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Product market competition and corporate governance

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Abstract

This paper investigates whether product market competition acts as an external mechanism for disciplining management and also whether there is any relationship between the degree of competition a firm faces and its corporate governance. We find that firms in competitive industries or with low market power tend to have weak corporate governance structures. Results are robust to various competition measures at firm and industry levels, even after controlling for firm-specific variables. We further find that corporate governance quality has a significant effect on performance only when product market competition is weak. The overall evidence suggests that product market competition has a substantial impact on corporate governance and that it substitutes for corporate governance quality. Finally, we provide evidence that the disciplinary force of competition on management is from the fear of liquidation.

JEL classification: G18; G34

Keywords: Product market competition; Corporate governance; Firm value; Firm performance

1. Introduction

Since Berle and Means (1932) publish their seminal work on the separation of ownership and control, numerous theoretical and empirical works have focused on the role of corporate governance systems in mitigating the agency problems between shareholders and managers. However, existing evidence has shown that conventional corporate governance mechanisms do not work very effectively.[4] Even with the lack of effective corporate governance systems, many firms still operate efficiently and compete effectively in global markets. Some non-profit organizations in competitive industries are good examples. They typically have no outside shareholders and a smaller proportion of independent directors and, as generally argued, such governance structures tend to have lower monitoring capabilities. While these governance structures are typically prevalent among non-profit organizations, they have little impact on their operational efficiency and corporate performance. Allen and Gale's (2000) theoretical arguments suggest that standard governance mechanisms are less crucial for firms that operate in changing product market environments. The purpose of our current study is to address this issue – whether a firm's product market environment acts as an external mechanism for disciplining management and ensuring corporate performance.

Theoretical models have argued that competition in product markets is a powerful force for overcoming the agency problem between shareholders and managers.[5] Tough product market competition forces management to improve financial performance and to make the best decisions for the future, because failure to do so would possibly result in bankruptcy and job loss. Recently, Allen and Gale (2000) formalize a model to show that competition in product markets plays the role of takeovers. Well-managed firms take over the market from poorly managed firms.

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[4] Allen and Gale (2000) provide a literature review of the effectiveness of standard corporate governance mechanisms in monitoring management and corporate performances.

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[5] See, for example, Alchian (1950), Hart (1983), Scharfstein (1988), Schmidt (1997), and Stigler (1958).

Competition helps reveal the best management team and discipline management.[6] In Allen and Gale's model, competition acts as a substitute for external governance mechanisms, particularly the market for corporate control. Their model gives rise to several testable implications that prompt our current study. We investigate whether and how the nature of product market competition acts as an external disciplinary mechanism for corporate management. We also examine whether corporate governance mechanisms matter for firms that operate in a dynamic competitive product market environment. Specifically, we test whether the fear of liquidation is the channel through which the competition uses to reduce managerial slack and ensure the quality of management.

For our analyses, we employ the G- and E-index proposed by Gompers et al. (2003) and Bebchuk et al. (2009), respectively, as proxies for the quality of corporate governance. Furthermore, we employ the Herfindahl index (H-index) at the industry level and industry adjusted price-cost margins (IPCM) at the firm level as measures of product market competition. The H-index indicates the degree of concentration for an industry, while IPCM gauges the ability of a firm to price over the cost and the dominance of firms within industries. If a firm faces stronger competition from other firms within the same industry, the ability for this firm to price over the cost is smaller. The smaller value of IPCM implies that a firm has a weaker market power or faces stronger competition from the product market. IPCM is also a good proxy for the fear of liquidation because firms with low market power have a higher probability to be liquidated. Similarly, a smaller H-index demonstrates that there are many competitive firms in an industry.

Our study finds evidence consistent with the theoretical prediction that competition acts as a substitute for corporate governance mechanisms. Firms in highly competitive industries tend to have significantly weaker corporate governance than firms in concentrated industries. Firms with low values of IPCM are inclined to have poor-quality corporate governance structures. Taken together, both analyses at the industry and firm levels suggest that the quality of corporate governance is not important as long as competition is strong. As theoretically implied, competition has a disciplinary effect on management, suggesting that the force of discipline is from the fear of liquidation since loser firms (firms with low market power or low IPCM) are likely to be driven out of business.

Our results are robust even after controlling for size, firm value, trading volume, return on assets, stock returns, dividend yields, and institutional ownership. Existing studies have shown that firm value and corporate governance are simultaneously determined; we apply three-stage least squares regressions with instrumental variables for governance index and firm value to again test the relationship between competition and governance (e.g., Palia, 2001; Brick et al., 2005). Our main finding that strong competition is associated with weak governance structures is robust across the industry and firm level analyses. When we substitute past firm value for current firm value to mitigate the problem of endogeneity, the findings remain similar. Therefore, the effect of competition on the quality of corporate governance is not caused by low firm value or poor operating performance. Competition does have an impact on corporate governance.

Finally, we show that corporate governance quality has a significant effect on performance only when competition is weak. Competition alone, to some extent, may be sufficient to discipline management. When competition is strong, well-governed firms do not earn higher abnormal returns than poorly governed firms. However, good firms do perform better than bad firms in weak-competition portfolios. Therefore, the quality of corporate governance does not add value to firm performance when competition is sufficiently strong to discipline management. Our findings not only demonstrate that the agency problem may not be as serious as the previous literature has suggested, but they also underline the importance of product market competition. The overall evidence suggests that competition plays a substitute role in corporate governance mechanisms.

Our study contributes to the existing literature in three ways. First, we provide empirical evidence in support of related theories that the influence of product market competition on corporate governance does exist. While competition is widely regarded as a good thing, there is little knowledge about the connection between competition and corporate governance. Hermalin (1992) uses a theoretical model to show that an increase in the shareholders' bargaining power can reduce agency problems and make managers more sensitive to competition. His argument suggests that competition complements corporate governance. Padilla (2000) also comments that corporate governance remains important even if competition plays a role in corporate governance. However, Karuna (2007) demonstrates that firms in competitive industries have a better quality of corporate governance because of the fact that these firms have more power and need to be monitored. Our work differs from most of the previous studies in that we treat competition as a corporate governance mechanism to examine the direct relationship between competition and corporate governance.

Second, we investigate how product market competition affects corporate governance and the channel which competition acts as a disciplinary tool. Guadalupe and Pérez-González (2010) find that strong competition reduces private benefits of control. They attribute the effect of competition to both the improvement of information transparency for firms in the same industry and the fear of bankruptcy. However, as discussed earlier, information available in the market reveals the best management and that the fear of losing market share compels management to work hard. This, therefore, motivates us to explore whether the information improvement or fear of bankruptcy is the major force that disciplines management. Cremers et al. (2008) also find that firms in competitive industries have poor governance quality, and they ascribe this finding to customer relationships. Our study, however, determines the potential driving forces behind the competition on corporate governance.

Third, we contribute to the policy debate about corporate governance. Prior studies generally investigate the problem of

[6] Throughout the paper, we use the general term "competitionto describe product market competition.

corporate governance from internal governance structures of a firm. For example, they mainly focus on board structures, executive compensation, and shareholder rights. Since internal governance and management systems are integrated, to some extent, managers have power to control or maneuver governance structures to entrench themselves or gain private benefits. Therefore, some researchers provide a solution to the problem of corporate governance through lawmaking. They argue that a well-designed law can improve corporate governance. Competition may be a solution. Unlike conventional governance mechanisms, competition is an exogenous factor and provides an effective market monitoring mechanism. Our evidence suggests that competition generates a strong incentive for managers to work diligently.

The remainder of this paper is organized as follows. Section 2 discusses the related literature. Section 3 describes data and sample selection. Section 4 examines the relationship between corporate governance and product market competition, while Section 5 looks at how corporate governance interacts with product market competition. Section 6 concludes.

2. Theoretical and existing evidence

2.1. Theoretical considerations

How does product market competition affect the quality of corporate governance? Allen and Gale (2000) argue that competition can be an option for corporate governance; competition can substitute for corporate governance mechanisms directly. Japanese companies are the most impressive examples that illustrate how intense competition produces successful companies, such as Toyota and Honda. The boards of directors in these Japanese companies are at least three times larger than similar companies in the United States and United Kingdom and have a small ratio of independent directors. Takeovers also rarely happen in the Japanese market (e.g. see Allen and Gale, 2000). Conventional wisdom is that these characteristics cannot be classified as good governance practices, because Japanese companies lack supervisory mechanisms from their boards of directors and from the market for corporate control. However, in reality, Japanese companies are successful and profitable. Their products are the symbols of higher quality, cheaper prices, and better designs. Most consumers favor Japanese products and place them at the top of their shopping list. These are some examples suggesting that quality corporate governance is not a necessary component for strong performance. In other words, product market competition can provide an effective monitoring of management and is an alternative form of corporate governance mechanisms.

Another example that Allen and Gale (2000) raise to reinforce their points is those non-profit organizations with weak boards that can compete with, or even beat, for-profit corporations. The successful story of the Internet browser, Firefox, is a case in point. Firefox's parent company, Mozilla, is a public benefit organization, which internationally unites many enthusiastic programmers to develop open source code applications for public use. The market share of Firefox climbed from 4.22% in January 2005 to 13.38% in March 2007. Meanwhile, the market share of Microsoft's Internet Explorer dropped from 85.97% in January 2005 to 70.52% in March 2007 (see survey from Janco Associates Inc., 2007). Mozilla has no outside shareholders and only four people on its board of directors. This implies again that good governance practices do not necessarily guarantee better performance and competition alone can provide effective monitoring of management.

