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The Interplay between CEOs and Board of Directors: From the Human and Relational Capital Perspective

par
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Résumé

Dans cette thèse, je tente de contribuer à la littérature sur l'interaction entre le capital humain et relationnel des acteurs clés de la gouvernance - les *présidents-directeurs généraux* (PDG) et leur conseil d'administration - et l'efficacité de la gouvernance des entreprises. Basé sur trois perspectives théoriques principales: (1) le capital humain (Becker, 1964) (2) la dépendance des ressources (Pfeffer et Salancik, 1978) et (3) l'agence (Jensen et Meckling, 1994). Cette thèse conduit une analyse empirique dans le contexte chinois et fournit trois essais.

Dans le premier essai, j'utilise la théorie du capital humain pour expliquer le pouvoir structurel des PDG et s'il y a des différences de genre dans les attributs qu'explique le pouvoir structurel, des PDG en Chine. Je démontre que le capital relationnel et le capital humain sont complémentaires pour expliquer le pouvoir structurel du PDG dans les sociétés chinoises cotées en bourse et que la différence de genre modère cette relation. Mes résultats suggèrent que, bien que les femmes PDG soient de plus en plus nombreuses dans les entreprises chinoises, il leur reste difficile d'obtenir le même pouvoir structurel que leurs homologues masculins et qu'elles ont besoin de diversifier leurs attributs humains et relationnels par rapport aux hommes.

Le deuxième essai intègre les théories de l'agence et de la dépendance aux ressources pour examiner le rôle du conseil d'administration comme un possible lien manquant dans la relation entre la performance de l'entreprise et le conseil d'administration. Sur la base de l'analyse du contenu des rapports de réunions du conseil d'administration de 1054 entreprises chinoises cotées en bourse, je trouve que l'accent mis par le conseil sur le rôle de surveillance est associé à la performance de l'entreprise, et cette relation est plus forte avec la proportion croissante d'administrateurs non affiliés et le degré de diversité fonctionnelle au sein du conseil. En revanche, les mandats multiples exercés par les administrateurs ont un effet négatif sur l'efficacité du rôle de contrôle exercé par le conseil d'administration, de sorte que le rendement des entreprises diminue lorsque les «conseils d'administration occupés» augmentent l'importance du contrôle. Notre étude souligne la nécessité de faire la distinction entre les rôles de contrôle et de service du

conseil et de contribuer à la discussion en cours sur les attributs qui permettent au conseil d'exercer son double rôle.

Enfin, le troisième essai examine une situation particulière lorsque les administrateurs s'engagent dans une transaction entre parties liées. Cela peut rendre ces administrateurs «gris» et représenter un potentiel d'affaiblissement de l'indépendance du conseil d'administration et des efforts de surveillance. Cela amène à se demander si les administrateurs gris affectent la motivation à s'engager dans des transactions entre parties liées, et finissent par avoir des impacts sur la qualité du rapport financier des entreprises. Sur la base des sociétés cotées chinoises, je trouve une relation positive entre le pouvoir des administrateurs gris et les transactions entre parties liées, ce qui conduit conjointement à une probabilité plus élevée de retraitements futurs. Les résultats montrent que les transactions avec les parties liées se présentent comme un canal de médiation par lequel de puissants dirigeants gris déforment la qualité de l'information financière, ce qui soulève des inquiétudes quant à l'efficacité du suivi des administrateurs gris.

Mots clés: le pouvoir structurel, le genre, les rôles et attributs du conseil d'administration, la structure du conseil d'administration, le capital humain et le capital relationnel des administrateurs, les directeurs gris, transactions entre parties apparentées, qualité de l'information financière, Chine.

Méthodes de recherche: empirique, recherche quantitative, archivistique.

Abstract

In this thesis, I attempt to contribute to the literature on the interplay between the human and relational capital of key governance actors−CEOs and board of directors−and firms' governance effectiveness. Based on three main theoretical perspectives: (1) Agency Theory (Fama and Jensen, 1983; Jensen and Meckling, 1994), (2) Human Capital Theory (Becker, 1964), and (3) Resource Dependence Theory (Pfeffer and Salancik, 1978), this thesis conducts empirical analysis in the Chinese setting and provides three essays.

In the first essay, I use human capital theory to explain CEOs' structural power, and explore whether there are gender differences in the attributes that lead CEOs to gain structural power in Chinese listed firms. I show that relational and human capital are complementary in explaining CEO structural power in Chinese listed firms, and that the gender difference moderates those relationships. I contend that CEOs' structural power is a result of their superior human and relational capital, and although female CEOs are growing in number in Chinese firms, it remains difficult for them to gain the same structural power as their male counterparts and that they need to leverage different human and relational capital attributes compared to male CEOs.

The second essay considers whether the board of directors should focus more on monitoring or advising. Moreover, both the structure of the board of directors and the human capital it possesses are assumed to foster its ability to perform the dual role of monitoring and advising. Hence, my second essay integrates agency and resource dependence theories to examine the board role as a potential missing link in the board−firm performance relationship. Based on content analysis of board meeting reports of 1054 Chinese listed firms, I find that board's emphasis on monitoring role is positively associated with firm performance, and this relationship is stronger with increasing proportion of nonaffiliated directors and degree of functional diversity on the board. In contrast, directors' multiple directorships adversely affect board monitoring role effectiveness, such that firm performance decreases when "busy boards" increase the

monitoring role emphasis. Our study underscores the need to distinguish between the board's dual role and contributes to the ongoing discussion on the attributes that best equip the board to enact its roles.

Finally, the third essay investigates a special situation when directors engage in related party transactions. This may render these directors "gray" and represent potential to weaken board independence and monitoring efforts. This essay investigates whether gray directors influence boards' probability of engaging in related party transactions, and ultimately generate impacts on the quality of firms' financial reporting. Based on a sample of Chinese listed firms, the results show that related party transactions present as a mediating channel through which powerful gray directors adversely affect financial reporting quality, thereby raising concerns about the monitoring effectiveness of having gray directors on board.

Keywords: Chief Executive Officers, Structural Power, Gender, Board Role, Board Structure, Board Capital, Gray Director, Related Party Transaction, Financial Reporting Quality, China.

Research methods: Empirical, Quantitative Research, Archival Data.

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List of acronyms

BvD: Bureau Van Dijk's

CCER: China Center for Economic Research

CCGLC: Chinese Code of Corporate Governance for Listed Companies

CEO: Chef Executive Officer

CSMAR: China Stock Market and Accounting Research

CSR: Corporate Social Responsibility

CSRC: China Securities Regulatory Commission

DV: Dependent Variable

GICS: Global Industry Classification Standard

H: Hypothesis

IPO: Initial Public Offerings

IV: Independent Variable

M: Mediator

MHRSS: Ministry of Human Resources and Social Security

OLS: Ordinary Least Squares

ROA: Return on Assets

ROE: Return on Equity

RPT: Related Party Transaction

SME: Small and Medium-sized Enterprises

SOE: State Owned Enterprise

SSE: Shanghai Stock Exchange

SZSE: Shenzhen Stock Exchange

US: United States of America

VIF: Variance Inflation Factors

To My Family

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It is a great pleasure that I now have the opportunity to convey my appreciation for all the people who provided support and who just simply believed in me when I did not believe in myself.

My thanks first go to my thesis supervisor, Professor Eduardo Schiehll, who has tremendous shared his knowledge and experience with me and provided very relevant and constructive feedback all long the process, and precisely on my comprehensive exam, research proposal, working papers, and this thesis. Particularly, these working papers which have been and will be submitted to peer-reviewed journals and conferences are largely attributed to the great help and guidance from Professor Schiehll. I am also appreciated his availability and the numerous opportunities to discuss my research in various occasions, and financial support from his SSHRC of Canada research grants to make this thesis possible. I would never have finished this work without his guidance, patience and encouragement.

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Introduction

This thesis focuses on the interplay between the human and relational capital of key governance actors–CEOs and board of directors–and firms' governance effectiveness. Corporate governance by definition is "*the design of institutions that induce or force management to internalize the welfare of stakeholders*" (Tirole, 2001: 4; Aguilera *et al.,* 2015). It is a complex area that covers among others, managerial incentives, boards of directors, ownership structure, market institutions, etc. (Zahra and Pearce, 1989; Daily *et al.,* 2003; Aguilera *et al.,* 2015). Within this broad context, CEOs are at the apex of the management hierarchy, responsible for the overall operations, while boards of directors are the core of the internal governance system serving to monitor and support CEOs toward stakeholders' welfare maximization (Zahra and Pearce, 1989; Aguilera *et al.,* 2012; Aguilera *et al.,* 2015). A framework of the CEO–board relationship in a typical firm is illustrated in Figure 1. Building on this framework, this thesis consists of three essays on this CEO–board relationship from different angles: power distribution between CEOs and boards, the dual role of board of directors, and directors' engagement on related party transactions. As such, this thesis aims to provide a more comprehensive understanding on how the human and relational capital behind CEOs and boards contribute to effective corporate governance and firm success. In order to do so, this thesis uses and integrates three main theoretical perspectives: (1) Agency Theory (Fama and Jensen, 1983; Jensen and Meckling, 1994), (2) Human Capital Theory (Becker, 1964), and (3) Resource Dependence Theory (Pfeffer and Salancik, 1978). Based on these theories, this thesis conducts empirical analysis in the setting of the largest emerging economy, China.

In the following paragraphs, I explain how the three essays integrate and contribute to the ongoing discussion on these theories and summarize the empirical results.

Insert Figure 1 about here

Essay 1 investigates the CEO–board relationship with CEOs' standing position. In tradition, agency theory is the predominant perspective applied to explain the CEO–board relation (Zahra and Pearce, 1989; Aguilera *et al.,* 2012; Aguilera *et al.,* 2015). Assuming a divergence of interests between CEOs and shareholders, agency theory posits a conflicting relationship between CEOs and boards, since CEOs may not always operate the firm toward the maximization of shareholders' welfare (Jensen and Meckling, 1976; Fama and Jensen, 1983). Accordingly, powerful CEOs have long been considered as a signal of ineffective board monitoring and a threat to shareholder wealth (e.g., Haynes and Hillman, 2010; Li and Tang, 2010). However, from the perspective of human capital theory, individuals' upward mobility as well as career achievement could be seen as one's investment reward on human capital (i.e. access to information, expertise, network, prestige, and legitimacy). CEO human capital would therefore contribute to instead of colliding with shareholder value creation (Becker, 1964; Rosenbaum, 1984; Bigley and Wiersema, 2002; Peng *et al.*, 2015). Following this line of reasoning, Essay 1 shows that CEOs' structural power is a result of their superior capability, consisting of human and relational capital they possessed in Chinese listed firms. Moreover, gender differences exist in this association, indicating that female CEOs need to leverage different human and relational capital attributes compared to males CEOs to gain structural power.

Essay 2 investigates the CEO–board relation from the angle of board of directors. Building on findings documented in Essay 1, directors are also superior individuals with power and strong capability (Hillman *et al.,* 2000; Johnson *et al.,* 2013). Especially, from the perspective of resource dependence theory, their human and relational capital provide critical resources to the firm, which help CEOs deal with external risks and contribute value to their firms (Hillman and Dalziel, 2003; Hillman *et al.,* 2009). The functions of boards of directors are, therefore, an integration of agency and resource dependence perspectives (Hillman and Dalziel, 2003): on one hand, boards of directors monitor CEOs through controlling decision making (i.e. decisions ratification and oversight of risk-taking) (Fama and Jensen, 1983); and on the other hand, boards work as boundary spanners and resource providers with an excellent position to advise CEOs on strategy formulation and implementation (Hillman and Dalziel, 2003; Haynes and

Hillman, 2010; Dalziel *et al.*, 2011). Accordingly, Essay 2 examines whether board of directors should focus more on the monitoring or advisory role, and contends that the board role emphasis works as a potential missing link in the board–firm performance relationship. The results show that board monitoring emphasis is positively associated with firm market performance, and this relationship is strengthened with high levels of nonaffiliated directors and functional diversity, a proxy for their human capital, on the board. However, directors' multiple directorships, representing board relational capital, seem to adversely affect board monitoring effectiveness, such that firm performance decreases when "busy boards" increase the control role emphasis. Overall, in this essay the evidence demonstrates that both the structure and the human and relational capital of the board of directors interact to foster its ability to perform the dual role of monitoring and advising.

Finally, Essay 3 considers board of directors in a special situation when they engage in related party transactions and are inclined to stand on the same side as CEOs (Klein, 2002; Gordon *et al.*, 2004; Gordon *et al.*, 2007; Pizzo, 2013). Directors under such circumstance become "gray", and their vigilance regarding management opportunism is expected to be adversely affected (Gordon *et al.*, 2004; Gordon *et al.*, 2007; Kohlbeck and Mayhew, 2010). Based on unique archival data from Chinese listed firms, the results show a positive relationship between the power of gray directors and the propensity of firms engaging in related party transactions, which in turn explains firms' probability of future restatements. This indicates that related party transactions present a channel through which the power of gray directors distorts financial reporting quality, thus raising concerns about the benefits of the relational capital represented by the presence of gray directors in the board.

In summary, the contribution of this thesis to the corporate governance literature is twofold. From a theoretical perspective, this thesis contributes to the emerging view that agency theory (Fama and Jensen, 1983; Jensen and Meckling, 1994), resource dependence theory (Pfeffer and Salancik, 1978), and human capital theory (Becker, 1964) are neither isolated or opposite. They in fact can be seen as complementing each other to better explain the complex interplay between human capital and the roles of

CEOs and board of directors (Hillman and Dalziel, 2003; Haynes and Hillman, 2010). From an empirical perspective, this thesis provide evidence within the context of China, hence contrasting with prior governance literature, which mainly focuses on developed countries, with less attention on emerging economies (Van Essen *et al.*, 2015; Jiang and Kim, 2015). Through setting the research on a context with highly concentrated ownership structure and strong government intervention, the results in this thesis play a role in challenging and extending previous empirical conclusions generated from the Anglo Saxon context. Therefore, this thesis might also inspire new directions for the internationalization of corporate governance research.

The main content of this thesis, including three essays along with their theoretical grounds, research methods, results, and main contributions, is further summarized in Table 1. These three essays are then presented in the following sections: Chapter 1, 2 and 3, respectively.

Insert Table 1 about here

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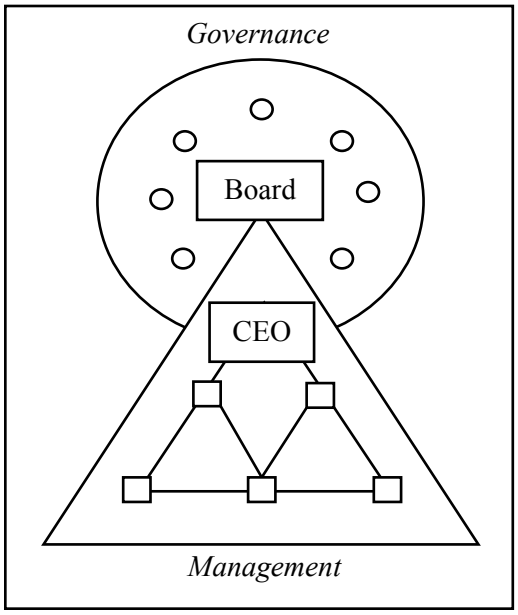
Figure 1 The CEO-board relationship



Source: Adapted from Tricker (2015: 44).

Table 1 An overview of major properties of three essays

Essay	Theory	Unit of analysis	Research Methods	Main Conclusion
Essay 1: Human and Relational Capital behind the Structural Power of CEOs in Chinese Listed Firms	Human Capital Theory	Firm-level, Focus on CEO power	Empirical, Archival Data, Quantitative Analysis	Human and relational capital complementarily contribute to CEO structural power.
Essay 2: Finding the Right Fit: How Board Attributes Affect the Board−Performance Relationship	Agency Theory, Resource Dependence Theory	Firm-level, Focus on board roles	Empirical, Archival Data, Quantitative Analysis	A fit exists between board dual role and attributes to create firm value.
Essay 3: The Influence of Gray Directors in China: Evidence on Related Party Transactions and Financial Reporting Quality	Agency Theory	Firm-level, Focus on board and related party transactions	Empirical, Archival Data, Quantitative Analysis	Directors' engagement in related party transactions impairs financial reporting quality.

Chapter 1
Human and Relational Capital behind the Structural Power of CEOs in Chinese Listed Firms

Abstract

This study examines the human and relational capital attributes that enable CEOs to acquire structural power in Chinese listed firms, and whether gender differences intervene in the attributes that explain this structural power. We show that CEOs with elite education, longer years of education and work experience and more outside directorships are more likely to gain structural power in Chinese listed firms. However, female CEOs are less likely than male CEOs to achieve similar structural power, while only outside directorships, as a proxy for relational capital, compensate for this gender inequality. Employing human capital theory, our study advances the knowledge on CEO leadership by revealing the role of human and relational attributes to explain CEO structural power. Further, our study provides new insights about upward mobility and gender inequality in a fast emerging economy.

1.1 Introduction

This study examines the human and relational capital attributes that enable CEOs to acquire structural power, and whether gender intervenes in the attributes that explain this structural power in Chinese listed firms. As Finkelstein (1992) argues, power is emanated from managers' personal abilities, plays a key role in decision making, and greatly influences board effectiveness. Previous studies, however, have focused on the effects of CEO power on firm-level outcomes (e.g. Finkelstein, 2009; Haynes and Hillman, 2010; Li and Tang, 2010; Muller-Kahle and Lewellyn, 2011; Lewellyn and Muller-Kahle, 2012), while little is known about how executives gain structural power in their organizations (Daily and Johnson, 1997; Singh *et al.*, 2008; Smith, 2012; Muller-Kahle and Schiehll, 2013). We, therefore, extend and deepen this line of inquiry by considering human capital as a critical source of CEO structural power. Since individuals with stronger human capital are assumed to be able to make better decisions (Becker, 1964, 1971; Hillman and Dalziel, 2003; Dalziel *et al.*, 2011), we expect that individual capabilities foster CEOs' upward mobility (Finkelstein, 1992; Rosenbaum, 1984; Bigley and Wiersema, 2002; Peng *et al.*, 2015). More attention should be paid to human capital theory in attempts to explain CEO structural power, which constitutes the main motivation for our study.

Since the criteria for upward mobility can be vague and subjective, the process of obtaining structural power is somewhat susceptible to discrimination (Powell, 1999; Smith, 2002; Muller-Kahle and Schiehll, 2013). Some scholars argue that a male is more likely than a female to be selected to receive higher levels of trust, support and career-related information and opportunities, making the capability of a female less likely to be recognized in the organization (Smith, 2002; Cooke, 2003; Tan, 2008; Smith, 2012). Although many female managers have more years of formal education than male managers (Catalyst, 2016) and many of them have similar qualifications for executive positions (Dezsö and Ross, 2012), women continue to be scarce at the very top (e.g., CEO or Chairman). Therefore, whether gender intervenes in the human capital attributes that explain CEOs structural power constitutes our second motivation for this study.

Extending this line of inquiry to Chinese listed firms is interesting for several reasons. First, China's economic marketization reform has drastically increased the demand for human capital in market competition, making employees with superior expertise more likely to be assigned to higher positions (Nee, 1989; Cao, 2001; Peng *et al.*, 2015; Giannetti *et al.*, 2015). Second, due to concentrated ownership structures as well as political interventions, power is highly concentrated in Chinese listed firms (Kato and Long, 2006; Jiang and Kim, 2015). This creates greater incentives for executives to exchange their human capital with upward mobility, and thus strengthens the demand and supply relationship of human capital in explaining structural power (Cao, 2001; Chen *et al.*, 2010; Peng *et al.*, 2015). Third, because of weak formal institutions and strong informal systems (Xin and Pearce, 1996; Allen *et al.*, 2005), relational capital is far more influential in the executive job market in China than in most Western countries. This provides an instructive opportunity to analyze the influence of relational capital on leadership. Fourth, the ideology underlying female discrimination is rooted in Eastern culture and tradition (Cao, 2001; Cooke, 2003; Yukongdi and Rowley, 2009; Terjesen *et al.*, 2009; Terjesen *et al.*, 2015), making China an interesting setting to explore whether human and relational capital can compensate for gender barriers on CEO careers.

Our results suggest that formal education, work experience and outside directorships greatly explain the presence of CEO structural power in China. Our findings corroborate the individual level perspective proposed by Powell (1999) and Hillman and Dalziel (2003), whereby human and relational capital are complementary assets that enable a better understanding of CEO upward mobility. Our findings also suggest that, even though the number of female CEOs is growing in Chinese listed firms, female CEOs continue to find it more difficult than male CEOs to achieve structural power. More important, we show that formal education and work experience do not compensate for this gender inequality, while the positive association between multiple directorships and CEO structural power is stronger for female CEOs, suggesting that only relational capital is able to compensate for gender inequality in Chinese listed firms.

This study contributes to the literature on human capital and CEO leadership in three main aspects. First, existing studies have long been considered CEO power a threat to

shareholder wealth (Li and Tang, 2010; Haynes and Hillman, 2010; Lewellyn and Muller-Kahle, 2012). However, after tracing back to the source of CEO structural power, we show that CEO structural power comes from the human capital that the CEO brings to the firm, which is assumed to contribute to firm value creation. Second, our results extend our understanding of the benefits for upward mobility of investing in human capital in transition economies (Nee, 1989), and emphasize the role of human capital in Chinese managerial market (Xin and Pearce, 1996; Fan and Wong, 2004; Allen *et al.*, 2005; You and Du, 2012). Third, our findings shed new light on gender inequality (e.g., Ye *et al.*, 2010; Lam *et al.*, 2013; Liu *et al.*, 2014; McGuinness *et al.*, 2015). We demonstrate that, despite the sharp rise in Chinese female CEOs, the glass ceiling remains, supporting claims that gender inequality increases as the workplace power rises (Powell, 1999; Smith, 2002; Elliott and Smith, 2004; Smith, 2012). Third, our study also has practical implications, as it provides evidence that the standards for upward mobility differ between female and male CEOs. This calls for organizations to provide equitable training and promotion opportunities for females and males alike, and echoes Jiang and Kim (2015), who argue that managerial talent markets and promotion standards for managers are different and independent in China.

The next section describes our institutional context, followed by our theoretical background and hypotheses development. Data collection and research methods are then explained, followed by the empirical results, robustness checks, and discussion. The final section summarizes the findings and contributions.

1.2 Institutional context and motivation

Our research context is China, the largest emerging economy and the second largest economy in the world (World Bank, 2017). In comparison to previous literature on managerial power, which mainly focus on developed countries and under the stable Anglo Saxon context (see the review by Van Essen *et al.*, 2015), China's economic reform led to significant changes in "*the determinants of socioeconomic attainment and therefore the sources of power and privilege*" (Nee, 1989: 663). [1] The 1990s

[1] Few exceptions are the studies by Li and Tang (2010), You and Du (2012) and Lam et al. (2013).

marketization economic reform exposed Chinese firms to increased market competition, thus giving rise to higher returns in human capital investments (Cao, 2001; Nee and Opper, 2012; Peng *et al.*, 2015). An important effect of these reforms is the growth of top management labor market, and especially for skilled CEOs (Peng *et al.*, 2015; Jiang and Kim, 2015). Before such reforms, top management mobility in China was low and mainly under restrictive control by the government (Yukongdi and Benson, 2005; Yukongdi and Rowley, 2009; Jiang and Kim, 2015). Such a transition has increased managerial labor market mobility and has promoted the human capital demand and supply relationship as a key driver of the managerial labor market (Nee, 1989; Chen *et al.*, 2011; Peng *et al.*, 2015). Since Chinese firms face competitive pressure to optimize their managerial deployment in order to survive and to enhance efficiency, employees are more likely to be respected for productivity and efficiency they bring to the organization (Nee and Opper, 2012; Peng *et al.,* 2015). At the same time, Chinese firms learned to value human capital as an important factor in allocating managerial personnel to retain and attract managerial talent (Cao, 2001; Jiang and Kim, 2015). Based on the above discussion, we contend that Chinese listed firms provide an interesting research setting for our investigation, which employs human capital theory (Becker, 1964, 1971) to examine the human capital attributes that enable CEOs to acquire structural power in China and whether gender intervenes in the attributes that explain such structural power.

1.3 Theoretical background and research hypotheses

Like other types of capital which builds on initial investments and generates future income over a long period, human capital comprises an individual's investment in the "intangible" forms of capital such as knowledge, skills, health, or values, which add to future returns over an individual's lifetime (Becker, 1964, 1971). Human capital theory has been widely used to understand executives' effectiveness, which predicts that through investments in human and relational capital, e.g. education, experience, social ties, CEOs acquire high cognitive ability and knowledge to contribute to firm value creation (Hillman and Dalziel, 2003; Haynes and Hillman, 2010; Dalziel *et al.*, 2011; Peng *et al.,* 2015). As Peng *et al.,* (2015: 118) state, "*Because CEOs are aware that their human capital adds value, they are interested in leveraging it"*. Upward mobility

can be considered an important reward for individuals' capability and effort, which contains not only direct compensation, but also legitimacy, reputation, cooperative partnership, personal fulfilment and future opportunities (Sicherman and Galor, 1990). Previous evidence supports this argument and shows that executives' upward mobility can be considered the prize based on how hard they work and the human capital they possess (e.g., Rosenbaum, 1984; Sicherman and Galor, 1990; Zajac and Westphal, 1996; Bigley and Wiersema, 2002; Bhagat *et al.*, 2010). Following this line of reasoning, in the next section we discuss how human capital attributes can explain the structural power of CEOs in Chinese listed firms.

