above empirical model. The coefficient of the interaction variable between *G-index* and *High* is statistically insignificant, whereas the interaction variables between *G-index* and *Median* and between *G-index* and *Low* have a significantly negative effect on corporate payout after

Table 7. Separating sample approach

This table shows the multivariate results for the effect of the interaction between product market competition and corporate governance on the corporate payout (Tobit model, Panel A) and likelihood of the corporate payout (Probit model, Panel B) using the separated sample approach. Competitive is a dummy that takes a value of one if a firm is in a more competitive market (firms with HHI lower than the median). High is dummy that takes a value of one if a firm has HHI in the lowest tertile. Median is a dummy that takes a value of one if a firm has a HHI in the median tertile. Low is dummy that takes a value of one if a firm is in the highest tertile. The definitions of other variables are same as those in table 4. The numbers in the square brackets are t-statistics computed by the robust standard error. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel A: Payout/ME					
	Competitive=1	Competitive=0	High=1	Median=1	Low=1
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
<i>G-index</i>	-0.0003 [-0.86]	-0.0015*** [-5.36]	-0.0002 [-0.49]	-0.0012** [-2.47]	-0.0016*** [-4.62]
Intercept	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes
N	4,888	4,938	3,302	3,285	3,239
Pseudo R ²	-0.189	-0.169	-0.206	-0.182	-0.158
Panel B: Payout (dividend + stock repurchase) > 0 (payout dummy)					
	Competitive=1	Competitive=0	High=1	Median=1	Low=1
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
<i>G-index</i>	-0.0241*** [-2.68]	-0.0577*** [-6.00]	-0.0174 [-1.62]	-0.0521*** [-4.31]	-0.0575*** [-4.87]
Intercept	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes
N	4,888	4,938	3,302	3,285	3,238
Pseudo R ²	0.314	0.355	0.315	0.359	0.345

controlling the firm characteristics (Model (2)). The coefficients and statistical significance of these interaction variables increase monotonically with the level of *HHI*. Using the payout dummy as the

Table 8. Robustness test I: Alternative measures for corporate governance

This table shows the multivariate results for the effect of the interaction between product market competition and corporate governance on the corporate payout (Tobit model) and likelihood of the corporate payout (Probit model) using the alternative measures for corporate governance. The definitions of other variables are same as those in table 4. The numbers in the square brackets are t-statistics computed by the robust standard error. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Payout/ME		Payout (dividend + stock repurchase) > 0 (payout dummy)	
	Model (1)	Model (2)	Model (3)	Model (4)
<i>E-index</i>	-0.0025*** [-3.86]	-0.0025*** [-4.13]	-0.0627*** [-4.23]	-0.1017*** [-5.69]
<i>E-index*</i>	0.0019* [1.89]	0.0023** [2.45]	0.0294 [1.41]	0.0600** [2.38]
<i>Competitive</i>	-0.0028 [-0.73]	-0.0074** [-2.02]	-0.0269 [-0.31]	-0.1655 [-1.55]
Intercept	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes
Industry effect	No	Yes	No	Yes
Year effect	No	Yes	No	Yes
N	10,052	9,826	10,052	9,825
Pseudo R ²	-0.00228	-0.174	0.00722	0.330

dependent variable (Model (4)), we confirm the similar pattern.

Due to the correlation between corporate governance and product market competition, there could be some bias in our analyses using the interaction variable. Thus, to confirm our hypotheses more clearly, we divide our sample into two groups based on the median of *HHI* and re-estimate the effect of corporate governance on corporate payout in each separated group. In Panel A of table 7, we use the payout amount as the dependent variable. In Model (1), we use firms in more competitive (concentrated) markets, which have a lower *HHI* than the median. The effect of corporate governance on corporate payout is statistically insignificant. However, in Model (2), for firms in less competitive markets with *HHI* over the median, *G-index* has a significantly negative effect on corporate payout. These results are also observed when we divide our sample based on the level of *HHI* into three groups and estimate the effect of

Table 9. Robustness test II: Alternative model specifications

This table shows the multivariate results for the effect of the interaction between product market competition and corporate governance on the corporate payout and likelihood of the corporate payout using the alternative model specification. The definitions of other variables are same as those in table 4. The numbers in the square brackets are t-statistics computed by the robust standard error. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Payout/ME		Payout (dividend + stock repurchase) > 0 (payout dummy)	
	Clustered S.E at firm-level	Tobit model with random effect	Clustered S.E at firm-level	Probit model with random effect
	Model (1)	Model (2)	Model (3)	Model (4)
<i>G-index</i>	-0.0018*** [-4.18]	-0.0019*** [-4.44]	-0.0664*** [-4.16]	-0.1055*** [-4.65]
<i>G-index</i> *	0.0015** [2.37]	0.0011** [2.06]	0.0463** [2.21]	0.0655** [2.28]
<i>Competitive</i>	-0.0200** [-2.19]	-0.0156* [-1.87]	-0.6275* [-1.92]	-0.8646* [-1.96]
Intercept	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
N	9,826	9,826	9,826	9,826
Pseudo R ² / Log likelihood	-0.1747	10169.59	0.3312	-2875.50

corporate governance on corporate payout in each sample as in table 6. Using the payout dummy as a dependent variable (Panel B), we find the similar pattern.