The triumphant stories of Japanese companies and non-profit organizations suggest that product market competition induces managers to work hard. In their theoretical model, Allen and Gale (2000) argue that product market competition is used to select the best management team and to eliminate firms with bad management. They presume that successful companies are able to control a large product market share, making it difficult for loser companies to compete. Thus, competition acts like a takeover, but firms take over the product market instead of other firms. If the management does not work diligently, their companies will lose market shares and managers will eventually have no job security. Thus, the fear of liquidation compels managers to put forth their best efforts for their firms.

Allen and Gale (2000) assume that there are n firms in the market and that they choose the investment strategy $k = k_1, \ldots, k_n$ at date 0 to develop products. At this time, no one, including both investors and managements, knows the state of nature w and the value of product V until date 1. The value of the product depends on both the amount of capital invested in the project and the quality of management. At date 1, the state of nature w and value of product V for the firms are realized,

$$V(k, w) = (V_1(k_1, w), \ldots, V_n(k_n, w)).$$

In order to capture the whole product market, the firm with the first-best product will try to force the products of other firms to be of no value for consumers. The strategy is that the best firm will price its product to be equal to the difference between the values of the first- and second-best products such that the price of the second-best product will be exactly zero. If the second-best firm sets the price higher than zero for its product, no one will want to buy its product. The price of other inferior products in the market will be zero too. For any firm i, let

$$V_{-i}(k_{-i}, w) = (V_1(k_1, w), \ldots, V_{i-1}(k_{i-1}, w), V_{i+1}(k_{i+1}, w), \ldots, V_n(k_n, w))$$

denote the vector of product values where $j \neq i$; let

$$k_{-i} = (k_1, \ldots, k_{i-1}, k_{i+1}, \ldots, k_n)$$

denote the vector of investments where $j \neq i$; and let

$$V^*_{-i}(k_{-i}, w) = \max\{V_j(k_j, w)\}$$

denote the highest product value in the vector of $V_{-i}(k_{-i}, w)$. As a result, the price $p_i(k, w)$ for the product of firm i should be set to

$$p_i(k, w) = \max\{V_i(k, w) - V^*_{-i}(k_{-i}, w), 0)\}, \quad \forall i.$$

In this way, only the winner firm with the first-best product can make a profit and survive. Other firms in the same industry will

be withdrawn from the market, because the marginal cost of these loser firms is greater than its marginal benefit. Since an inferior product indicates an insufficient investment or a worse management, if loser firms want to continue their business and recover the loss at date 1, these firms have to invest more k at data 1 which will reflect on the increase of the R&D ratio or to enhance the management. This allows them to produce higher quality products and to be able to compete again with the winner firm at the next stage, for example date 2.

As discussed earlier, competition helps reveal good management teams and can discipline those with poor performance. Since the purpose of corporate governance is to ensure the management quality, competition provides almost the same function as corporate governance does. Therefore, competition can be considered as an efficient governance mechanism and can act as a substitute for traditional corporate governance structures. Our hypotheses are as follows:

H1. The source of disciplining management for product market competition comes from the fear of liquidation.

H2. Firms in competitive industries or with low market power have weaker corporate governance structures.

H3. Competitive industries and firms with lower market power have higher R&D ratios.

Allen and Gale (2000) further suggest that the importance of agency cost is over-emphasized. Executives in the United States put tremendous efforts into their jobs. In fact, they act like entrepreneurs. Managers always try their best to identify investment opportunities and to develop good products in order to make their companies grow, even though there are some conflict of interests between shareholders and management. Shareholders may not know better than their management about the industry and product market. If competition can be a governance mechanism, the quality of corporate governance is less important as long as the product market is competitive.

Padilla (2000), however, points out that competition may not be the one and only solution to solve the problem of mismanagement, implying that better governance structures still have an effect on management, even under intense product market competition. If competition cannot effectively substitute for corporate governance, we expect that poorly governed firms would still perform worse than well-governed firms, even though the product market is competitive. We test the null hypotheses in line with Allen and Gale's (2000) argument that

H4. There is no significant difference in abnormal returns between good and poor governance portfolios when the product market competition is strong.

2.2. Related empirical literature

Although many researchers argue that competition can improve performance and monitor management, there are not many papers providing empirical evidence to show that such direct effects exist. Nickell (1996) demonstrates that product market competition improves productivity growth, while Hou and Robinson (2006) show that competitive industries earn higher returns, compared to concentrated industries. Johnson et al. (2009) find that the distribution of shareholder rights differs from industry to industry, with some industries having stronger rights than others. After controlling for industry effects, firms with stronger shareholder rights earn no abnormal returns than firms with weaker rights. The results are still consistent when the entrenchment index from Bebchuk et al. (2009) is used to measure the quality of corporate governance. Therefore, industry characteristics do matter for the quality of corporate governance.

Karuna (2007) measures competition at the industry level and finds that firms in competitive industries have better corporate governance structures. He argues that managers in competitive industries have discretionary powers over deciding the effective strategies for the company. Therefore, these managers have to be well monitored. However, Cremers et al. (2008) find that firms in competitive industries have weaker shareholder rights, and they contend that the industry effect on corporate governance is caused by long-term customer relationships. If service providers are taken over by another firm, customers often suffer from switching service providers. This is especially evident in competitive industries in which firms have long-term relationships with their customers. Thus, these firms increase shareholder provisions that restrict shareholder rights to alleviate customers' survival concern. While these two studies are closely related to our work, we examine whether and how competition influences corporate governance and particularly, we explore how competition interacts with firm value and performance to affect the quality of governance structures.

A somewhat related study is by Guadalupe and Pérez-González (2010) who provide indirect evidence that industry characteristics affect the quality of corporate governance. Using publicly traded data in 19 countries, their study shows that the higher degree of competition is associated with the lower degree of private benefits of control. Thus, when a domestic industry faces strong competition from the international market, managers and owners in the industry receive fewer private benefits from controlling their companies. The reduced benefits are generally considered as a signal of good governance structures in corporate governance-related literature. The evidence implies that competition improves corporate governance. Furthermore, Guadalupe and Pérez-González conclude that the effect of competition on corporate governance comes from both the improvement of information transparency for firms in the same industry and the fear of bankruptcy among top executives. These are two major explanations offered in previous literature as to how product market competition affects corporate governance. However, no study to date provides convincing evidence that explains which of these two theories most accurately describes the effect of competition on management.

Our work relates to studies that link product market competition to corporate governance. We test the empirical implication of Allen and Gale's (2000) theoretical model that competition serves as an external mechanism to discipline management. We show evidence that competition can substitute for corporate governance, and that the effect of competition on corporate governance possibly stems from the fear of losing market share.

Although product market competition, firm value, and firm performance individually affect corporate governance, we show that neither firm value nor firm performance is able to completely subsume the effect of competition on corporate governance. The implication is that the impact of competition on corporate governance is not driven by firm value or firm performance. We find that good-quality corporate governance does not add value to companies when they face intense competition from the product market.

3. Data and sample construction

Our sample comes from three key data sources: (i) corporate governance rating information from the 2006 publications of the Investor Responsibility Research Center (IRRC) and from Bebchuk's website; (ii) accounting information from the COMPUSTAT industrial annual file; and (iii) returns data from the CRSP monthly file. The sample consists of all NYSE-, AMEX-, and NASDAQ-listed stocks that have complete information from the three data sources for the period of 1990–2005.

3.1. Measures of product market competition

We employ two different approaches to measure product market competition. The first measure is the Herfindahl index of concentration (H-index) that measures the degree of competition among firms in an industry. Holmström (1999) and Nalebuff and Stiglitz (1983) contend that if the number of competitors in a market increases, and if the shocks affecting each firm's costs are correlated, then an increase in competition would generate additional information that can be used to mitigate moral hazard problems. Increased competition as well as greater probability of liquidation of firms can be used to discipline management (Schmidt (1997)). In both cases, the Herfindahl index measures product market competition at the industry level. If there are more firms belonging to the same industry with each firm having a small market share, this industry is said to have a strong product market competition. A smaller Herfindahl index implies the existence of many competitive firms in an industry, and a larger Herfindahl index suggests that only a few, primarily large, firms in an industry that dominate the market.

The Herfindahl (H) index is defined as

$$\text{H-index}_i = \sum_{j=1}^{J} s_{ij}^2,$$

where s_{ij} is the market share of firm j in industry i. For each year, market share is calculated by using a firm's net sales divided by total sales in its industry. In order to reduce possible errors in the data, we apply this calculation to each industry for each year and average the values of past three years to find the H-index for an industry at the industry level analysis. Then, a firm is assigned the H-index of its industry to determine the intensity of its product market competition at the firm level analysis if the H-index is the measure of competition. Following Hou and Robinson (2006), we categorize industries using three-digit level SIC codes because this balances two problems associated with an industry classification. First, unrelated firms are not grouped together. Second, we have enough firms within each industry.

Our sample contains 357 non-regulated industries.[7] There are several reasons for excluding firms from regulated industries. One, managers in regulated industries have less incentive to perform better because of a ratchet effect. Since outside regulators determine product price or profit, managers of regulated firms would be inclined to put forth less effort. Hence, these regulated firms face different corporate governance requirements from investors (Meyer and Vickers, 1997). Two, regulated firms may have low operating costs and specific capital structures compared with their counterparts from other industries.