1.3.1 Educational qualification

Years of formal education and the quality of this education are the most institutive investments that enhance human capital by conferring skills and technical knowledge that qualify individuals for more complex jobs (Becker, 1964; Dalziel *et al.*, 2011). Sicherman and Galor (1990) find that the process of occupational upgrading in the organizational hierarchy represents a critical part of the expected achievement when individuals invest in education. After analyzing 2,600 CEO turnover cases in the US, Bhagat *et al.,* (2010) find that CEOs with higher levels of education are more likely to be appointed. Similarly, Jalbert *et al.,* (2002) shows that large US firms recognize educational backgrounds for CEO selection and Crumley (2008) finds that education generates bargaining power for CEOs to increase their compensation. Since education is costly and time-consuming, individuals invest in education in order to foster their future productivity, which in turn, supports their organizations and contributes to their own career attainment (Rosenbaum, 1984).

The quality of education is also a critical dimension. Elite schools with their highly prestige and selective admission structures choose only the top candidates for their programs (Dalziel *et al.*, 2011; Liu and Jia, 2017). Those who graduate from elite schools receive prestige and legitimacy transferred from educational institutions and valuable social networks generated from elite alumni (Daily and Johnson, 1997). Elite education also signals superior cognitive and analytical abilities (Useem, 1979), making those with an elite education more likely to be given higher structural power. Along this

line, Liu and Jia (2017) show that attending an elite university in China has a crucial bearing on career prospects and greatly influences one's upward mobility.

Moreover, during the Chinese Cultural Revolution, college entry examinations were halted from 1966 to 1977, preventing enormous numbers of people born in the 1950s from getting a university level education (Cao, 2001; Fan and Wong, 2004). As Liu and Jia (2017) suggest, China's College Entrance Exam not only determines whether a young person will attend a Chinese university, but also which one. Statistics from the Survey System for Chinese Entrepreneurs as well as many academic papers (e.g., Fan and Wong, 2004; Kato and Long, 2006; Liu *et al.*, 2014) show that most CEO positions are mostly held by individuals born in the 1950s. This would not only make formal education a key advantage for CEOs in the labor market competition, but also push firms to strength the relationship between education and upward mobility (Jiang and Kim, 2015). This evidence supports our argument that educational qualifications−length and quality−build CEO human capital and play an important role in achieving structural power in Chinese listed firms. This leads to the following hypothesis:

> *Hypothesis 1: In Chinese listed firms, educational qualifications (years of education and elite education) are positively associated with the likelihood of the CEO to have structural power.*

1.3.2 Work experience

Similar to educational qualifications, work experience fosters human capital by increasing applied knowledge and expertise in specific positions, and developing valuable firm-specific experiences (Becker, 1964; Wayne *et al.,* 1999; Dalziel *et al.*, 2011). Many scholars argue that work experience facilitates upward mobility and is even more important than education for promotion to top management positions (Powell 1999). As firms vary in history, culture, and external threats and opportunities, work experience allows CEOs to apply and acquire new skills building on past knowledge and thus manage uncertainties more successfully, making them hard to be replaced and at the same time strengthening their bargaining ability in terms of upward mobility (Wayne *et al.,* 1999; Dalziel *et al.*, 2011; Johnson *et al.,* 2012). Moreover, because of the college education shutdown in China, people started to work at a very young age during the

Cultural Revolution period (Liu and Jia, 2017), suggesting that work experience may be a critical source for CEOs to build human capital to remedy the missed access to education. We, therefore, propose that on-the-job experience is an important component of CEO human capital which can help CEOs achieve structural power in Chinese listed firms:

> *Hypothesis 2: In Chinese listed firms, work experience is positively associated with the likelihood of the CEO to have structural power.*

As Finkelstein (1992) states, CEOs could gain power through their outstanding ability for external contact and interorganizational communication. Accordingly, as an important dimension of human capital, relational capital is *"the sum of the actual and potential resources embedded within, available through, and derived from, the network of relationships processed by an individual"* (Nahapiet and Ghoshal, 1998: 243). Taking the form of investments into the access to informal social networks, relational capital provides access to valuable information and critical job related knowledge that is often difficult to obtain through formal channels (Xin and Pearce, 1996; Finkelstein, 1992; Peng *et al.*, 2015). Moreover, in contrast to Western countries, which are largely based on formal institutions (e.g., contracts, rules, and laws), informal institutions (e.g., *guanxi*, or private relationships) operate in China and contribute to an unstable legal environment (Xin and Pearce, 1996; Allen *et al.*, 2005). Thus, Chinese firms rely intensively on personal trust and private relationships for all aspects of daily operations, e.g., obtaining projects, investments, licenses, or government permits (Allen *et al.*, 2005), making relational capital an important individual attribute to explain CEO structural power (Powell, 1999; Smith, 2002). As such, we examine two attributes related to a CEO's relational capital: political ties and multiple directorships.

1.3.3 Political ties

Uncertainties caused by government policies or regulations are major environmental threats with potential impacts on firm performance (Pfeffer and Salancik, 1978). As the government is the major market participant and the rule maker in China (Allen *et al.*, 2005; Ma and DeDeo, 2017), CEOs with political ties are able to obtain resources from

political elites and the government to support their firms, and more importantly, may also influence the government's decisions in favor of their firms to reduce external risks (Shi *et al.*, 2014; Peng *et al.*, 2015; Ma and DeDeo, 2017). Fan and Wong (2004) find that political connections increase the likelihood of CEOs to be appointed, while You and Du (2012) find that political ties greatly increase CEOs' power by making them less likely to be dismissed even in cases of bad firm performance in Chinese listed firms. These two studies corroborate the idea that CEOs may use their political connections to support their organization and at the same time consolidate their managerial position (Okhmatovskiy, 2010; Peng *et al.*, 2015). Therefore, political ties could be deemed a critical capability for upward mobility of executives in China, which leads to the following hypothesis.

> *Hypothesis 3: In Chinese listed firms, political ties are positively associated with the likelihood for the CEO to have structural power.*

1.3.4 Directorships

Multiple directorships (i.e., sitting on a board of directors of another firm) create channels for knowledge exchange with other firms (Fich and White, 2005). Pfeffer and Salancik (1978) argue that through interacting with leaders in other firms, CEOs could gain firsthand information and insights, learn new approaches, and modify their own businesses accordingly. This combination of broader experience and useful information channels are expected to contribute to firm performance and enhance the power of CEOs to influence boardroom discussions (Hillman and Dalziel, 2003; Fich and White, 2005). In China, firms have been found closely connected together by reciprocally sitting on each other's boards, and only executives involved in those interorganizational directorships are able to enter privileged network positions (Ma and Dedeo, 2017). Thus, due to their ability to quickly update information and facilitate communication, CEOs who are seated on outside boards have more control over their firms' daily operations and, thus, are more likely to benefit themselves by consolidating their status and increasing their power within the firm (Bigley and Wiersema, 2002). Accordingly, we contend that multiple directorships help CEOs obtain structural power in Chinese listed firms. This leads to the following hypothesis:

Hypothesis 4: In Chinese listed firms, outside directorships are positively associated with the likelihood for the CEO to have structural power.

1.3.4 CEO gender

The upward mobility mechanism in a corporate hierarchy is often considered a subjective selection process through which may incur gender discrimination (e.g., Lyness and Thompson, 1997; Smith, 2002; Smith, 2012; Muller-Kahle and Schiehll, 2013). Moreover, many scholars argue that women in transition economies like China face greater difficulties compared to their peers in developed countries (Leung, 2003; Tan, 2008; Terjesen *et al.*, 2009; Terjesen *et al.*, 2015).[2] Powell (1999) suggests that what hinders women from obtaining structural power can be analyzed from three levels. At the societal level, Chinese women face not only a "glass ceiling" but also a "bamboo curtain" stemming from Confucian ideology entrenched in Eastern culture and tradition (Liu *et al.,* 2000; Tan, 2008; Liu *et al.,* 2014). Under this masculine value system, women have long been labeled as family caretakers and subordinates of men (Liu *et al.,* 2000; Cooke, 2003; Leung, 2003). At the organizational level, although state-owned enterprises (SOEs) comprise about half of Chinese listed firms (Allen *et al.*, 2005), these firms did not contribute much to the recent rise of female CEOs in China (Lam *et al.,* 2013; Liu *et al.,* 2014), probably due to the SOE reform in 1990s which led to massive layoffs, of which female employees accounted for a large proportion (Cooke, 2003). These layoffs greatly interrupted the on-the-job knowledge and the continuity of work experience of Chinese female executives (Tan, 2008). As a consequence, at the individual level, females in China may not had the same opportunities as males to invest and build human and relational capital, and more importantly, may be less likely to be recognized and rewarded for the personal capability improvement (Cooke, 2003; Leung, 2003; Tan, 2008), and (Cooke, 2003; Liu and Jia, 2017). For these reasons, we contend that female leaders face more barriers compared to male leaders in China, which leads to the following hypothesis:

[2] Although China's female labor participation rate began to grow around the time of the Cultural Revolution in the 1960s (Cooke, 2003; Tan, 2008), economic reforms and the retreat of communist ideology during the 1970s and 1980s led to setbacks in gender equality policies (Zhang and Dong, 2008).

Hypothesis 5: Female CEOs are less likely than male CEOs to achieve similar structural power in Chinese listed firms.

Previous studies show that investments in human capital significantly reduce gender gaps (e.g., Lyness and Thompson, 1997; Powell, 1999; Liu *et al.,* 2000; Chi and Li, 2008) and increase female's probability of gaining access to authority in the workplace (Smith, 2002; Smith, 2012; Muller-Kahle and Schiehll, 2013). For example, Liu *et al.,* (2000) and Chi and Li, (2008) found that human capital characteristics substantially bridge the wage gap between female and male employees in Chinese listed firms. Moreover, Song (2003) documents that formal education is able to increase Chinese female managers' power by preventing them from being replaced by males. Hillman *et al.,* (2002) and Singh *et al.,* (2008) suggest that adequate experience helps women be appointed to more powerful positions. In the same line, Cooke (2003) and Chi and Li (2008) show that working experience improves managerial career opportunities for Chinese women, while predominant informal network systems (Xin and Pearce, 1996; Allen *et al.*, 2005) may lead political ties and outside directorships in China to be far more important for female CEOs to obtain similar structural power as male CEOs. This supports the view that female executives in China may need to leverage individual-level factors above their male counterparts to reach similar structural power. This leads to the following research hypothesis:

Hypothesis 6: In Chinese listed firms, human capital attributes, such as years of education, elite education, political ties, and directorships, increase the likelihood for female CEOs to have similar structural power as male CEOs.

1.4 Research methods

1.4.1 Data and sample

Panel data has been used in our study and includes Chinese listed firms in either the Shanghai or Shenzhen A-Share Stock Exchange from 2010 to 2013. The starting point for our sampling strategy is the Sinofin database developed by the Beijing University China Center for Economic Research (CCER), which is one of the most widely-used

financial databases of Chinese listed firms[3]. The Sinofin corporate governance database provides information on 9,435 firm-year observations, including demographic data on 179,849 senior managers and information about the board of directors such as board size, CEO duality, and the percentage of independent directors on the board and firms' financial data, including firm total assets, firm age, and past performance. The available demographic data on CEOs includes gender, education background, work experience, job title, and board memberships. Similar to Kato and Long (2006) and Lam *et al.,* (2013), we used the terms "General Manager" (*Zhong Jing Li*) and "Chief Executive Officer" (CEO) (*Zongcai* or *Shouxi Zhixingguan*) to identify the leading executive position in our sample firms, which the Chinese call "CEO". As shown in Table 2, missing data from 151 firms reduced our sample to 9,284 observations. We then eliminated 696 observations from firms operating in the financial sector based on the 2-digit Global Industry Classification Standard (GICS) code due to specialized high-leverage operations and specific regulation environments (Fama and French, 1992). We also excluded firms that went public (initial public offerings/IPOs) within one year and firms that underwent CEO turnover, as information on past performance was missing or the power of newly appointed CEOs was considered unstable (Haynes and Hillman, 2010). Our final sample comprises 6,545 firm-year observations, which includes 2,284 firms.

Insert Table 2 here

1.4.2 Variable measurement

Dependent Variable

Table 3 summarizes the variables used in our empirical analysis. *Structural power* is the dependent variable which is a binary variable indicating whether a CEO also holds the position of chairperson of the board of directors and was termed CEO duality. This variable has been applied as a measure of structural power by many scholars, e.g., Finkelstein (1992), Daily and Johson (1997), Lewellyn and Muller-Kahle (2012), and

[3] Sinofin database has been used by many papers, such as Kato and Long (2006), Wu et al. (2011) and Cao et al. (2011).

Muller-Kahle and Schiehll (2013). Board chair in Chinese listed firms is "*generally involved in the company's daily decision making,*" and "*if both the chairman and the general manager are responsible for a company's daily operations, the chairman is considered to be more powerful than the general manager,*" as argued by Kato and Long (2006: 803). Therefore, CEO duality is assumed to provide the CEO with ultimate structural power as well as complete authority over the firm (Finkelstein, 1992; Finkelstein *et al.*, 2009). To avoid potential endogeneity issue, the dependent variable was calculated using values one year after the independent variables.

Independent Variables

We include five variables capturing elements of the CEO's human capital. The first is *Years of education*. Similar to Datta and Guthrie (1994) and Muller-Kahle and Schiehll (2013), we use the natural logarithm[4] of the number of years of formal education, coded as follows: less than high school graduation equals 9 years, high school graduation equals 12 years, bachelor's degree equals 16 years, master's degree equals 18 years, and PhD degree equals 22 years. *Elite education* is a dummy variable which takes on the value of one when the CEO graduated from either a Chinese or a foreign *Ivy League* university and zero otherwise. Elite Chinese universities belong to the C9 League,[5] an alliance of nine outstanding universities. Together, they receive 10% of the national research spending and produce 20% of all academic publications and 30% of all citations in mainland China. We consider elite foreign universities any of the 8 Ivy League universities in the US, the U15 in Canada, the Russell Group in the UK, or the Go8 in Australia. Consistent with Lam *et al.*, (2013), *Work experience* represents the number of years working in the current firm, and is measured by the natural logarithm of the number of years served in the firm.[6] We measure CEO's *Political ties* following Fan

[4] *Years of education* is skewed in our sample, since 45% CEOs have education lower than bachelor.

[5] C9 League started from 2009 and includes Fudan University, Harbin Institute of Technology, Nanjing University, Peking University, Shanghai Jiao Tong University, Tsinghua University, University of Science and Technology of China, Xi'an Jiaotong University, and Zhejiang University. Data source: China Academic Degrees and Graduate Education information Center. Available at (Accessed on 8 February 2018): http://www.cdgdc.edu.cn/xwyyjsjyxx/xwsytjxx/yxmd/274942.shtml.

[6] According to Kato and Long (2006: 804), Chinese database "*provides data on the starting year of each CEO's current term, with a typical term for CEOs being three years in China, but fails to supply the year in which he or she is first appointed to the CEO position*". We follow Kato and Long (2006) and obtain data on the total CEO tenure for those who serve more than a term from director's curriculum vitae. Since

and Wong (2004) and Okhmatovskiy (2010), by creating a dummy that equals one if the CEO previously worked for the Chinese government or other SOE whose personnel were overseen by the Ministry of Human Resources and Social Security (MHRSS) and zero otherwise. Similar to Ma and DeDeo (2017), the variable *Directorships* captures the CEO's outside network, measured as the natural logarithm[7] of the number of external firms where s/he serves as a board director. To test our research hypotheses on the determinants of CEO structural power in Chinese listed firms and potential gender influence, we include *Gender* as another independent variable. This is a dichotomous variable that equals one if the CEO is female and zero if male.

Control Variables

Consistent with previous literature, we include a number of control variables. As Lam *et al.,* (2013) and Liu *et al.,* (2014) show, female CEOs are likely to be supported by other women directors on the board. Hence, we control for *Women directors%*, measured by the percentage of female directors within the total number of directors (i.e., board size). As Tan (2008) contend, when women face unfair barriers in their original organization, they tend to quit and start their own business, and subsequently become top management of their own companies. Accordingly, we control for *Founder*, using a dummy that equals one if the CEO is the firm's founder and zero otherwise. Because China halted university education from 1966 to 1977 (Fan and Wong, 2004; Liu and Jia, 2017), we created a *Cultural Revolution* dummy that equals one if the CEO was born between 1948 and 1959, such that when they were 18 years old and ready to graduate from high school, university education was unavailable.[8] Allen *et al.,* (2005) find that in less developed Chinese financial markets, fundraising from the family greatly helps founders and managers acquire early-stage funds through private equity and loans. Hence, similar to Andres (2008), we control for *Family ownership%*, measured by the percentage of CEO relatives' shareholding to the total number of shares. Due to the government's

most of the senior managers in Chinese listed firms do not report working experience in the prior firms, so we can only trace back to their working experience in the focal firm.

[7] *Directorships* is skewed, since 52% CEOs in our sample have 0 directorships.

[8] Our results are unchanged when we replace *Cultural Revolution* with CEOs' age. Since the Cultural Revolution has influenced the accessibility to education of some individuals born in a certain period, we expect that this variable is therefore more accurate than the CEO age to control the special historical effect in the Chinese context.

dominant role in the Chinese capital market, we control for *SOEs*. Similar to Cao *et al.,* (2011), we create a dummy that equals one if the focal firm is a SOE.[9] Claessens *et al.,* (2000) report that in Asia, controlling shareholders commonly create divergence between control rights (the right to vote) and cash-flow rights (the right to receive dividends) through ownership pyramids. The shareholding wedge by the largest shareholder tends to be inversely related to CEO power over the board (e.g., Claessens *et al.*, 2000; Cao *et al.*, 2011). Thus, we control for *Large shareholder wedge,* or the divergence between voting and cash-flow rights held by the ultimate controlling shareholder.[10] In line with Kato and Long (2006), Ye *et al.,* (2010), and Lam *et al.,* (2013), we also control for *Firm size, Firm age* and *Industry* (see measurement details in Table 3). Following Daily and Johnson (1997), good prior firm performance boosts a CEO's reputation and helps the CEO acquire higher structural power. We therefore consider *Past ROE*, measured by one-year lagged ROE (return on equity). Since firms tend to mimic each other and be influenced by the institutional environment, we follow Li and Tang (2010) and Zhou *et al.,* (2016) and control for the quality of the governance environment (*Genviron*) of the provincial jurisdiction in which the firm's headquarter is located. The *Genviron* is a composite variable, measured by the average of four indicators: governance, finance, intermediary and judiciary (see measurement details in Table 3 and more details in Zhou *et al.*, 2016). Following Haynes and Hillman (2010), outliers were checked and recorded as the highest value of non-outliers based on the normal distribution assumption.

Insert Table 3 here

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[9] The ultimate controlling shareholder is a state asset management bureau, an SOE affiliated with the central government, or an SOE affiliated with a local government. Ultimate controlling shareholders are the shareholder who directly or indirectly controls more than 10 percent of the firm's voting shares (See more details in Claessens et al., 2000).

[10] It is worth noting that *Large Shareholder Wedge* is different from the BvD (Bureau Van Dijk) independence indicator, which represents the ownership concentration level, used in our matching sample procedures.

1.4.3 Regression model

Following Muller-Kahle and Lewellyn (2011) and Lewellyn and Muller-Kahle (2012), we test our hypotheses using panel data logistical regression with random-effect estimation by using the xtlogit commands in STATA 14. The following justifies our estimation method: our dependent variable, CEO structural power, is a binary variable; our sample is longitudinal, not every firm exists in all years of the panel; and many of the independent variables (e.g. CEOs' education level and gender) are relatively stable overtime.

1.5 Results

1.5.1 Descriptive statistics

Descriptive statistics of all variables for the full sample are presented in Table 4. Table 4 Panel A shows that 24% of CEOs in Chinese listed firms also held the board chair position. This contrasts with the 13% CEO duality from 2000 to 2008 in McGuinnes *et al.,* (2015) and 16% from 1999 to 2011 in Liu *et al.,* (2014). In addition, 5.9% of the CEOs in our sample are female. This shows an increase in the proportion of female CEOs, when compared with previous studies: 4.4% from 2000 to 2008 (Ye at al., 2010; Lam *et al.*, 2013; McGuinnes *et al.*, 2015), and 5% from 1999 to 2011 (Liu *et al.*, 2014). Our data therefore indicate that both CEO duality and the number of female CEOs in China have been increasing significantly in recent years[11].

Insert Table 4 here

Panel A, Table 4 also shows that the CEOs in our sample have an average of 13.3 years of formal education, which is much less than the years required to obtain a bachelor's degree (16 years), and that only 48.4% (not reported) have a university degree. These results concur with Fan and Wong (2004) and Liu *et al.,* (2014). Moreover, 7.2% of CEOs in our sample graduated from elite universities, representing lower level when

[11] Those results are significant at 1% level in the sample period based on the LSD tests. All the results not reported in this paper are available from the authors.

compared to CEOs in the US.[12] 20% of CEOs in our sample have *Political ties*, which is consistent with Fan and Wong (2004). On average, 1.8% of the CEOs are founders of the focal firm. Only 23.4% of CEOs in our sample were born during the Cultural Revolution period. 45.5% of the firms in our sample are controlled by the government (SOEs). Jiang and Kim (2015) show that in 1999 the state was the largest shareholder of 85.8% of Chinese listed firms. This percentage dropped to 47% by 2012.

Table 4, Panel B shows that our mean value for *Work experience* is 6.3 years[13] and CEOs sit on at least one board of directors on average, with a maximum of 37. 39.57% of the CEOs have at least one outside directorship (not reported), with a maximum of 37, suggesting that CEO interlocking is common practice in Chinese listed firms. The proportion of *Women directors%* is on average 12.4%, which is consistent with Liu *et al.,* (2014) which reports that from 1999 to 2011, 10.2% of directors in Chinese listed firms were female. On average, CEOs' relatives control 2.3% of the shareholdings of their focal firms. The average large shareholder wedge is 4.9%, whereas in Cao *et al.,* (2011), in a sample of Chinese listed firms from 2002 to 2007, the large shareholder wedge is 6.4%.[14] Firm size, firm age and past performance in our sample are also comparable to those in prior studies (e.g., Cao *et al.*, 2011; Liu *et al.*, 2014; McGuinnes *et al.*, 2015).

Table 4 also compares descriptive statistics by subgroups: firms with female CEO and firms with a male CEO. The main variables are compared using either χ^2 test or *t-tests* of differences[15], respectively. *Structural power*, *Years of education*, *Founder*, *SOE*, *Work experience*, *Women directors%*, *Family ownership%*, *Large shareholder wedge*, and *Firm size* show significant differences between the female and male CEO subgroups. As expected, female CEOs are less likely than male CEOs to hold the board chair position, our proxy for CEO structural power. However, female CEOs have human capital that is

[12] See for example the study by Muller-Kahle and Schiehll (2013) based on CEOs in the US.
[13] The average CEO tenure in McGuinnes et al.'s (2015) sample is around 2.8 years, which measures the tenure of each CEO's current term (normally three years) and therefore it is not directly comparable to our measure.
[14] The decreasing trend for the large shareholder wedge and number of SOEs could be explained by recent economic reforms and privatizations in China (Jiang and Kim, 2015).
[15] Following Norušis (2006), the binary and categorical variables are compared using χ^2 test, and continuous variables are compared using *t-test*.

equal to or greater than male CEOs. Female CEOs are more likely to have more years of education and more *Work experience* than male CEOs. More female than male CEOs are founders, and are more likely to work in non-SOE firms with higher level of *Women Directors%* on the board and to have a lower level of *Large shareholder wedge*, more *Family ownerships%* and smaller *Firm size*, consistent with Lam *et al.,* (2013) and Liu *et al.,* (2014).

The correlation matrix shown in Table 5 indicates that the correlations among independent variables are far below 0.5, indicating the absence of potential multicollinearity among variables. To test for multicollinearity, for all regression models, variance inflation factors (VIF) for the independent and control variables were calculated and are far below the suggested value of 10, ranging from 1.01 to 1.48, indicating the absence of potential multicollinearity problems. In Table 5, all of the human capital attributes, except for *political ties*, are positively associated with CEO structural power, while *Gender* again is negatively associated with CEO structural power. Overall, these findings indicate that human capital attributes help CEOs obtain structural power, while female CEOs have less structural power than male CEOs, and that there are certain demographic differences that distinguish female and male CEOs.

