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Product market competition, state-ownership, corporate governance and firm performance

Keywords: Corporate Governance; State-Ownership; Product Market Competition; Firm Performance.

1. INTRODUCTION

Debate on privatization or product market competition (PMC) in promoting firm efficiency has not reached conclusive results. A series of papers in public choice literature argue that increased competition in product markets plays a more important role than privatization in promoting allocative efficiency (Kay and Thompson 1986; Millward 1982; Wortzel and Wortzel 1989). Borcherding, Pommerehne, and Schneider (1982 p. 136) state that "given sufficient competition between public and private producers, the differences in unit costs turn out to be insignificant." On the other hand, a number of studies find that government shareholders are more likely to expropriate firm wealth, thus advocating the privatization of public enterprises to enhance firm performance (Bailey 1986; Bishop and Kay 1989; Kikeri, Nellis, and Shirley 1994). However, some studies argue that good corporate governance practices in public enterprises may lead to no inferior efficiency relative to private enterprises (e.g. Sun, Tong, and Tong 2003).

The objective of this study is to investigate the association between product market competition (PMC) and firm performance and how state-ownership and corporate governance practices affect firm performance when operating in markets with higher PMC. Hence, the study posits four research questions: (1) Does PMC affect firm performance? (2) Do corporate governance practices affect firm performance when operating in markets with higher PMC? (3) Does the association between PMC and firm performance for firms controlled by state-ownership differ from firms controlled by non-state-ownership? and (4) Does the effect of state-ownership on the association between PMC and firm performance

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differ for firms with good corporate governance practices from firms without good corporate governance practices?

China provides a distinctive setting of economic system for our investigation. Since the late 1970s, the Chinese government has begun to restructure the Chinese economy from a centrally-planned one to a market-oriented economy. The economic reforms are carried out mainly through the 'Open Door Policy', the permission for entrepreneurs to set up businesses and the partial privatization of state-owned enterprises through the establishment of the Chinese stock market (Zhang 2005). After more than three decades of economic reforms, product markets in China have become increasingly competitive. Market forces of supply and demand have become an important determinant of price formation and economic behaviour (Conway et al. 2010). In addition, the accession to the World Trade Organization (WTO) in 2001 has become one of main impetuses to enhance the role of market mechanisms in allocating resources in China. The Chinese government aims to improve the efficiency of state-owned enterprises through the transition to a socialist market economy with more competitive product markets.

State-ownership remains widespread in Chinese listed firms (Tian and Estrin 2008; Chalmers, Haman, and Qu 2014). Over the years, the role played by state-ownership in listed Chinese firms has been described as either a "grabbing hand" (when state-ownership facilitates the expropriation behaviour through tunnelling) (Chen, Wang, and Lin 2014) or a "helping hand" (when it provides listed firms priority for state-controlled resources thus assists firms to achieve better performance) (Qian 2003; Tian and Estrin 2008; Blanchard and Shleifer 2001; You and Du 2012). To protect minority shareholders' interest and improve operating efficiency of Chinese listed firms, the government has launched a series of profound corporate governance reforms since early 2000s [i]. Corporate governance mechanisms such as board of directors and supervisory board are expected to bestow the

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responsibility of monitoring managerial actions, reducing management slack and strengthening firms' sustainability in the increasingly competitive product market. Prior studies demonstrate that effective corporate governance has played a positive and significant role in improving firm performance in China (Cho and Rui 2007; Su and He 2012).

Based on a sample of 20,706 firm-year observations listed on the Chinese stock market between 2001 and 2016, we report the following findings. First, we find that higher PMC is associated with lower performance of Chinese firms listing on the Shanghai and Shenzhen stock exchanges. In other words, firms operating in markets with higher PMC have lower performance than firms operating in markets with lower PMC. Second, good corporate governance practices moderate the association between higher PMC and lower firm performance. Third, we find that state-ownership does mitigate the negative effect of higher PMC on firm performance. The findings suggest that firms with state-ownership enjoy higher performance relative to firms without state-ownership when operating in markets with higher PMC. Finally and most importantly, we find that the moderation effect of state-ownership on the association between higher PMC and lower firm performance is more pronounced for firms with good corporate governance practices relative to firms without good corporate governance practices.

Our findings are important in extending our understanding on the relationship between PMC and firm performance. Further, they provide insightful knowledge on the role of state-ownership and good corporate governance practices in mitigating the negative effect of higher PMC on firm performance. Extant studies investigating the relationship between PMC and corporate governance assume the former as one of the external corporate governance mechanisms and suggest an either complementary or substitutive relationship between PMC and internal corporate governance in developed economies (Nickell 1996; Schmidt 1997; Giroud and Mueller 2011; Huang and Peyer 2012). However, extant studies

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have largely ignored the interactive role played by the strong presence of state-ownership and good corporate governance practices on firm performance in highly competitive product markets in an emerging economy. Our study contributes to the corporate governance literature by identifying the combined role of state-ownership and good corporate governance practices in improving performance when firms confronting intense PMC.

The findings suggest that in a market-oriented system where state-owned enterprises still dominate Chinese economy, the presence of state-ownership benefits firms when operating in markets with higher PMC. The findings indicate to insiders of Chinese firms, investors, and regulators that the involvement of state-controlling shareholders in business enterprise can mitigate the negative effect of higher PMC on firm performance. Furthermore, the findings imply that with good corporate governance practices, the expropriation behaviour of state-ownership ("grabbing hand") is minimized, leading to the benefits brought by the state-ownership ("helping hand"). The study informs insiders of firms, investors and regulators of the benefits of good corporate governance practices combined with state-ownership in increasing performance of Chinese listed firms when operating in markets with higher PMC. The findings provide insightful information to regulators of other emerging economies that state-ownership with good corporate governance practices can play an important interactive role to enhance firm performance by mitigating the negative effect of higher PMC on firm performance.

The remainder of the paper is structured as follows. Section 2 presents the literature review and develops the hypotheses to be tested. Section 3 discusses the data and research methodology to test hypotheses. Results and analysis are presented in Section 4. Further analyses are discussed in Section 5. Section 6 concludes the study, noting limitations and avenues for future research.

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2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Product market competition and firm performance

Economists argue that PMC promotes resource allocation efficiency. They have provided ample support for this notion by showing that PMC reduces the divergence between equilibrium prices and marginal production costs (Horn, Harald, and Stefan 1994). For individual firms, intense PMC is featured with additional competitors entering into the market, expansion of competitors' market share and reduced product price overall (Porter 1990). In a highly competitive product market, it is common to have cost reductions across all firms and this is accompanied by falling prices.

Extant studies in developed economies assert that a high PMC may decrease or increase firm performance. Schmidt (1997) suggests that increased PMC would increase the likelihood of a firm with high costs becomes less profitable therefore can negatively affect firm performance. On the other hand, Hart (1983) asserts that PMC reduces managerial slack. He contends that in a highly competitive product market, the selling prices of products or services are more likely to fall. Since managers are concerned with their economic interest which may be tied up with firm performance, they are more likely to work hard in order to increase productivity that is more likely to reduce costs and ultimately increase firm performance.