The second measure of competition is an industry-adjusted price-cost margin (IPCM). This measure is based on the concept of the Lerner index. This index is widely employed in the economic literature to measure a firm's ability to price above its marginal cost and therefore capture its pricing power. A firm with little or no pricing power would face strong competition from the product market and might have a greater likelihood of going into bankruptcy. A related firm with strong pricing power, on the other hand, would experience little competition. A number of empirical studies implement the Lerner index or a similar methodology to measure a firm's fear of bankruptcy or product market competition (see, for example, Nickell, 1996; Funk and Wanzenried, 2003; Gaspar and Massa, 2006). Thus, IPCM is a good proxy for product market competition at the firm level. The lower a firm's IPCM, the higher is its degree of competition from the product market.

A firm's price-cost margin (PCM) is defined as

$$\text{PCM}_i = \frac{\text{profit}_{it}}{\text{sales}_{it}},$$

where profit is calculated as sales minus the sum of the cost of goods sold and selling, general and administrative expenses. If there is any missing value, the operating income is used to measure profit. A firm's IPCM is then determined by subtracting the industry average PCM from its PCM, where industries are based on a 3-digit SIC classification.

Table 1 presents summary statistics of our sample. Panel A of the table shows the distribution of the two competition measures: the H-index and IPCM. The H-index varies from 0.01 to 1, with a mean of 0.55, and the IPCM is between −464.3 and 93.46 with a mean of 1.64. There are some extreme outliers for the distribution of IPCMs, so we use two methods to mitigate this problem. One, we average the IPCM values of the past three years (IPCM-3YR). Two, we winsorize PCMs at 1% and 5% levels to calculate the value of IPCM for each firm (IPCM-1% and IPCM-5%). The resulting means for IPCM-3YR, IPCM-1%, and IPCM-5% are 1.38, 0.33, and 0.10, respectively. It is interesting to note that there is almost no correlation between the IPCM and H-index at the firm level, suggesting that firms

[7] As suggested in Barclay and Smith (1995), regulated industries include railroads (SIC 4011), trucking (SIC 4210–4813), airline (SIC 5412), telecommunications (SIC 4812 and 4813), and gas and electric utilities (SIC 4900–4939).

Table 1
Summary statistics.

	Mean	SD	25%	Median	75%	Correlation			
						H-index	IPCM 3YR	1%	5%
Panel A: Product market competition measures									
H-index	0.55	0.34	0.26	0.48	0.86	1.00			
IPCM 3-YR	1.38	6.86	0.00	0.09	0.70	−0.06	1.00		
IPCM 1%	0.33	1.10	0.00	0.09	0.41	−0.08	0.57	1.00	
IPCM 5%	0.10	0.23	0.00	0.06	0.17	−0.09	0.37	0.72	1.00

Rank	Index	Size	Asset	Sales	ROA	*Q*	R&D	IO	YLD
Panel B: Characteristics of competition-formed portfolios									
H-index formed portfolios									
Low	0.20	1447.02	2493.75	1506.70	0.07	1.82	0.34	0.35	0.02
2	0.49	1482.97	3719.59	1351.04	0.09	1.84	0.12	0.34	0.02
High	0.96	1368.28	2633.09	1399.34	0.08	2.12	0.17	0.30	0.03
IPCM-3YR formed portfolios									
Low	−0.32	3350.27	9129.66	4201.96	0.10	1.38	0.17	0.54	0.02
2	0.13	5786.49	12353.26	4128.74	0.14	1.69	0.02	0.57	0.02
High	4.34	5847.29	6323.40	2609.40	0.13	2.28	0.13	0.57	0.01
IPCM-1% formed portfolios									
Low	−0.15	3415.77	10205.85	4252.85	0.09	1.38	0.21	0.54	0.02
2	0.11	5612.62	11501.86	3953.06	0.13	1.66	0.02	0.56	0.02
High	1.04	5954.81	6104.05	2733.23	0.14	2.30	0.09	0.58	0.01
IPCM-5% formed portfolios									
Low	−0.07	3165.69	9140.69	3987.23	0.08	1.41	0.25	0.53	0.02
2	0.07	5027.08	10777.44	3979.14	0.14	1.58	0.02	0.55	0.02
High	0.32	6780.66	7209.14	2969.81	0.16	2.35	0.06	0.60	0.01

Panel A of this table provides the distribution of two product market competition measures: the Herfindahl index (H-index) of industries and industry adjusted price-cost margin (IPCM) of firms. The H-index is given by the sum of squared market shares of all firms in an industry. Market share is the ratio of a firm's sales to total sales in its industry. Price-cost margin is the ratio of profit to sales, where profit is sales less the sum of cost of good sold and selling, general and administrative expenses. If there is any missing profit value, operating income is used instead. IPCM-3YR is the three-year-moving-average of IPCM for each firm. IPCM-1% and IPCM-5% are PCMs winsorized at 1% and 5% levels. PCMs that are larger or lower than the boundaries are assigned to the values of 99(95)% or 1(5)% in the PCM distribution. Industries are defined using three-digit SIC codes. The correlation between competition measures is calculated at the firm level by assigning a firm's industry H-index to the firm. Panel B shows average values of characteristics for industries and firms grouped based on two product market competition measures. The sample includes all NYSE/AMEX/NASDAQ firms that have complete information from CRSP, COMPUSTAT, and information on IRRC governance ratings for the period 1990–2005. Every year industries and firms are sorted into three groups according to either the H-index or IPCM. Size is the equity value in millions of dollars. Asset and sales are the total assets and net sales. ROA is the operating income before depreciation divided by total assets. *Q* is the ratio of market value of assets to book value of assets, where the market value of assets equals book value of assets + market value of common stock – book value of common stock – deferred taxes. R&D is the ratio of max(R&D expenditure,0) to total assets; IO is the total institutional ownership (in percent); and YLD is dividend yield which is defined as the ratio of dividend to share price at fiscal year end. All variables are equal-weighted averages at the industry level when the H-index is the measure of competition.

in competitive industries do not necessarily have a low pricing power.

3.2. Governance ratings

We employ governance ratings as a proxy for the quality of corporate governance. Such ratings are available from IRRC, as well as Bebchuk's website. The IRRC governance index (G-index) takes into account 24 different provisions in 5 categories – tactics for delaying hostile bidders, proxy voting rights, director/officer protection, other takeover defenses, and state laws. The G-index of a firm varies between 0 and 24, which is constructed by adding one point to every specific provision in place and zero otherwise. As a result, the lower a firm's G-index score, the higher is the quality of its corporate governance.

Bebchuk et al. (2009) argue that not all 24 governance provisions, which form the G-index, are detrimental to shareholders or firm value. Some provisions are even positively correlated with firm value or stock performance. Hence they construct the E-index based on six provisions – staggered boards, limits to shareholder bylaw amendments, supermajority requirements for mergers, supermajority requirements for charter amendments, poison pills, and golden parachutes. They give one point to the presence of each provision and zero otherwise and then sum all points up to form the E-index. Similar to the G-index, the greater a firm's E-index, the lower is the quality of its corporate governance.

3.3. Control variables

Drawn from existing studies, we also control for several variables that may have an impact on the quality of corporate governance. They are (a) Firm size, the market value of equity in millions, (b) Institutional ownership, the fraction of

shares owned by all 13F institutional investors, as of the previous calendar year-end, (c) Largest Shareholder, the fraction of shares owned by the largest 13F institutional investors, as of the previous calendar year-end, (d) Trading volume, the past 5-year average monthly trading volume divided by the number of shares outstanding, (e) Sales Growth, the average of sales growth over past 5 years, (f) Past-5-year return, defined as the past 5-year average monthly return before fiscal year-end, (g) Tobin's Q, the ratio of market value of assets to book value of assets, where market value is calculated as the book value of assets plus the market value of equity minus book value of common stock and minus deferred taxes (balance sheet), (h) ROA, net income divided by book value of assets and (i) Dividend Yield, calculated as dividends divided by calendar year-end market value. Accounting-based control variables are calculated using the accounting information from the fiscal year ended before June 30 of year $t-1$.

Panel B in Table 1 shows the distribution of stock characteristics for industries and firms grouped by their competition measures at the industry level (H-index) and at the firm level (IPCM). For each year $t-1$, we sort industries and firms based on the competition measures and divide them into three groups. Results indicate that these measures do not necessarily suggest that firms with a low H-index would share the same firm characteristics as those with a low IPCM. For example, firms in competitive industries (i.e., with low H-index) tend to have larger market values and institutional ownership, but smaller total assets and lower dividend yields. On the other hand, firms with low market power (small IPCM) tend to have smaller market values and institutional ownership, but have larger assets and higher dividend yields. Firms with both low H-index and IPCM have larger sales and R&D, but smaller ROA and Tobin's Q. A high R&D ratio for competitive industries and low IPCM firms indicate that when firms face strong competition from the product market, they will invest more capital to improve their product quality or production efficiency.[8] This is consistent with our prediction that loser firms or firms facing strong competition will invest more capital to develop products of better quality in order to survive.

4. The role of product market competition

In this section, we study how a firm's corporate governance mechanism is related to competition. In particular, we explore how product market competition interacts with firm value and firm performance to affect the quality of corporate governance.