Insert Table 5 here

1.5.2 Regression results

Table 6 presents the results of the panel data logistical regressions using CEO structural power as the dependent variable. Model 1 includes control variables only. To address our first research question concerning the human capital attributes that explain CEO structural power (Hypothesis 1-4) and the hypothesis on the greater barriers for female compared to male CEOs in obtaining structural power (Hypothesis 5), we estimate Model 2, which includes all independent variables of interest and the control variables. As expected, Model 2 has higher explanatory power than Model 1, with a significant improvement between Model 1 to Model 2 ($\Delta\chi^2$=240, p<1%). Table 6, Model 2 shows that *Years of education* (b=0.27, p<1%), *Elite education* (b=0.22, p<10%) and *Work*

experience (b=0.15, p<1%) show strong positive associations with CEO structural power, supporting Hypothesis 1 and 2 concerning human capital attributes. *Political ties* has an insignificant association with CEO structural power, providing no support for Hypothesis 3, but CEO's *Directorships* (b=0.5, p<1%) shows a significant and positive association with CEO structural power, which supports our Hypothesis 4. As expected, *Gender* shows significant and negative coefficient (b= -0.68, p<1%), supporting Hypothesis 5 that female CEOs are less likely than their male counterparts to gain structural power.

In order to further investigate whether this gender effect (Hypothesis 6) impacts the relationships between CEO's human capital and the probability to gain structural power, we built interaction terms between the *Gender* and the human capital variables in Model 3 (Table 6). Following Cohen *et al.,* (2003), the independent variables were mean centered to decrease the potential multicollinearity. As expected, Model 3 has significantly higher explanatory power than Model 1 ($\Delta\chi^2$=253.9, p<1%) and Model 2 ($\Delta\chi^2$=13.8, p<5%). Interaction terms between *Gender* and *Years of education, Elite education, Work experience* and *Political ties* show insignificant coefficients, suggesting higher levels of human capital in these attributes do not increase the probability of female CEOs attaining *Structural power*. We interpret these results as evidence that these attributes are not enough to mitigate the gender inequality from a leadership perspective in our sample. The interaction term *Gender* with *Directorships* (b=0.44, p<1%) is, however, significantly positive, suggesting that CEO's outside directorships are the only attribute that mitigates gender inequality in Chinese listed firms.

Insert Table 6 here

To better visualize gender differences in the relationship between CEO's human capital attributes and structural power documented in Table 6 Model 3, and consistent with Hoetker, (2007) we estimate the probabilities of female and males CEOs obtaining the structural power. These probabilities are presented in Table 7[16]. Holding all other

[16] The results only include independent variables with significant direct effects on the dependent variable.

variables constant at their mean values (see more details in Long 1997, Folta and O'Brein, 2004; Hoetker, 2007), *Years of education* increase the probability of male CEOs to obtain structural power from 17% to 26%, while it appears to be detrimental for female CEOs in our sample, as the probability decreases from 13% to 8%. In contrast, *Elite education* greatly improves the probability of female CEOs obtaining structural power (from 10% to 21%), but not as much as the probability for male CEOs with *Elite education* (23%) to obtain similar structural power. This also suggests that *Elite education* can help female CEOs to obtain structural power only if compared with male CEOs without *Elite education*. As *Work experience* increases from 1 to 30 years, the probability of both female and male CEOs obtaining structural power increases, but again the effect is greater for male CEOs. In other words, with similar level of work experience, the likelihood of obtaining structural power is always higher for male CEOs than for female CEOs.

As the number of directorships increases, the probability of CEOs obtaining structural power increases significantly for both females and males. The probability of female CEOs with no directorships to obtain structural power is only 7%, much lower than the probability of male CEOs (16%) under the same conditions. More important, with 10 directorships, the probability of female CEOs obtaining structural power exceeds male CEOs with similar level of directorships. Although not reported, holding all other variables constant at the mean, the difference between female and male CEOs obtaining structural power in our sample becomes insignificant when the CEO has at least one directorship. To further illustrate the gender differences documented by the results of Table 6, Model 3 and Table 7, we plot the 95% confidence intervals[17] of the relationship between *Directorships* and *Structural power* for the female and male subgroups (see more details in Long 1997; Hoetker, 2007). Figure 2 shows that *Directorships* increase the structural power of both female and male CEOs, but the influence is stronger for females than males, and the confidence intervals begin to overlap only after the CEO's directorships reach a certain level, indicating that with around four directorships, the probability of female CEOs obtaining structural power becomes indifferent from male CEOs. This suggests that outside directorships is the only attribute capable to mitigate

[17] We thank one of the reviewers for this suggestion.

gender inequality at the executive level in Chinese listed firms. We interpret this evidence as additional support to Hypothesis 6.

Insert Table 7 and Figure 2 about here

Overall, our results suggest that human capital attributes such as years of education, elite education and work experience, are important determinants of CEO structural power in Chinese listed firms. They increase the likelihood of CEOs to obtain structural power but, are not able to mitigate the gender inequality. Although not tabulated, it is worth noting that in our sample the average age of CEOs is 48.6 years old, with 75% born after 1960 and 32% born after 1965, and thereby showing a significant decreasing trend of CEOs whose access to university would have been affected by the *Cultural Revolution*. This suggests that contrary to the argument in Fan and Wong (2005), the Chinese Cultural Revolution would not be the main explanation for the low level of formal education among Chinese CEOs in our sample, given that the *Cultural Revolution* influenced mainly people who were born before 1960. Again, although not tabulated, we find that as years of education increases, the probability of female obtaining structural power decreases. After tracing back to the data, we find that as the level of education increases, the number of directorships of female CEOs declines drastically, while the directorships for male CEOs increases. Since directorships are expected to play a far more important role to improve female CEOs' structural power in the Chinese context, we interpret this as evidence that too much education may cause opportunity costs in deterring female CEOs' opportunities to gain multiple directorships, and females may supplement their deficiency in formal education with stronger external directorships. These findings concur with Xin and Pearce (1996), Fan and Wong (2004), Allen *et al.,* (2005), and You and Du (2012), about the key role of relational capital in China in the appointment and promotion of top management. Although not tabulated, it is worth noting that, in our sample, female CEOs are significantly younger than male CEOs, and the age gap between CEOs and chairpersons is significantly larger when the CEO is

female [18]. This significant age gap suggests that female CEOs work under the supervision of more experienced and powerful board chairs, which echoes the argument by Jiang and Kim (2015).

1.6 Robustness checks

Given the relatively small number of female CEOs in our sample and the potential differences in their organizations when compared with male CEOs, we built a matching pair sample by pairing firms with a female CEO to comparable firms with a male CEO. Lyness and Thompson (1997) suggest that matched samples are useful for examining gender issues as it allows better control for potential organizational-level differences. Similar approaches are used by Judge *et al.,* (2010) and Muller-Kahle and Schiehll (2013). Hence, we matched each female CEO to a male CEO whose firm (i) operates in a similar industry, (ii) has similar ownership concentration (BvD independence indicator),[19] (iii) has the same type of controlling shareholder (state, family, foreign, or financial institution), and (iv) has similar size (±25% range of total assets). The results are a final matched sample of 774 observations, 387 female with 387 male CEOs.

We first examine the descriptive statistics of the matching pair sample (Table 8, Panel A), followed by a random-effect logistical regression analysis using the matching pair sample (Table 8, Panel B). We compare the main variables between the two subgroups and, as expected, no significant differences are found between the two subgroups with respect to the four matching criteria. Consistent with our main analysis, reported in Table 6, female CEOs are less likely than male CEOs to hold the board chair position, our proxy for CEO structural power. Table 8, Panel B, presents three panel data logistical regression models based on the matching pair sample (Model 1) and the female and male CEO subgroups (models 2 and 3), respectively, with CEO *Structural*

[18] Those results are significant at 1% level in the sample period based on the *t*-statistic tests.

[19] We collected the the BvD Independence Indicator from the Bureau Van Dijk's (BvD) ORBIS database. Bureau Van Dijk's (BvD) independence indicator: "*The BvD Independence Indicator categorizes the degree of independence of a company; it is not a rating. This indicator excludes the following owners from consideration when determining status of independence: Public, Mutual Funds, Private shareholders (more than one unnamed individual), and Bulk list of shareholders (more than one unnamed shareholder, but containing a mixture of companies and individuals)*" (Orbis user guide, 2017). Available at (Accessed on 8 February 2018): https://help.bvdinfo.com/mergedProjects/68_EN/Home.htm.

power as the dependent variable. In Model 1, *Gender* is again negatively associated with CEO *Structural power*, supporting our main results in Table 6. *Years of education*, *Elite education*, and *Work experience* and *Directorships* again show significantly positive coefficients in Model 1 Table 8, again consistent with our main results. In models 2 and 3, Table 8, *Elite education* improves CEO structural power only for females, while *Years of education* and *Work experience* improve CEO structural power only for males, which seems consistent with the analysis of differences in probabilities, as suggested by Hoetker (2007), and presented in our Table 7. The coefficient of outside *Directorships* is again positive in all three models, but has a stronger positive effect on female CEO structural power (Model 2). Overall, the regression results with the matching pair sample corroborate our main results reported in Table 6.

Insert Table 8 here

A second concern is that CEO structural power could result from factors other than CEO duality. For instance, ownership could be another source of CEO power (Finkelstein, 1992; Daily and Johnson, 1997; Haynes and Hillman, 2010; Lewellyn and Muller-Kahle, 2012). Similar to Haynes and Hillman (2010), we use CEO relative to board shareholdings as an alternative measure of CEO power. Accordingly, we construct a CEO power composite variable based on CEO duality and CEO/Board ownership (CEO relative to board equity holdings). These two variables are standardized and summed, and the Cronbach's (1951) alpha is 0.57. Our results with this alternative measure of CEO power are qualitatively similar to our main results. However, it is worth noting that as reported by Jiang and Kim (2015), different from western countries, CEOs as well as directors and other senior managers in China are less likely to obtain shares of their firms, with the average of shareholding percentage is close to 0% from 1999 to 2012.[20] Therefore, we contend that CEO ownership might not be as important as in Western firms, to capture CEO structural power in Chinese listed firms. As suggested by Haynes and Hillman (2010) and Lewellyn and Muller-Kahle (2012), board independence (the ratio of independent directors on the board) could also be a dimension of CEO structural

[20] Given space constraints, the results are not tabulated here, but are available upon request.

power, because boards with a high ratio of independent directors would monitor CEOs intensively, thereby negatively influencing CEO power. In our sample, however, board independence is positively correlated with CEO duality (0.06),[21] reflecting the fact that in firms where the CEO is also the board chair, the board has a higher proportion of independent directors. In line with this literature, and as summarized in Table 9, board independence begins to correlate positively with CEO duality after 2003, when the China Securities Regulatory Commission (CSRC-102, 2001) required listed firms in China to have boards composed of one-third independent directors. Thus, we view board independence as reflecting institutional pressure instead of the real effect of CEO relative to board power in Chinese listed firms, concurring with Jiang and Kim (2015).[22]

Insert Table 9 here

As Finkelstein (1992), Peng *et al.,* (2015) and Van Essen *et al.,* (2015) argue, CEO compensation could be another indicator of CEO power, since CEOs with higher power over the board may attempt to maximize their compensations. In our sample, however, the correlation between CEO compensation (CEO relative to board compensation) and CEO duality is insignificant, and more than 3% of CEOs and 25% of directors in our sample did not receive compensation from the focal firms. Consistent with Hu *et al.,* (2010), this evidence suggests that in Chinese listed firms, large shareholders appoint their representatives as CEOs or directors, and also provide their compensation. For example, Hu *et al.,* (2010) reports that 17% directors in their sample directly receive compensation from large shareholders, suggesting that compensation may not capture CEOs and directors' real income. In the same line, Jiang and Kim (2015) show that CEOs and directors of SOEs are more like government officers rather than professional

[21] This positive correlation between CEO duality and board independence is consistent with other studies of Chinese listed firms (e.g., Conyon and He, 2011; Liu et al., 2014; McGuinness et al., 2015) using data after 2003.

[22] We used the term "Director" (*Dongshi*) to identify directors, excluding those who resigned in 2013 in SinoFin executive database. We used the term "Independent Director" (*Duli Dongshi*) to identify independent directors in SinoFin executive database, in which the original data comes from firms' annual reports and the definition of "Independent Director" follows CSRC (2001), Guiding opinions on establishing the independent director institution in listed companies. Available at (Accessed on 8 February 2018): http://www.csrc.gov.cn/pub/csrc_en/newsfacts/release/200708/t20070810_69191.html.

managers, and, thus, getting promoted is somewhat more important for them than raising compensation. Consistent with this evidence, we contend that compensation may not be an appropriate way to measure structural power of CEOs in Chinese listed firms.

Previous studies also indicate that Chinese SOEs behave differently from non-SOEs (e.g., Cao *et al.*, 2011; Jiang and Kim, 2015). As reported above, our sample contains significantly more female CEOs in non-SOEs than SOEs. Therefore, as an additional robustness test, we run the models only with non-SOEs (3,566 firm-years observations). Qualitatively, our results again indicate that in non-SOEs, female CEOs have less structural power than male CEOs, and in terms of human capital attributes examined, the results are again qualitatively similar to our main results. This suggests that our results are still robust to potential differences in the upward mobility between SOEs and non-SOEs.

1.7 Concluding remarks

The objective of this study is to examine the human capital attributes that enable CEOs to acquire structural power in Chinese listed firms, and whether gender differences in these attributes can explain this structural power. Drawing on human capital (Becker, 1964, 1971) perspective, we hypothesize that the CEO's human capital attributes (years of education, elite education, and work experience, political ties and outside directorships) explain structural power, and that higher level in these attributes can mitigate gender inequality in terms of executive mobility in Chinese listed firms.

The years and quality of education, work experience, and outside directorships greatly explain CEO's structural power. This echoes Dalziel *et al.,* (2011), that the quality of education contains another perspective of individuals' capability, e.g. superior cognitive ability, legitimacy and valuable social networks, which are hardly to be acquired from extending the length of education. Moreover, our findings concur with Daily and Johnson (1997) and Elliott and Smith (2004), who argue that employees could obtain resources and critical assistance through personal capability and networks, which in turn determine the power they gained within their organizations. Our findings also extend the studies by Xin and Pearce (1996), Fan and Wong (2004), Allen *et al.,* (2005), and You

and Du (2012), who underscore the key role of relational capital in China in the appointment and promotion of top management. In contrast to most of gender-related literature, which investigates gender inequality from perspectives of board diversity, female executive participation, or gender compensation gap (e.g., Ye *et al.*, 2010; Lam *et al.*, 2013; Liu *et al.*, 2014; McGuinness *et al.*, 2015; Terjesen *et al.*, 2015), we extend Powell (1999), Smith (2002) and Finkelstein *et al.,* (2009) work by examining gender effects on hierarchical authority. We find that although the percentage of female CEOs in China exceeds that of many developed countries (Fan and Wong, 2004; Ye at al., 2010; Lam *et al.*, 2013), there remains barriers that prevents female CEOs from obtaining as much structural power as their male counterparts. Hence, our results corroborate previous literature suggesting that the level of gender inequality may increase at higher levels of workplace power (Powell, 1999; Smith, 2002; Elliott and Smith, 2004; Smith, 2012). Our results also show that years of formal education explains both male and female CEO structural power in Chinese listed firms, but does not mitigate gender barriers. Although in our sample period the majority of CEOs were born after 1960, and were less likely to be influenced by the Cultural Revolution, formal education remains a scarce resource for CEOs in Chinese listed firms. Moreover, multiple directorships show a stronger positive effect on the likelihood of female CEOs obtaining similar or higher structural power than their male counterparts, suggesting that one way for female CEOs to achieve the similar structural power is through investments in relational capital.

Like all empirical studies, ours has some limitations, which in turn open opportunities for future research. For example, we focus on Chinese firms listed in the Shanghai and Shenzhen A-share market, and do not consider Chinese firms listed overseas. Second, we do not account for the impact of female CEO authority on firm-level outcomes. Future research can examine how female executives with different degrees of structural power influence firm value or strategic outcomes. Third, our study only focusses on Chinese firms, which operate under a specific and evolving institutional context. While we believe that our findings are relevant to other Asian and emerging countries that share similar cultural and societal attributes, as documented by Yukongdi and Benson

(2005), future research can extend our research through a cross-country analysis of female leadership.

Despite these limitations, our study makes a number of significant contributions to the leadership and gender inequality literature. First, we find that education and experience attributes alone do not suffice to explain CEO structural power. Our results suggest that human and relational capital attributes are complementary, and that when combined, they provide better explanatory power and model fitness to explain CEO structural power in Chinese listed firms. This corroborates our proposal, which is based on Powells' (1999) individual-level perspective and Hillman and Dalziel's (2003) integration of human and relational capital theories. Our study also departs from leadership studies in the US by investigating female CEOs in China, where power is highly concentrated within firms and relational capital is generally far more important than in Western cultures (Cooke, 2003; Allen *et al.*, 2005). Finally, our results have implications for both practitioners and policy makers. We echo the argument by Jiang and Kim (2015) that executives face different job markets and promotion standards in China than their peers in Western countries. Our findings also support the claim that the standards for upward mobility differ between female and male CEOs, and that Chinese firms need to provide equitable training and opportunities for male and female employees. To conclude, we believe that this study contributes to female leadership literature and practice in China, and our findings will generate additional research on leadership, and related issues.

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Table 2 Sample description

Sample selection procedure	Obs.
1. Total number of firms listed on the Shanghai and Shenzhen A-share stock market at December 31, 2010-2013 in the Sinofin Database;	9,435
2. Drop firms with missing data;	(151)
3. Drop firms in financial industry, based on 2-digit GICS code;	(696)
4. Drop IPOs and firms that underwent CEO turnover in 2010-2013.	(2,043)
Final Sample Size:	6,545

Table 3 Variable definitions

Structural power	Dummy variable equal to 1 if the CEO is also the chairperson and 0 otherwise.
Years of education	Natural log of years of education for the CEO: "less than high school"=9 years, "high school"=12 years, "bachelor"=16 years, "master"=18 years, and "PhD"=22 years.
Elite education	Dummy variable equal to 1 if the CEO graduated from either a Chinese or foreign elite university and 0 otherwise. Chinese elite universities are those in the C9 League. Elite foreign universities are those in the Ivy League in the US the U15 in Canada, the Russell Group in the UK, or the Go8 in Australia.
Work experience	Natural log of years the CEO has served in the focal firm.
Political ties	Dummy variable equal to 1 if the CEO used to work for the government or SOE and 0 otherwise.
Directorships	Natural log of number of firms where the CEO also serves as director.
Gender	Dummy variable equal to 1 if the CEO is a female and 0 otherwise.
Women directors%	The percentage of women directors to the total number of directors.
Founder	Dummy variable equal to 1 if the person is the firm's founder and 0 otherwise.
Cultural Revolution	Dummy variable equal to 1 if the person was born between 1948 and 1959.
Family ownership%	The percentage of CEO relatives' shareholding to the total number of shares.
SOE	Dummy variable equal to 1 if the ultimate controlling shareholder is a state asset management bureau, a state-owned enterprise (SOE) affiliated with the central government, or an SOE affiliated with the local government, and 0 otherwise.
Large shareholder wedge	The difference between the control rights and cash flow rights of the ultimate controlling shareholder.
Firm size	Natural log of firm's total assets.
Firm age	Natural log of years since the firm was created.
Past ROE	Net profit return/total equity in the past year.
Genviron	Average of the four indicators: (1) Governance: The relations between local government and market. (2) Finance: The maturity of the products market, including the competition of financial factors and marketization of credit allocation. (3) Intermediary: The service conditions of lawyers and certified public accountants, and the assistance level of industry associations given to enterprises. (4) Judiciary: The efficiency of judicial system and administrative executing departments.
Industry	Dummy variables representing 9 industries: Energy, Materials, Industrial, Consumer Discretionary, Consumer Staples, Health Care, Utilities, Information Technology, and Telecommunication Services.

Table 4 Descriptive statistics and comparisons between female and male CEOs in our sample

Panel A Dummy and categorical variables

	Full Sample (n=6545)				Female CEOs (n=387)	Male CEOs (n=6158)	
	Min	Max	Mean	SD	Mean	Mean	χ^2
Structural power	0	1	0.240	0.427	0.200	0.240	3.364*
Years of education[a]	9	22	13.341	4.349	13.726	13.317	13.986***
Elite education	0	1	0.072	0.258	0.078	0.071	0.212
Political ties	0	1	0.200	0.400	0.196	0.201	0.043
Gender (Female=1)	0	1	0.059	0.236	-	-	
Founder	0	1	0.018	0.134	0.031	0.017	3.790*
Cultural Revolution	0	1	0.234	0.424	0.233	0.234	0.008
SOE	0	1	0.455	0.498	0.287	0.466	47.000***

Panel B Continuous variables

	Full Sample				Female CEOs	Male CEOs	
	Min	Max	Mean	SD	Mean	Mean	*t-stat*
Work experience[a]	1	41	6.265	5.150	6.863	6.228	2.355**
Directorships[a]	0	37	1.567	2.927	1.793	1.553	1.569
Women directors%	0	0.600	0.124	0.115	0.240	0.117	21.175***
Family ownership%	0	0.739	0.023	0.103	0.057	0.021	6.669***
Large shareholder wedge	0	0.632	0.049	0.082	0.041	0.049	-1.986**
Firm size	13.763	28.282	21.666	1.291	21.359	21.686	-4.829***
Firm age [a]	1	33	13.703	5.110	13.535	13.714	-0.669
Past ROE	0	0.438	0.093	0.104	0.099	0.093	1.169
Geviron	2.320	9.620	7.288	1.452	7.248	7.290	-0.554

[a] Before logarithm transformation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 5 Pearson correlation matrix for CEOs in Chinese listed firm(s) (Full sample: n=6545)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Structural power	1															
2. Years of education	0.129***	1														
3. Elite education	0.091***	0.300***	1													
4. Work experience	0.120***	0.111***	0.088***	1												
5. Political ties	-0.006	-0.017	-0.012	0.034***	1											
6. Directorships	0.196***	0.106***	0.062***	0.114***	-0.042***	1										
7. Gender	-0.023*	0.028**	0.006	0.032**	-0.003	0.017	1									
8. Women directors%	0.077***	0.018	0.008	0.016	0.013	0.023*	0.253***	1								
9. Founder	0.124***	0.071***	0.100***	0.079***	0.026**	0.031**	0.024*	0.048***	1							
10. Cultural Revolution	0.038***	-0.124***	-0.080***	0.057***	0.004	-0.017	-0.001	0.027**	-0.013	1						
11. Family ownership%	0.085***	0.081***	0.049***	0.072***	-0.016	0.044***	0.082***	0.088***	0.076***	-0.040***	1					
12. SOE	-0.301***	-0.148***	-0.118***	-0.144***	-0.005	-0.144***	-0.085***	-0.167***	-0.115***	0.103***	-0.193***	1				
13. Large shareholder wedge	-0.039***	-0.023*	-0.008	-0.084***	0.014	0.056***	-0.025**	-0.010	-0.020	0.014	-0.095***	-0.096***	1			
14. Firm size	-0.167***	-0.020	0.031**	0.023*	-0.002	0.054***	-0.060***	-0.159***	-0.037***	0.080***	-0.092***	0.360***	0.049***	1		
15. Firm age	-0.129***	-0.217***	-0.087***	-0.027**	0.048***	-0.143***	-0.014	-0.012	-0.058***	0.075***	-0.158***	0.244***	0.032***	0.045***	1	
16. Past ROE	-0.014	0.016	0.011	-0.014	0.003	0.001	0.014	-0.004	0.009	0.007	-0.018	0.014	0.039***	0.076***	0.058***	1
17. Geviron	0.095***	0.038***	0.081***	0.080***	0.008	0.143***	-0.007	0.040***	0.022*	0.013	0.060***	-0.182***	-0.014	-0.029**	-0.076***	0.003

*, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 6 Logistic regressions for CEOs in Chinese listed firm(s) (Full Sample n=6545)

DV:		Model 1 Structural power			Model 2 Structural power			Model 3 Structural power		
	Exp. Sign	B	SE	*p*	B	SE	*p*	B	SE	*p*
Constant		1.519	0.717	0.034**	2.818	0.744	0.000***	2.815	0.744	0.000***
Women directors%	+	0.327	0.264	0.215	0.597	0.279	0.032**	0.622	0.280	0.026**
Founder	+	1.116	0.201	0.000***	1.035	0.209	0.000***	1.065	0.210	0.000***
Cultural Revolution	-	0.504	0.073	0.000***	0.560	0.076	0.000***	0.553	0.076	0.000***
Family ownership%	+	0.064	0.253	0.801	0.032	0.258	0.902	0.045	0.259	0.861
SOE	-	-1.392	0.080	0.000***	-1.263	0.082	0.000***	-1.261	0.082	0.000***
Largest shareholder wedge	-	-1.900	0.414	0.000***	-2.057	0.427	0.000***	-2.008	0.428	0.000***
Firm size	-	-0.129	0.029	0.000***	-0.193	0.030	0.000***	-0.193	0.030	0.000***
Firm age	-	-0.261	0.065	0.000***	-0.123	0.069	0.074*	-0.125	0.069	0.070*
Past ROE	+	-0.028	0.310	0.928	0.000	0.320	0.999	0.036	0.320	0.912
Geviron	+	0.072	0.023	0.002***	0.030	0.024	0.202	0.030	0.024	0.217
Direct Effects:										
Years of education	H1(+)				0.272	0.055	0.000***	0.265	0.055	0.000***
Elite education	H1(+)				0.217	0.117	0.064*	0.209	0.118	0.075*
Work experience	H2(+)				0.152	0.042	0.000***	0.155	0.042	0.000***
Political ties	H3(+)				0.022	0.079	0.786	0.025	0.080	0.751
Directorships	H4(+)				0.500	0.041	0.000***	0.497	0.041	0.000***
Gender	H5(−)				-0.676	0.144	0.000***	-0.769	0.164	0.000***
Interaction Terms:										
Gender × Years of education	H6(+)							-0.588	0.255	0.210
Gender × Elite education	H6(+)							0.700	0.482	0.146
Gender × Work experience	H6(+)							0.030	0.202	0.884
Gender × Political ties	H6(+)							-0.186	0.377	0.621
Gender × Directorships	H6(+)							0.444	0.171	0.009***
Log likelihood/Model χ^2		-3188.60/675.80 (p=0.000***)			-3068.56/836.98 (p=0.000***)			-3061.67/846.55 (p=0.000***)		
$\Delta\chi^2$ (vs Model 1)					240.07 (p=0.000***)			253.85 (p=0.000***)		
$\Delta\chi^2$ (vs Model 2)								13.78 (p=0.017**)		

Notes: Industry dummies and year fixed effect included in models, but not reported. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 7 Probabilities of CEO structural power

Variables:	Probability (Structural Power=1)		
Years of education	Female	Male	Difference
Lower	12.6%	17.4%	-4.8%
High School	10.6%	20.6%	-10.0%
Bachelor	9.5%	22.7%	-13.1%
Master	8.9%	24.2%	-15.4%
PhD	8.3%	25.5%	-17.1%
Elite education	Female	Male	Difference
0	10.1%	20.3%	-10.2%
1	21.1%	23.1%	-2.1%
Work experience	Female	Male	Difference
1	8.3%	16.9%	-8.6%
5	10.8%	20.6%	-9.9%
10	12.1%	22.4%	-10.4%
20	13.5%	24.3%	-10.9%
30	14.4%	25.5%	-11.1%
Directorships	Female	Male	Difference
0	6.5%	16.3%	-9.8%
1	11.6%	21.2%	-9.7%
5	26.3%	31.1%	-4.8%
10	38.4%	37.6%	0.8%
15	46.7%	41.8%	4.9%

Notes: Calculated at the mean values of all variables based on the logistic regressions in Table 6 Model 3.