Chinese firms operate in an emerging market where market mechanisms are being developed comparable to those in developed economies. After more than three decades of establishing a socialist market economy, product markets across all China's industrial sectors have become increasingly competitive. However, market for corporate control in China has not been well developed. In addition, the manager job market is typically less competitive

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and inefficient relative to developed economies (Ruan, Tian, and Ma 2011). Lack of sufficient competition and inefficiency in the manager job market suggests weak incentive for managers to enhance firm performance in a highly competitive market. Based on this notion, we develop hypothesis (H1) to address research question 1.

H1: Higher product market competition is associated with lower performance of Chinese firms.

2.2 Corporate governance attributes, state-ownership, product market competition and firm performance

The precedent discussions indicate that China differs from other developed economies in particular related to, the lack of an efficient manager job market and lower managerial ownership. In this type of setting, managers are more likely to have less incentive to enhance firm performance. On the other hand, there is an increasingly competitive product market. If a highly product market competition does negatively affect firm performance, it is interesting to know whether state-ownership and/or good corporate governance moderate this negative association in China. Good corporate governance has becoming an important attribute since the launch of corporate governance reform by the Chinese government in 2001. Furthermore, state-ownership has been one of the unique institutional characteristics of listed firms in China; in particular the state still remains the majority shareholder in 31% of publicly listed firms (Tian and Estrin 2008).

2.2.1 The moderating role of good corporate governance

The role of good corporate governance practices has become more important after the collapse of corporations such as WorldCom and Enron in the U.S., and Chengdu Hongguang and Yinguangxia in China (Fu 2010). There is a perception that lack of good corporate governance practices contributed to such corporate failures. It is well established that good

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corporate governance practices can generally increase firm performance (Fama and Jensen 1983; Weisbach 1988; Agrawal and Knoeber 1996; Su and He 2012). More specifically, well-governed firms have better operating performance because good corporate governance reduces control rights conferred by shareholders and creditors (Shleifer and Vishny 1994). Lending further support to this argument, Gregory and Simms (1999) affirm that good corporate governance is important in attracting lower-cost investment capital through the increase in investors' confidence.

Extant studies examine the effect of good corporate governance on the association between firm value and PMC suggesting two conflicting arguments (Januszewski, Koke, and Winter 2002; Grosfeld and Tressel 2001; Karuna 2010; Byun, Lee, and Park 2011). The substitutive viewpoint asserts that PMC acts as a substitution for good corporate governance as competitive pressure forces managers to maximize firm value (Giroud and Mueller, 2011; Fracassi and Tate 2012; Ammann, Oesch, and Schmind 2013). A highly competitive market reduces corporate profit and erodes market value of shares. This could attract for a corporate takeover, thereby putting pressures on managers to perform well (Roe 2004). Thus, PMC acts as an external disciplinary governance mechanism to minimize agency costs. The complementary view, on the other hand, argues that PMC and good corporate governance practices complement each other in improving firm performance since PMC increases agency costs and hence increases the need for corporate governance mechanisms to closely monitor managers (Karuna 2010; Byun, Lee, and Park 2011).

Studies focusing on China reveal that PMC and corporate governance exhibit a complementary relationship (Jiang and Chen 2007; Chen and Tao 2013; Yu, Li, and Yang 2017). Chen and Tao (2013) find that competitive product market environment reinforces internal control mechanism within Chinese listed firms; Jiang and Chen (2007) suggest that PMC contributes to more stringent monitoring over CEOs. Yu, Li and Yang (2017)

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document the complementarity between PMC and corporate governance, showing that good corporate governance in China significantly increases firm value in more competitive industries. Thus, in China, PMC is one of the impetuses for firms to establish a good corporate governance which in turn, has a positive impact on firm performance. We therefore expect that corporate governance can moderate the negative association between PMC and firm performance in China. Based on these notions, we address research question 2 by proposing hypothesis 2a (H2a):

H2a: Good corporate governance practices moderate the negative effect of higher product market competition on performance of Chinese firms.

2.2.2 The moderating role of state-ownership

State-ownership among listed firms is one of the most distinctive institutional characteristics in China. The effect of state-ownership on firm performance has been controversial. The "helping hand" view presents a variety of potential benefits that state-ownership can bring to firms. For example, state-controlling shareholders could use their extensive government network to get preferential treatments with respect to equity funding and/or debt financing (Cull and Xu 2005), reduced tax or fees (Adhikari, Derashid, and Zhang 2006), and expanded business (Lu 2011). These benefits ultimately help to improve the performance of firms (Tian and Estrin 2008; Blanchard and Shleifer 2001; You and Du 2012; Qian 2003). You and Du (2012) find a significant positive relationship between firm performance and state-ownership.

The competing view is that state-controlling shareholders in China pursue a variety of non-financial objectives through their social roles and responsibilities. For example, state-controlling shareholders assume extensive social responsibilities, including supporting the construction of social facilities and helping to merge loss-making state-owned enterprises

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with profitable firms (e.g. Bai and Xu 2005). Extant studies find that state-controlling shareholders diverting firm resources for their own benefits at the expense of non-controlling shareholders. This "grabbing hand" behaviour has been proven to negatively affect firm performance in both short-term and long run (Aharony, Wang, and Yuan 2010; Cheung, Stouraitis, and Wong 2005).

In a market with higher competition, state-controlling shareholders' expropriation behaviour is likely to be less severe. This is because higher PMC enables non-controlling shareholders to monitor firm performance by using information obtained from the rival firms as the benchmark. An increase in PMC therefore generates more information and promotes the flow of firm-specific information to all shareholders (e.g. Holmstrom 1982; Nalebuff and Stiglitz 1983). Hence, a higher PMC facilitates shareholders' monitoring and enhances firm transparency. A more transparent environment is assumed to mitigate state-controlling shareholders' expropriation behaviour since the latter would attract higher additional costs including reputation loss and drop of share price.

Given that state-controlling shareholders are likely to restrain their expropriation behaviour when firms facing a higher PMC, the role of "helping hand" offers more substantial benefits to firm performance. With the "helping hand" from government, firms with state-ownership are more likely to perform better than firms without it when operating in markets with higher PMC. Using German data, Januszewski, Koke, and Winter (2002) find that state-owned firms operating in markets with higher competition enjoy higher productivity growth. Based on this notion, we address research question 3 by developing hypothesis 2b (H2b).

H2b: The association between higher product market competition and lower performance of Chinese firms is weaker for firms with state-ownership relative to firms without state-ownership.

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2.2.3 The interaction of state-ownership and good corporate governance on PMC and firm performance

As discussed early in hypotheses 2a (H2a) and 2b (H2b), good corporate governance practices and state-ownership are expected to moderate the negative effect of higher PMC on firm performance respectively. State-ownership can have a negative effect on firm performance when it engages in expropriation behaviour. However, extant studies find that good corporate governance practices can reduce this negative effect. Gao and Kling (2008) and Jiang, Lee, and Yue (2010) find that good corporate governance practices such as independent directors can curb state-controlling shareholders' expropriation behavior.

With the good corporate governance practices, it is expected that expropriation behaviour of state-controlling shareholders can be minimized, leading to the benefits which result in better performance and performance. Since state-ownership is expected to increase firm performance when firms operate in markets with higher PMC (Januszewski, Koke, and Winter 2002; Koke and Renneboog 2005), we conjecture that the benefits of state-ownership is more pronounced in firms with good corporate governance practices relative to firms without good corporate governance practices. Based on this conjecture, we develop hypothesis 3 (H3) to address research question 4.