4.1. Competition and corporate governance

We first examine the direct link between product market competition and corporate governance. To assess the effect of competition on corporate governance, we split industries or firms into three competition-sorted portfolios. For the industry level analysis, we sort all industries yearly by the H-index and divide them into three competition portfolios. We average G- or E-index across all firms within an industry and assign the value to this industry. Then, we pool all industries in the same portfolio together across all years, and calculate the aggregate average of the G- or E-index. The top (bottom) competition-sorted portfolio is concentrated (competitive) industries.

Similarly, we group all firms that have a G- or E-index available into three competition portfolios according to their IPCM value and rebalance the portfolios every year. We calculate the average G- or E-index of firms in the IPCM-formed portfolios. Firms in the portfolio with a high (low) IPCM value have a high (low) market power.

Table 2 presents the relationship between the degree of product market competition and the quality of corporate governance, as well as t-statistics for the difference between two extreme competition-formed portfolios. The results from this table provide an overall picture that strong competition is related to weak corporate governance structures. In Panel A, the average G-index associated with competitive industries is 9.38, which is significantly higher than the average G-index of concentrated industries (9.04). Low-IPCM firms also have a higher average G-index (9.40) than high-IPCM firms (8.84) when we measure competition by using the IPCM-3YR. The results using the other two IPCM measures, IPCM-1% and IPCM-5%, are substantially similar. Panel B shows that the results are robust when the E-index is used as a proxy for corporate governance quality. The average E-index (2.60) of competitive industries is higher than

Table 2
Impact of competition on corporate governance structures.

Measure	Competition index			Low-High	
	Low	2	High	Mean	t-Stat
Panel A: G-index					
H-index	9.38	9.21	9.04	0.34	7.58**
IPCM-3YR	9.40	9.38	8.84	0.56	12.34**
IPCM-1%	9.38	9.40	8.85	0.53	12.34**
IPCM-5%	9.29	9.46	8.87	0.42	9.26**
Panel B: E-index					
H-index	2.60	2.60	2.35	0.25	4.83**
IPCM-3YR	2.45	2.45	2.18	0.27	12.19**
IPCM-1%	2.44	2.46	2.18	0.26	11.77**
IPCM-5%	2.42	2.47	2.19	0.23	10.57**

This table reports the equal-weighted average G- and E-index of portfolios at the industry and firm levels. The product market competition is measured using either the Herfindahl index (H-index) at the industry level, or the industry adjusted price-cost margin (IPCM) at the firm level. For the industry level analysis, where industries are defined by three-digit SIC classification, all industries are sorted yearly by the H-index into three competition portfolios. For the firm-level analysis, all firms with the G- and E-index are sorted into three portfolios yearly based on the firms' IPCMs. IPCM-3YR is the three-year-moving-average of IPCM for each firm. IPCM-1% and IPCM-5% are PCMs winsorized at 1% and 5% levels. PCMs that are larger or lower than the boundaries are assigned to the values of 99(95)% or 1(5)% in the PCM distribution. Each panel also reports the difference of the average G- or E-index between low and high competition portfolios. The sample period is from 1990 to 2005.
*Significance at the 10% level.
** Significance at the 5% level.

[8] The differences of R&D ratio between portfolios with high and low competition measures, except based on IPCM-3YR, are all significant at conventional levels.

Table 3
Market competition, governance structures, and the level of ownership.

Ownership	G-index					E-index				
	Competition Index			Low-High		Competition Index			Low-High	
	Low	2	High	Mean	*t*-Stat	Low	2	High	Mean	*t*-Stat
Panel A: H-index formed portfolios										
High	9.25	9.13	8.57	0.69	4.35**	2.34	2.42	2.12	0.22	2.73**
2	9.22	9.38	8.53	0.69	4.55**	2.40	2.47	2.19	0.22	2.67**
Low	9.40	9.19	8.84	0.56	3.62**	2.50	2.39	2.14	0.36	3.16**
High-Low	−0.15	−0.06	−0.27			−0.16	0.04	−0.01		
t-Stat	−1.52	−0.36	−1.08			−3.41**	0.49	−0.09		
Panel B: IPCM-3YR formed portfolios										
High	9.31	9.22	8.85	0.46	5.48**	2.46	2.46	2.23	0.23	5.68**
2	9.50	9.57	8.75	0.75	8.98**	2.55	2.55	2.20	0.35	8.71**
Low	9.42	9.44	8.84	0.58	6.94**	2.41	2.41	2.08	0.33	7.99**
High-Low	−0.10	−0.23	0.02			0.05	0.06	0.15		
t-Stat	−1.17	−2.68**	0.21			1.20	1.38	3.79**		
Panel C: IPCM-1% formed portfolios										
High	9.28	9.25	8.86	0.419	4.95**	2.45	2.47	2.23	0.22	5.31**
2	9.48	9.56	8.77	0.711	8.51**	2.54	2.54	2.22	0.32	7.98**
Low	9.38	9.47	8.85	0.532	6.38**	2.41	2.42	2.06	0.35	8.55**
High-Low	−0.11	−0.22	0.01			0.04	0.04	0.17		
t-Stat	−1.23	−2.60**	0.07			0.91	1.06	4.42**		
Panel D: IPCM-5% formed portfolios										
High	9.24	9.32	8.82	0.42	4.99**	2.45	2.48	2.22	0.23	5.55**
2	9.37	9.71	8.79	0.58	6.96**	2.50	2.60	2.23	0.27	6.78**
Low	9.25	9.51	8.89	0.37	4.37**	2.39	2.46	2.04	0.35	8.35**
High-Low	−0.02	−0.19	−0.07			0.06	0.03	0.18		
t-Stat	−0.19	−2.18**	−0.87			1.36	0.69	4.45**		

This table presents the average G- or E-index of competition portfolios for a given category of ownership (high, 2 or low). The ownership in each firm is measured at the last quarter of the previous year by the largest institutional ownership. When the H-index is used as a competition measure, the ownership is equally weighted at the industry level. Otherwise, ownership is measured at the firm level. All industries or firms in each competition portfolio of Table 2 are again sorted by largest ownership into three ownership groups to form $3 \times 3 = 9$ portfolios yearly. The table also reports the difference of the average G-index (and E-index) between low and high competition portfolios and between high and low ownership portfolios. The sample period is from 1990 to 2005.
*Significance at the 10% level.
** Significance at the 5% level.

the average E-index (2.35) of concentrated industries. When we further assess competition at the firm level by using the three IPCM measures, low-IPCM firms consistently show a higher average E-index than high-IPCM firms. All differences between portfolios of low and high competition indexes are statistically significant at the 5% level.

Next, we investigate whether competition can substitute for corporate governance from the viewpoint of shareholders. As documented in the previous literature, larger shareholders have incentives to monitor executives and have more power to vote against management proposals that are detrimental to them (see, e.g., Shleifer and Vishny, 1997; Gillan and Starks, 2003). If the large shareholders perceive that competition offers an inadequate disciplinary force, they may ensure the quality of corporate governance by prohibiting management from increasing the number of shareholder rights provisions. In this case, we expect no significant difference in the average G- and E-indexes between two extreme competition portfolios given the same level of large institutional ownership. On the contrary, if competition provides enough monitoring, the results of Table 2 should remain unchanged, even after controlling for the degree of large shareholder ownership.

Cremers and Nair (2005) investigate how the market for corporate control interacts with internal monitoring by using the largest institutional ownership as a proxy for the degree of internal monitoring. We employ a similar methodology to measure ownership in each firm for the last quarter of the previous year. Within the same competition portfolio, all industries and firms are split into three groups according to the ownership of the largest institutional shareholder. We expect the average G- or E-index of the low competition-index portfolio to be higher than the high competition-index portfolio within the same level of ownership.

Table 3 depicts average G- and E-indexes of competition-ownership portfolios with varying competition measures. It also contains differences of these average indexes, along with their *t*-statistics, between low and high competition-sorted portfolios. The results in Panel A are consistent with Table 2. In the highest ownership portfolio, competitive industries have an average G-index of 9.25, compared with 8.57 for concentrated industries. For the medium or low ownership portfolio, the average G-index of competitive industries is consistently higher than the average G-index of concentrated industries. Using the E-index, we again find that strong competition is associated with poor

Table 4
Competition and corporate governance analysis at the industry level.