Table 8 Descriptive statistics and logistic regressions using the matching pair sample

Panel A Descriptive statistics for CEOs in the matching pair sample.

	Female CEOs (n=387)		Male CEOs (n=387)		
	Mean	SD	Mean	SD	χ^2
Structural power	0.202	0.402	0.315	0.465	13.053***
Elite education	0.078	0.268	0.072	0.259	0.075
Political ties	0.196	0.398	0.233	0.423	1.503
	Mean	SD	Mean	SD	*t-Stat*
Years of education[a]	13.726	4.167	13.401	4.215	1.081
Work experience[a]	6.863	5.681	6.558	4.659	0.816
Directorships[a]	1.793	3.289	1.708	2.553	0.403

Panel B Logistic regressions for CEOs in the matching pair sample.

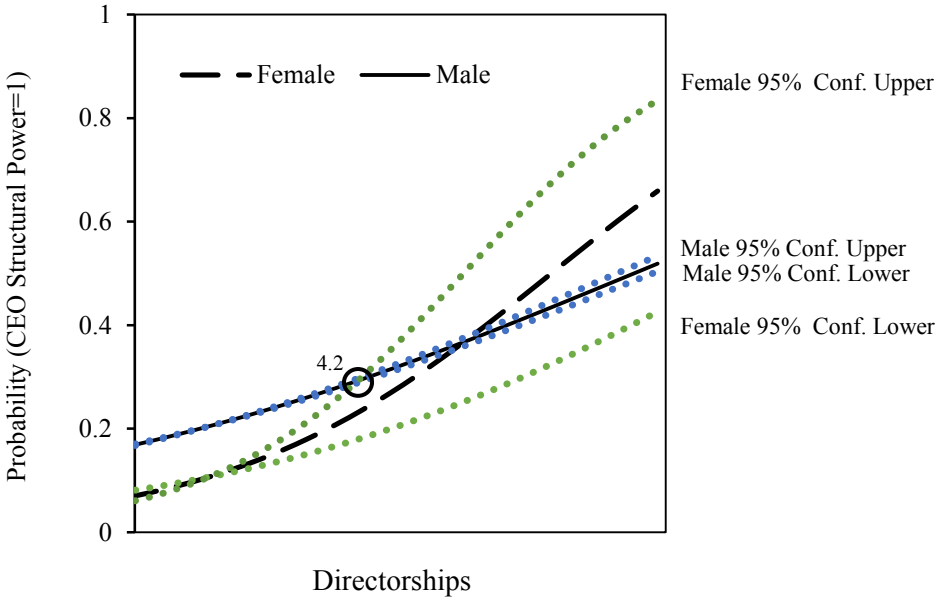
Sample:	Model 1 Matching Pair			Model 2 Female CEOs			Model 3 Male CEOs		
DV:	Structural power			Structural power			Structural power		
	B	SE	*p*	B	SE	*p*	B	SE	*p*
Constant	-2.593	0.617	0.000***	-4.645	2.665	0.081*	-3.032	0.855	0.000***
Years of education	0.061	0.023	0.009***	-0.038	0.068	0.578	0.107	0.032	0.001***
Elite education	0.751	0.316	0.017**	0.459	1.415	0.082*	0.346	0.453	0.446
Work experience	0.063	0.016	0.000***	0.062	0.051	0.223	0.097	0.027	0.000***
Political ties	-0.097	0.220	0.658	-0.314	0.669	0.639	-0.017	0.289	0.954
Directorships	0.154	0.029	0.000***	0.293	0.145	0.044**	0.140	0.046	0.002***
Gender	-0.880	0.202	0.000***						
Control Variables	Included			Included			Included		
Log likelihood	-392.27			-172.66			-206.97		
Model χ^2	83.88 (p=0.000***)			4.60 (p=0.970)			49.48 (p=0.000***)		
Obs.	774			387			387		

Notes: [a] Before logarithm transformation. Control variables and year fixed effect included in models, but not reported. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 9 Previous studies on CEO duality/board independence correlations in Chinese listed firms

Author(s)	Journal	Definition of independent director	Correlation	Significance	Sample Period	Data source
Tian and Lau (2001)	APJM	Directors who are not employed by the focal shareholding company or its subsidiaries	-0.15	Unknown	1996	IPO statements
Firth *et al.* (2007)	JAPP	Independent non-executive directors	-0.035	$p<10\%$	1998-2003	CSMAR Database
Conyon and He (2011)	JCF	Directors hold "independent director" job title in Sinofin	0.01	Unknown	2001-2005	Sinofin Database
Liu *et al.* (2014)	JCF	Directors hold "independent director" job title in CSMAR	0.02	Unknown	1999-2011	CSMAR Database
McGuinness *et al.* (2015)	APJM	Directors hold "independent director" job title in CSMAR	0.027	Unknown	2000-2008	CSMAR Database

Figure 2 Influence of the interaction between CEO directorship and gender on CEO structural power under 95% confidence interval



Chapter 2
Finding the Right Fit: How Board Attributes Affect the Board-Performance Relationship

Abstract

We examine the board-performance relationship in terms of board role emphasis and the moderating effect of the board's structural, human, and relational capital attributes. Based on 35,954 board decisions from 1,054 Chinese listed firms, we find that boards' emphasis on control role is positively associated with firm performance, and this relationship is stronger with increasing proportion of nonaffiliated directors and degree of functional diversity on the board. In contrast, directors' multiple directorships adversely affect board control role effectiveness, such that firm performance decreases when "busy boards" increase the control role emphasis. Our study underscores the need to distinguish between the board's control and service roles, and contribute to the ongoing discussion on the attributes that best equip the board to enact its dual role.

2.1 Introduction

Should the board of directors focus more on control or service? Does the board's role emphasis influence its ability to affect firm performance? These are debatable questions. Although the direct effects of board attributes on firm performance have been extensively studied, the findings are inconclusive and conflicting (see, e.g., the reviews by Dalton *et al.*, 1998; Dalton and Dalton, 2011; Van Essen *et al.*, 2012). Some authors argue that this is due to lack of information on what boards actually do (e.g., Zahra and Pearce, 1989; Forbes and Milliken, 1999; Huse, 2007; Minichilli *et al.*, 2009; Tricker, 2015). The premise is that board attributes alone cannot yield (or explain) any firm-level outcomes directly, but instead through the extent to which board attributes, such as board structure and human capital, adequately support the board's control and/or service roles. This argument provides the main motivation for the present study.

Governance scholars have underscored the need to investigate what boards actually do in the boardroom (e.g., Vafeas, 1999; Huse, 2007; Aguilera *et al.*, 2012; Schwartz-Ziv and Weisbach, 2013). However, the difficulty in obtaining access to board meetings and decisions might explain the scarcity of studies on board activity and role emphasis. With few exceptions, studies have mainly surveyed small samples of firms (e.g., Minichilli *et al.*, 2009; Schwartz-Ziv and Weisbach, 2013; Machold and Farquhar, 2013; Tricker, 2015), providing an incomplete picture of what really goes on in the boardroom.

Our study attempts to flesh out this portrait. The China Securities Regulatory Commission (CSRC) mandates listed firms to disclose the content of board meetings, offering unique access to the inner workings of boards. This situation allows us to explore the board-performance relationship in terms of board role emphasis and to further investigate whether this effect is conditional on the structural, human, and relational capital attributes that enable the board to fulfill its dual role effectively. We propose a theoretically grounded classification of board activity in which we consider the allocation of time and effort to control or service activities as a proxy for board role emphasis (Adams, 2003). Thus, we distinguish board emphasis in terms of (1) the control role (based on agency theory), whereby the board monitors executives and provides accountability to protect shareholder interests (Fama and Jensen, 1983; Jensen

and Meckling, 1994); and (2) the service role (based on resource dependence theory), whereby the board advises executives on matters of strategy formulation and policymaking (Pfeffer and Salancik, 1978).

In an examination of 7,225 board meeting reports and 35,954 board decisions obtained from 1,054 Chinese listed firms, we find that a one percent increase in control role emphasis increases firm performance (*Adj-Tobin's* Q_{t+1}) by 0.8 percent on average. More importantly, a one percent increase in control role emphasis in firms with a high percentage of nonaffiliated directors improves firm performance by 1.85 percent, and a one percent increase in control role in firms with high functional diversity on the board improves firm performance by 2.1 percent. In contrast, a high percentage of multiple directorships on the board adversely affects control role effectiveness, such that firm performance decreases by 0.31 percent when "busy boards" increase the control role emphasis by one percent.

The contribution of our study is twofold. First, we build on the work by Vafeas (1999), who assesses board activity in terms of board meeting frequency. Thus, we underscore the need to distinguish between the control and service roles when investigating the board's ability to affect firm performance, and we contribute to the ongoing discussion of how boards fulfill their fiduciary responsibilities. Second, we explore beyond the performance effects of board attributes alone to consider them jointly with the board role emphasis (Zahra and Pearce, 1989; Hillman and Dalziel, 2003). We contend that board attributes may not be directly associated with firm performance, but instead they strengthen the performance effect of the board roles. Hence, board role emphasis should be considered when assessing the effectiveness of board attributes (Zahra and Pearce, 1989; Vafeas, 1999; Huse, 2007; Aguilera *et al.*, 2012; Tricker, 2015). Thus, a good fit should exist between board attributes and board role emphasis (Hambrick *et al.,* 2015), and boards that adjust their attributes to optimally fit the dual role would be better positioned to impact firm performance (Hillman and Dalziel, 2003; Schiehll *et al.*, 2017).

The next section presents the theoretical background and research hypotheses. The third section presents the research methods followed by the empirical results, robustness checks, and discussion. The final section summarizes the findings and contributions.

2.2 Theory and hypotheses

The board's dual role of control and service has been a staple topic in the governance literature (e.g., Lorcsh and MacIver, 1989; Zahra and Pearce, 1989; Hillman and Dalziel, 2003; Van Essen *et al.*, 2012; Aguilera *et al.*, 2012). The control role (also called the monitoring function) is grounded on agency theory (e.g., Fama and Jensen, 1983; Jensen and Meckling, 1994) and has been fueled by governance rules (e.g., Sarbanes-Oxley Act, 2002). Given the board's distance from day-to-day operations and its need to remain independent, many scholars contend that the board's main contribution is to monitor top management by preventing wrongdoings such as fraud, misrepresentation, and embezzlement so as to minimize the downside potential of shareholder wealth (e.g., Fama and Jensen, 1983; Jensen and Meckling, 1994; Schiehll and Bellavance, 2009; Martins *et al.*, 2016). From a different theoretical perspective, resource dependence theory, other scholars argue that board members should work in collaboration with top management to shape the organization's strategic directions and reduce external uncertainties in order to maximize the future upside potential of shareholder wealth (Hillman and Dalziel, 2003; Huse, 2007; Haynes and Hillman, 2010; Dalziel *et al.*, 2011). Accordingly, the board fulfills its service role by acting as a resource provider: it offers strategic advice, provides access to information outside the firm, and enables preferential access to valuable resources through personal connections, expertise, and legitimacy (Haynes and Hillman, 2010; Dalziel *et al.*, 2011; Courtemanche *et al.*, 2013).

Accordingly, analyses of the board-performance effect should consider the board role emphasis. However, due to "*the absence of reliable data on the content of board meetings*" (Vafeas, 1999: 141), few studies have looked at the activities that the board actually carries out. Fortunately, unlike most Western countries, the Stock Listing Rules of the Shanghai (SSE) and Shenzhen (SZSE) stock exchanges (2000: 7-1-1)[23] mandate Chinese listed firms to disclose their board meeting reports, along with the decisions made by the board (e.g. Lin *et al.*, 2012; Lo *et al.*, 2010; Ma and Khanna, 2015). Moreover, in China, the board's governance function has been greatly influenced by

[23] Available at (Accessed on 8 February 2018):
http://www.sse.com.cn/services/sselisting/relevantrules/securities/c/c_20150912_3985797.shtml;
http://www.csrc.gov.cn/pub/shenzhen/xxfw/tzzsyd/ssgs/zh/zhyfz/200902/t20090224_95401.htm.

Western countries (Peng, 2004; Mcfarlan *et al.*, 2009; Jiang and Kim, 2015). Since the SSE and SZSE began operations in the 1990s, China has undergone several corporate governance reforms in order to align with international practices (for more details, see Peng, 2004; Jiang and Kim, 2015). The CSRC has emphasized the importance of the board, and the Company Law of the People's Republic of China (2005: 4-3-47; hereafter, Company Law)[24] made the board's fiduciary responsibilities comparable to those in Western countries (Chen *et al.*, 2006; Mcfarlan *et al.*, 2009). China's regulatory environment therefore offers a unique setting in which to empirically examine our research question.

Adopting a more comprehensive view, Tricker (2015) considers the control role in terms of activities concerning executive supervision and accountability and the service role in terms of strategy formulation and policymaking. Accordingly, and consistent with Tricker (2015), Pearce and Zahra (1992), and Hillman and Dalziel (2003), we propose assessing board effectiveness by distinguishing between (1) control and (2) service activities. Table 10 presents our classification of board activities. Based on the literature, we assume that the board enacts control when it makes decisions about any of these three issues: executive turnover and compensation, financial reporting, and profit distribution. Alternatively, the board provides service when it makes decisions about any of these three issues: advising (policy and structure, technology and operations, financing), strategic planning, and corporate social responsibility (CSR) practices. As Forbes and Milliken (1999: 493) explain:

"*The time that directors devote to their tasks can differ considerably across boards, and these differences can significantly determine the degree to which boards are able to represent shareholders' interests successfully* [control role] *and to make contribution to strategy* [service role]."

Consistent with Schwartz-Ziv and Weisbach (2013), who find that the board's allocation of time and effort to the control or service role is similar to the proportion of the total number of related decisions discussed during meetings, our premise is simple: the frequency of these different decisions reflects the board's role emphasis.

[24] Because our data starts in 2013, we apply the Company Law (2005) in effect at that time.

Insert Table 10 about here

Moreover, because the board's ability to fulfill its dual role is assumed to depend on how it is configured, many studies have examined how board attributes directly affect firm performance (e.g., Dalton *et al.*, 1998; Dalton and Dalton, 2011; Van Essen *et al.*, 2012). This direct effect assumption has long been criticized for ignoring actual board activity and the fact that board role emphasis varies across firms (Vafeas, 1999; Forbes and Milliken, 1999; Adams, 2003; Machold and Farquhar, 2013). In their seminal study, Zahra and Pearce (1989: 330) suggest that:

"*Direct links among board attributes and company financial performance is misguided and will yield contradictory findings. Scholars need to ponder whether examination of the indirect links (attributes→roles→company performance) would enrich our understanding of board contribution to organizational performance.*"

The implication is that board attributes foster the board's ability and motivation to effectively fulfill its functions. Boards have the potential to either benefit or harm firm value, depending on whether their structural attributes (e.g., independence) and capital attributes (e.g., human and relational capital) are appropriate for effective enactment of the dual role (e.g., Hillman and Dalziel, 2003; Haynes and Hillman, 2010; Dalziel *et al.*, 2011; Tricker, 2015; Hambrick *et al.*, 2015). In this sense, board configuration involves a tradeoff (Hillman and Dalziel, 2003; Schiehll *et al.*, 2017), whereby board attributes could moderate the board-performance relationship, as illustrated in Figure 3.

Insert Figure 3 about here

Board structural attributes are assumed to foster the performance effect of control activities, since these attributes therefore reflect the board's ability and willingness to resolve agency problems and protect shareholder wealth (Dalton and Daily, 1999; Hillman *et al.*, 2000; Hillman and Dalziel, 2003; Johnson *et al.*, 2013). Hence, we consider the proportion of nonaffiliated directors on the board as a key dimension of board structure. Thanks to their nonaffiliated relationships with the company and their

distance from management, nonaffiliated directors are expected to make more objective and independent judgments (e.g., Dalton and Daily, 1999; Hillman *et al.*, 2000; Hillman and Dalziel, 2003; Johnson *et al.*, 2013; Martins *et al.*, 2016). Dalton and Daily (1999: 32) echo this argument:

"*A board could be completely independent and, at the same time, fail utterly in its expertise/counsel and resource-dependence roles* [service role]. *Conversely, a board dominated by insider and affiliated directors could fall short in its ability to monitor and control* [control role]*."*

Consistent with the findings in Western settings, and despite the review by Van Essen *et al.,* (2012), which argues that there is little evidence of a direct relationship between nonaffiliated directors and firm performance in China, studies show that nonaffiliated directors in China are associated with control activities intended to alleviate opportunistic managerial behavior such as fraud, earnings management, and non-arm's length related-party transactions (Chen *et al.*, 2006; Liu and Lu, 2007; Lo *et al.*, 2010). Furthermore, they increase the probability of CEO turnover and strengthen the positive relationship between CEO turnover and firm performance (Kato and Long, 2006; Firth *et al.*, 2006). We therefore propose the following hypothesis:

> *Hypothesis 1: Board structural attributes moderate the relationship between board role and firm performance such that the positive association between board control role emphasis and firm performance is stronger when the board of director includes a higher proportion of nonaffiliated directors.*

Hillman and Dalziel (2003) were the first to introduce the concept of "board capital," or the human and relational capital of the directors on the board. Whereas human capital is assumed to enhance individual directors' cognitive and productive capabilities to benefit decision making (Becker, 1975), relational capital comprises *"the sum of the actual and potential resources embedded within, available through, and derived from, the network of relationships processed by an individual"* (Nahapiet and Ghoshal, 1998: 243). Because firms face different challenges, their boards need to have strong sets of knowledge and capabilities in order to enhance board functions (Hillman and Dalziel, 2003; Haynes and Hillman, 2010; Schiehll *et al.*, 2017).

In particular, heterogeneity of functional experience (functional diversity) may improve the board's effectiveness through expertise in a wide range of competences and skills (Hillman *et al.*, 2000; Minichilli *et al.*, 2009; Haynes and Hillman, 2010). Similarly, critical monitoring activities such as scrutinizing financial information, assessing CEO compensation and turnover, and overseeing regulatory compliance would require a broad range of expertise (Hillman and Dalziel, 2003; Johnson *et al.*, 2013; Hambrick *et al.*, 2015). As Hillman and Dalziel (2003) argue, insufficiently knowledgeable or inexperienced directors may have problems understanding and interpreting certain critical issues, to the detriment of effective monitoring. Hambrick *et al.,* (2015) also demonstrate that to be an effective monitor, directors need to combine objectivity and in-depth understanding of the domain being monitored. For example, distributing board members across diverse *functional* categories can expose directors to different organizational perspectives, which in turn promote a culture of questioning and enhance the board's ability to critically assess CEO decisions (Minichilli *et al.*, 2009). In line with this view, Wahid (2011) finds that board heterogeneity increases the performance sensitivity of CEO turnover and reduces excessive management compensation. These findings concur with those of studies conducted in China. Given the scarcity of managerial and professional experience in China, highly reputable, independent directors are considered valuable resources for firms, which suffer significant reputation costs if fraud scandals lead to director dismissals (Fan *et al.*, 2007; Lo *et al.*, 2010; Lin *et al.*, 2012; Liu *et al.*, 2014; Giannette *et al.*, 2015). For example, Lo *et al.,* (2010) find that Chinese listed firms with financial experts on their audit committees are less likely to engage in non-arm's length related-party transactions. Similarly, Lin *et al.,* (2012) find that directors with accounting background are more likely to issue opposing opinions and make important contributions to boardroom discussions, suggesting that more heterogeneous boards are more effective monitors. We therefore propose the following hypothesis:

> *Hypothesis 2: Board capital attributes moderate the relationship between board role and firm performance such that the positive association between board control role emphasis and firm performance is stronger when the board of directors includes greater functional diversity.*

As an important dimension of relational capital, multiple directorships (i.e., sitting on the board of more than one firm) are assumed to provide channels for directors to exchange information and resources between firms, gain insights into new approaches, and modify their own business practices accordingly (Pfeffer and Salancik, 1978; Kor and Sundaramurthy, 2009; Johnson *et al.*, 2013). Despite these proposed service benefits, directors who hold multiple directorships can also be viewed as "busy directors," which is considered a negative factor for their ability to devote the requisite time and attention to the focal firm (Hambrick *et al.*, 2015). This holds the potential to undermine the board's monitoring function, which in turn reduces firm performance and value (Johnson *et al.*, 2013; Field *et al.*, 2013). Accordingly, Core *et al.,* (1999) show that multiple directorships are associated with excessive CEO compensation, whereas Shivdasani and Yermack (1999) find that director independence is compromised when directors hold multiple directorships. Empirical studies conducted in China draw similar conclusions (Liu *et al.*, 2014; Giannetti *et al.*, 2015). Consistent with this perspective, the CSRC has raised concerns about the number of directorships held by directors, suggesting that, "*In principle, independent directors can only hold concurrently the post of independent directors in five listed companies at maximum. They shall have enough time and energy to perform the duties of the independent directors effectively*" (Zhengjianfa [2001] No. 102-1-2). Hence, we expect directors with multiple directorships to be less effective in curbing agency costs, which leads to the following hypothesis:

> *Hypothesis 3: Board relational attributes moderate the relationship between board role and firm performance such that the positive association between board control role emphasis and firm performance is weaker when the board of directors includes more multiple directorships.*

2.3 Research methods

2.3.1 Data and sample

Our sample is drawn from Chinese firms listed at December 31, 2013 on the A Share Main Board of either the SSE or the SZSE.[25] Our starting point was the Sinofin database, developed by the Beijing University China Center for Economic Research (CCER), a prominent database for corporate governance research on Chinese listed firms,[26] with information on 1,418 firms listed on the SSE and SZSE main boards. We excluded 167 firms operating in the financial sector, based on the Global Industry Classification Standard (GICS) 2-digit code, due to their specific regulation environment. We also excluded 197 firms with missing values. Our final sample therefore comprises 1,054 firms for which corporate governance and basic financial information was derived from the Sinofin database. We retrieved board meeting reports from the official SSE and SZSE websites for these 1,054 firms for the period January 1 to December 31, 2013, for a total of 7,225 reports. In these reports, firms are required to disclose their decisions along with the specific content of each decision.[27] We then coded the reports to obtain detailed information on board decisions and to classify the decisions into control, service, or routine activities. In all, we identified, content analyzed, and classified 35,954 board decisions, as presented in Table 10.