H3: The moderation effect of state-ownership on the association between higher product market competition and lower firm performance is more pronounced for firms with good corporate governance practices relative to firms without good corporate governance practices.

3. RESEARCH DESIGN

3.1 Sample selection

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Our sample comprises all listed firms in the Chinese stock market in the period from 2001 to 2016. The selection of 2001 as the starting sample year is based on the following considerations. First, from 2001 Chinese listed firms are mandatorily required to disclose ownership structure along with the ultimate owners' name in the annual financial reports. This enables us to classify firms into firms with state-ownership (SOEs) and firms without state-ownership (non-SOEs) based on the nature of the ultimate owners of the firm. Second, China Securities Regulatory Commission (CSRC) promulgates the *Guideline for Setting up the Independent Directors Mechanism in Listed Companies* in 2001 followed by the release of the *Code of Corporate Governance for Listed Companies*. These two regulations were regarded as the first comprehensive official guidelines that marked the commencement of the corporate governance reform in China.

We first exclude all firms in utility industry and financial institutions because of the inherent differences in regulatory and institutional structures for these two industry sectors. To match firms with industries, we require firms with non-missing CSRC top-level industry code in the Chinese Stock Market Accounting Research (CSMAR) database. We further delete firm-year observations that do not have adequate financial variables. After applying the above criteria, our final observations in the period from 2001 to 2016 are 20,706 firm-year observations.

3.2 Measurement of product market competition

Our study uses three methods to measure PMC: market concentration, product substitutability, and market size. Most prior research relies on a single dimension, i.e. market concentration, as a proxy for PMC, but produces conflicting results. The inconclusive findings are arguably to be partly attributed to a lack of consideration of whether market structure is exogenous or endogenous, which could lead to market concentration capturing

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only a partial dimension of PMC (Raith 2003). Recent theoretical studies in economics argue that concentration by itself may be a poor proxy for competition and suggest that product market competition embodies several dimensions (Raith 2003; Karuna 2007). Therefore, following prior research (Leventis, Weetman, and Caramanis 2011; Karuna 2009), this study considers three determinants of competition: concentration, product substitutability, and market size. These three determinants are discussed as follows.

The first determinant of competition is market concentration. As a market becomes less concentrated, price and unit margins would decline, due to higher competition among existing market participants. Consistent with prior studies (e.g. Giroud and Mueller 2011; Aggarwal and Samwick 1999), we use Herfindahl-Hirschman index (denoted as *HHI*) as a measure of market concentration. *HHI* is calculated for CSRC top-level industries by summing the square of the individual firm market shares based on total sales of all available listed firms in the industry from the CSMAR database. A higher value of *HHI* indicates a lower competition.

The second determinant of competition is product substitutability. Product substitutability is defined as the extent to which a close substitute exists for a particular product in an industry. Where there are higher degrees of substitutability, the intensity of price competition is greater, thus product market is being deemed more competitive. Prior studies in the Industrial Organizations literature use the price-cost margin as a measure of product substitutability, with low (high) levels of the price-cost margin signifying high (low) levels of substitutability. Consistent with prior research (e.g. Nevo 2001), we use price-cost margin (denoted as *SUB*) as a measure of product substitutability. *SUB* is calculated as total industry sales divided by total industry operating costs at top-level CSRC industry. The total industry sales and total industry operating costs are calculated based on all available listed

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firms in the industry from the CSMAR database. A higher value of *SUB* indicates a lower competition.

The third determinant of competition is market size. Market size refers to the consumers' demand for a particular product in an industry. As the market demand for a product increases at a given price, sales of that product are more likely to increase accordingly. Attracted by the prospect of the product, more new firms enter into that industry, thus increasing PMC (Sutton 1991). Following prior research (Karuna 2009), we use total sales at the industry level (denoted as *MKTSIZE*) as a measure of market size. *MKTSIZE* is calculated as the logarithm of total industry sales at top-level CSRC industry based on all available listed firms in the industry from the CSMAR database. A higher value of *MKTSIZE* indicates a higher competition.

3.3 Measurement of good corporate governance practices

We manually construct an internal corporate governance index as a measure of corporate governance practices.[ii] The index is based on the practice of the two-tier boards in Chinese listed firms because the *Guideline for Setting up the Independent Directors Mechanism in Listed Companies* and the *Code of Corporate Governance for Listed Companies* specifically address the importance of the two-tier boards in aligning interests of managers with shareholders and protecting minority shareholders' interests. The index consists of three sub-indexes. The first sub-index is the board independence, measured by the ratio of the number of independent directors over the total number of board of directors. Higher ratio indicates higher independence of board of directors (denoted as *indep*). The second is the monitoring strength of supervisory board over board of directors, captured by the number of supervisory board divided by the number of board of directors.[iii] Higher ratio is deemed more effective of the supervisory board overseeing board of directors (denoted as

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tbsize). The third sub-index is the monitoring strength of board of directors over CEO, proxied by the separation of the CEO and chairman-of-the-board position. The separation of the two positions indicates greater strength in monitoring CEOs (denoted as *duality*).

The information on corporate governance attributes is extracted from the CSMAR database. We calculate median values of *indep* and *tbsize* for each sample year. If the value of *indep* (*tbsize*) is above the median, the board independence sub-index (the monitoring strength of supervisory board sub-index) is set to 1 and zero otherwise. If a firm's CEO is separated from the chairman position, the monitoring strength of board of director sub-index is set to 1 and zero otherwise. To compile a comprehensive corporate governance measure (*CGI*), we consider a firm having good corporate governance practices if at least two sub-indexes have values of 1. For firms having good corporate governance, *CGI* equals 1 and zero otherwise.

3.4 State-ownership

Following Bortolotti and Faccio (2009) who argue that the identification of state control over business enterprises should take into account the indirect ownership by government, this study classifies the ultimate controlling shareholders into state-controlling shareholders and non-state-controlling shareholders based on the information of ownership structure disclosed by firms in their annual financial reports. Since 2001 Chinese listed firms are mandatorily required to disclose whether firms have ultimate controlling shareholders. This enables us to identify the names of ultimate controlling shareholders and define the nature of the ultimate controlling shareholders. If firms' ultimate controlling shareholders are government agencies, they are classified as SOEs. If firms are ultimately controlled by private, they are classified as non-SOEs. The presence of state shareholders has been used by

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prior research investigating the impact of politician influence (e.g. Avendano and Santiso 2010; Sun et al. 2003).

3.5 Measurement of firm performance

We use Tobin's Q (Tobinq) as a market-based measure of firm performance. For the additional test, we employ return on assets (ROA) as an accounting-based measure of firm performance. Tobin's Q is defined as the sum of the market value of equity and the book value of net debt, divided by total assets. Prior studies have extensively used Tobin's Q as a proxy for firm performance. It has been shown robust to different time-periods and countries (Jain and Kini 1994; Gompers, Ishii, and Metrick 2003; Moeller, Schlingemann, and Stulz 2004; Krishnan et al. 2011).

3.6 Empirical model

We employ multivariate analysis to test hypotheses. The regressions are estimated at the firm-year level. The firm-year level analysis allows us to control for the possible differences in the industry mix of sample firms over time which may affect the level of performance (Bushman, Engel, and Smith 2006). We estimate *t* statistics correcting for heteroscedasticity.