Panel A in table 8 shows the results of the same analysis, as in tables 3 and 4, by using the entrenchment index (*E-index*) as a proxy for the corporate governance. *E-index* has a significantly negative effect on corporate payout. On the other hand, the interaction variable has a significantly positive effect on corporate payout. The sum of the coefficient of *E-index* and the interaction variable shows the marginal effect of corporate governance on corporate payout in more competitive (concentrated) markets. This effect is lower than that in less competitive markets. This result is similarly observed

in the analysis using the payout dummy as the dependent variable (Model (3), (4)).

Petersen (2009) advocates the use of a pooled panel with clustered standard errors in order to mitigate potential serial autocorrelation and omitted variable bias. Thus, we estimate the effect of the interaction between corporate governance and product market competition on corporate payout with cluster standard errors at the firm level in Model (1) in table 9. The results show the substitution effect between two different control mechanisms in corporate payout as our main results. To control the endogeneity problem¹³⁾ at minimum, we estimate the Tobit model with random effect in the panel analysis. In Model (2) using this methodology, the substitution effect between corporate governance and product market competition on corporate payout is also observed. On the other hand, using the payout dummy as the dependent variable, we also confirm the same results. These show the robustness of our results.

CONCLUSION

This paper examines the effect of the interaction between internal corporate governance and product market competition on corporate payout policy. Existing literature shows that product market competition, as an external control mechanism, substitutes corporate governance as an internal control mechanism; thus, the marginal effect of corporate governance on firm value is stronger in less competitive (concentrated) markets than it is in more competitive markets. Extending the argument, this paper investigates how this substitution effect affects managerial decision-making related to corporate payout in order to explore the interaction effect between different control mechanisms more broadly. It is our conjecture that if the interaction between corporate governance and product market competition is going to affect firm value and performances, it should also be observed in corporate financial decisions. In this respect, this is an analysis that tries to

13) To mitigate the endogeneity problem, this paper uses lagged payout, lagged corporate governance, and lagged market competition as independent variables in the Tobit model with random effect, and finds the consistent results.

identify channels through which the interaction between internal and external monitoring mechanisms would affect firm value and performances.

Our finding is that corporate governance has a negative effect on corporate payout. However, this effect decreases or disappears in more competitive (concentrated) markets, whereas it is strong in less competitive markets. This suggests that the role of corporate governance in regulating managerial decisions is mitigated by competitive pressure. From our findings, we interpret that corporate payout is the channels through which the two different control mechanisms interact to affect shareholder wealth as have been suggested in the existing literature. Our results will provide practical and institutional implications regarding the most efficient method of finding the optimal internal corporate governance structure given product market competition, as firms in competitive environment get disciplinary effect from competitive pressure without paying large investment in the internal corporate governance. It will help firms to allocate limited resources into internal corporate governance mechanism effectively and maximize the benefit from it.

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Appendix A. Definition of variables

Variables	Definitions
<i>Payout/ME</i>	(Dividend + Stock repurchase)/the book value of equity
<i>Payout/BE</i>	(Dividend + Stock repurchase)/market value of equity
<i>Payout/Total asset</i>	(Dividend + Stock repurchase)/total asset
<i>Payout/Sales</i>	(Dividend + Stock repurchase)/sales
<i>Payout/Net income</i>	(Dividend + Stock repurchase)/net income
<i>HHI</i>	Herfindahl-Hirschman index calculation based on Fama and French (1997) 48 industry classifications
<i>G-index</i>	24 minus Governance index in Gompers, Ishii, and Metrick (2003)
<i>E-index</i>	6 minus Entrenchment index in Bubchuk, Cohen, and Ferrell (2009)
<i>Competitive</i>	Dummy that takes a value of one if a firm is in a competitive market based on HHI lower than the median, Market Size higher than the median, or Product Substitutability lower than the median.
<i>High</i>	Dummy that takes a value of one if the HHI of firm is in the lowest tertile
<i>Median</i>	Dummy that takes a value of one if the HHI of firm is in the median tertile
<i>Low</i>	Dummy that takes a value of one if the HHI of firm is in the highest tertile
<i>Size</i>	Log (Total assets)
<i>Profit</i>	Net income/total asset
<i>RE/TA</i>	Ratio of retained earnings/total assets.
<i>SRVOL</i>	Standard deviation of monthly stock returns over the most recent two years including the current fiscal year
<i>M/B ratio</i>	The book value of common equity/(Common shares outstanding*stock price)
<i>Investment</i>	(CAPEX + R&D Expense)/the book value of equity