[25] Accordingly to the official SZSE website, China has a multi-tier capital market that includes the Main Board (large and mature firms), the ChiNext (a NASDAQ-type exchange for high-growth and high-tech start-ups), and the SME (small and medium enterprise exchange). Because the Stock Exchange regulations are looser for the ChiNext and SME compared to the general regulations for the Main Board, due to the specialties of young and small firms, our study addresses only firms listed on the Main Board. Available at (Accessed on 8 February 2018): https://www.szse.cn/main/en/ListingatSZSE/ListingQA/.

[26] The Sinofin database has been widely used by many authors, including Kato and Long (2006) and Cao *et al.* (2011).

[27] Information Disclosure Format of the Listed Company (1-41: The Format of Board Meeting Report). Available at (Accessed on 8 February 2018): http://www.sse.com.cn/lawandrules/guide/disclosure/dailymemo/c/c_20151229_4030044.shtml. Company Law (2005: 4-3-113) stipulates that, "*If a resolution…causes serious losses to the company, the directors who participated in the adoption of such a resolution shall be liable for compensation to the company."* We therefore assume that this data source is reliable, and that the decisions disclosed in the board meeting reports represent actual board activity.

2.3.2 Variables measurement

Dependent Variable

We measure firm performance using *Adj-Tobin's* Q_{t+1}, or the ratio of market capitalization to the book value of total assets, representing both the firm's current performance and its growth potential. This measure is widely used by governance researchers (e.g., Vafeas, 1999; Peng, 2004; Haynes and Hillman, 2010; Hu *et al.*, 2010; Ma and Khanna, 2015; Jiang and Kim, 2015). Following Vafeas (1999), we use industry-adjusted firm performance to control for the industry effect. In order to minimize endogeneity problems, we measure firm's Tobin's Q in the next year, or 2014.[28]

Independent Variables

Based on the literature and the proposed classification (see Table 10), we built a set of key words in order to content analyze the board meeting reports and to code the decisions as control, service, or routine activities. The literature shows that boards of directors also deal with routine decisions, in which they engage symbolically to comply with the law or other regulations. Routine decisions are not expected to influence firm performance (Vafeas, 1999; Machold and Farquhar, 2013; The SSE, 2006, 6-6-1).[29]

A total of 98.33% out of 35,954 board decisions were coded electronically. The remaining decisions were analyzed and coded manually and independently by the two

[28] Next year industry adjusted Tobin's Q is the next year Tobin's Q for the sample firm minus the median Tobin's Q in the five prior years (2009-2013) using all firms in the same two-digit GICS code. Tobin's Q=[(Total shares-B Share) Closing price of A share+B Share Closing price Exchange Rate]/Total Assets. Some authors are concerned about the appropriateness of Tobin's Q as the majority of shares in Chinese listed firms used to be nontradable, with ambiguous prices. A more recent Chinese review by Jiang and Kim (2015) reports that the government has pursued a nontradable share reform since 2005 aiming to gradually transform all shares into tradable shares, such that almost all shares (95%) in Chinese listed firms were tradable in 2012, greatly alleviating concerns about the inappropriateness of Tobin's Q. Because the quality of some accounting-based firm performance measurements, e.g., return on equity (ROE), in Chinese listed firms might be affected by earnings management (e.g., Liu and Lu, 2007), we contend that market-based performance, e.g., using Tobin's Q, would be more reliable.

[29] In a previous version, we did not distinguish between routine and control activities. However, results are unchanged after eliminating routine activities, and the percentage of routine decisions alone is nonsignificantly associated with firm performance. Aalthough the average percentage of routine activity is quite high (28.3%), the standard deviation for routine is much lower (significant at 1% based on Levene's test) than those for control and service (untabulated). Thus, we expect routine activities to be driven by regulations and very similar across firms, thus not representative of either the control or service role.

co-authors. Similar to Schwartz-Ziv and Weisbach (2013), we measure control role emphasis (*Control Role*) as the percentage of control-related decisions within the total number of board control and service decisions annually. This variable is assumed to capture the extent to which the directors' time and efforts were devoted to control (relative to service) activities at board meetings.

Among our main independent variables, we measure an important board structural attribute, the proportion of nonaffiliated directors on the board, as well as board capital attributes such as board functional diversity and multiple directorships. Prior studies on Chinese corporate governance note the significant influence of large shareholders on corporate board composition (Peng, 2004; Allen *et al.*, 2005; Fan *et al.*, 2007; Jiang and Kim, 2015), suggesting that large shareholders appoint their representatives to the board, and that some directors receive compensation directly from these large shareholders (Hu *et al.*, 2010; Lo *et al.*, 2010). As in Lo *et al.,* (2010), we call these directors "parent directors," who should not be considered as independent directors in Chinese listed firms (Jiang and Kim, 2015). Hence, similar to Tian and Lau (2001), Peng (2004), and Hu *et al.,* (2010), we measure *Nonaffiliated Directors* as the ratio of independent directors who are not also employed by or do not also receive compensation from one of the ten large shareholders of the focal firm to the total number of directors (i.e., board size).[30] Following Hillman *et al.,* (2000) and Haynes and Hillman (2010), we measure board *Functional Diversity* with Blau's (1977) index to capture the degree of heterogeneity among nonaffiliated directors in terms of occupation: business experts, support specialists, and community influentials.[31] This variable ranges from 0 to 0.667. Similar to Ruigrok *et al.,* (2006) and Johnson *et al.,* (2013), we measure *Directorships* to capture the extent of the directors' networks, using the natural logarithm of the total

[30] We use CSRC-102 (2001) to identify independent directors, and we exclude 72 directors (2%) who are classified as independent by Sinofin but who are also parent directors.

[31] $(1 - \sum \rho_i^2)$, where ρ_i is the proportion of group members in each of the *i* number of categories. Because nonaffiliated directors are only part-time employees of the focal firm, we identify their major occupations based on their full-time employment in the Sinofin executive database. Business experts are "*current and former senior officers of other large for-profit firms,*" support specialists are "*lawyers, bankers (commercial and investment), insurance company representatives, and public relations experts,*" and community influentials are "*political leaders, university faculty, members of clergy* (not found in our sample), *and leaders of social or community organizations*" (Hillman *et al.*, 2000: 240).

number of multiple *directorships* held by nonaffiliated directors of the focal firm.[32] In addition to investigating each board attribute independently, we follow Tang *et al.,* (2011) and Wahid (2011) to create an aggregate index, the *Board Attributes Index*, which sums the index scores for *Nonaffiliated Directors*, *Functional Diversity*, and reversed *Directorships*.[33] This aggregate index captures whether boards combine all three attributes that foster effective board control. All three variables were median scaled before construction of the aggregate index.

Control Variables

We include a set of control variables that are likely to affect the examined associations. As Lorsch and MacIver (1989) and Adam (2003) suggest, board tasks could also be handled by board committees. Chinese listed firms are not required to disclose board committee meeting reports. Moreover, according to the Chinese Code of Corporate Governance for Listed Companies (CCGLC, 2002: 3-6-52 and 58),[34] board committees only make recommendations to the board, and all proposals must be reviewed by the board for approval. We therefore control for *Board Committees* only, measured as the natural log of the total number of board committees, including nomination, compensation, strategy, and auditing committees. Similar to Haynes and Hillman (2010), we also control for *Board Tenure*, measured as the natural log of the average years of working experience for the directors, excluding the chairman, in the focal firm.[35] By law, Chinese listed firms must operate a two-tier board structure consisting of a supervisory board and the board of directors (Company Law, 2005: 2-2-52). However, in China, the

[32] Alternatively, similar to, e.g., Field *et al.* (2013), we also measured board average directorships and nonaffiliated directors' directorships, with consistent results.

[33] The variable *Directorships* was reversed (1/ the total number of multiple directorships) before summing, because we expect fewer multiple directorships to be associated with more effective control. The Cronbach's alpha is relatively low because each variable is expected to capture different aspects of the board attribute and the index should be treated as a formative rather than a reflective construct (Tang *et al.*, 2011).

[34] Code of Corporate Governance for Listed Companies. 2002. Available at (Accessed on 8 February 2018): http://german.china.org.cn/business/documents/txt/2004-07/09/content_2121138.htm.

[35] The board chair function is similar to that of the CEO in Chinese listed firms (Kato and Long, 2006; Jiang and Kim, 2015). As Jiang and Kim (2015: 209) argue, "*Given that the board chair is often the de facto top manager, the extent of CEO/chair duality may be highly underestimated in the literature*," suggesting that board chair is the de facto CEO and that CEO duality is less related to monitoring effectiveness in Chinese listed firms. Thus, we control for the tenure of the board of directors, excluding the chairman, and we do not control for CEO duality.

supervisory board has long been considered ineffective and highly subordinated to the board of directors (Voß and Xia, 2006; Mcfarlan *et al.*, 2009). Thus, we expect supervisory boards in Chinese listed firms to hardly reflect board activity. Instead, similar to Hu *et al.,* (2009), we capture the supervisory board structure and we control for *Employee Supervisors*, or the percentage of employee representatives within the supervisory board, and *Share Supervisors*, or the percentage of directors within the supervisory board who are employed by or receive compensation from one of the ten large shareholders of the focal firm.

Unlike other countries, by maintaining control over state-owned enterprises (SOEs), the Chinese government plays the role of both regulator and market participant (investor), not only to pursue certain political goals, but also to prevent expropriation by managers and other shareholders (Allen *et al.*, 2005; Jinag and Kim, 2015). In line with Lo *et al.,* (2010) and Ma and Khanna (2015), we control for *SOE* using a dummy variable that equals one if the controlling shareholder[36] is the government and zero otherwise, and we use the *Top10 Shareholders*, or the Herfindahl index of the 10 largest shareholders' percent shareholdings, to measure ownership concentration. Following the related literature (e.g., Li and Tang, 2010; Ma and Khanna, 2015; Martins *et al.*, 2016), we also control for *Firm size,* or the natural log of the firm's market capitalization; *Firm age*, or the natural log of years since the firm's initial public offering; *Past performance,* or the return on assets (ROA) in 2012; *Leverage,* or the debt-to-equity ratio; *Industry,* which includes three variables representing industry munificence, industry complexity, and industry uncertainty (see more details in Li and Tang, 2010); and 30 *Province* dummies to represent the 31 Chinese provinces. All variables are winsorized at the 99 percentile to prevent extreme outliers.

2.4 Results

Table 11 presents the descriptive statistics and the correlation matrix. The average Tobin's Q (before industry-adjusted in 2014, untabulated) is 1.9, slightly higher than the findings by Jiang and Kim (2015), with a median ranging from 1.3 to 1.7 in Chinese

[36] The controlling shareholder directly or indirectly controls more than 10 percent of the firm's voting shares (see more details in Cao *et al.*, 2011).

listed firms in 2012, and higher than the findings by Hu *et al.,* (2010) of 1.1 for Chinese listed firms in 2003-2005. Table 11 also shows that 46.1 percent of the total board activities (excluding routine decisions) concern the control role, versus 38.9 percent for the service role (untabulated). This indicates that these boards devote the majority of their time to control activities. These results are consistent with Schwartz-Ziv and Weisbach (2013), who coded the board meeting minutes of 34 Israeli firms and find that only 34 percent of the decisions were related to service. Similarly, Tricker (2015), in a survey of hundreds of directors around the world, finds that they spend 37 percent of their time on service activities.

The Company Law (2005: 4-3-111) in China stipulates that "*Meetings of the board of directors shall be held at least twice a year.*" The firms in our sample hold 6.9 board meetings annually on average, consistent with Hu *et al.,* (2010), who report that Chinese listed firms hold 7.7 board meetings annually. This also concurs with authors of Western-based studies, such as by Vafeas (1999), Forbes and Milliken (1999), and Adams (2003) and Tricker (2015), who find an average of seven board meetings annually. Taken together, our board meeting data indicate considerable variation in board role emphasis across firms (Forbes and Milliken, 1999; Adams, 2003; Machold and Farquhar, 2013; Schwartz-Ziv and Weisbach, 2013; Tricker, 2015). In addition, it appears that board meetings and reported decisions in Chinese listed firms are comparable to those in other countries, and hence cannot be attributed solely to the Chinese institutional environment.

As shown in Table 11, the average proportion of *Nonaffiliated Directors* is 36 percent, consistent with Jiang and Kim (2015) (37%). As the CSRC (2001) requires the boards of Chinese listed firms to contain at least one-third independent directors, only 10 percent of the firms in our sample have lower than one-third independent directors. In contrast, 53.8 percent of these boards have more than one-third independent directors, indicating that although nonaffiliated directors are imposed by law, the proportion actually varies significantly across firms. On average, *Functional Diversity* is 0.36 in our sample. Unfortunately, we cannot compare this variable with other studies, because we are the first to our knowledge to measure board functional diversity in Chinese listed firms.

Nevertheless, our components of functional diversity, namely the proportions of business experts, support specialists, and community influentials, are comparable to the results of Heidrick and Struggles (2007), Mcfarlan *et al.,* (2009), and Lin *et al.,* (2012). The average number of *Directorships* is eight, which is comparable to the results of Liu *et al.,* (2014) and Giannetti *et al.,* (2015).[37]

Consistent with the governance regulation in China (CCGLC, 2002), almost all firms in our sample have four board committees, for an average number of *Board Committees* approaching 4 (3.75). The average *Board Tenure* is 4.4 years. As required by the Company Law (2005: 2-2-52), the supervisory board must have at least three members, including shareholder representatives and at least one employee representative. In our sample, the supervisory boards contain 4.6 directors on average, with 35.8 percent employee representatives and 35.9 percent large shareholder representatives, which is consistent with Firth *et al.,* (2007). Hence, our results support the argument that supervisory boards in Chinese listed firms are mainly symbolic, and largely a matter of compliance. Moreover, 64.4 percent of the firms in our sample are SOEs, compared to 68.9 percent in Ma and Khanna (2010) and 68.4 percent in Lo *et al.,* (2010). The average percentage of *Top10 Shareholders* in our sample is 0.18, similar to 0.2 in Ma and Khanna (2010). Firm size, firm age, leverage, and industry distribution in our sample are also comparable to those in prior studies (e.g., Liu and Lu, 2007; Lo *et al.*, 2010; Liu *et al.*, 2014). As shown in Table 11, the correlations among the independent variables are far below 0.5,[38] and the variance inflation factors (VIF) for the independent and control variables in all regression models show a mean of 1.3 and a maximum of 2.9 (industry), far below the suggested threshold of 10 (Kutner *et al.*, 2004), indicating the absence of potential multicollinearity problems.

Insert Table 11 about here

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[37] Previous studies based on Chinese listed firms measure directors' interlocks as the proportion of "busy directors," or the percentage of directors who sit on the boards of two or more other firms in the total number of directors on board. Although untabulated, the proportion of "busy directors" in our sample is comparable to Liu *et al.* (2014) and Giannetti *et al.* (2015).

[38] Although the Board Attributes Index and the other board attribute variables are highly correlated, they are not supposed to be included in the same regression model.

Table 12 presents the results of the ordinary least squares (OLS) regressions to test the effect of board control role emphasis (*Control Role*) on firm performance, measured by *Adj-Tobin's* Q_{t+1}, as well as the moderating effects of board structural and capital attributes on the board-performance relationship (Hypothesis 1, 2 and 3). Model 1 includes control variables only, with similar coefficients across all models. In Model 2, we test the direct effect of board control role emphasis (*Control Role)* on firm performance. As expected, Model 2 has significantly higher explanatory power than Model 1. The coefficient for *Control Role* (b=0.81, p=0.01) indicates that, other things held constant, a one percentage increase in the control role improves *Adj-Tobin's* Q_{t+1} by 0.8 percent. In economic terms, these results also show that moving from the 5th to the 95th percentile of the control role emphasis significantly increases *Adj-Tobin's* Q_{t+1} by 0.41. We note that these effects are economically significant, given that the average *Adj-Tobin's* Q_{t+1} in our sample is 0.15. Model 2 also shows that only board *Directorships* exerts a significant direct effect on firm performance, whereas the direct effects of *Nonaffiliated Directors* and *Functional Diversity* on firm performance are nonsignificant.

Insert Table 12 about here

In Model 3 we examine the hypothesized moderating effects of board attributes on the board control role-performance relationship. As expected, Model 3 presents significantly higher explanatory power than models 1 and 2. Figure 4 (a-c) further illustrates the moderating effects presented in Table 12, Model 3. In Figure 4 (a), the coefficient of the interaction term between *Control Role* and *Nonaffiliated Directors* (b=7.81, p=0.02) indicates that the slope of the function between *Control Role* and *Adj-Tobin's* Q_{t+1} increases from -0.32 to 1.85 when *Nonaffiliated Directors* on the board moves from the 5th to the 95th percentile. This suggests that a one percent increase in control role emphasis in firms with a high percentage of *Nonaffiliated Directors* (95th percentile) increases the *Adj-Tobin's* Q_{t+1} by 2.2 percent relative to firms with a low percentage of *Nonaffiliated Directors* (5th percentile). This provides strong support for

Hypothesis 1, which predicts a stronger performance effect of monitoring when the board contains a greater proportion of nonaffiliated directors.

The coefficient of the interaction term between *Control Role* and *Functional Diversity* (b=4.52, *p*=0.00) in Table 12, Model 3 shows that a one percent increase in the control role in the 95th percentile of *Functional Diversity* increases future firm performance by 2.8 percent over firms in the 5th percentile. Consistent with Hypothesis 2, directors' functional diversity strengthens the performance effect of board control role emphasis. Figure 4 (b) shows the plot of the moderating effect of board functional diversity. Figure 4 (c) shows that board control role emphasis is negatively associated with firm performance for firms with higher board *Directorships*. The coefficient of the interaction term between *Control Role* and *Directorships* (b= -0.71, *p*=0.04) in Model 3 shows that only a lower proportion of multiple directorships (5th percentile) positively affects board control role effectiveness, such that a one percent increase in control role emphasis increases *Adj-Tobin's* Q_{t+1} by 2.0 percent. In contrast, in firms with a high proportion of *Directorships* (95th percentile), a one percent increase in control activity decreases *Adj-Tobin's* Q_{t+1} by 0.3 percent, supporting Hypothesis 3.

Insert Figure 4 about here

In order to further examine the moderating effects of board attributes on the association between control role emphasis and firm performance, we split our sample into three equal subgroups, with 33.33% and 66.67% percentiles of the variable *Control Role* as cut-offs.[39] Model 4 represents the results for firms with high *Control Role* (66.67% percentile). The coefficient for *Control Role* (b=2.3, *p*=0.05) indicates a stronger performance effect compared with the results for Model 2, whereas the direct effects of *Nonaffiliated Directors* (b=1.83, *p*=0.06) and *Functional Diversity* (b=0.83, *p*=0.03) on firm performance are significantly positive, consistent with Hypothesis 1 and 2. However, *Directorships* (b= -0.22, *p*=0.03) consistently shows a negative influence on

[39] Our results are unchanged when we use different cut-offs (median and the 25th and 75th percentiles). The untabulated *t-test* results show that increasing the ratio of control role emphasis from the 33.33% to 66.67% percentile significantly increases firm performance from 0.02 to 0.27.

firm performance, again supporting Hypothesis 3. Model 5 includes firms with low *Control Role* emphasis (33.33% percentile), with nonsignificant coefficients for *Control Role*, *Nonaffiliated Directors*, and *Directorships*, whereas *Functional Diversity* (b= -1.21, *p*=0.00) shows a negative effect on firm performance.

Model 6 includes the regression coefficients for the *Board Attributes Index*. Consistent with Model 3, the direct effect of *Board Attributes Index* is nonsignificant, whereas the coefficient for the interaction term between *Board Attributes Index* and *Control Role* (b=0.44, *p*=0.01) is statistically significant. Thus indicates a stronger positive performance effect of board *Control Role* when the board combines all three attributes that are assumed to enhance monitoring effectiveness. Taken together, our results indicate that *Nonaffiliated Directors* and *Functional Diversity* improve firm performance, whereas multiple *Directorships* adversely affect firm performance when boards are more intensively involved in control activities.

Given that boards may increase their overall effort instead of changing the allocation of their time to control or service activities (Vafeas, 1999; Adams, 2003), we conduct a multidimensional scaling method by combining the two dimensions overall *Board Activity* and *Control Role* emphasis, where *Board Activity* is the natural log of the total number of decisions the board made in 2013. According to these combined variables, and using the 40 and 60 percent percentiles as thresholds for *Board Activity* and board *Control Role* emphasis, we then divided the firms into four subgroups, as shown in Figure 5. Consistent with the conceptual framework developed by Jonsson (2005) and Carter and Lorsch (2004), we classify four board archetypes as follows: (I) Watchdog (high activity, high control role), (II) Pilot (high activity, high service role), (III) Advisor (low activity, high service role), and (IV) Rubber stamper (low activity, high control role).[40] Figure 5 presents the ideal board types for each archetype subgroup.

[40] (I) Watchdog: this board type keeps a sharp eye on monitoring and barks if it is necessary to fire CEOs, modify CEO compensation, detect frauds, and so on. (II) Pilot: leads the company's direction, makes decisions, and provides advice on technical, operational, and strategic issues, etc., and is therefore intensively involved in service-oriented decisions. (III) Advisor: is involved more in service than control, but not intensively. It may merely advise managers instead of leading the company's direction. (IV) Rubber Stamper: protects shareholders symbolically by making a few control decisions. We obtained similar findings using the total number of board control and service decisions (excluding routine decisions) and the total number of board meetings as proxies for board activity and using dummies instead

As shown in Table 13, Panel A, 227 firms (21.5%), or the largest subgroup in our firm sample, is classified as having a Rubber Stamper board, which concurs with the empirical evidence by Vafeas (1999) and Carter and Lorsch (2004). Moreover, compared to the three other subgroups, Rubber Stamper boards are associated with the highest firm performance, with the lowest for Pilot boards. As expected, Watchdog boards (high activity, high control role) contain the greatest proportion of *Nonaffiliated Directors* and *Functional Diversity,* whereas Rubber Stamper boards have the lowest proportion of *Directorships*. In sum, this analysis confirms that board control role emphasis is associated with a higher proportion of nonaffiliated directors and higher functional diversity. Directors' multiple directorships appear to be positively associated with more service-oriented board activity. This corroborates our main results in Table 12, that nonaffiliated directors and functional diversity facilitate board control role effectiveness, whereas multiple directorships appear to adversely affect board control emphasis.

As Doty and Glick (1994) suggest, the Euclidean distance formula is useful for examining multidimensional scaling. Thus, similar to Govindarajan (1988) and Doty and Glick (1994), we treat end points of the standardized scale as ideal board types for each subgroup, and we measure the Euclidean distance between each firm and the end point of its respective quadrant.[41] The resulting distance variable represents the degree of remoteness for the firm from a given board type. Thus, shorter distance indicates greater similarity to a given ideal board type, and a negative correlation coefficient indicates that a given board type is positively associated with firm performance. Table 13, Panel B presents the associations between the distance variable and firm performance by subgroup. Results show that Watchdog and Pilot boards are significantly and positively correlated with our measure of firm performance, whereas Rubber Stamper boards are significantly and negatively correlated with firm

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of distance measures to identify board types. Instead of the median, we use the 40th and 60th percentiles as thresholds. We eliminate firms located in the middle (median) because both board activity and board control role are continuous variables, and firms located in the middle could be hardly distinguished in terms of the four board types.

[41] See more details in Doty and Glick (1994: 236), Formula (1.0). The analysis reported so far treated the end points as the ideal value to identify board types. As Govindarajan (1988) suggests, the robustness of the results can be examined by applying other possible ideal values. The results are robust when we use the middle point as the ideal value and when we measure board activity by the number of board meetings.

performance, indicating that Rubber Stamper boards (low activity, high control role) are associated with high firm performance. Overall, our results suggest that board role emphasis explains the financial performance of Chinese listed firms. Greater emphasis on control relative to service activities tends to be more important than overall board activity in explaining firm performance. In other words, we show that when the combined effect of board activity and role emphasis are taken into account, boards that conduct fewer activities and that focus on the control role (Rubber Stamper) are associated with higher firm performance.

Insert Table 13 about here

Although untabulated, we find that the total number of board meetings and the total number of decisions made at these meetings negatively influence firm performance. Moreover, the variability of board service activities is significantly greater than the variability of board control activities,[42] and more than 80 percent of the volatility of total annual decisions and board meetings can be explained by the variance in board service activities. This indicates that excessive board activity might be due to excessive managerial risk-taking instead of excessive monitoring. This may reflect the firm's need for stronger board intervention to address firm profitability or other strategic issues, corroborating Vafeas (1999).

It is worth noting that previous studies have frequently associated board decisions on research and technology investments, new products, mergers and acquisitions, or market diversification, all of which are service activities, as proxies for the firm's risk-taking behavior and managerial empire building, which may lead to high failure risk and low expected returns (e.g., Huse, 2007; Li and Tang, 2010; Van Essen *et al.*, 2012). Accordingly, we propose that the board's emphasis on monitoring activities is well perceived by stock market participants, whereas emphasis on service activities may signal excessive risk-taking and overconfident management. More importantly, these potential risk-taking behaviors may have a greater effect in China, given its history of

[42] This result is significant at the 1% level (p=0.000), based on Levene's test for equality of variance.

centralized economy and the fact that the government continues to dominate the market. Strategic activities are likely to suffer from inefficient project screening mechanisms and weak responsibility-seeking mechanisms in Chinese listed firms compared to firms in decentralized market economies (Zhang *et al.*, 2003; Allen *et al.*, 2005; Li and Tang, 2010; Van Essen *et al.*, 2012; Jiang and Kim 2015).