We use the following regression specification to examine H1 whether higher PMC is associated with lower performance of Chinese listed firms.

$$\begin{aligned} TOBINQ_{i,t} = {} & \alpha + \beta_1 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 CHSLS_{i,t} \\ & + \beta_5 CGI_{i,t} + \beta_6 SOE_{i,t} + \beta_7 CLIST_{i,t} + \delta YearDum_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

We expand regression (1) by including the interaction between good corporate governance practices and PMC to test H2a - whether good corporate governance practices moderate the negative effect of higher PMC on performance of Chinese listed firms. The regression specification is as follows:

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$$TOBINQ_{i,t} = \alpha + \beta_1 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) + \beta_2 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) \times CGI_{i,t} + \beta_3 CGI_{i,t} + \beta_4 SOE_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 LEV_{i,t} + \beta_7 CHSLS_{i,t} + \beta_8 CLIST_{i,t} + \delta YearDum_{i,t} + \varepsilon_{i,t} \quad (2)$$

To test H2b - whether the negative effect of higher PMC on performance of Chinese listed firms is weaker in SOEs compared to non-SOEs, we expand regression (1) by including the interaction between SOEs and PMC. The regression specification is as follows:

$$TOBINQ_{i,t} = \alpha + \beta_1 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) + \beta_2 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) \times SOE_{i,t} + \beta_3 SOE_{i,t} + \beta_4 CGI_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 LEV_{i,t} + \beta_7 CHSLS_{i,t} + \beta_8 CLIST_{i,t} + \delta YearDum_{i,t} + \varepsilon_{i,t} \quad (3)$$

To test H3 we partition the total sample into two sub-samples: one with good corporate governance practices, and the other without good corporate governance practices. We run regression (3) for the two sub-samples and compare the coefficients on the variables of interest across two sub-samples.

We investigate the relationship between corporate governance, state ownership and firm performance across industries with different degrees of product market competition. We build two-quantile of the empirical distribution of each PMC measures and assign a dummy variable to each firm-year observation according to whether a firm is in the industry with the highest HHI (SUB, MKTSIZE), or the lowest HHI (SUB, MKTSIZE). This approach is similar to Ammann et al. (2013) and Gompers et al. (2003).

We include a number of commonly used control variables that prior literature finds to be associated with firm performance (e.g. Chen, Firth, and Xu 2009). Firm size (*size*), measured by log of total assets, is used to control for economies of scale or the size effect. Leverage ratio (*lev*) is included to control for influence of capital structure on firm performance. Change in Sales (chsls), measured by the increase or decrease in sales revenue over the past year, is to capture the ability of a firm to generate sales revenue. As indicated by prior research, larger firms and firms with higher leverage are expected to have lower performance. Firms with higher positive change in sales revenue are expected to achieve better performance. We further include a dummy variable indicating whether a firm is a *SOE* and a dummy variable indicating whether a firm has good corporate governance mechanism

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(*CGI*), because prior studies suggest that SOEs firms and well-governed firms are associated with better firm performance. In addition, we include *CLIST* controlling for difference in regulatory environment and requirements which may affect firm performance due to the cross-listing status. Appendix A provides detailed explanation of variables.

4. EMPIRICAL RESULTS

4.1 Sample distribution

Table 1 presents the sample distributions over years and industry sectors, represented by the number of firms. It shows that the final sample comes from 12 industries, with the highest percentage of observations coming from the manufacturing sector, followed by firms from the information technology, while the communication industry has the lowest percentage.

Insert Table 1 here

4.2 Descriptive statistics

Table 2, Panel A reports mean values of three proxies for product market competition by year. It shows that the Chinese product market overall becomes more competitive across years. Panel B summarizes descriptive statistics for the dependent variable and control variables. To remove the potential impact of the outliers, all the control continuous variables are winsorized at 1 per cent percentile. The average *Tobinq* is 2.522, similar to the statistics presented by Wu et al. (2012). Among the final sample, 88 per cent are classified as having good corporate governance practices, 54.22 per cent of observations are SOEs, and 7.36 per cent are cross-listed overseas. Furthermore, Panel B reports the univariate tests of the differences between variables for sub-samples with high versus low market competition using Herfindahl-Hirschman index as a measure of competition (*HHHI*). It shows that firms in a

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more competitive market are associated with lower firm performance, have smaller firm size and lower leverage, exhibit lower sales growth, establish weak corporate governance mechanisms, are less likely to be controlled by state, and less likely to be listed overseas. The univariate comparison remains similar when we use product substitutability and market size as measures of the market competition.

Insert Table 2 here

Table 3 presents the Pearson correlations of variables. The correlation coefficients among most variables are relatively low, suggesting collinearity problems are not a concern. Firm performance (*Tobinq*) is negatively associated with *HHHI* and *HSUB*, and positively related to *HMKTSIZE*. Consistent with prior research, firm performance (*Tobinq*) is negatively related to firm size (*size*), leverage ratio (*lev*), and the nature of ultimate owner being government (*SOE*). The absolute value of correlation coefficients between *HHHI* and *HMKTSIZE,* and *HSUB* and *HMKTSIZE* are above 0.5, while the correlation between *HHHI* and *HSUB* is 0.417. The correlations among the measures of competition imply that our measures capture different dimensions of PMC.

Insert Table 3 here

4.3 Firm performance and product market competition

Table 4 Panel A presents the results of testing hypothesis 1 (H1) using equation (1). Column I reports regression results when market concentration (*HHHI*) is used as a measure of market competition. The coefficient on the variable of interest *HHHI* shows 0.181 (*t statistic* =7.36) at the one per cent level which is significantly and positively associated with firm performance (*Tobinq*). Since dummy *HHHI* indicates lower PMC, the result suggests that lower product competition is associated with higher firm performance. Results are similar when PMC is measured by product substitutability (*HSUB*). Column III in Panel A

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presents the results from the regression where market size (*HMKTSIZE*) is included as the proxy for PMC. The coefficient on *HMKTSIZE* shows -0.126 (*t statistic* -5.36). Since dummy *HMKTSIZE* indicates higher PMC, the result suggests that higher product competition is associated with lower firm performance. Collectively, the results in Panel A suggest that higher PMC is significantly associated with lower performance of Chinese listed firms. The results support hypothesis 1 (H1).

The estimation results for control variables in regression (1) are generally consistent with those presented by prior studies (e.g. Chen, Firth, and Xu 2009). The negative coefficients on *size* suggest that smaller firms have higher performance. Similarly, the negative coefficients on *lev* indicate that highly leveraged firms are associated with lower firm performance. The positive coefficients on *CHSLS* suggest that positive changes in sales revenue reflect better firm performance. The coefficients for *CLIST* are significantly positive, suggesting that compared to firms listed only domestically, firms cross-listed overseas are valued higher. There is no statistical evidence supports those firms with good corporate governance achieve better performance. The significantly negative coefficients on *SOE* across the three columns indicate that firms controlled by state are associated with lower firm performance.