Variable	G-index				E-index			
	Model (1)		Model (2)		Model (3)		Model (4)	
	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat
Intercept	10.76	14.82**	11.23	30.81**	3.21	10.84**	3.08	19.06**
H-index	−0.38	−3.25**	−0.36	−15.39**	−0.12	−2.23**	−0.10	−5.68**
Size	0.09	0.95	0.08	2.75**	−0.06	−1.43	−0.04	−2.26**
Q	−0.04	−2.10**	−0.19	−5.67**	−0.02	−3.33**	−0.07	−4.06**
Volume	0.15	0.72	−1.40	−1.97*	0.14	2.81**	0.73	2.23**
Return	−10.38	−2.72**	−7.00	−2.57**	−1.98	−1.13	−1.88	−1.22
ROA	−0.09	−0.57	−0.80	−4.13**	0.04	0.56	0.03	0.37
SGROWTH	−1.61	−4.21**	−1.58	−8.89**	−0.17	−1.06	−0.13	−1.16
YLD	−0.04	−1.59	5.58	1.52	0.01	0.93	1.04	0.95
IO	2.45	3.05**	3.02	8.58**	0.60	1.57	0.47	3.42**
LargeO	−10.90	−4.77**	−10.78	−10.94**	−3.00	−2.75**	−2.36	−3.55**
Error clustered	Industry		NO		Industry		NO	
Adj. *R*-square	0.10		NA		0.06		NA	
Observations	3783		16		3729		16	

This table shows regressions results using two different approaches: (i) fixed effects regression with errors clustered at the industry level, and (ii) the Fama-MacBeth method. The dependent variable is the average G- and E-index at the industry level. The competition index, H-index, is the Herfindahl index. Every year, industries are grouped into three competition portfolios according to their competition index by using COMPUSTAT information in previous year. Competitive industries are assigned value 0. Concentrated industries are assigned value 2. Other industries are assigned value 1. These portfolio values are used to substitute competition index to run regressions. Models (1) and (2) are fixed effect regressions, whereas Models (3) and (4) are Fama-MacBeth cross-sectional regressions. Size is log of equity value measured in millions; *Q* is the ratio of market value of assets and book value of assets, where market value of assets is calculated by (book value of assets + market value of common stock-book value of common stock-balance sheet deferred taxes); volume is the 5-year-trading volume divided by the number of shares outstanding prior to the fiscal end; return is the monthly average return over 5 years prior to the fiscal end; ROA is the operating income before depreciation divided by total assets; SGROWTH is the average growth of sales over five fiscal years; YLD is the dividend yield which is dividend-to-share price ratio at the fiscal year end; IO is total institutional ownership in percent from Thomson financials measured at December of year $t-1$; LargeOWN is the largest institutional ownership in the firm at December of year $t-1$. All variables are equal-weighted averages at the industry level. The sample includes all NYSE/AMEX/NASDAQ-listed securities which contain stock information in CRSP, sales information in COMPUSTAT industrial annual file from 1990 to 2005.

* Significance at the 10% level.

** Significance at the 5% level.

corporate governance at various levels of the largest ownership. All differences are statistically significant at conventional levels.

Panels B, C, and D report the results using IPCM for the firm-level analysis to measure competition. In each of the three ownership categories, low-IPCM firms in general have a higher average G-index than high-IPCM firms. For example, the average G-indexes for firms with low IPCM and high ownership are 9.31 in Panel B, 9.28 in Panel C, and 9.24 in Panel D, which are all higher than their counterparts with high IPCM and in the high ownership category. When we continue to use the E-index as a proxy for corporate governance, low-IPCM firms still have a higher average E-index at various levels of ownership. All average G- and E-index differences between portfolios with low and high IPCM are statistically significant at the 5% level. The findings suggest that if a firm faces strong competition, institutional investors will not use their voting power to improve shareholder rights.

There is weak evidence that large institutional investors prefer better corporate governance. Across different H-index levels, firms with a high institutional ownership in general have a low G-index. The same pattern also exists when using the E-index as a proxy for corporate governance. Based on IPCM as a measure of competition, the results show some evidence that the large institutional shareholders are concerned about corporate governance. In Panel B, the average G-indexes for low- and medium-IPCM firms at the high level of ownership are 9.31, and 9.22, which are lower than the averages of G-index for the corresponding firms in other categories of ownership. However, no similar patterns are observed when the E-index is used as a proxy for the quality of corporate governance.

In summary, we show that strong competition is associated with poor quality corporate governance and that the fear of liquidation may be the primary force that disciplines management. It is plausible that poor corporate governance is caused by industry characteristics other than product market competition, such as customer relationships (e.g., Cremers et al., 2008). However, our overall evidence at the firm and industry levels would suggest that competition does play a role in the quality of corporate governance. Thus, we interpret that our results are more likely to reflect the competition effect, consistent with our prediction that competition can be an option for governance mechanisms and a substitute for traditional corporate governance structures.

4.2. Competition, firm characteristics, and corporate governance

Gompers et al. (2003) find that firms with weak shareholder rights tend to be large, and have low sales growth, poor performance, low firm value, and high institutional ownership. Many researchers believe that there is a strong connection between the

Table 5
Firm-level Herfindahl index and corporate governance.

Variable	G-index				E-index			
	Model (1)		Model (2)		Model (3)		Model (4)	
	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat
Intercept	8.06	21.14**	8.14	42.52**	2.74	15.52**	2.56	41.23**
H-index	−0.11	−0.98	−0.12	−3.46**	−0.06	−1.16	−0.07	−5.25**
Size	0.25	5.31**	0.22	14.8**	−0.02	−0.84	−0.03	−7.26**
Q	−0.19	−4.67**	−0.16	−9.97**	−0.11	−5.69**	−0.11	−10.43**
Volume	−2.29	−5.16**	−1.89	−6.66**	−1.19	−5.56**	−1.45	−6.94**
Return	−10.04	−3.58**	−8.88	−4.13**	−2.36	−1.78*	−1.06	−0.88
ROA	−0.99	−2.07**	−1.29	−4.08**	0.05	0.23	0.13	1.37
SGROWTH	−0.71	−4.12**	−0.72	−10.04**	−0.13	−1.60	−0.14	−6.69**
YLD	1.70	2.80**	11.92	3.55**	0.80	2.74**	5.01	3.54**
IO	1.60	5.21**	2.06	7.71**	0.77	5.09**	0.95	9.54**
Error clustered	Firm		NO		Firm		NO	
R-Square	0.05		NA		0.05		NA	
Observations	17975		16		17641		16	

This table shows regressions results using two different approaches: (i) fixed effects regression with errors clustered at the firm level, and (ii) the Fama-MacBeth method. The dependent variable is the G- or E-index of an individual firm. Competition index, H-index, is the Herfindahl index at the industry level. Each year industries are grouped into three competition groups according to their H-index. The competitive portfolio of firms is assigned to value 0, the concentrated portfolio of firms is assigned to value 2, and portfolio of firms between competitive and concentrated is assigned to value 1. These values are used to substitute competition index and assigned to firms under the same competition portfolio to run regressions. Models (1) and (2) are fixed effect regressions, whereas Models (3) and (4) are Fama-MacBeth cross-sectional regressions. Size is log of equity value measured in millions; *Q* is the ratio of market value of assets and book value of assets, where market value of assets is calculated by (book value of assets+market value of common stock-book value of common stock-balance sheet deferred taxes); volume is the 5-year-trading volume divided by the number of shares outstanding prior to the fiscal end; return is the monthly average return over 5 years prior to the fiscal end; ROA is the operating income before depreciation divided by total assets; SGROWTH is the average growth of sales over five fiscal years; YLD is the dividend yield which is dividend-to-share price ratio at the fiscal year end; IO is total institutional ownership in percent from Thomson financials measured at December of year $t-1$; LargeOWN is the largest institutional ownership in the firm at December of year $t-1$. All variables are equal-weighted averages at the industry level. The sample includes all NYSE/AMEX/NASDAQ-listed securities which contain stock information in CRSP, sales information in COMPUSTAT industrial annual file from 1990 to 2005.

* Significance at the 10% level.

** Significance at the 5% level.

quality of corporate governance and firm value and that various firm characteristics also affect corporate governance. The results in Table 1 show a potential relationship between strong competition and low firm value. A question arises is whether the effect of competition on corporate governance are actually caused by firm value and other firm characteristics. To assess the robustness of the effect of competition on the quality of corporate governance, we regress the G- or E-index on the measures of competition and control for the factors mentioned above, including firm value, as follows:

$$\begin{aligned}\text{G-index}\quad(\text{E-index})_i = {} & \alpha_0 + \beta_1 Q_i + \beta_2 \text{H-index}\quad(\text{IPCM})_i \\ & + \beta_3 \text{Size}_i + \beta_4 \text{Volume}_i + \beta_5 \text{Return}_i \\ & + \beta_6 \text{ROA}_i + \beta_7 \text{SGROWTH}_i \\ & + \beta_8 \text{YLD}_i + \beta_9 \text{IO}_i + \beta_{10} \text{LargeO}_i,\end{aligned}$$

where the control variables are firm value, competition measures, firm size, trading volume, stock performance, operating performance, sales growth, dividend yield, institutional ownership, and largest shareholder. A detailed description of the control variables is contained in the data section.

Table 4 shows the regression results of the above model, with *t*-statistics computed based on clustered standard errors at the firm level. Models (1) and (3) are estimated using fixed effects regressions, whereas Models (2) and (4) are based on the Fama-MacBeth cross-sectional regression. Our overall results confirm a negative link between the H-index and governance quality measured by both G- and E-indexes. While the findings suggest that a higher firm value is related to better corporate governance, with the coefficients of firm value being negative and statistically significant, Models (1)–(4) show that increasing competition is associated with weak shareholder rights, even after controlling for effect of firm value. Other firm performance measures, such as ROA, return, and sales growth, bear a negative sign in the regressions, but they are not robustly significant and do not affect the observed relation between competition and governance.

Table 5 shows the results of firm-level pooled fixed effect regressions with *t*-statistics corrected for clustered standard errors and of firm-level Fama-MacBeth cross-sectional regressions. Unlike Table 4, Table 5 excludes the largest institutional ownership from the regression because it is highly correlated with overall institutional ownership.[9] Again, we find a robust negative association between the H-index and corporate governance. The coefficient of firm value remains statistically

[9] The correlation between the largest ownership and overall ownership in our sample is 0.72, inducing a collinearity problem in the estimation. Cremers and Nair (2005) also document that there is a high correlation (88%) between the total blockholdings and largest blockholding.

Table 6
Firm-level market power and corporate governance.