In sum, the stronger positive performance effect of the control role emphasis in firms with higher proportions of nonaffiliated directors Hypothesis 1 is consistent with the previous governance research in China (Kato and Long, 2006; Firth *et al.*, 2006; Chen *et al.*, 2006; Liu and Lu, 2007; Lo *et al.*, 2010). Moreover, it corroborates the argument that nonaffiliated directors strengthen the performance effect of the board control role in China. We also demonstrate that board functional diversity strengthens the performance effect of board control activities, supporting Hypothesis 2. This supports the argument for the economic benefits of boardroom diversity in Chinese listed firms (Mcfarlan *et al.*, 2009; Heidrick and Struggles, 2007; Lin *et al.*, 2012). Consistent with Heidrick and Struggles (2007) and Lin *et al.,* (2012), the majority of nonaffiliated directors in our sample are community influentials (53.7%), and the proportion of support specialists is the strongest explainer of board functional diversity. Although untabulated, further analysis results suggest that the percentage of support specialists is positively associated with the performance effect of control role emphasis, whereas the categories of community influentials and business experts have no effect. Hence, our findings corroborate the ineffectiveness of community influentials such as political leaders and university professors in Chinese listed firms. Their appointments are more likely to be driven by personal and private relationships, making them easily swayed by managers and large shareholders (Heidrick and Struggles, 2007; Mcfarlan *et al.*, 2009; Lin *et al.*, 2012). Therefore, the presence of support specialists (e.g., accountants, auditors, and lawyers) on the board of Chinese listed firms appears to be critical for enhancing the board's ability to fulfill its control role (Lo *et al.*, 2010; Mcfarlan *et al.*, 2009; Lin *et al.*, 2012). Finally, our results show that time constraints and the heavier information processing demands on directors with multiple directorships may adversely affect their ability to engage in effective monitoring (e.g., Lorsch and MacIver, 1989; Johnson *et al.*, 2013; Field *et al.*, 2013; Hambrick *et al.*, 2015).

2.5 Robustness checks

We further examine whether our main results are robust using alternative measures and model specifications. Previous research in Chinese firms indicates that SOEs may behave differently from non-SOEs (e.g., Jiang and Kim, 2015; Ma and Khanna, 2015). We therefore re-ran our models separately with SOEs (679 firms) and non-SOEs (375 firms). The untabulated results are similar to our original results for SOEs, as presented in Table 12 Model 3: *Control Role* (b=0.6, *p*=0.07) is positively associated with *Adj-Tobin's* Q_{t+1}, and *Nonaffiliated Directors* (b=9.06, *p*=0.01) and *Functional Diversity* (b=2.75, p=0.05) strengthen this association considerably, whereas the moderation effect of *Directorships* is nonsignificant. Interestingly, for non-SOEs, the direct effect of *Control Role* is nonsignificant, whereas the interaction terms between *Control Role* and *Functional Diversity* (b=5.51, *p*=0.08) and *Directorship* (b= -1.55, *p*=0.03) show coefficients that are consistent with our original results. However, the moderation effects of *Nonaffiliated Directors* and *Directorships* become nonsignificant. Our interpretation is that the stock market prefers a control role emphasis for SOE boards, and particularly when the ratio of nonaffiliated directors to functional diversity is high. This aligns somewhat with the argument of some Chinese studies that SOEs are more likely to engage in inefficient strategic projects, whereas without government backing, non-SOEs need to be more efficient. Consequently, external professional directors would be particularly helpful in facilitating operations for non-SOEs (Allen *et al.*, 2005; Jiang and Kim 2015).

Some scholars argue that the percentage of nonaffiliated directors reflects institutional pressures instead of real monitoring efforts (e.g., Peng, 2004; Mcfarlan *et al.*, 2009; Jiang and Kim, 2015). To address this issue, we repeat the analysis reported in Table 12, Model 3 using the piecewise method described in Morck *et al.,* (1988), and we replace our independent variable *Nonaffiliated Directors* with two variables: *Less than 1/3 Nonaffiliated* (directors) and *More than 1/3 Nonaffiliated* (directors).[43] Only the results

[43] Because the CSRC (2001) requires the boards of Chinese listed firms to contain at least one-third independent directors, we measure *Less than 1/3 Nonaffiliated = Nonaffiliated Directors* if *Nonaffiliated Directors* < 1/3, = 1/3 if *Nonaffiliated Directors* ≥1/3; and *More than 1/3 NonAffiliated = Nonaffiliated Directors* if *Nonaffiliated Directors* > 1/3, = 1/3 if *Nonaffiliated Directors* < 1/3.

with *More than 1/3 Nonaffiliated* (b=11.31, *p*=0.01) are consistent with our original results, suggesting that nonaffiliated directors support the board control role and improve firm performance, with a more pronounced effect in firms with a percentage of nonaffiliated directors that exceeds institutional requirements.

Because some scholars argue that strategic activities may lead to decreased short-term returns but could sustain long-term growth and innovation (e.g., Huse, 2007; Van Essen *et al.*, 2012), we replace next-year firm performance with Tobin's Q in 2015 and 2016 (two and three years ahead) and find consistent results. We also use the original next-year value of Tobin's Q (before industry adjustment) and Tobin's Q based on other measurements (e.g., excluding the intangible assets and goodwill from the total assets) in our regressions, with similar results. Furthermore, as a sensitivity check of our original measure of board control role, we repeat the original analysis using the absolute number (natural logarithm) of total control and service activities in 2013. The untabulated results are qualitatively similar to the original results reported in Table 12. Moreover, some scholars argue that board involvement in social responsibility issues is a control rather than a service activity (e.g., Huse, 2007). Therefore, we recoded our variable *Control Role* by moving CSR decisions from the board service role to the board control role, and the results (untabulated) remain unchanged.

2.6 Conclusion

We proposed and tested the effect of board role emphasis (control or service) on firm performance and the moderating effect of board structural, human, and relational capital attributes (proportion of nonaffiliated directors, board functional diversity, and multiple directorships) on this relationship. Drawing on agency theory and resource dependence theory, we hypothesized that the board influences firm performance through the types of activities it carries out, and that board attributes would indirectly influence firm performance by enhancing the board's control and/or service role effectiveness (Hypothesis 1, 2 and 3).

We find that a board's emphasis on control activities improves firm performance, and that higher proportions of nonaffiliated directors and greater degree of board functional diversity strengthen this positive effect. In contrast, the presence of multiple

directorships is negatively associated with firm performance, and this association is stronger when the board emphasizes the control role. Our interpretation is that the board's involvement in control-related activities is positively perceived by the stock market, whereas emphasis on service-related activities may be perceived as excessive risk-taking and management entrenchment, which are negatively associated with firm market performance. Overall, our results support our hypotheses and are robust to alternative model specifications and different variable measurement methods.

Like any empirical study, ours has certain limitations, which nevertheless may be viewed as opportunities for future research. Due to the difficulty of obtaining and coding board meeting data, we consider only one data year. In future, researchers could use a longitudinal approach to investigate dynamic relationships between board roles, board attributes, and firm performance. The sampling strategy could also be expanded to include firms listed in other, smaller stock exchanges in China, where governance rules are still evolving and are less influenced by Western trends. Finally, although our data on board role emphasis are corroborated by comparisons with the prior literature, we relied on public disclosure and assumed that all board decisions were successfully implemented. Future studies could collect additional information, such as the duration of board meetings, and could classify board decisions in terms of whether or not expected outcomes were achieved.

Despite these limitations, our results provide valuable insights into the board role-performance relationship, with implications for both practitioners and policy makers. As Huse (2007: 3) argues, "*Actual board behavior and the dynamics within the boardroom have in most research been considered as something of a black box.*" We attempted to open this black box in order to capture real board activity and classify the types of activity as control- or service-oriented. Our results recall Tricker's (2015: 178) argument that "*directors' time is under pressure,*" such that it is critical to allocate the board's work to ensure sufficient time for each role and to strike the optimal balance between the different activities.

Furthermore, as Aguilera *et al.,* (2012) point out, despite "*a large literature on the monitoring role of boards,*" "*research on the advisory role...as well as the interaction*

between board roles and other corporate governance mechanisms has been scarce." Our study responds to repeated calls to integrate agency and resource dependence theories (Hillman and Dalziel, 2003; Dalziel *et al.*, 2011; Aguilera *et al.*, 2012; Schiehll *et al.*, 2013). Thus, we jointly investigate the dual role of the board of directors and the attributes that enable it to enact its monitoring and advisory roles. Our findings corroborate the argument that the effectiveness of the board's dual role depends on finding the right fit between board attributes and board role emphasis. Boards that successfully achieve this fit by adjusting their configuration and balancing the two roles can contribute to superior firm performance. Thus, board attributes and role emphasis should be considered jointly in board design (e.g., Hillman and Dalziel, 2003; Huse, 2007; Minichilli *et al.*, 2009; Haynes and Hillman, 2010; Dalziel *et al.*, 2011; Tricker, 2015).

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Table 10 Proposed classification for coding board activity

Board Role	Board Decisions	Key words used in the content analysis of board meeting reports
Control Role	1. Executive turnover/Compensation	Hiring/firing/appointing/nominating executives; succession composition/adjustment of board members; manager's/director' work statement.
		Incentive; compensation; pension; reward, salary; bonus; stock option.
	2. Financial reporting	Corporate governance report; risk management; budget report; earnings forecast report.
		Related-party transaction report.
		Disclosure; restatement; bad debt allowance; depreciation; receivable; accounting policy; external auditing.
	3. Profit distribution	Profit distribution report; profit sharing; dividends; capital usage and transaction.
Service Role	4. Advising:	
	Policy/Structure	Firm's registration information change; structure/department/branch; firm form change.
		Legal issues; HR policy.
		Presiding over shareholder meetings.
	Technology/Operations	Technology; R&D; equipment upgrade; new products.
		Project launch; transaction contract; markets/marketing; advertisement.
		Construction; production; materials.
	Finance/Investment	Loan; debt; mortgage; secured lending; hedge; public offering.
		Financial service; financial product; investment.
	5. Strategic Planning	Business concept/mission/direction; long-term strategy.
		M&A; subsidiary; disbandment; separation.
	6. Corporate Social Responsibility (CSR)	Charity; donation; environment; safety; CSR report.
	7. Routine (neither Control nor Service Role)	Annual/half-year/seasonal report.

Table 11 Descriptive statistics and correlation matrix

	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Adj-Tobin's Q_{t+1}	0.145	1.711	-2.062	9.214	1														
2. Control Role	0.461	0.156	0.125	0.833	.090[d]	1													
3. Nonaffiliated Directors	0.360	0.087	0.119	0.611	.046	.092[d]	1												
4. Functional Diversity	0.357	0.233	0	0.667	.013	-.006	.153[d]	1											
5. Directorships	7.851[a]	9.064[a]	0[a]	46[a]	-.126[d]	.011	-.044	.017	1										
6. Board Attributes Index	3.452	1.817	0.875	8.500	.055[b]	.012	.221[d]	.299[d]	-.463[d]	1									
7. Board Committees	3.794[a]	0.548[a]	2[a]	4[a]	.002	.005	-.008	.012	-.023	.033	1								
8. Board Tenure	4.407[a]	1.245[a]	1.500[a]	7.258[a]	-.095[d]	.129[d]	-.009	-.036	.015	.008	-.066[c]	1							
9. Employee Supervisors	0.358	0.112	0	0.667	.019	-.008	-.014	-.003	-.006	-.015	-.009	.017	1						
10. Share Supervisors	0.359	0.248	0	1	-.071[c]	-.033	-.044	.007	.056[b]	-.011	-.070[c]	-.037	-.063[c]	1					
11. SOE	0.644	0.479	0	1	-.170[d]	-.027	-.016	.010	.006	.014	-.019	-.004	.079[d]	.283[d]	1				
12. Top10 Shareholders	0.176	0.134	0.01	0.626	-.143[d]	.060[b]	-.024	.004	.188[d]	-.088[d]	-.029	-.082[d]	.053[b]	.149[d]	.205[d]	1			
13. Firm Size	22.316	0.892	20.831	24.983	-.138[d]	.004	.031	-.046	.222[d]	-.165[d]	-.093[d]	.000	.054[b]	.078[c]	.108[d]	.354[d]	1		
14. Firm Age	13.633[a]	4.655[a]	1[a]	21[a]	.064[c]	-.086[d]	.032	.017	-.222[d]	.146[d]	-.011	.029	-.010	.113[d]	.147[d]	-.263[d]	-.147[d]	1	
15. Past Performance	0.037	0.114	-0.113	0.228	.164[d]	.019	.029	.018	.011	-.022	-.005	-.015	.016	-.019	-.046	.017	.123[d]	-.035	1
16. Leverage	0.512	0.206	0.084	0.932	-.256[d]	-.179[d]	.022	-.029	-.007	-.011	.008	-.011	-.014	.078[c]	.102[d]	-.005	-.054[b]	.160[d]	-.097[d]

N=1,054. [a] Before natural logarithm. [b, c,] and [d] indicate *p*-values (two-tailed) significance at 10%, 5%, and 1%, respectively.

Table 12 Moderating effect of board attributes on the relationship between the board control role and firm performance (*Adj-Tobin's Q_{t+1}*)

	(1) Full Sample	(2) Full Sample	(3) Full Sample	(4) High CR [a]	(5) Low CR [a]	(6) Full Sample
(Constant)	9.552(1.634)*[0.000]****	9.369(1.650)*[0.000]****	9.189(1.634)*[0.000]****	4.930(3.371)*[0.145]****	10.080(2.769)*[0.000]****	9.500(1.631)*[0.000]****
Board Committees	-0.050(0.269)*[0.852]*	-0.047(0.267)*[0.862]*	-0.073(0.265)*[0.782]*	0.006(0.467)*[0.990]*	0.089(0.412)*[0.830]*	-0.045(0.267)*[0.866]*
Board Tenure	-0.536(0.158)*[0.001]****	-0.584(0.159)*[0.000]****	-0.619(0.158)*[0.000]****	-0.532(0.332)*[0.110]*	-0.200(0.254)*[0.430]*	-0.589(0.159)*[0.000]****
Employee Supervisors	0.566(0.449)*[0.207]*	0.594(0.447)*[0.184]*	0.621(0.443)*[0.161]*	1.544(0.811)*[0.058]**	-0.112(0.767)*[0.884]*	0.613(0.447)*[0.170]*
Share Supervisors	-0.010(0.211)*[0.963]*	0.040(0.211)*[0.851]*	0.005(0.209)*[0.981]*	0.658(0.403)*[0.104]*	-0.194(0.361)*[0.592]*	0.011(0.210)*[0.957]*
SOE	-0.533(0.115)*[0.000]****	-0.535(0.115)*[0.000]****	-0.524(0.114)*[0.000]****	-0.453(0.227)*[0.046]***	-0.536(0.186)*[0.004]****	-0.525(0.115)*[0.000]****
Top10 Shareholders	-0.868(0.422)*[0.040]***	-0.874(0.423)*[0.039]***	-0.810(0.419)*[0.054]**	-1.428(0.803)*[0.076]**	-0.386(0.706)*[0.585]*	-0.917(0.422)*[0.030]***
Firm Size	-0.288(0.061)*[0.000]****	-0.270(0.062)*[0.000]****	-0.262(0.062)*[0.000]****	-0.144(0.116)*[0.217]*	-0.342(0.106)*[0.001]****	-0.277(0.062)*[0.000]****
Firm Age	0.206(0.089)*[0.021]***	0.178(0.090)*[0.048]***	0.196(0.089)*[0.028]***	0.137(0.161)*[0.397]*	0.196(0.190)*[0.303]*	0.202(0.089)*[0.023]***
Past Performance	2.256(0.434)*[0.000]****	2.237(0.432)*[0.000]****	2.219(0.428)*[0.000]****	0.772(0.655)*[0.240]*	3.166(0.624)*[0.000]****	2.239(0.432)*[0.000]****
Leverage	-1.993(0.251)*[0.000]****	-1.866(0.255)*[0.000]****	-1.874(0.253)*[0.000]****	-2.650(0.445)*[0.000]****	-1.898(0.443)*[0.000]****	-1.847(0.255)*[0.000]****
Control Role (CR)		0.812(0.325)*[0.013]***	0.760(0.322)*[0.019]***	2.302(1.154)*[0.047]***	1.325(1.251)*[0.291]*	0.858(0.323)*[0.008]****
Nonaffiliated Directors		0.678(0.581)*[0.244]*	0.657(0.578)*[0.257]*	1.830(0.963)*[0.058]**	-0.179(1.001)*[0.858]*	
Functional Diversity		-0.140(0.215)*[0.513]*	-0.122(0.213)*[0.567]*	0.830(0.388)*[0.033]***	-1.208(0.360)*[0.001]****	
Directorships		-0.117(0.056)*[0.037]***	-0.112(0.055)*[0.043]***	-0.224(0.102)*[0.029]***	0.006(0.094)*[0.951]*	
Board Attributes Index						0.018(0.028)*[0.522]*
CR×Nonaffiliated Directors			7.814(3.408)*[0.022]***			
CR×Functional Diversity			4.207(1.378)*[0.002]****			
CR×Directorships			-0.720(0.341)*[0.035]***			
CR×Board Attributes Index						0.441(0.178)*[0.013]***
$R^2/\Delta1R^2/\Delta2R^2$ [b]	0.192***	0.203***/0.011**	0.221***/0.029***/0.018**	0.327***/0.043***	0.325***/0.031***	0.203***/0.011***/0.005**
N	1054	1054	1054	351	351	1054

Industry and *Province* dummies were included in all models. Standard errors in parentheses. *p*-values in squared brackets (two-tailed). [a] Subgroups are based on the 33.33% and 66.67% percentiles of Control Role. [b] $\Delta1R^2$: R^2 change compared with the model including control variables only; $\Delta1R^2$: R^2 change compared with the model including control variables and direct effects. [c] and [d] significant at 1% and 5% (F static), respectively.

Table 13 Comparisons among four board archetypes

Panel A: *t-test* for equality of means

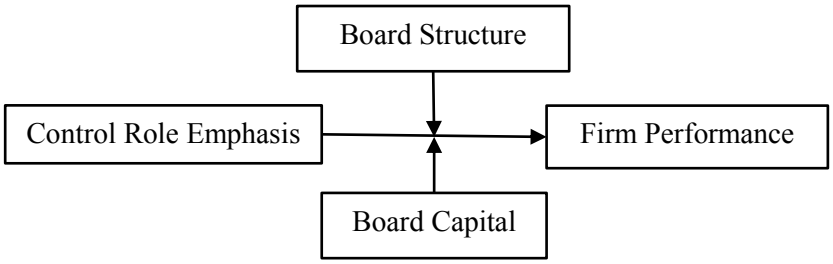
	I: Watchdog (N=145)	II: Pilot (N=181)	III: Advisor (N=90)	IV: Rubber Stamper (N=227)
	Mean	Mean	Mean	Mean
Adj-Tobin's Q_{t+1}	0.079[*0.613*] (-0.505)	-0.123[*0.020*]** (-2.324)	0.159[*0.938*] (0.078)	0.358[*0.035*]** (2.114)
Nonaffiliated Directors	0.373[*0.073*]* (1.796)	0.361[*0.970*] (0.037)	0.351[*0.262*] (-1.122)	0.362[*0.725*] (0.352)
Functional Diversity	0.395[*0.032*]** (2.147)	0.344[*0.426*] (-0.797)	0.377[*0.380*] (0.878)	0.346[*0.439*] (-0.774)
Directorships	9.082[*0.015*]** (2.434)	8.345[*0.052*]* (1.943)	6.496[*0.103*] (-1.634)	6.437[*0.014*]** (-2.472)

Panel B: Correlations between distance measure and firm performance (*Adj-Tobin's* Q_{t+1}).

Subgroups:	Correlations
I: Watchdog (N=145)	0.169[*0.042*]**
II: Pilot (N=181)	0.172[*0.021*]**
III: Advisor (N=90)	0.014[*0.899*]
IV: Rubber Stamper (N=227)	-0.146[*0.028*]**

Note: *p*-values in squared brackets (two-tailed); t-statistics in parentheses.

Figure 3 Integrated model of the relationships between board role, board attributes, and firm performance



Source: Adapted from Hillman and Dalziel (2003).

Figure 4 Moderating effect of board attributes on the relationship between board role and firm performance (*Adj-Tobin's Q_{t+1}*)

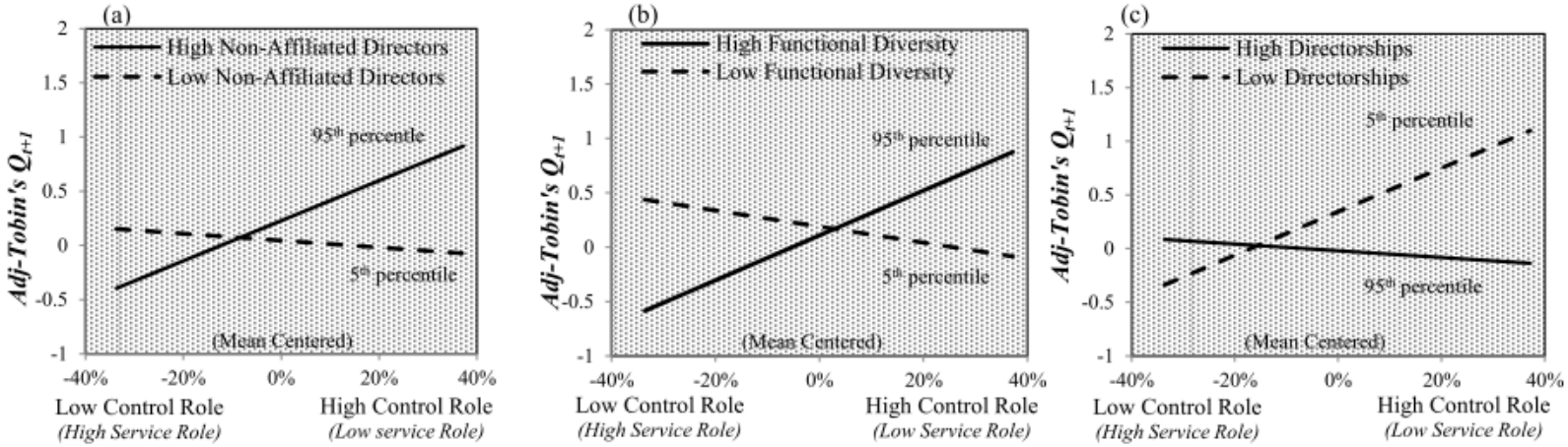
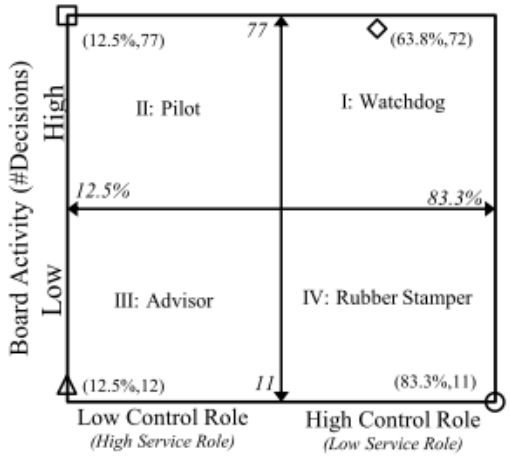


Figure 5 Board archetypes combining a board role and board activity and the ideal types



Board Archetypes	Ideal Type				
	Board Activity	Control Role		Ticker	Company Name
I	72	63.8%	◇	000021	Shenzhen Kaifa Technology Co. Ltd.
II	77	12.5%	□	000793	Hainan Minsheng Gas Corp.
III	12	12.5%	△	000626	Lianyungang Ideal Group Co. Ltd.
IV	11	83.3%	○	000987 600172 600211	Guangzhou Friendship Co. Ltd.; Henan Huanghe Whirlwind Co. Ltd.; Xizang Rhodiola Pharmaceutical Co. Ltd.

Chapter 3
The Influence of Gray Directors in China: Evidence on Related Party Transactions and Financial Reporting Quality

Abstract

This study investigates whether gray directors influence boards' probability of engaging in related party transactions (RPTs), and ultimately generate impacts on the quality of firms' financial reporting. Based on Chinese listed firms, we find a positive relationship between the power of gray directors and RPTs, which conjointly lead to higher probability of future restatements. Our results suggest that the increase of RPTs transmits the impact of gray directors on firms' financial reporting distortion, thereby raising concerns about the monitoring effectiveness of gray directors on the board as well as the consequence of RPTs.