Insert Table 4 here

4.4 The impact of good corporate governance practices on the association between firm performance and product market competition

Column I to Column III in Panel B of Table 4 presents the regression results of testing hypothesis 2a (H2a). Column I reports the results when we use market concentration (*HHHI*) as a measure of competition. The coefficient of *HHHI* is 0.304 (*t statistic* =4.80), significantly and positively associated with firm performance at the one per cent level. The

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result means that lower (higher) PMC is significantly associated with higher (lower) performance of firms without good corporate governance practices. On the other hand, the coefficient of the variable of interest, namely *HHHI*CGI* shows -0.14 (*t statistic* = -2.11) significantly and negatively associated with firm performance at the five per cent level. The negative coefficient of *HHHI*CGI* suggests that the association between higher PMC and lower firm performance is weaker for firms with good corporate governance practices relative to firms without good corporate governance practices. Column II and column III report similar results when we use product substitutability (*HSUB*) and market size (*HMKTSIZE*) as measures of competition. The coefficient on *HSUB*CGI* shows -0.132 (*t statistic* = -1.93), significantly and negatively associated with firm performance at the five per cent level, while the positive coefficient of *HMKTSIZE*CGI* suggests that the association between higher PMC and lower firm performance is weaker for firms with good corporate governance practices relative to firms without good corporate governance practices. Hence, the results in columns I, II and III in Panel B of Table 4 support hypothesis 2a (H2a). The results of the control variables across these three Columns are qualitatively similar to those reported in Panel A of Table 4.

4.5 State-ownership and the relationship between product market competition and firm performance

Column IV to Column VI in Panel B of Table 4 report the results of testing hypothesis 2b (H2b) - whether the negative effect of PMC on performance of Chinese listed firms is weaker in SOEs. Column IV presents the results when market concentration (*HHHI*) is used as a measure of competition. The coefficient of *HHH1* shows 0.493 (*t statistic* =14.37) and is significantly and positively associated with firm performance at the one per cent level. Since higher *HHHI* indicates lower PMC, the result means that lower (higher) PMC is significantly

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associated with higher (lower) performance for non-SOEs. On the other hand, the coefficient of *HHHI*SOE* is negative and significant at the one per cent level (-0.569 with *t statistic* = -12.97) suggesting that the negative effect of PMC on firm performance is much weaker in SOEs compared to non-SOEs. The results are similar when product substitutability (*HSUB*) is a proxy for competition in Column V and market size (*MKTSIZE*) as a measure of competition in Column VI. In general, the results suggest that the presence of government shareholders moderates the association between higher PMC and lower performance in Chinese listed firms.

4.6 Endogeneity testing

The findings may potentially subject to the endogeneity problem. For example, it is possible that firms with weak corporate governance mechanisms make an unwise decision to enter into a fiercely competitive market or SOEs utilize its political flavour to be able to operate in industries with lower competition. To address this concern, we use the corporate governance index and whether a firm is SOE in the last year as instrumental variables and re-run two-stage least squares regressions (2SLS) for Panel B of Table 4. The estimation results are reported in Panel C of Table 4. As compared to Panel B of Table 4, the results are qualitatively unchanged except that when market size (HMKTSIZE) is used as a measure of product market competition, the results are opposite to what have been presented in Panel B of Table 4.

4.7 The moderation effect of state-ownership and good corporate governance practices

To test hypothesis 3 (H3), we partition total sample into two subsamples: one having good governance practices and the other without good corporate governance practices, and

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re-run regression (3). The regression results are reported in Table 5. Column I of Table 5 presents the results when market concentration (*HHHI*) is used as a measure of competition. The coefficient of the variable of interest, namely *HHHI*SOE* of firms with good corporate governance practices (*CGI*=1) shows -0.548 (*t statistic* = -11.72), significantly and negatively associated with firm performance at the one per cent level. When firms are not characterized with good corporate governance practices (*CGI* = 0), we do not find that the coefficient of *HHHI*SOE* is statistically significant. The result demonstrates the moderation effect of SOE on the association between higher PMC and lower performance for firms with good corporate governance practices is more pronounced than for firms without good corporate governance practices.

When we use *HSUB* as a measure of competition, we find the coefficients of *HSUB*SOE* are statistically significant and negative for firms both with and without good corporate governance practices (see column II in Table 5). The comparison of the two coefficients indicate that the moderation effect of SOE is more pronounced for firms with good corporate governance. When we use *HMKTSIZE* as a measure of competition, we find that the coefficients of *HMKTSIZE*SOE* for the sample firms with (*CGI = 1*) and without good corporate governance practices (*CGI = 0*) are both significantly positive. The comparison of the two coefficients suggests that the coefficient on *HMKTSIZE*SOE* for the sample firms with good corporate governance practices is significantly higher than the one of *HMKTSIZE*SOE* for the sample firms without good corporate governance practices. The results show that the moderation effect of SOEs on the association between higher PMC and lower performance is more pronounced for firms with good corporate governance relative to firms without good corporate governance practices. Collectively the results in Table 5 support hypothesis 3 (H3).

Insert Table 5 here

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5. ADDITIONAL ANALYSES

In this section, we perform a series of tests to examine the robustness of the main findings[iv].

First, the empirical results above are built on the firm-level analysis while PMC is calculated at the industry level. To make the level of measurement consistent, we perform the regression analyses at the industry level. We transform the firm-level measures into industry level variables by taking the equal-weighted industry average of each firm's variable of interest. As a result, binary variables are converted to continuous variables. The analyses on industry level suggest that the main findings are qualitatively similar to the main results.

Second, we construct the corporate governance measure as a continuous variable. Instead of classifying a firm having good corporate governance if at least two of the three sub-indexes (*indep tbsize*, *duality*) have a value of 1, we add up the value of sub-indexes and take the sum as the value of corporate governance (denoted as *NCGI*). Results from equation (2) suggest when *HHHI* (*HSUB*) is used as a measure of competition, the coefficient on *HHHI* (*HSUB*) is 0.277 with *t statistic* = 5.07 (0.356 with *t statistic* = 6.09), and the coefficient for *HHHI*NCGI* (*HSUB*NCGI*) -0.109 with *t statistic* = -1.98 (-0.110 with *t statistic* = -1.85). When *HMKTSZIE* is a proxy for competition, the coefficient for *HMKTSIZE* shows -0.212 (*t statistic* = -4.15) and the coefficient of *HMKTSIZE*NCGI* is 0.096 (*t statistic* = 1.89). The results suggest that good corporate governance moderates the negative effect of higher PMC on firm performance.

Third, we employ ROA as a measure for firm performance following Dybvig and Warachka (2012). Results from Equation (1) using ROA suggest coefficient on *HHHI* is significantly positive, and coefficient on *HMKTSIZE* is significantly negative, but the coefficients on *HSUB* are not significant. Results from Equation (2) suggest the coefficients

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on *HHHI*CGI* is significantly negative, but not significant on *HSUB*CGI* and *HMKTSIZE*CGI*. Results from Equation (3) show that the coefficient on *HMKTSIZE*SOE* is significantly positive. We do not find significant results consistent with *H3* after we partition total sample into firms with good corporate governance practices and those without good corporate governance practices.

Fourth, the findings in this study could vary with the institutional development. Prior studies find that institutional factors influence firm performance, and are associated with corporate governance practices and the presence of SOEs in business enterprises. In China, there is a great heterogeneity in the degree of institutional development of its provinces (Allen, Qian, and Qian 2005). We use Fan and Wang's (2001, 2002, 2003, 2004, 2006, 2007, 2008, 2009) index of the market development of Chinese provinces as a proxy for institutional development. To examine the influence of regional disparity, we locate the provinces sample firms are headquartered, and classify provinces as having high (low) institutional development when provincial market development index are above (below) the median value of the annual index. We re-run equations on the two subsamples; one with low and the other one with high intuitional development. The results suggest that our findings are not influenced by the intuitional development.