Variable	G-index				E-index			
	Model (1)		Model (2)		Model (3)		Model (4)	
	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat
Panel A: IPCM-5% formed portfolios								
Intercept	8.08	21.72**	7.51	38.82**	2.68	15.37**	2.51	38.25**
IPCM	−0.12	−1.75*	−0.13	−4.59**	−0.08	−2.46**	−0.05	−3.18**
Size	0.29	6.07**	0.22	15.47**	−0.01	−0.65	−0.03	−6.28**
Q	−0.20	−5.12**	−0.18	−9.08**	−0.10	−5.42**	−0.11	−9.38**
Volume	−2.21	−4.96**	−2.41	−8.96**	−1.08	−5.03**	−1.32	−6.64**
Return	−9.76	−3.65**	−10.01	−6.25**	−2.47	−1.86*	−1.22	−1.02
ROA	−0.60	−1.26	−0.39	−1.18	0.18	0.81	0.22	2.10*
SGROWTH	−0.70	−4.06**	−0.06	−3.19**	−0.10	−1.18	−0.11	−5.09**
YLD	1.56	2.93**	10.84	3.38**	0.77	2.83**	4.87	3.42**
IO	1.40	4.61**	2.01	7.40**	0.77	5.09**	0.95	9.73**
Error clustered	Firm		NO		Firm		NO	
R-Square	0.07		NA		0.05		NA	
Observations	17769		16		17638		16	
Panel B: IPCM-3YR formed portfolios								
Intercept	8.13	21.96**	7.55	38.11**	2.71	15.53**	2.54	38.01**
IPCM	−0.12	−1.82*	−0.11	−3.13**	−0.06	−2.19**	−0.04	−2.20**
Size	0.28	6.04**	0.22	14.90**	−0.02	−0.72	−0.03	−6.69**
Q	−0.20	−4.99**	−0.18	−8.86**	−0.10	−5.34**	−0.11	−9.08**
Volume	−2.17	−4.87**	−2.35	−7.84**	−1.07	−4.98**	−1.30	−6.55**
Return	−9.71	−3.63**	−10.03	−6.30**	−2.43	−1.83*	−1.16	−0.99
ROA	−0.80	−1.71*	−0.56	−1.80*	0.06	0.25	0.13	1.43
SGROWTH	−0.71	−4.15**	−0.06	−3.25**	−0.11	−1.31	−0.12	−5.61**
YLD	1.57	2.92**	11.04	3.36**	0.78	2.81**	4.94	3.46**
IO	1.38	4.57**	2.00	7.30**	0.76	5.03**	0.94	9.61**
Error clustered	Firm		NO		Firm		NO	
R-Square	0.04		NA		0.05		NA	
Observations	17769		16		17638		16	
Panel C: IPCM-1% formed portfolios								
Intercept	8.13	21.92**	7.54	38.36**	2.71	15.5**	2.53	38.04**
IPCM	−0.11	−1.69*	−0.11	−3.24**	−0.07	−2.21**	−0.05	−2.73**
Size	0.28	6.04**	0.22	14.97**	−0.02	−0.71	−0.03	−6.58**
Q	−0.20	−5.02**	−0.18	−8.98**	−0.10	−5.34**	−0.11	−9.28**
Volume	−2.19	−4.9**	−2.38	−8.07**	−1.07	−4.97**	−1.30	−6.65**
Return	−9.77	−3.64**	−10.05	−6.27**	−2.46	−1.86*	−1.22	−1.04
ROA	−0.75	−1.61	−0.53	−1.66	0.09	0.39	0.15	1.54
SGROWTH	−0.71	−4.16**	−0.06	−3.24**	−0.11	−1.31	−0.12	−5.64**
YLD	1.57	2.92**	11.04	3.37**	0.78	2.82**	4.95	3.46**
IO	1.39	4.58**	2.00	7.34**	0.76	5.05**	0.94	9.67**
Error clustered	Firm		NO		Firm		NO	
R-Square	0.07		NA		0.05		NA	
Observations	17769		16		17638		16	

This table shows regressions results using two different approaches: (i) fixed effects regression with errors clustered at the firm level, and (ii) the Fama-MacBeth method. The dependent variable is the G- or E-index of individual firm. The competition index, IPCM, is the industry adjusted price-cost margin, where industries are defined by using three-digit SIC classification. Firms are classified into three competition groups according to their values of IPCM each year. Firms with a high IPCM are assigned to value 2, firms with a low IPCM are assigned to value 0, and firms between high and low IPCM are assigned to value 1. These values are used to substitute competition index and assigned to firms under the same portfolio to run regression. Models (1) and (2) are fixed effect regressions, whereas Models (3) and (4) are Fama-MacBeth cross-sectional regressions. Size is log of equity value measured in millions; *Q* is the ratio of market value of assets and book value of assets, where market value of assets is calculated by (book value of assets + market value of common stock-book value of common stock-balance sheet deferred taxes); volume is the 5-year-trading volume divided by the number of shares outstanding prior to the fiscal end; return is the monthly average return over 5 years prior to the fiscal end; ROA is the operating income before depreciation divided by total assets; SGROWTH is the average growth of sales over five fiscal years; YLD is the dividend yield which is dividend-to-share price ratio at the fiscal year end; IO is total institutional ownership in percent from Thomson financials measured at December of year $t-1$; LargeOWN is the largest institutional ownership in the firm at December of year $t-1$. All variables are equal-weighted averages at the industry level. The sample includes all NYSE/AMEX/NASDAQ-listed securities which contain stock information in CRSP, sales information in COMPUSTAT industrial annual file from 1990 to 2005.

* Significance at the 10% level.
** Significance at the 5% level.

significant and negative, implying that firms with higher firm value have stronger shareholder rights.

We next explore whether competition affects the choice of corporate governance by running regressions at the firm level and by using IPCM as a proxy for competition. Table 6 shows the results by using G-index as a corporate governance measure and three different IPCMs as an intensity index of competition. We first report the results by using IPCM-5% because it is the most conservative measure for competition at the firm level.[10] In order to confirm our findings, we further present results with IPCM-1% and IPCM-3YR as competition measures in Panels B and C. In Panel A, the coefficients of the fixed effect regression and Fama-MacBeth regression on IPCM are −0.12 and −0.13, and they are negative and significant at the 10% and 5% levels, respectively. The coefficients of IPCM in Panel B and Panel C are again negative. These consistent findings corroborate our conclusion that competition has a negative effect on corporate governance. Thus, when competition is strong, the quality of a firm's corporate governance is lower.

The firm level results are robust when the E-index is employed as the proxy for the quality of corporate governance. IPCM remains negatively associated with the E-index in Panels A, B and C, suggesting that greater market competition is related to poor governance structures. Stock return, ROA, and sales growth have a weak correlation with the E-index. The overall results provide reinforcing evidence that competition has a significant impact on corporate governance after controlling for the effects of various firm characteristics.

4.3. Endogeneity of firm value and corporate governance

Recent studies have shown that firm value and corporate governance mechanisms are simultaneously determined (Palia, 2001; Durnev and Kim, 2005; Brick et al., 2005). Lehn et al. (2007) further provide evidence to show that low firm value actually causes poor corporate governance practices. Although the empirical evidence has been inconclusive, firm value and corporate governance are likely to affect each other. Firms that have a stronger ability to compete in the product market tend to higher value or better performance. These better performing firms could in turn have strong shareholder rights. On the other hand, strong corporate governance improves incentives for management and the efficiency of operations. As a result, good corporate governance may be associated with high firm value or good competition performance.

To address the endogeneity issue, we estimate the relations between competition, firm value, and corporate governance using a system of simultaneous equations with a three-stage least squares (3SLS) methodology. For the regression, we need to identify the instrumental variables that are related to corporate governance or firm value only, but identifying the suitable instrumental variables is difficult. Following the existing literature, we use a three-year-lagged Tobin's Q to substitute for firm value and then re-estimate the previous results. The three-year-lagged firm value is highly correlated with the current firm value; however, it is unlikely for the current corporate governance to affect the three-year-lagged firm value.[11] Thus, the results obtained using the three-year-lagged firm value in the 3SLS estimation offer additional evidence on the relationship between corporate governance and competition.

Table 7 shows the results of 3SLS Fama-MacBeth cross-sectional regressions of governance indexes on competition measures and control variables. For each year, we run one 3SLS regression to obtain the coefficient estimate of each variable. The final coefficients for the model are the distributions of each coefficient for the years from 1990 through 2005. We use the total institutional and the largest ownership as instrumental variables for the G- or E-index. The reason is that institutional investors and large shareholders are shown to be related to the quality of corporate governance (Gillan and Starks, 2003). Additionally, in our sample, the correlation between institutional ownership and firm value is low, and the correlation between ownership and the G- or E-index is high, suggesting that institutional and largest ownerships are two valid instrumental variables for the G- or E-index.

To find instrumental variables for firm value, we adopt the methodology of Palia (2001), who uses treasury stock (treasury), R&D ratio (R&D), and advertising expense (Adv) as instrumental variables for firm value. Treasury stock is the ratio of treasury stock to book value of assets, R&D ratio is the research and development expenditure divided by sales, and advertising expense is the ratio of advertising expenses to book value of assets. Higher values of R&D and Adv represent greater opportunities for future growth, which is unlikely related to the quality of corporate governance. The ratio of treasury stock is supposed to be positively correlated with firm value.[12] Since COMPUSTAT has some missing values for R&D and Adv, we add dummies for the firms that do not have values for these two variables. This prevents us from losing too many observations.