3.1 Introduction

This study investigates the effect of gray directors on firms' financial reporting quality, and the mediation role of related party transactions (RPTs, hereafter) in this relationship. In modern firms, as senior managers control day-to-day operations without bearing corresponding risks of corporate failure, they may treat shareholders' interests with lower priority, and distort information disclosure quality to cover their self-interested activities, such as fraud, misrepresentation, and embezzlement (Jensen and Meckling, 1994; Bushman and Smith, 2001; Armstrong *et al.,* 2010). Sometimes, they even cross the "red line" and commit financial statement frauds (Beasly, 1996; Bell *et al.,* 2000; Kohlbeck and Mayhew, 2017). To better monitor the management, shareholders delegate boards of directors to monitor the quality of financial reporting and to insure the proper use of firms' resources (Fama and Jensen, 1983; Zahra and Pearce, 1989; Johnson *et al.,* 1996). Accordingly, a direct effect of boards of directors' monitoring efforts on financial disclosure quality is expected and has attracted much attention (see e.g. Beasley, 1996; Bell *et al.,* 2000; Chen *et al.,* 2006). Because the findings on this association are still inconclusive (e.g. Zhang, 2006; Hou and Moore, 2010; Firth *et al.,* 2011; Chen *et al.,* 2013; Conyon and He, 2016; Chen *et al.,* 2016), some scholars suggest the necessity of understanding indirect effects in an attempt to explor intervening mechanisms through which boards of directors affect financial disclosure quality (e.g. Zahra and Pearce, 1989; Forbes and Milliken, 1999; Dalton and Dalton, 2011). As such, we aim to extend and deepen this line of inquiry by exploring the potential mediation effect of RPTs on the relationship between boards of directors and financial reporting quality. This constitutes the main motivation for our study.

RPTs are common business practices, while have been frequently associated with corporate failures and recognized as an important means of earnings manipulation (Sherman and Yong, 2001; Gordon *et al.*, 2004 a&b; Johnstone and Bedard, 2004; Gordon *et al.*, 2007; Kohlbeck and Mayhew, 2010; Pizzo, 2013)[44]. Unlike normal transactions which take place in an open market, RPTs are somewhat away from the

[44] Several high-profile account frauds involving RPTs, such as Adelphia, Enron and Tyco, reported by Louwers et al. (2008), and several Chinese listed firms, such as Sanjiu Group, reported by Jian (2003).

market oversight, thus providing opportunities for management opportunism (Gordon *et al.*, 2007; Pizzo, 2013; Kohlbeck and Mayhew, 2017). Moreover, directors' engagement in RPTs may make them relax monitoring and more likely to compromise on RPT decisions (Gordon *et al.*, 2004 a&b; Gordon *et al.*, 2007; Kohlbeck and Mayhew, 2010). This phenomenon has been addressed by some scholars, and labeled as "gray directors" who are board representatives of the related party with which a firm performs RPTs (e.g. Klein, 2002; Gordon *et al.*, 2004 a&b; Gordon *et al.*, 2007; Pizzo, 2013). Reconizing such potential threat to board monitoring, the China Securities Regulatory Commission (CSRC) introduced a special mechanism which prohibits gray directors from voting for RPTs the focal firm engage in. The premise is to better regulate gray directors as well as RPTs. However, the deprivation of gray directors' voting rights on RPTs may hardly hinder their potential influence on the final decision, especially with the engagement of some powerful board members (Mace, 1986; Lorsch and Young, 1990). As many scholars argue (e.g. Pearce and Zahra, 1991; Dunn, 2004; Ma and Khanna, 2015), some powerful directors may easily set the tone for the board to "*bring about the outcomes they desire*", leaving other directors inclined to conform (Salancik and Pfeffer, 1974: 3). We therefore explore the influence of powerful gray directors on RPTs, which conjointly affect firms' financial reporting quality.

Given the unique mechanism described above, China provides a well-suited research setting to investigate our research question for several reasons. First, RPTs are deeply rooted in Chinese economy due to the history of centralized economy and the presence of group-affiliated firms (McMillan and Naughton, 1992; Jian, 2003; Jian and Wong, 2010; Wong, 2016). Second, the CSRC sets strict earning targets for listed firms, which create incentives for earnings manipulation to avoid delisting as well as other punishments (Jian, 2003; Liu and Lu, 2007; Jian and Wong, 2010; Lo *et al.*, 2010). Third, due to highly concentrated ownership of Chinese firms, large shareholders, which in most cases are the government, are powerful enough to engage in RPTs to expropriate minority shareholders (Clarke, 2003; Allen *et al.*, 2005; Wong, 2016; Jiang and Kim, 2015). All of these increase opportunities and incentives for Chinese listed firms to engage in expropriation through RPTs.

Based on unique archival and hand-collected data disclosed by 1,054 Chinese listed firms, we find that the power of gray directors on the board is positively associated with RPTs, especially transactions related to good sales and loans, which are the most common RPTs and frenquently used to prop up earnings and divert resources by Chinese listed firms (Khanna and Yafeh, 2005; Jian and Wong, 2006; Ge et al., 2010; Jiang et al., 2010; Wang and Yuan, 2012; Wong 2016). Moreover, we find that RPTs increase the likelihood of financial reporting misstatements, with a complete mediation effect of RPTs on the association between gray directors' power and the probability of financial restatements. Hence, our results support our hypothesis that RPTs present a channel which mediates the impact of gray directors on financial disclosure quality.

Our contribution is twofold. First, previous literature has focused on the direct effect of RPTs on fraudulent financial reporting (Bell *et al.,* 2000; Kohlbeck and Mayhew, 2017), as well as on relationships between weak corporate governance and RPTs (Lo *et al.,* 2010; Liu and Lu, 2007). Our study builds on and extends this literature by incorporating RPTs into the analysis of the indirect board−financial reporting disclosure relationship. Second, as some scholars argue, previous research on the influence of gray directors is unclear, mainly because of the difficulties of data collection on gray directors (Gordon *et al.*, 2004 a&b; Gordon *et al.*, 2007; Kohlbeck and Mayhew, 2010; Pizzo, 2013). Based on a unique access to the identity and power of gray directors and corresponding RPTs in Chinese listed firms, our study deepens the knowledge of boards of directors' involvement in RPTs, and challenges board effectiveness with the presence of gray directors.

The next section presents the theoretical background and develops our research hypotheses. Data collection and research methods are then explained, followed by the empirical results and robustness checks. The final section summarizes the findings and contributions.

3.2 Institutional context and motivation

Wealth transfer and financial frauds though RPTs may become more relevant in transition economies[45], such as China (Allen *et al.*, 2005; Pizzo, 2013; Jiang and Kim, 2015). Most of the Chinese firms, starting from their origin, were located in an industry chain, and born with connected suppliers and customers (Jian, 2003; Clarke, 2003; Allen *et al.*, 2005). After the 1980's economic reform, the government re-organized industry chains into affiliated-groups, and these groups then separated and listed their most profitable members on the stock market (Clarke, 2003; Allen *et al.*, 2005; Jiang and Kim, 2015).[46] As such, Chinese listed firms are still closely connected within their corporate groups, which makes RPTs unavoidable and widespread (Jian, 2003; Jian and Wong, 2010).

Moreover, although earnings management and wealth expropriation through RPTs are common in both developed and emerging countries, some scholars argue that Chinese listed firms have greater incentives to do so (Jian, 2003; Lo *et al.*, 2010; Pizzo, 2013). As the CSRC sets earning thresholds to assess listed firms, such as delisting firms with return on equity (ROE) below zero (Jian, 2003; Liu and Lu, 2007; Cheung, *et al.*, 2009; Jian and Wong, 2010; Lo *et al.*, 2010), Chinese listed firms have strong motivation to inflate earnings through RPTs within their corporate groups, which allows them not only to shield from delisting, but also to hide the real financial situation of the entire corporate group and the potential expropriation activities (Liu and Lu, 2007; Jian and Wong, 2010).

In addition, ownership concentration in China is much higher than in most western countries (Clarke, 2003; Allen *et al.*, 2005), making wealth transfers easier to achieve (Johnson *et al.,* 2000). The government, which is the major market participant and also the rule maker, is often the large shareholder of most of Chinese listed firms, thus in a powerful position to maximize their own interests through expropriation (Clarke, 2003;

[45] Transition economies are those transited from a central planned to a market economy, such as Russian, China, Ukraine, Cuba, etc.

[46] e.g. Geree Electric Appliances Inc. of Zhuhai (000651) is affiliated to Zhuhai Gree Group Co., Ltd. which is a Chinese state-owned enterprise supervised by the State-owned Assets Supervision and Administration Commission (SASAC) of Zhuhai local government.

Allen *et al.*, 2005; Wong, 2016; Jiang and Kim, 2015). Moreover, the government may also seek to achieve non-economic political goals (e.g., national security, controlling sensitive industries, and increasing employment opportunities, and social well-being), which can be conflicting with firm value creation and minority shareholders' interests (Clarke, 2003; Allen *et al.*, 2005).

Based on the above discussion, we contend that Chinese listed firms intensively apply RPT activities as expropriation and information distortion, thus providing an interesting setting to examine our research question. In the next paragraphs, we present our theoretical grounds and develop our research hypotheses on the mediation effect of RPTs on the relationship between gray directors and the quality of financial reporting in Chinese listed firms.

3.3 Theoretical background and research hypotheses

3.3.1 Boards of directors and financial reporting quality

Due to the separation of ownership and control, shareholders' interest is under threat of self-interested managers (Fama and Jensen 1983; Jensen and Meckling, 1994). Under such circumstance, agency scholars suggest boards of directors to be the apex of the internal governance system and to take charge of decision control (ratifying and monitoring strategic actions) separated from decision management (initiating and implementing strategic decisions) (Fama and Jensen 1983; Johnson *et al.,* 1996; Armstrong *et al.,* 2010). As such, one of the critical fiduciary responsibilities of the board is to assure transparency by review and approval of financial reports provided by the management (Fama and Jensen 1983; Zahra and Perce, 1989). As the most important source of financial information and performance evaluation, firms' financial reporting quality is associated with the degree of information asymmetries among market participants (Beasly, 1996; Bell *et al.,* 2000; Bushman and Smith, 2001). More importantly, the incidence of a fraud in financial reports is a disaster for both the firm's market value (Zahra *et al.,* 2005; Firth *et al.,* 2011; Chen *et al.,* 2016) and directors' personal reputation (Beasley, 1996; Farber, 2005; Srinivasan, 2005). Accordingly, boards are responsible for monitoring managers' information distortion behaviors, and

at the same time, should be the one with the primary responsibility for any mistakes in financial statements (Fama and Jensen, 1983; Bushman and Smith, 2001).

The relationship between board effectiveness and the firm's information disclosure has been studied by many scholars (e.g. Beasley, 1996; Bell *et al.,* 2000; Dunn, 2004; Farber, 2005). Dating back to Beasley (1996), empirical results show deterrent effect of board monitoring on financial statement frauds (Bell *et al.,* 2000; Dunn, 2004; Farber, 2005), while recent studies based on the Chinese context find inconsistent results (Zhang, 2006; Hou and Moore, 2010; Firth *et al.,* 2011; Chen *et al.,* 2013; Conyon and He, 2016; Chen *et al.,* 2016). This mixing evidence underscores the urgency of exploring intervening mechanisms that occure the impact of boards of directors on financial misstatement (Zahra and Pearce, 1989; Forbes and Milliken, 1999; Dalton and Dalton, 2011). In attempting to address this void, our research examines the mediation mechanism between gray directors and the quality of firms' financial statements, and considers RPTs as the mediator in the following sections.

3.3.2 Related party transactions: A channel of expropriation

RPTs have long been viewed as the top indicator of aggressive accounting and risky auditing, and the major reason of financial restatements (Beasley *et al.,* 2001; The General Accounting Office, 2003; Moyes *et al.,* 2005; Kohlbeck and Mayhew, 2017). Actually, not all RPTs are harmful (Louwers *et al.*, 2008; Gordon *et al.*, 2007; Pizzo, 2013). Based on related parties with a certain degree of understanding and trust, RPTs are able to reduce transaction risks and facilitate efficiency (Gordon *et al.*, 2004 a&b; Lo *et al.*, 2010). However, RPTs normally take place in a private environment where negotiations and contracts are not transparent, which may give rise to non-market transfer prices and wealth transfer behavior (Levine *et al.*, 1997; Gordon *et al.*, 2004 a&b; Cullinan *et al.*, 2006; Gordon *et al.*, 2007; Ge *et al.*, 2010; Lo *et al.*, 2010).

Moreover, RPTs are hard to monitor and audit (Beasley *et al.*, 2001; Gordon *et al.*, 2007; Louwers et al, 2008; Kohlbeck and Mayhew, 2017). This is mainly because the information allowing external auditors as well as internal governance systems to both identify and evaluate a RPT, mainly comes from transaction participants (Beasley *et al.*, 2001; Louwers et al, 2008). Prior studies show that the level of RPTs increases the

difficulty of the audit (Habib *et al.,* 2015; Kohlbeck and Mayhew, 2017), misstatement risks (Cullinan *et al.,* 2006; Henry *et al.,* 2007) and suspicious earnings (Ming and Wong, 2003; Gordon *et al.,* 2004), and decreases firms' valuation (Kohlbeck and Mayhew, 2010; Ge *et al.,* 2010; Kang *et al.,* 2014). Hence, the quality of RPTs' information heavily relies on the coordination and objectiveness of boards of directors as well as other insiders (Gordon *et al.*, 2004 a&b; Gordon *et al.*, 2007; Louwers et al, 2008)[47]. We therefore expect a positive relationship between gray directors and RPTs, and the corresponding positive effect on the probability of fraudulent financial reporting, which motivates our hypothesis in the next section.

3.3.3 Gray directors, RPTs and financial reporting quality

Scholars have noticed that the monitoring of RPTs may become more difficult with the engagement of some directors in RPT activities, who have then been defined as "gray directors" (Klein, 2002; Gordon *et al.*, 2004 a&b; Gordon *et al.*, 2007; Pizzo, 2013).[48] A few empirical studies also show that gray directors on the board increase RPTs (Gordon and Henry, 2005a&b), exacerbate negative market reactions of RPTs (Ryngaert and Thomas, 2012), and reduce firm performance (Kohlbeck and Mayhew, 2010).

In line with this concern, the CSRC built a special voting mechanism in Chinese listed firms by requiring that gray directors should not vote or represent others to vote.[49] The purpose is to protect RPTs authorized by impartial directors, with the negligence of considering that board members may not depend only on formal voting procedures to influence board behaviors (Lorsch and Young, 1990; Pearce and Zahra, 1991; Finkelstein, 1992; Veltrop *et al.,* 2017). In real voting situations, the power of boards of directors, especially of some individual board members, goes far beyond their formal voting rights (Pearce and Zahra, 1991; Dunn, 2004). Here, power could be defined as "*the capacity of individual actors to exert their will*" over other board members

[47] An example in Louwers *et al.* (2008) properly illustrates this concern: Softpoint and Pantheon provided fake fax numbers leading the auditors to fail in identifying some RPTs which were in fact fictitious transactions with the firm's president, chairman and many other senior managers.

[48] We follow the definition in Gordon et al. (2007: 93) that "*a transaction with a related party who is a director of the company renders the director gray*".

[49] Corporate Law (2005-Chapter 4, Section 5, Article 125), SSE (2008-Section 2, 10.2.1) and SZSE (2004-Section 2, 10.2.1) require: "*For public firms, directors who are related to the decisions involving the related party transactions should not vote or represent others to vote*".

(Finkelstein, 1992: 506). Since some powerful directors create the board's agenda and determine information availability for boardroom discussions, they may control the voting results by easily yielding conformity from others (Zald, 1969; Mace, 1986; Lorsch and Young, 1990; Veltrop *et al.,* 2017).

Moreover, managers may use private gains extracted from non-market RPTs as an incremental compensation, in which gray directors are also included (Gordon and Henry, 2005; Kohlbeck and Mayhew, 2010). This makes gray directors tend to stand on the same side of the management, and compromise on managers' information distortion behavior in order to cover the rise in RPTs and consequent expropriation (Gordon *et al.*, 2007; Henry *et al.*, 2007; Louwers *et al.*, 2008; Kohlbeck and Mayhew, 2010; Pizzo, 2013). With the potential of getting a stake on the gain, powerful gray directors on the board may indicate extensive partiality, which leads to monitoring incapability, and makes embezzlement through RPTs and information distortion more likely to occur. As the mediation analysis reveals how and why one variable influences another (Baron and Kenny, 1986, Miller and Triana, 2009), we anticipate that the presence of gray directors, especially the power they possess, weakens board vigilance on RPT activities, and thereby exacerbates wealth transfer through generating excess RPTs, which, in turn, account for the impact of gray directors on financial reporting quality. Essentially, we posit a chain of effects starting from the power of gray directors to RPTs, and ultimately, to the quality of financial reporting, which leads to the following hypothesis:

> *Hypothesis: RPTs mediate the relationship between the power of gray directors and financial reporting quality in Chinese listed firms, such that the power of gray directors is positively associated with RPTs, and the level of RPTs is positively associated with the occurrence of financial reporting restatement.*

3.4 Research methods

3.4.1 Data and sample

Table 14 shows the selection procedure of our sample. Started with 1,418 firms listed in either Shanghai or Shenzhen Stock Exchange (SSE and SZSE) A-share Main Board[50] in

[50] Accordingly to Shenzhen Stock Exchange official website, China has a multi-tier capital market, which

December 31, 2013 contained in Sinofin database[51], we excluded 167 firms in the finance industry, based on the Global Industry Classification Standard (GICS), because of their specific regulatory environment and operations, and excluded 197 firms with missing values. Our final sample consists of 1,054 firms.

Similar to Habib *et al. (*2015), the detailed information on RPTs was derived from China Stock Market and Accounting Research (CSMAR) Related Party Transaction database. According to the previous literature, Chinese listed firms mainly use related sales to prop up earnings (Khanna and Yafeh, 2005; Jian and Wong, 2006; Ge *et al.,* 2010; Wang and Yuan, 2012; Wong 2016), and use related loans to divert resources (e.g. cash and public financing capital) to their parent firms and corporate groups (La Porta *et al.,* 2001; Jian and Wong, 2006; Jiang *et al.,* 2010; Wong 2016). Therefore, we follow Jian and Wong (2006), Ge *et al. (*2010) and Habib *et al. (*2015), and classify transactions into five categories of RPTs: goods sales, assets sales, service sales, and loans to and loans from related parties.[52] In total, we collected data about 18,346 RPTs. Due to unavailable transaction direction and amount information, 2,986 transactions are further eliminated from our sample, resulting in 15,360 RPTs for the 1,054 firms in our sample.

As the CSRC requires listed firms to disclose their RPT decisions along with the specific voting information for each decision in their board meeting reports, we retrieved 7,225 meeting reports from the official SSE and SZSE websites for these 1,054 firms for the period January 1 to December 31, 2013,[53] and then identified and hand

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"*is designed for enterprises at different stages of growth and of different quality and risk profiles*". This multi-tier capital market includes Main Board (large and mature firms), ChiNext (a NASDAQ-type exchange for high-growth and high-tech start-ups) and SME (small and medium enterprise exchange). Considering the specialties of young and small firms, regulations by the Stock Exchanges are looser for ChiNext and SME than the general regulations for Main Board. Available at (Accessed on 8 February 2018): https://www.szse.cn/main/en/ListingatSZSE/ListingQA/.

[51] Sinofin is a Chinese database developed by Beijing University China Center for Economic Research (CCER), and has been widely used by many papers, e.g. Jiang et al. (2010) and Tong and Wang (2008).

[52] Summarized by Ge et al. (2010), the CSRC mainly requires Chinese listed firms to disclose 11 categories RPTs: (1) goods transactions; (2) assets transactions; (3) service transactions; (4) agency; (5) leasing; (6) loans, guarantee and mortgage, morgage or other capital transactions in forms of cash or physical assets; (7) management contract; (8) transfer of research and development projects; (9) license agreement; and (10) senior executives' compensation.

[53] English versions of the Shenzhen and Shanghai Stock Exchanges official websites. Available at (Accessed on 8 February 2018): https://www.szse.cn/main/en/Disclosure/Firms/; http://english.sse.com.cn/listed/announcements/.

collected the information about gray directors. Additional corporate governance and the basic financial information come from Sinofin database.

Insert Table 14 here

3.4.2 Variables measurement

Dependent Variable

Table 15 summarizes the variables used in our study. In order to capture the quality of Chinese listed firms' financial reporting, we hand collected information about sample firms' restatements during 2014 to 2016. As required by the Securities Law in China, the CSRC has responsibility to investigate frauds of listed firms.[54] Through regular reviews and random inspections, the CSRC reports its investigation results and sanction corresponding firms if the wrongdoing is found. We hand collected all published CSRC enforcement actions from 2014 to 2016,[55] and measure our dependent variable consistent with Chen *et al. (*2006) and Kohlbeck and Mayhew (2017). Hence, *Restatement* is a dummy variable with the value one if the firm has announced a restatement between 2014 and 2016 affecting the financial reporting of the 2014 financial year[56], and zero otherwise.

Mediation Variables

We consider five variables capturing different categories of RPTs. RPTs are defined as "*transactions conducted between the reporting entity (listed company) and its related parties, which include shareholders, key executives and their family members, associated firms, subsidiaries, and other firms that are controlled or significantly influenced by the above related parties*" (Chinese Accounting Standard-Disclosure of

[54] The Securities Law (2013-10-180) mentioned that the CSRC has the right to carry "*on-the-spot examination*" of a listed company, and make "*investigation and collecting evidence in a place where any suspected irregularity has happened*". The English version of the Securities Law (2013) available at (Accessed on 8 February 2018):
http://www.fdi.gov.cn/1800000121_39_4814_0_7.html.

[55] The data available on the CSRC official website. Available at (Accessed on 8 February 2018):
http://www.csrc.gov.cn/pub/newsite/xxpl/shjspl/.

[56] To avoid potential endogeneity issue, the dependent variable was calculated using values in one year after the independent variables.

Related Parties and Corresponding Transactions, 2001). Similar to Jian (2003) and Jian and Wong (2010), we summarize the value of RPTs occurring for the sample firms in 2013. Specifically, we measure *RPT Goods Sales*, which is the total amount of related sales of goods deflated by the firm's total revenue; *RPT Asset Sales*, which is the total amount of related sales of assets deflated by the firm's total assets; *RPT Service*, which is the total amount of related sales of service divided by the total revenue; and *RPT Loan to* and *RPT Loan from*, which are total amounts of related loans to/from related parties divided by total assets. Essentially, these variables aim to capture the extent to which the firm's operation depends on or is affected by RPTs (Gordon *et al.*, 2007; Gordon *et al.*, 2004 a&b; Lo *et al.*, 2010).

Independent Variable

Another important independent variable in this investigation is to measure the power of gray directors. As mentioned before, based on disclosure rules on board meetings flollowing the Corporate Law (2005), the SSE (2008) and the SZSE (2004), we are able to identify gray directors for each RPT decision[57]. In order to capture the power of gray directors, we mirror the method introduced by Haynes and Hillman (2010), and build a four-dimension index, *Gray Power*, including (1) the ratio of total number of directors classified as "gray directors" to the total number of directors on the board, following Gordon *et al. (*2004, a&b); (2) a dummy variable equals to one if the board chair is a gray director, similar to Gordon *et al. (*2004a); (3) the tenure of gray directors to the aggregrate tenure of total directors on the board; (4) the ratio of gray directors' shareholding to the total directors' shareholding of the focal firm. The range of this

[57] SSE (2008-Section 2, 10.2.1) further define related directors as "*The related directors as mentioned in the preceding paragraph refers to the following directors or a director that meets any of the following conditions: (1) the counterparty to the transaction; (2) having direct or indirect controlling power over the counterparty to the transaction; (3) holding a position in the counterparty to the transaction, or in any legal person or other organization that either directly or indirectly controls the counterparty to the transaction, or in any legal person or other organization under the direct or in direct control of the counterparty to the transaction; (4) he is a close family member (as defined in (4) of Section 10.1.5 hereof) of a counterparty to the transaction, or of the direct or indirect controller of the counterparty to the transaction; (5) he is a close family member (as defined in (4) of Section 10.1.5 hereof) of a director, supervisor or senior officer of the direct or indirect controller of the counterparty to the transaction; or (6) other directors whose independent business judgment may be affected as determined by the CSRC, the Exchange or the listed company in accordance with the principle that essence is more important than form*".

composited variable is between 0 to 4, and the Cronbach's (1951) alpha between these measures is 0.651.