Fifth, politically-connected managers could bring in various forms of government-related benefits, e.g. favourite bank loans. It is possible that managers' political connections may influence the moderation effect of SOEs on firm performance when firms operating in markets with higher PMC. We therefore control for political connection by including a dummy variable (*PC*) equalling 1 if a firm's Chairman of board of directors and/or CEO is politically-connected. Wu et al. (2012) find that politically-connected managers have different impact on firm performance depending on whether firms are controlled by state shareholders. We accordingly partition total sample into SOEs and non-SOEs. Results from

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equation (3) show that the coefficient on *HHHI*PC* (*HSUB*PC*, *HMKTSIZE*PC*) is not significant in the SOEs subsample. For the non-SOEs subsample, estimation results from equation (3) show that the coefficient on *HSUB*PC* (*HMKTSIZE*PC*) is -0.156 (0.193) with associated t-statistics -2.49 (2.69), while the coefficient on *HHHI*PC* is not significant. The results suggest that our main findings remain robust after controlling for politically-connected managers. In addition, the analysis indicates that non-SOEs having connection with politicians through appointment of political-connected managers are associated with higher firm performance in highly competitive industries.

Sixth, Chinese capital market has dropped considerably since 2007. The change in market-wide pricing parameter would affect Tobin's Q. We therefore divide total sample into two subsamples with one subsample is from the period 2001 to 2006 and the other is from the period 2007 to 2016, and re-run equations. Results suggest that our findings are robust to different time-periods. Seventh, cross-listed firms are exposed to different regulatory environment from domestically listed firms. We therefore exclude cross-listed firms. The findings are qualitatively similar to the main results.

Finally, we exclude the board independence, and use the monitoring strength of supervisory board over board of directors and the monitoring strength of board of directors over CEO to construct our corporate governance index. The reason is that the *Guideline for Setting up the Independent Directors Mechanism in Listed Companies* regulates that listed companies should have at least one third of independent directors. Therefore the board independence may not effectively capture good corporate governance in China. After applying this new measure of corporate governance, the findings are qualitatively similar to the main results.

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6. CONCLUSION

This study investigates the influence of state-ownership and good corporate governance practices on the performance of Chinese listed firms operating in markets with higher PMC. We construct a corporate governance index which measures the extent of board independence, monitoring strength of supervisory board over board of directors, and monitoring strength of board of directors over CEOs. We consider different dimensions of the PMC that affect the nature of competition, and use market concentration, product substitutability and market size as the proxies for PMC.

Our study provides empirical evidence that Chinese listed firms achieve lower performance when they are confronted with higher PMC. We also find that state-ownership and/or good corporate governance practices can moderate the negative effect of higher PMC on firm performance. The findings suggest that in a transition economy where there is a strong presence of state-owned enterprises, state-ownership benefits firms when operating in markets with higher PMC. The study informs insiders of firms, investors and regulators that the moderation effect of state ownership on the association between higher PMC and lower performance is more pronounced for firms with good corporate governance practices relative to firms without good corporate governance practices. The findings suggest that good corporate governance practices restrain state-controlling shareholders' expropriation behaviour ("grabbing hand") and lead to the benefits brought by state-controlling shareholders ("helping hand") to firms when operating in markets with higher PMC. The findings can be extended to other emerging countries that state ownership with good corporate governance practices can play an important role in the economy by mitigating the negative effect of higher PMC on firm performance.

Our study is subject to several limitations. First, corporate governance measurement of listed firms in China is not publicly available. In this study, we manually construct a

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corporate governance index which mainly measures the two-tier boards. Regulations require that supervisory board and board of directors in China play major roles in establishing and maintaining effective corporate governance mechanisms. Researchers also find the two-tier boards influence the effectiveness of corporate governance system. However, future research may explore a more comprehensive measurement of corporate governance practices. Second, the measures of PMC are computed from the CSMAR database, which includes only publicly listed firms rather than all Chinese firms. Even though Chinese listed firms serve as a good indicator of Chinese economy, future research exploring the market competition based on all Chinese firms may be warranted.

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Table 1 Sample Distribution

Table 1 reports the number of firm within each industry group in each year over the period 2001–2016. The industry index is officially coded by the CSRC. The total sample is classified into each industry, based on the reported top-level CSRC industry code. The industry codes are: A: Agriculture, Forestry and Fishing; B: Mining; C: Manufacturing; D: Electricity, Gas, and Water Production and Supply; E: Construction; F: Transportation and Warehousing; G: Information Technology; H: Wholesale and Retail Trade; J: Real Estate; K: Services; L: Communication; M: Multi-industry.

year	A	B	C	D	E	F	G	H	J	K	L	M
2001	3	4	50	8	0	3	9	12	17	10	2	4
2002	3	4	82	12	1	7	7	21	19	6	5	7
2003	5	6	131	21	2	12	9	28	27	13	5	7
2004	10	13	261	23	8	24	20	46	43	20	6	16
2005	17	26	467	46	18	32	45	67	71	24	13	37
2006	21	28	578	64	21	47	57	82	86	31	14	39
2007	23	33	650	64	26	56	63	86	92	32	13	42
2008	24	42	721	64	30	60	69	89	101	38	16	40
2009	26	48	766	65	32	60	76	90	108	40	17	41
2010	29	49	851	66	35	60	103	95	110	48	20	42
2011	38	56	1,096	68	41	69	143	109	110	62	28	42
2012	40	57	1,262	70	47	74	171	111	109	67	33	45
2013	43	64	1,364	70	53	76	191	117	113	74	37	48
2014	43	64	1,346	70	52	72	192	113	111	72	38	47
2015	41	64	1,332	71	51	73	185	116	108	71	37	43
2016	36	52	1,037	64	42	66	147	102	89	58	33	36
Total	402	610	11,994	846	459	791	1,487	1,284	1,314	666	317	536

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Table 2 Descriptive Statistics

Panel A: Mean values of product market competition measures by year

year	HHI	SUB	MKTSIZE
2001	0.063	1.289	25.790
2002	0.055	1.288	26.185
2003	0.058	1.285	26.501
2004	0.058	1.262	26.885
2005	0.064	1.231	27.038
2006	0.060	1.240	27.243
2007	0.054	1.255	27.623
2008	0.059	1.232	27.804
2009	0.054	1.254	27.892
2010	0.052	1.261	28.263
2011	0.050	1.250	28.551
2012	0.049	1.241	28.668
2013	0.050	1.243	28.777
2014	0.048	1.253	28.839
2015	0.046	1.254	28.884
2016	0.045	1.264	28.974
Average	0.052	1.251	28.293

Panel B: descriptive statistics

Variable	N	Mean	Min	Max	HHHI=0	HHHI=1	Mean difference^
					Mean	Mean	
Tobinq	20,706	2.522	0.762	20.381	2.491	2.550	-0.05**
size	20,706	21.857	19.063	26.046	21.726	21.971	-0.24***
lev	20,706	0.465	0.026	0.935	0.442	0.485	-0.04***
chsls	20,706	0.227	-0.825	8.094	0.211	0.241	-0.03***
CGI	20,706	0.880	0	1	0.863	0.895	-0.031***
SOE	20,706	0.542	0	1	0.474	0.6	-0.125***
CLIST	20,706	0.073	0	1	0.069	0.077	-0.082**

Note: The variables are defined in Appendix A. HHHI=1 (0) if Herfindahl-Hirschman index in a particular year is greater than (lower) the median value. ^ T-test for the difference of continuous variables and Z-test for the binomial variables.