Panel A of Table 7 uses the H-index as a measure for competition, whereas Panel B employs the IPCM winsorized at 5%. The dependent variable is a firm's G- or E-index for Models (1) and (3), and is firm value in Models (2) and (4). The panels show corroborating evidence that strong competition and low firm value are related to a high G- or E-index. The effect of competition on the quality of corporate governance is not caused by firm value. The coefficients of Tobin's Q and the H-index are consistently negative and statistically significant. Furthermore, firms with better stock performance or operating performance have better governance structures and higher firm value. The coefficients of return, ROA, and sales growth are significantly negative, indicating that weak firm performance is associated with poor corporate

[10] There are some extreme outliers when we calculate PCM for each firm. These outliers affect the average of PCM for an industry. Therefore, the value of IPCM for a firm may vary with different treatments of outliers.

[11] Lehn et al. (2007) provide evidence to show that firm value lagged up to 20 years is still significantly associated with the current firm value.

[12] For a more detailed explanation of these three instrumental variables, see Palia (2001).

Table 7
3SLS Fama-MacBeth cross-sectional regressions of the governance index on competition measures.

Variable	G-index				E-index			
	Model (1)		Model (2)		Model (3)		Model (4)	
	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat
Panel A: H-index formed portfolios								
Intercept	8.44	47.51**	0.88	6.50**	3.03	18.63**	0.52	4.52**
Q	−0.12	−2.15**			−0.23	−3.73**		
Gov. Index			−0.14	−14.10**			−0.31	−13.63**
H-index	−0.12	−2.85**	0.08	5.45**	−0.10	−5.20**	0.07	4.69**
Size	0.16	10.18**	0.14	8.55**	−0.06	−2.55**	0.10	6.46**
Volume	−2.47	−7.88**	−0.14	−0.72	0.71	1.92*	−0.34	−1.69
Return	−9.13	−3.70**	20.41	8.12**	−2.56	−1.35	21.56	8.28**
ROA	−1.48	−3.67**	4.71	22.25**	0.23	0.88	4.86	22.86**
SGROWTH	−0.63	−8.69**	0.02	0.37	−0.10	−0.81	0.06	1.70
YLD	12.12	3.47**	−1.63	−2.13**	1.42	1.16	−1.93	−2.82**
IO	3.00	13.49**			0.47	2.71**		
LargeO	−5.04	−13.41**			−1.83	−12.17**		
Treasury			0.82	10.75**			0.78	10.48**
R&D			7.07	8.16**			6.93	7.81**
Adv			1.41	4.83**			1.36	4.71**
R&DDum			0.05	2.02*			0.05	2.50**
ADVDum			0.00	−0.16			0.00	−0.16
Panel B: IPCM-5% formed portfolios								
Intercept	8.50	49.59**	0.96	6.79**	2.71	49.99**	0.54	4.68**
Q	−0.22	−2.47**			−0.19	−3.35**		
Gov. Index			−0.15	−13.98**			−0.30	−12.93**
IPCM	−0.09	−2.49**	0.00	0.36	−0.06	−3.22**	0.00	−0.17
Size	0.19	13.54**	0.14	8.34**	−0.06	−8.25**	0.10	6.26**
Volume	−2.47	−7.34**	−0.22	−1.06	−1.54	−7.36**	−0.34	−1.67
Return	−8.51	−3.00**	20.78	8.11**	0.12	0.08	21.60	8.33**
ROA	−1.09	−2.67**	4.72	21.86**	0.47	1.81*	4.91	22.57**
SGROWTH	−0.63	−7.39**	−0.02	−0.34	−0.06	−2.48**	0.05	1.24
YLD	10.87	3.40**	−1.55	−2.18**	4.61	3.19**	−1.94	−2.78**
IO	2.77	12.98**			1.42	17.30**		
LargeO	−4.97	−12.29**			−2.63	−16.78**		
Treasury			0.81	10.72**			0.80	10.84**
R&D			6.96	8.01**			6.87	7.72**
Adv			1.36	4.55**			1.36	4.54**
R&DDum			0.06	2.40**			0.06	2.57**
ADVDum			−0.01	−0.38			−0.01	−0.31

This table shows results of 3SLS Fama-MacBeth cross-sectional regressions at the firm level. The dependent variable is the G- or E-index of an individual firm. The H-index is the Herfindahl index at the industry level, while IPCM is the industry adjusted price-cost margin of the firm with three-digit SIC industry classification. Firms are grouped into three competition portfolios according to their values of IPCM each year. Firms in the high IPCM portfolio are assigned to value 2, firms in the low IPCM portfolio are assigned to value 0, and firms between high and low IPCM are assigned to value 1. Industries are also independently sorted into three competition portfolios according to their values of H-index each year. Firms are assigned a value 0, 1, or 2 with respect to the degree of competition in the industry. Portfolio of firms with a low H-index is assigned a value 0, portfolio of firms with a high H-index is assigned a value 2. In Panels A and B, we use the competition indicator based on the H-index and IPCM, respectively. For each year, we use 3SLS to estimate the following simultaneous equations:

$$\text{G-index (E-index)}_i = \alpha_{1,0} + \gamma_{1,1} Q_i + \beta_{1,1}\text{H-index (IPCM)}_i + \beta_{1,2}\text{Size}_i + \beta_{1,3}\text{Volume}_i + \beta_{1,4}\text{Return}_i + \beta_{1,5}\text{ROA}_i + \beta_{1,6}\text{SGROWTH}_i + \beta_{1,7}\text{YLD}_i + \beta_{1,8}\text{IO}_i + \beta_{1,9}\text{LargeO}_i$$

$$Q_i = \alpha_{2,0} + \gamma_{2,1}\text{G-index (E-index)}_i + \beta_{2,1}\text{H-index (IPCM)}_i + \beta_{2,2}\text{Size}_i + \beta_{2,3}\text{Volume}_i + \beta_{2,4}\text{Return}_i + \beta_{2,5}\text{ROA}_i + \beta_{2,6}\text{SGROWTH}_i + \beta_{2,7}\text{YLD}_i + \beta_{2,8}\text{Treasury}_i + \beta_{2,9}\text{R\&D}_i + \beta_{2,10}\text{Adv}_i + \beta_{2,11}\text{R\&DDum}_i + \beta_{2,12}\text{ADVDum}_i,$$

where competition is either the H-index or IPCM, and the governance index is either G- or E-index. The final coefficients are the average of 3SLS regression results year by year. In the first equation, total institutional ownership and largest institutional ownership are used as instrumental variables to proxy the G- or E-index. In the second equation, Treasury, R&D, Advertisement, R&D dummy, and Advertisement dummy are used as instrumental variables to proxy firm value. Treasury is the ratio of treasury stock to book value. R&D is the research and development expenses. Adv is the ratio of advertising expenses to book value. R&DDum and ADVDum are dummies set to 1 for firms that do not have reported values on R&D expenses and advertising expenses. The dependent variables of Models (1) and (3) are governance indexes of each firm. The dependent variables of the Models (2) and (4) are individual firm value. The sample period is from 1990 to 2005.

* Significance at the 10% level.

** Significance at the 5% level.

Table 8
Effect of firm-level competition on corporate governance with three-year lagged Tobin's Q as firm value.

Variable	G-index				E-index			
	Model (1)		Model (2)		Model (3)		Model (4)	
	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat	Coef.	*t*-Stat
Panel A: H-index formed portfolios								
Intercept	8.03	20.94**	8.17	44.40**	2.70	15.26**	2.55	43.35**
H-index	−0.11	−0.97	−0.11	−2.77**	−0.06	−1.10	−0.07	−4.28**
Size	0.23	4.92**	0.21	14.30**	−0.03	−1.49	−0.04	−8.87**
Q3	−0.05	−2.42**	−0.17	−6.66**	−0.04	−3.51**	−0.09	−8.07**
Volume	−2.29	−4.83**	−1.49	−5.36**	−1.13	−5.02**	−1.27	−6.03**
Return	−14.38	−5.47**	−11.99	−5.86**	−4.84	−3.91**	−3.28	−3.02**
ROA	−1.46	−3.06**	−1.12	−4.90**	−0.19	−0.82	0.08	0.96
SGROWTH	−0.64	−3.63**	−0.64	−10.43**	−0.07	−0.87	−0.08	−3.30**
YLD	1.78	2.78**	11.89	3.45**	0.84	2.67**	5.13	3.48**
IO	1.61	5.21**	1.98	8.04**	0.77	5.06**	0.93	9.75**
Error clustered	Firm		NO		Firm		NO	
R-Square	0.06		NA		0.04		NA	
Observations	17975		16		17641		16	
Panel B: IPCM-5% formed portfolios								
Intercept	8.03	21.43**	7.67	44.96**	2.64	15.09**	2.50	40.47**
IPCM	−0.14	−2.06**	−0.10	−3.58**	−0.09	−2.73**	−0.05	−3.10**
Size	0.26	5.62**	0.22	15.31**	−0.03	−1.26	−0.04	−7.89**
Q3	−0.05	−2.44**	−0.20	−7.06**	−0.04	−3.42**	−0.09	−7.72**
Volume	−2.20	−4.63**	−1.75	−6.78**	−1.01	−4.49**	−1.16	−5.80**
Return	−14.74	−5.86**	−14.97	−7.37**	−4.84	−3.91**	−3.42	−3.26**
ROA	−1.08	−2.29**	−0.33	−1.62	−0.02	−0.09	0.17	1.69
SGROWTH	−0.61	−3.47**	−0.08	−3.88**	−0.04	−0.45	−0.05	−2.35**
YLD	1.64	2.91**	10.72	3.34**	0.81	2.77**	4.99	3.38**
IO	1.43	4.67**	1.89	7.37**	0.78	5.07**	0.93	9.97**
Error clustered	Firm		NO		Firm		NO	
R-Square	0.07		NA		0.05		NA	
Observations	17769		16		17638		16	

This table replicates results of Tables 5 and 6 with three-year lagged Tobin's Q as firm value. The dependent variable is the G- or E-index for each firm. All variables are at the firm level. See Tables 5 and 6 for the description of control variables and competition measures. Panel A shows the results replicating Table 5. Panel B shows the results of replicating Table 6 with IPCM-5% as a measure of product market competition. Models (1) and (3) are fixed effect regressions, whereas Models (2) and (4) are Fama-MacBeth cross-sectional regressions. The sample period is from 1990 to 2005.
*Significance at the 10% level.
** Significance at the 5% level.

governance. Firms with poor governance structures are large in size and have higher institutional ownership.