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Table 3 Correlations

	HHHI	HSUB	HMKTSIZE	Tobinq	size	lev	chsls	CGI	SOE	CLIST
HHHI	1									
HSUB	0.4174***	1								
HMKTSIZE	-0.6969***	-0.5963***	1							
Tobinq	-0.0150**	-0.0442***	0.0679***	1						
size	0.0973***	0.0669***	0.0065	-0.3941***	1					
lev	0.1016***	-0.0149**	-0.0903***	-0.2933***	0.3802***	1				
chsls	0.0226***	0.0649***	-0.0426***	0.0581***	0.0362***	0.0542***	1			
CGI	0.0492***	-0.0047	-0.0197***	-0.0059	0.0943***	0.0936***	-0.0082	1		
SOE	0.1261***	0.0721***	-0.1671***	-0.2394***	0.2758***	0.2647***	-0.0443***	0.1662***	1	
CLIST	0.0157**	0.0193***	-0.0161**	-0.0964***	0.2566***	0.0945***	-0.0213***	0.0335***	0.1744***	1

Note: The variables are defined in Appendix A
***, **, * indicate statistical significance at the 0.01, 0.05, 0.1 level, respectively, based on a two-tailed test

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Table 4: Regression analysis results

Panel A: Coefficient estimate for the association between firm performance and product market competition

Variable	Column I	Column II	Column III
HHHI	0.181***		
	(7.36)		
HSUB		0.257***	
		(10.55)	
HMKTSIZE			-0.126***
			(-5.36)
size	-0.681***	-0.680***	-0.677***
	(-64.68)	(-64.77)	(-64.39)
lev	-1.015***	-0.973***	-1.011***
	(-17.59)	(-16.88)	(-17.51)
chsls	0.211***	0.204***	0.211***
	(13.21)	(12.81)	(13.22)
CGI	0.0362	0.0404	0.0394
	(1.07)	(1.2)	(1.16)
SOE	-0.190***	-0.189***	-0.186***
	(-7.78)	(-7.78)	(-7.65)
CLIST	0.316***	0.309***	0.313***
	(7.39)	(7.23)	(7.31)
Intercept	17.75***	17.57***	17.76***
	(71.67)	(70.98)	(71.64)
Year dummy	Yes	Yes	Yes
N.	20706	20706	20706
Adj. R^2	0.377	0.379	0.376

The table reports the results from the estimation of the following regression:

$$TobinQ_{i,t} = \alpha + \beta_1 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) + \beta_2 size_{i,t} + \beta_3 lev_{i,t} + \beta_4 chsls_{i,t} + \beta_5 CGI_{i,t} + \beta_6 SOE_{i,t} + \beta_7 CLIST_{i,t} + \delta YearDum_{i,t} + \varepsilon_{i,t} \quad (1)$$

The variables are defined in Appendix A. For brevity, the coefficients on the year dummies are not reported.
***, **, * indicate statistical significance at the 0.01, 0.05, 0.1 level, respectively, based on a two-tailed test

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Panel B: The results of testing the effect of good corporate governance practices and state-ownership on the association between PMC and performance.

Variable	Column I	Column II	Column III	Column IV	Column V	Column VI
HHHI	0.304***			0.493***		
	(4.8)			(14.37)		
HSUB		0.374***			0.514***	
		(5.73)			(14.61)	
HMKTSIZE			-0.298***			-0.381***
			(-4.56)			(-11.17)
HHHI*CGI	-0.140**					
	(-2.11)					
HSUB*CGI		-0.132*				
		(-1.93)				
HMKTSIZE*CGI			0.192***			
			(2.82)			
HHHI*SOE				-0.569***		
				(-12.97)		
HSUB*SOE					-0.453***	
					(-10.10)	
HMKTSIZE*SOE						0.461***
						(10.31)
CGI	0.103**	0.090**	-0.076	0.021	0.035	0.026
	(2.22)	(2.12)	(-1.44)	(0.64)	(1.06)	(0.78)
SOE	-0.190***	-0.190***	-0.189***	0.108***	-0.0219	-0.458***
	(-7.82)	(-7.81)	(-7.74)	(3.24)	(-0.75)	(-12.77)
size	-0.681***	-0.680***	-0.677***	-0.673***	-0.674***	-0.673***
	(-64.65)	(-64.75)	(-64.37)	(-64.06)	(-64.31)	(-64.18)
lev	-1.017***	-0.975***	-1.014***	-1.067***	-1.001***	-1.054***
	(-17.62)	(-16.92)	(-17.56)	(-18.52)	(-17.38)	(-18.25)
chsls	0.211***	0.204***	0.211***	0.206***	0.200***	0.209***
	(13.2)	(12.81)	(13.22)	(12.98)	(12.58)	(13.11)
CLIST	0.317***	0.310***	0.314***	0.314***	0.306***	0.310***
	(7.41)	(7.25)	(7.34)	(7.36)	(7.19)	(7.26)
Intercept	17.68***	17.51***	17.83***	17.45***	17.45***	17.96***
	(70.75)	(70.03)	(71.59)	(70.46)	(70.59)	(72.4)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
N	20706	20706	20706	20706	20706	20706
Adj. R^2	0.377	0.379	0.376	0.382	0.382	0.379

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The table reports the results from the estimation of the following regression:

$$TobinQ_{i,t} = \alpha + \beta_1 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) + \beta_2 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) \times CGI_{i,t} + \beta_3 CGI_{i,t} + \beta_4 SOE_{i,t} + \beta_5 size_{i,t} + \beta_6 lev_{i,t} + \beta_7 CHSLS_{i,t} + \beta_8 CLIST_{i,t} + \delta YearDum_{i,t} + \varepsilon_{i,t} \quad (2)$$

The table reports the results from the estimation of the following regression:

$$TobinQ_{i,t} = \alpha + \beta_1 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) + \beta_2 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) \times SOE_{i,t} + \beta_3 SOE_{i,t} + \beta_4 CGI_{i,t} + \beta_5 size_{i,t} + \beta_6 lev_{i,t} + \beta_7 CHSLS_{i,t} + \beta_8 CLIST_{i,t} + \delta YearDum_{i,t} + \varepsilon_{i,t} \quad (3)$$

The varialbes are defined in Appendix A. For brevity, the coefficient on the year dummies are not reported.
***, **, * indicate statistical significance at the 0.01, 0.05, 0.1 level, respectively, based on a two-tailed test

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Panel C: Competition, firm performance, corporate governance and SOEs: 2SLS

Variable	Column I	Column II	Column III	Column IV	Column V	Column VI
HHHI	6.928***			2.868***		
	(15.38)			(27.46)		
HSUB		0.249			0.785***	
		(0.65)			(6.52)	
HMKTSIZE			6.610***			9.461***
			(12.84)			(13.98)
HHHI*CGI	-6.586***					
	(-14.62)					
HSUB*CGI		0.0271				
		(0.07)				
HMKTSIZE*CGI			-6.470***			
			(-12.60)			
HHHI*SOE				-2.949***		
				(-26.58)		
HSUB*SOE					-0.706***	
					(-5.64)	
HMKTSIZE*SOE						-9.125***
						(-13.42)
CGI	3.282***	0.12	4.183***	0.0196	0.121***	0.406***
	(14.78)	(0.8)	(12.84)	(0.44)	(2.87)	(4.67)
SOE	-0.597***	-0.483***	-0.265***	0.973***	-0.229***	5.701***
	(-17.73)	(-16.91)	(-7.24)	(15.52)	(-4.41)	(12.42)
size	-0.521***	-0.513***	-0.537***	-0.508***	-0.512***	-0.626***
	(-37.93)	(-43.56)	(-38.30)	(-40.76)	(-43.38)	(-24.95)
lev	-1.788***	-1.591***	-1.429***	-1.938***	-1.600***	-0.253
	(-21.72)	(-22.65)	(-17.04)	(-25.82)	(-22.77)	(-1.47)
chsls	0.216***	0.223***	0.263***	0.196***	0.210***	0.427***
	(8.94)	(10.77)	(10.81)	(8.92)	(10.02)	(9.81)
CLIST	0.222***	0.143***	0.0799	0.206***	0.147**	0.103
	(3.68)	(2.77)	(1.32)	(3.77)	(2.85)	(0.99)
Intercept	11.65***	14.56***	10.84***	13.42***	14.36***	9.825***
	(33.5)	(52.34)	(26.84)	(50.81)	(58.1)	(16.49)
N	17796	17796	17796	17796	17796	17796

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Table 5 Coefficient estimate for the moderation effect of SOEs on the association between product market competition and firm performance for firms with good corporate governance compared to firms without good corporate governance.

	Column I		Column II		Column III	
	CGI=1	CGI=0	CGI=1	CGI=0	CGI=1	CGI=0
HHHI	0.484***	0.053***				
	(12.92)	(6.04)				
HSUB			0.508***	0.539***		
			(13.23)	(6)		
HMKTSIZE					-0.358***	-0.491***
					(-9.61)	(-5.74)
*HHHI*SOE*	-0.548***	-0.077				
	(-11.72)	(-1.45)				
*HSUB*SOE*			-0.443***	-0.156*		
			(-9.23)	(-1.86)		
*HMKTSIZE*SOE*					0.440***	0.204**
					(9.23)	(2.01)
gov	0.101***	0.158	-0.023	-0.01	-0.443***	-0.574***
	(2.88)	(1.41)	(-0.78)	(-0.11)	(-11.65)	(-4.90)
SOE	-0.665***	-0.753***	-0.667***	-0.745***	-0.665***	-0.751
	(-60.28)	(-21.72)	(-60.58)	(-21.47)	(-60.41)	(-21.64)
SIZE	-1.117***	-0.732***	-1.051***	-0.685***	-1.104***	-0.739***
	(-18.21)	(-4.31)	(-17.14)	(-4.03)	(-17.95)	(-4.34)
LEV	-0.209***	-0.200***	-0.203***	-0.190***	-0.212***	0.199***
	(-12.35)	(-4.28)	(-11.99)	(-4.04)	(-12.49)	(-4.24)
CHSLS	0.283***	0.611***	0.276***	0.613***	0.279***	0.619***
	(6.38)	(4.1)	(6.21)	(4.12)	(6.27)	(4.15)
CLIST	17.30***	19.02***	17.33***	18.84***	17.79***	19.54***
	(62.05)	(26.45)	(62.32)	(26.01)	(63.82)	(26.96)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
N	18240	2466	18240	2466	18240	2466
adj. R^2	0.382	0.374	0.382	0.372	0.38	0.371

The table reports the results from the estimation of the following regression:

$$TobinQ_{i,t} = \alpha + \beta_1 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) + \beta_2 HHHI_{j,t}(HSUB_{j,t}, HMKTSIZE_{j,t}) \times SOE_{i,t} + \beta_3 SOE_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 CHSLS_{i,t} + \beta_7 CLIST_{i,t} + \delta YearDum_{i,t} + \varepsilon_{i,t} \quad (3)$$

The varialbes are defined in Appendix A. For brevity, the coefficient on the year dummies are not reported.

The regression is run on two subsamples, one having god corporate governance (CGI=1),and the other without good corporate governance (CGI=0)

***,**,* indicate statistical significance at the 0.01, 0.05, 0.1 level, respectively, based on a two-tailed test

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Appendix A Variable definition

Variable		Definition of variables
$Tobinq_{i,t}$	=	Market value of assets divided by book value of assets, where market value of assets is the sum of market value of equity and book value of debt
$HHI_{j,t}$	=	Herfindahl-Hirschman index, which is calculated for CSRC top-level industries by summing the square of the individual firm market shares based on total sales of all available listed firms in the industry from CSMAR database. Higher HHI indicate low competition
$HHHI_{j,t}$	=	Indicator variable if *HHI* in a particular year is greater than the median value
$SUB_{j,t}$	=	Price-cost margin, which is calculated as total industry sales divided by total industry operating costs at top-level CSRC industry. The total industry sales and total industry operating costs are calculated based on all available listed firms in the industry from CSMAR database. Higher SUB indicate low competition
$HSUB_{j,t}$	=	Indicator variable if *SUB* in a particular year is greater than the median value
$MKTSIZE_{j,t}$	=	Market size, which is calculated as the logarithm of total industry sales at top-level CSRC industry based on all available listed firms in the industry from CSMAR database. A higher value of MKTSIZE indicates a higher competition.
$HMKTSIZE_{j,t}$	=	Indicator variable if *MKTSIZE* in a particular year is greater than the median value
$SOE_{i,t}$	=	Indicator variable if the ultimate owner is a government agency and 0 otherwise
$CGI_{i,t}$	=	Indicator variable if firms have good corporate governance practices and 0 otherwise.
$size_{i,t}$	=	The natural logarithm of total assets
$lev_{i,t}$	=	The total debt divided by total assets;
$CHSLS_{i,t}$	=	The difference between firm sales revenue in year t and year t-1 divided firm sales in year t-1
$CLIST_{i,t}$	=	Indicator variable if the firm is cross-listed overseas and 0 otherwise

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Notes:

[i] The corporate governance reform includes the issuance of the *Code of Corporate Governance for Listed Firms in China* and the *Guide Opinion on Establishing Independent Director System by Listed Firms*. Listed firms are required to establish a two-tier board structure (i.e. Board of Directors and Supervisory Board of Directors) and the board must be comprised of at least one-third independent directors (CSRC 2001; CSRC 2002).

[ii] Research undertaken in the US and other countries typically rely on corporate governance rating index compiled by authorities (for example, internal corporate governance index compiled by Korean Corporate Governance Services) or self-constructed indexes which have been widely accepted by researchers as proxies for corporate governance (for example, G-index constructed by Gompers et al. 2003). In China, the Research Centre of Corporate Governance compiles Chinese Company Governance Index (CCGINK) as a comprehensive measure for corporate governance of listed firms. However, the index is not publicly available.

[iii] The supervisory board's function, according to the PRC Company Law, is to oversee company directors, to examine firm's financial affairs, e.g. it can question and propose board of directors' resolution items as well as investigate when it discovers irregularities in how the firm is being managed (Article 55 and 119, The *Company Law*).

[iv] For brevity, results for additional tests are not tabulated. They are available upon request from the authors.

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