As we discussed earlier, a potential concern about 3SLS regressions is the problem of choosing the appropriate instrumental variables. To complete the analysis, we rerun the regressions in Tables 5 and 6, and substitute three-year-lagged Tobin's Q for the firm value. If competition does have an effect on the quality of corporate governance, and this effect is not driven by firm value, we expect the results to be consistent with the evidence that we have documented. This approach helps mitigate the problem of determining the suitable instrumental variables.

Table 8 replicates the results of Tables 5 and 6 using a three-year-lagged Tobin's Q for firm value. The evidence at both the industry and firm levels confirms our findings that firms facing strong competition from other companies are inclined to have poor governance structures. The coefficients of competition measures and firm values are negative and statistically significant. Firm performance is also negatively related to the G- or E-index. The results based on the three-year-lagged Tobin's Q are consistent with those based on 3SLS regressions. Overall, the results show that the trade-off between competition and corporate governance is robust.

5. Performance analysis

Thus far, we find convincing evidence that competition has a direct impact on corporate governance. Specifically, competition acts like a governance mechanism and can substitute for conventional corporate governance structures. One key argument that Allen and Gale (2000) have made is that agency problems have been exaggerated in the previous literature. They assert that managers naturally tend to work hard and efficiently for their companies. If competition is strong enough, conventional governance mechanisms are no longer needed because most mechanisms are designed to relieve the problem of agency costs. It is, therefore, essential that we test whether good corporate governance can still add value to firms, or if competition alone is enough to discipline management.

This section implements Cremers and Nair's (2005) methodology to explore the link between competition and corporate

Table 9
Competition, corporate governance, and abnormal returns.

Governance	G-index			E-index		
	Low	2	High	Low	2	High
Panel A: H-index formed portfolios						
Good	0.87%	0.57%	0.73%	0.92%	0.44%	0.67%
2	0.88%	0.73%	0.31%	0.73%	0.52%	0.42%
Poor	0.64%	0.45%	−0.23%	0.64%	0.60%	0.15%
Diff(Good,Poor)	0.23%	0.12%	0.95%	0.28%	−0.16%	0.52%
t-Stat	1.35	0.42	1.82*	1.06	−0.45	1.50
Panel B: IPCM formed portfolios						
Good	0.68%	0.42%	1.09%	0.50%	0.48%	1.34%
2	0.52%	0.51%	1.18%	0.54%	0.46%	0.92%
Poor	0.66%	0.32%	0.64%	0.54%	0.56%	0.33%
Diff(Good,Poor)	0.02%	0.10%	0.45%	−0.04%	−0.08%	1.01%
t-Stat	0.10	0.43	1.57	−0.15	−0.31	2.91**

This table reports monthly abnormal returns of nine portfolios (3 × 3) which are formed on Herfindahl index (H-index) or IPCM and corporate governance index as well as Diff(Good,Poor) governance portfolios. Each year, all industries are sorted into 3 portfolios according the H-index or IPCM. Firms in the same competition portfolio are divided into three governance portfolios whose G-index (E-index) is above or equal to 13 (5), between 12 and 7 (4 and 1), and below or equal to 6 (0), respectively. Diff(Good,Poor) governance portfolio buys good governance portfolio and sell poor governance portfolio stocks. Low H-index (IPCM) portfolio and high H-index (IPCM) portfolio indicate competitive and concentrated industries. The abnormal return is calculated by using monthly value-weighted excess return in each portfolio and Diff(Good,Poor) governance portfolio. The sample period is from 1990 to 2005, and the abnormal returns are estimated by using the following four-factor model.

$$R_t = \alpha + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_t,$$

where R_t is the excess return for the portfolio at month t. MKT_t, SMB_t, HML_t, and MOM_t are the monthly return on the market portfolio, small minus big portfolio, high minus low portfolio, and momentum portfolio. α is the abnormal return.

* Significance at the 10% level.

** Significance at the 5% level.

governance. If competition can substitute for corporate governance structures when the market competition is stiff, one would expect no significant difference in abnormal returns between portfolios of companies with strong and weak shareholder rights. We therefore examine the abnormal return of a strategy that longs on stocks of firms with good governance practices and shorts on stocks of firms with poor governance practices for a given competition intensity level.

For each year, all industries are sorted into three competition portfolios according to the H-index or IPCM. Firms in the same competition portfolio are further divided into three categories based on their governance ratings with the G-index (E-index) above or equal to 13 (5), between 12 and 7 (4 and 1), and below or equal to 6 (0).[13] The abnormal returns are estimated by using monthly value-weighted excess returns in each portfolio and the following four-factor model,

$$R_t = \alpha + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_t,$$

where R_t is the value-weighted excess return for a portfolio at month t. MKT_t, SMB_t, HML_t and MOM_t are the returns on the market portfolio, the small minus big portfolio, the high minus low book-to-market portfolio, and the momentum portfolio. α is the abnormal return.

Panels A and B of Table 9 report monthly abnormal returns for each portfolio as well as Diff(Good,Poor) by using the H-index and IPCM, respectively, as proxies for competition. Diff(Good,Poor) is the difference between a good governance portfolio and a poor governance portfolio. Results indicate that when competition is stiff, the quality of corporate governance does not have a significant effect on performance. In highly competitive environments as measured by the H-index or IPCM, well-governed firms perform no significantly better than poorly governed firms. Their Diff(Good,Poor) is between 0.23% and 0.28% in Panel A and between −0.04% and 0.02% in Panel B. Conversely, we find some evidence in concentrated industries that firms with good governance earn significantly larger abnormal returns than their counterparts with poor governance. Using the H-index as the competition measure, good and poor G-index governance portfolios generate abnormal returns of 0.73% and −0.23%, and the difference is statistically significant at the 10% level. Similarly, using IPCM, the difference in portfolios of firms with low and high E-index governance ratings is 1.01%, and is significantly different from zero at the 5% level. This finding is consistent with that of Hou and Robinson (2006), who find competitive industries, measured by using the H-index, having higher returns than concentrated industries.

In summary, product market competition can serve as an external governance mechanism to discipline management. When competition is tough enough to discipline management,

[13] Cremers and Nair (2005) relax the cutoff of the G-index for good corporate governance from G-index ≤ 5 to G-index ≤ 6 and for poor corporate governance from G-index ≥ 14 to G-index ≥ 13. This ensures that there are enough samples in each portfolio.

the quality of corporate governance does not add value to firm performance. Competition, to some extent, could be a substitute for corporate governance. Hence, our findings suggest that the previous literature might have overstated the agency problem.

6. Conclusion

This study provides empirical evidence that product market competition can be a governance mechanism. Specifically, we take the view of Allen and Gale (2000) that competition plays the role of takeovers. Firms with stronger management take control of the product market, and leave a much smaller share of the market for loser firms. Therefore, competition helps reveal the best management team and discipline the management with weaker performance. We investigate whether and how the nature of product market competition acts as an external disciplinary mechanism for corporate management and whether competition can be a substitute for corporate governance. Moreover, we examine whether the fear of liquidation is the driving force that induces firm managers to work harder.

To explore the link between product market competition and corporate governance, we construct two different competition indexes and conduct the test at the industry and firm levels. For the industry level analysis, we implement the H-index to measure the degree of concentration, and for the firm level analysis, we use IPCM to assess the market power of a firm and also to measure its probability to be liquidated. We also rate the quality of corporate governance with two different measures, G- and E-indexes.

The results show that product market competition is negatively related to corporate governance – strong competition is associated with poor corporate governance. Our findings are robust to the different competition measures employed, even after controlling for firm value, firm size, stock returns, operating performance, and institutional ownership. The implication is that competition does not affect corporate governance through firm value or firm performance. To circumvent the possible problem of endogeneity between corporate governance and firm value, We also implement the three-stage least squares regressions to reexamine the relationship between competition and corporate governance. The link between strong product market competition and poor corporate governance remains statistically significant at conventional levels.

Finally, we find that well-governed firms earn no significantly higher abnormal returns than poorly governed firms under intense product market competition. However, good firms do perform better than bad firms in a less competitive environment. These findings not only suggest that agency problems may not be as serious as what the previous literature has implied, but also strengthen the importance of product market competition. The overall evidence suggests that competition plays a substitute role in corporate governance mechanisms.

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