Control Variables

Similar to prior studies based on Chinese listed firms (e.g. Liu and Zu, 2007; Hu *et al.*, 2010; Lo *et al.*, 2010), we control for firm- and industry-level factors that may influence the level and economic impact of RPTs and the financial reporting quality. Consistent with the previous literature (e.g. Hu *et al.,* 2010; Lo *et al.,* 2010), we measure the level of board independence by the variable *Nonaffiliated Directors*, which is the ratio of directors who are independent directors [58] and are not representatives of large shareholders to the total number of directors on the board. More nonaffiliated directors on the board represent high levels of board independence, are expected to deter excess RPTs (Lo *et al.,* 2010), and increase financial reporting quality (Chen *et al.,* 2006). Moreover, as discussed above, because Chinese listed firms need to reach some earning thresholds which in turn may work as incentives to boost earnings through RPTs, we follow Liu and Lu (2007) and Jiang and Wong (2010) and measure *Past Performance*, using a dummy which equals one if the firm's ROE in the past year is negative (below 0%).[59] This variable measures the incentives of profit manipulation through RPTs. Big 4 auditors have been proved to provide higher quality audits, limiting harmful RPTs and increasing firms' disclosure quality. Thus, consistent with Khurana and Raman (2004)

[58] We used the term "*Independent Director*" (Duli Dongshi) to identify independent directors in SinoFin executive database, in which the original data comes from firms' annual reports and the definition of "*Independent Director*" follows the CSRC (2001-102): "*A person may not hold the position of the independent director in any of the following circumstances: the person who holds a position in the listed company or its affiliated enterprises, their direct relatives and major social relations (direct relatives refer to their spouse, father, mother and children etc.; major social relations refer to their brothers, sisters, father-in-law, mother-in-law, daughter-in-law, son-in-law, spouse of their brothers, sisters, and their spouse's brothers and sisters etc.); the person who holds more than 1% of the outstanding shares of the listed company directly or indirectly, or the natural person shareholders of the 10 largest shareholders of the listed company, or such shareholder's direct relative; the person who holds a position in a unit which holds more than 5% of the outstanding shares of the listed company directly or indirectly, or of the unit which ranks as one of the 5 largest shareholders of the listed company, or such employee's direct relative; the person meeting any of the three above-mentioned conditions in the immediate proceeding year; the person providing financial, legal or consulting services to the listed company or its subsidiaries; the person stipulated in the articles of association; the person determined by the CSRC*".

[59] SSE (2008: 14-1-1) and SZSE (2004: 13-2-1) entitled "Rules Governing Listing Of Stocks On Shenzhen Stock Exchange" state, "*When a listed company is under any of the following circumstances, the Exchange shall issue a delisting risk alert on its shares: (1) negative earnings in the last two consecutive years (based on the audited net profit disclosed in the latest two annual reports)*".

and Habib *et al. (*2015), we control for *Big 4*, using a dummy variable which indicates whether the firm's external auditing is conducted by the Big Four world leading auditing firms[60]. Since prioir literature mentions that board monitoring tasks are also conducted by some specific committees (Lo *et al.,* 2010), we control for *Audit Committee*, which is a dummy variable that equals one if the firm has an auditing committee and zero otherwise. According to the Chinese Code of Corporate Governance for Listed Companies (CCGLC, 2002: 3-6-52), audit committes are not mandatory for Chinese liusted firms[61], we therefore expect that *Auditing Committee* indicates firms' efforts to monitor financial reports and is negatively associated with RPTs as well as the probability of restatements. As Chinese listed firms have a two-tier board structure, similar to Hu *et al. (*2009), we control for the structure of firms' supervisory boards. We measure *Employee Supervisors* by the percentage of employee representatives within the supervisory board, and *Share Supervisors* by the percentage of directors within the supervisory board who are employed by or receive compensation from one of the ten large shareholders of the focal firm. We expect that *Employee Supervisors* is negatively correlated and *Share Supervisors* should be positively correlated with RPTs as well as restatements. Given the high ownership concentration and the government's special position, we follow Cao *et al. (*2011) and Lo *et al. (*2010) and control for *SOE*, which is a dummy that equals one if the ultimate controlling shareholder[62] is a state asset management bureau, an SOE affiliated with the central government, or an SOE affiliated with a local government (Ma and Khanna, 2015). Therefore, positive correlations between *SOE*, RPTs and restatement are expected.

As Claessens *et al. (*2000) report, controlling shareholders especially in Asia commonly create a shareholding wedge through ownership pyramids. Thus, we control for *Large Shareholder Wedge*, which is the divergence between voting and cash-flow rights held by the ultimate controlling shareholder. Consistent with the findings in Kang *et al. (*2014), we expect that the shareholding wedge by the largest shareholder would be

[60] The Big Four are the four largest accounting firms in the world, including KPMG, Deloitte Touche Tohmatsu, PricewaterhouseCoopers and Ernst & Young.

[61] CCGLC, 2002: 3-6-52: "*The board of directors of a listed company may establish…an audit committee…in accordance with the resolutions of the shareholders' meetings*".

[62] An ultimate controlling shareholder is the shareholder who directly or indirectly controls more than 10 percent of the firm's voting shares (See more details in Claessens et al., 2000).

positively related to RPTs and lower financial reporting quality. Similar to Habib *et al. (*2015), we also control for *Leverage*, or the debt-to-asset ratio, *Firm Size*, measured by the nature log of firm's total equity, and *Firm Age*, which is the nature log of years since the firm's initial public offering (IPO). *Industry* and *Province* dummies[63] have also been taken into consideration. Following Haynes and Hillman (2010), outliers were checked and recorded as the highest value of non-outliers based on the normal distribution assumption.

Insert Table 15 here

3.4.3 Regression model

The benefit of adding mediators in board–firm level outcomes is to examine why the process occurs and how it operates (Baron and Kenny 1986; Preacher and Hayes, 2004). Accordingly, in order to test whether *Gray Power* increases the probability of *Restatement* through enhancing the levels of RPTs, we conduct the mediation statistical method suggested by Baron and Kenny (1986), which has been widely used in governance and management literature to establish mediating effects[64]. In line with this procedure, we first use the ordinary least squares (OLS) regressions to test whether the independnet variable (IV) is associated with the mediator (M) (Figure 6, Path a). We then test whether M causes the dependent variable (DV) (Figure 6, Path b), controlling for IV (Figure 6, Path c'). Since the dependent variable (*Restatement*) is dichotomous, we follow Kutner, Nachtsheim and Neter (2004) and use a logistic regression model.

[63] 8 dummy variables representing 9 industrFies: Energy, Materials, Industrial, Consumer Discretionary, Consumer Staples, Health Care, Utilities, Information Technology, and Telecommunication Services. 30 dummy variables representing 31 provinces: Anhui Province, Beijing Municipality, Chongqing Municipality, Fujian Province, Gansu Province, Guangdong Province, Guangxi Zhuang Autonomous Region, Guizhou Province, Hainan Province, Hebei Province, Heilongjiang Province, Henan Province, Hubei Province, Hunan Province, Inner Mongolia Autonomous Region, Jiangsu Province, Jiangxi Province, Jilin Province, Liaoning Province, Ningxia Hui Autonomous Region, Qinghai Province, Shaanxi Province, Shandong Province, Shanghai Municipality, Shanxi Province, Sichuan Province, Tianjin Municipality, Tibet Autonomous Region, Xinjiang Uyghur Autonomous Region, Yunnan Province, Zhejiang Province.

[64] See for example, Tong and Wang (2005), Miller and Triana (2009), and Rogriguez and Nieto (2016).

Our hypothesis would be supported if Path ab is statistically different from 0, indicating the existence of the mediation effect, whereas Path ab is the mediation or indirect effect (IV→M→DV), and has the following equation:

$$c = ab + c' \quad (1)$$

Where c is the coefficient of the total effect of X on Y (Path c). We first use Sobel's (1982) test to examine the significance of Path ab.[65] The indirect effect is considered to be significant when the Sobel test's Z value is greater than 1.96:

$$Z = \frac{ab}{\sqrt{a^2 S_b^2 + b^2 S_a^2}} \quad (2)$$

Moreover, following Bollen and Stine (1990), we also considered Bootstrapping approach, which contains higher accuracy than Sobel's test shown in Preacher and Hayes (2004). When the resultant bootstrapped confidence intervals (CIs) do not contain value 0, the indirect effect is different from zero with 5% significant level. Since these tests make different assumptions, we follow Rogriguez and Nieto (2016) and apply both of the methods.

3.5 Results

3.5.1 Descriptive statistics

Table 16 Panel A shows the frequency and the average value of RPTs: 4,938 good sales (RMB 39 mil), 109 asset sales (58 mil), 1,806 service sales (20 mil), 3,114 loan transactions to related parties (63 mil), and 5,393 loan transactions from related parties (88 mil). Consistent with previous studies, good sales and loans are the most frequently occurring RPTs in Chinese listed firms (Jian and Wong, 2010; Habib *et al.,* 2015). In contrast, asset sales are relatively rare. As argued by Jian and Wong (2010), asset sales are easier to be detected, and especially after 1999, the CSRC no longer allows gains and losses from infrequent asset transactions to affect earnings, with the recognition of the potential earnings management risks behind those assets transfers.

[65] All coefficients and statistic values in mediation tests are directly calculated by a SPSS Macro created by Preacher and Hayes (2008). The Preacher and Hayes (2008)'s SPSS Mediation Effect Macro can be found at (Accessed on 8 February 2018): http://afhayes.com/spss-sas-and-mplus-macros-and-code.html.

Descriptive statistics of all variables in our sample are shown in Table 16 Panel B. There are in total 129 firms with announced *Restatement*, which accounts for 12.2% of firms in our sample. This result is higher than the number of accounting frauds in Chinese listed firms from 1999 to 2003 (169) recorded by Chen *et al. (*2006), and from 1999 to 2005 (270/3%) as documented in Lisic *et al. (*2015), while it is comparable to the S&P 1500 sample reported in Kohlbeck and Mayhew (2017) with 122 (10.1%) restatement firms in 2007. Thus, our data indicates not only the increasing trend of financial reporting misstatement, but also the strengthen law enforcement by the CSRC in recent years.

Moreover, the average *RPT Good Sales*, *RPT Asset Sales* and *RPT Service Sales* in our sample are 8.2%, 4.8% and 1.7%, respectively, similar to the related sales (6.1%, including good and service sales) reported in Jian and Wong (2010). The average values of *RPT Loan to* and *RPT Loan from* are 7% and 12.8%, respectively[66]. Although not reported, 873 (82.8%) firms in our sample disclose RPTs (related sales and loans), which is consistent with the findings in Jian (2003) that more than 90% of Chinese listed firms perform RPTs, which is higher than the result (60%) based on the US context (Kohlbeck and Mayhew, 2017). Moreover, on average, our sample shows that on average Chinese listed firms engage in 20 RPTs per year, which is comparable to Habib *et al.* (2015) who find that Chinese listed firms engage in 19.5 related sales and loans per year. Overall, our data on RPTs is comparable to previous studies and supports the pervasiveness of RPTs in Chinese listed firms.

On average, *Gray Power* in our sample is 1.25. We are unable to compare this variable with other studies, because, at the best of our knowledge, we are the first to measure this variable with multiple items. Nevertheless, our components of gray directors' power, namely the proportions of gray directors and the average percentage of gray board chair are comparable with the evidence provided by Gordon and Henry (2005).

The descriptive of control variables in our sample is also comparable to previous studies of Chinese listed firms. The average proportion of *Nonaffiliated Directors* is 36%, consistent with Jiang and Kim (2015) (37%). 10.4% firms in our sample report negative

[66] The average related loan amount in Jian and Wong's (2010) sample is around 5.3%, which measures the net amount between the loans to minus the loans from related parties, and therefore it is not directly comparable to our measure.

ROE in the previous year, which is slightly higher than the number (7.4%) reported by Chen *et al. (*2006). 4.4% of our sample firms hire *Big 4* auditors, slightly lower than 6.3% reported by Su and Wu (2017) and 6% in Habib *et al. (*2015). This may because our sample includes only listed firms in the Mian Board where SOEs occupy a large proportion and foreign firms are relatively rare, making firms in our sample more likely to be audited by local Chinese auditing companies. Although it is not mandatory by the CSRC, almost all firms in our sample have an auditing committee, for an average number of 97.5%, which is perhaps because our sample includes only large and mature firms with high levels of institutionalization. Comparable to the evidence provided by Firth *et al. (*2007), supervisory boards in our sample contain 35.8% employee representatives and 35.9% large shareholder representatives. Moreover, SOEs occupy 64.4% of the firms in our sample, comparable to Ma and Khanna (2010) and Lo *et al. (*2010). The average large shareholder wedge is 4.9%, slightly lower than 6.4% in Cao *et al. (*2011), and the mean *Leverage* is 0.58, consistent with the result (0.52) in Habib *et al. (*2015). Firm size, age, and industry and location distributions in our sample are also comparable to those in prior studies (e.g., Liu and Lu, 2007; Lo *et al.*, 2010; Liu *et al.*, 2014). Table 16 Panel B also compares mean values between firms with and without a restatement. The main variables are compared using either *t-test* or χ^2 test of mean differences[67], respectively. As expected, restatements are more likely to happen in firms with higher levels of *RPT Good Sales*, *RPT Loan to*, and *RPT Loan from*.

Insert Table 16 here

The correlation matrix presented in Table 17 shows that *RPT Good Sales*, *RPT Loan to* and *RPT Loan from* are positively associated with the probability of a *Restatement*, and are also positively associated with *Gray Power*, which to some extent support our hypothesis. Overall, these findings indicate that the power of gray directors leads to higher levels of RPTs, and may represent difference degrees of restatement risks. It is worth noting that the correlation coefficients among independent variables are far below

[67] Following Norušis (2006), the continuous variables are compared using *t-test*, and the binary variables are compared using χ^2 test.

the suggested value of 0.5, and the variance inflation factors (VIF) for independent and control variables in all regression models show a mean of 1.52 and a maximum of 4.16 (industry), far below the threshold of 10 (Kutner *et al.*, 2004), indicating the absence of potential multicollinearity problems.[68]

Insert Table 17 here

3.5.2 Regression results

Table 18 presents the regressions for testing the mediation effects of RPTs in the relation between the power of gray directors and the quality of firm's financial reporting. Panel A estimates OLS regressions to test the influence of *Gray Power* on RPTs, Path a. The coefficients of *Gray Power* in Model 1 (b=0.043, p<1%), 2 (b=0.015, p<5%), 4 (b=0.018, p<5%) and 5 (b=0.024, p<5%) are significantly positive, indicating that *Gray Power* is positively associated with *RPT Good Sales*, *RPT Asset Sales*, *RPT Loan to* and *RPT Loan from*. Panel B shows the logistic regression of the impacts of IV (Path c') and M (Path b) on DV. In Model 1 and 4, *RPT Good Sales* (b=1.056, p<5%) and *RPT Loan to* (b=0.984, p<5%) show significant positive impacts on *Restatement*.

Further, if M completely mediates the IV/DV relationship, Path c' should be indifferent from zero, with statistically insignificant coefficients. In Table 18 Panel B, *Gray Power* is insignificant with *Restatement* in all of the five models, indicating a complete mediation of RPTs. This suggests that *Gray Power* may not influence the restatement directly but through increasing firms' related sales and loan, which in turn, lead to poor reporting quality.

Panel C of Table 18 shows tests of the significance of indirect mediation effects. The Sobel's (1982) test shows that *RPT Good Sales* (Z=2.397, p<5%) and *RPT Loan to* (Z=1.891, p<10%) significantly mediate the relationship between *Gray Power* and *Restatement.* We then apply bootstrap simulation methods with 5,000 bootstrap resamples, and compute 95% confidence intervals of the mediation effects (Path ab).

[68] Although *RPT Loan to* and *RPT Loan from* are highly correlated, they are not supposed to be included in the same regression model.

The results consistently show that the mediation effect of *RPT Good Sales* is significantly greater than zero, ranging from 0.006 to 0.094, and 0.009 to 0.097, with 95% significant interval, while the mediation effect of *RPT Loan to* is also positively significant, ranging from 0.006 to 0.094, and 0.009 to 0.097. The results, again, indicate the significant mediation role of RPTs, which greatly support our hypothesis that *Gray Power* is positively associated with the probability of a restatement through increasing the levels of RPTs.

Insert Table 18 here

Due to the small sample size of restatement firms and the potential differences in their organizations, Beasley (1996) suggests that the matched sample is an appropriate approach to make comparisons between firms with and without a restatement. Accordingly, similar to Beasley (1996) and Chen *et al. (*2006), we build a matching pair sample by finding a comparable restatement firm with a peer based on the following criteria: the same industry, the same type of controlling shareholder (indicate whether a firm's ultimate controlling shareholder is the state or others), same ownership concentration (BvD independence indicator)[69], and similar firms size (±25% range of the total equity). We successfully matched 106 (82.2%) restatement firms with 106 non-restatement firms with all criteria, and lower the bar to match the rest 23 restatement firms with the most matchable peers, resulting in a final matched sample of 258 Chinese listed firms.

Table 19 Panel A reports comparison results of the matching pair sample. Given the matching criteria and as expected, *SOE*, *Large Shareholder Wedge*, *Firm Size* and

[69] It is worth noting that one of our control variables, *Large Shareholder Wedge* is different from the BvD (Bureau Van Dijk) independence indicator, which represents the ownership concentration level, used in our matching sample procedures. We collected the the BvD Independence Indicator from the Bureau Van Dijk's (BvD) ORBIS database. Bureau Van Dijk's (BvD) independence indicator: "*The BvD Independence Indicator categorizes the degree of independence of a company; it is not a rating. This indicator excludes the following owners from consideration when determining status of independence: Public, Mutual Funds, Private shareholders (more than one unnamed individual), and Bulk list of shareholders (more than one unnamed shareholder, but containing a mixture of companies and individuals)*" (Orbis user guide, 2017). Available at (Accessed on 8 February 2018): https://help.bvdinfo.com/mergedProjects/68_EN/Home.htm.

Industry show no significant difference between the two subgroups. Moreover, restatements are more likely to happen in firms with high levels of *RPT Good Sales* (*t*=5.00, *p*<1%), *RPT Loan to* (*t*=3.937, *p*<1%) and *RPT Loan from* (*t*=2.977, *p*<1%), and have more *Gray Power* (*t*=2.738, *p*<1%).

Together, Panel B, C and D in Table 19 represent the tests of the mediation effects of RPTs in the relation between the power of gray directors and the firm's future restatement. Consistent with the results in Table 18 Panel A, Table 19 Panel B tests the relationship between independent variable (*Gray Power*) and the mediator (RPTs). The results show that *Gray Power* is positively associated with *RPT Good Sales* (b=0.057, *p*<1%), *RPT Loan to* (b=0.03, *p*<5%) and *RPT Loan from* (b=0.076, *p*<1%), indicating a positive impact of gray directors' power on the level of firms' RPT. The results in Panel C of Table 19 show the combined influence of independent variable and the mediator on *Restatement*. In Model 1, 4 and 5, *RPT Good Sales* (b=4.33, *p*<1%), *RPT Loan to* (b=3.33, *p*<1%) and *RPT Loan from* (b=1.12, *p*<10%) are positively associated with *Restatement*, while *Gray Power* shows insignificant coefficients in almost all of the models. These results indicate that RPTs increase the likelihood of future restatements. Panel D shows the tests of the mediation effects. *Gray Power* is positively associated with *Restatement* through indirect paths: increase *RPT Good Sales* (b=1.229, *p*<5%), *RPT Loan to* (b=0.12, *p*<10%) and *RPT Loan from* (b=0.10, *p*<10%), with significant Sobel's Z statistics. Consistently, the results from bootstrap methods show that the mediating effect (Path ab) of *RPT Good Sales*, *RPT Loan to* and *RPT Loan from* are significantly indifferent from zero and highly positive, with 5% significant level, which again support our hypothesis and consistent with our results from the full sample.

Insert Table 19 here

In sum, our results show a strong impact of gray directors. These findings concur with Gordon *et al. (*2004 a&b), Gordon and Henry (2005), Gordon *et al. (*2007) and Kohlbeck and Mayhew (2010) who suggest the adverse effect of gray directors on board monitoring effectiveness. Moreover, we find that RPTs mediate the positively relationship between gray directors' power and financial reporting quality. This supports

our hypothesis, and provides evidence for the "conflict interest" perspective of RPTs theorized by Gordon *et al. (*2007) and Pizzo (2013). These authors argue that high levels of RPTs may hardly enhance transaction efficiency, but instead imply greater agency problems and potential expropriation of minority shareholders. Our results also extend the studies by Moyes *et al. (*2005) and Kohlbeck and Mayhew (2017), who show that RPTs could be considered as "red flags" in identifying poor information disclosure.

3.6 Robustness tests

As a sensitive check of our original measures of RPTs, we create additional variables, including *No. RPT Good Sales*, *No. RPT Asset Sales*, *No. RPT Service Sales*, *No. RPT Loan to* and *No. RPT Loan from*, based on the absolute number (natural logarithm) of total RPTs in 2013, respectively. We used these alternative measures as mediation variables to contrast with results obtained from Table 18. The results from this robustness test are qualitatively similar to the original results. More specifically, *Gray Power* is positively associated with the number of all five types of RPTs categories (p<1%). Moreover, *No. RPT Good Sales* (b=0.196, p<10%) and *No. RPT Loan from* (b=0.242, p<1%) greatly increase the likelihood of *Restatement*, and significantly mediate the relationship between *Gray Power* and *Restatement* (p<5%). As a second robusteness test, we re-run the same model in Table 18, and substitute our dependent variable (*Restatement*) with two earnings management measures: *Jones*, the discretionary accrual based on Jones' (1991) model, and *Modified Jones*, which is the method from Dechow *et al. (*1995). The results show that only *RPT Good Sales* is significantly associated with both *Jones* (b=0.25, p<1%) and *Modified Jones* (b=0.23, p<1%) discretionary accrual measures, and significantly mediates the relationship between *Gray Power* and *Jones* and *Modified Jones* (b>0, p<5%), consistent with the evidence in the existing literature that Chinese listed firms frenquently use related sales to prop up earnings (e.g. Ge et al., 2010; Wong 2016). The results reported here again support our hypothesis, indicating that the power of gray directors on the board is positively associated with RPTs, which in turn explain earning accruals. Prior Chinese based governance studies indicate that SOEs may behave differently in terms of ownership concentration, power distribution and board decision making, when

compared to non-SOEs (e.g., Jiang and Kim, 2015; Ma and Khanna, 2015). As we mentioned before, SOEs occupy a large proportion (64.4%) in our sample. In order to examine this issue, we run our models with only SOEs (679 firms). The results are qualitatively similar. On short, *Gray Power* is positively associated with *RPT Good Sales* (b=0.052, p<1%), *RPT Loan to* (b=0.021, p<5%) and *RPT Loan from* (b=0.024, p<10%). Again, as in Table 18, *RPT Good Sales* (b=1.81, p<1%) and *RPT Loan to* (b=0.92, p<10%) significantly increase *Restatement* and show strong mediation effects (b>0, p<5%). Overall, results from our robustness tests are similar to our original results based on the full sample, and support our hypothesis.

3.7 Conclusion

This study proposed and tested the mediation effect of RPTs in the relationship between the power of gray directors on the board and the firm's financial reporting quality. Our results show that the power of gray directors positively affects the level of RPTs, both in terms of related goods sales and related loans. More important, after controlling for several attributes, we show that RPTs lead to higher likelihood of financial reporting restatement. Using the matching pair sample as well as alternative measurements, our results are robust and our hypothesis is supported. We interpret these results as the evidence that RPTs provide a potential channel through which firms transfer wealth to related parties disregarding the interests of minority shareholders, which, in turn, could be reflected in firms' financial reporting quality.

Our study therefore provides original insights by jointly investigating the influence of gray directors and the level of RPTs on the quality of firms' financial statements, which echoes the early claim in Forbes and Milliken (1999: 490) that "*the influence of board demography on firm performance may not be simple and direct…but, rather, complex and indirect*". Our results show that boards of directors may not have direct impact on the firm level outcomes such as financial reporting quality, but this may not mean the absence of the influence through an indirect way by increasing firms' RPT engagement.

Moreover, although Gordon *et al.* (2007: 94) infer in their seminal research that "*gray directors may raise the likelihood of a material misstatement…and monitoring effectiveness are believed to be impaired*", few studies has taken into account the

influence of gray directors which could be seen as an antecedent of excess RPTs (Gordon *et al.*, 2005; Kohlbeck and Mayhew, 2010). As such, our results provide empirical evidence and contribute to the ongoing discussion about how gray directors influence board decision making and monitoring effectiveness, thus reminding both academic scholars and practitioners the potential tradeoffs of having gray directors on the board (e.g., Gordon *et al.*, 2004 a&b; Gordon *et al.*, 2007; Kohlbeck and Mayhew, 2010; Kohlbeck and Mayhew, 2017).

As any empirical investigations, our study has its limitations which could also be considered as opportunities for future research. First, our research mainly focuses on the consequences reflected on firms' financial reporting misstatements. Although we have considered the discretionary accounting accrual as a robustness test as a supplemental analysis, future research can extend our investigation by considering other approaches to measure disclosure quality as well as earnings management. Second, we only focus on related sales and loans which have been considered as the most widely used RPTs in Chinese listed firms (Jian, 2003; Jian and Wong, 2010). Future research can cover other types of RPTs. Finally, we consider only data in a specific context, China. Future studies could use a longitudinal approach by containing more years of observations, and expand the sample to other countries. Given the rapid progress of globolization and growing international transactions, our research also inspires studies on gray directors and RPTs in a multinational context.

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Table 14 Sample description

Sample Selection Procedure:	No.
1. Total number of firms listed in Shanghai and Shenzhen A-share stock market on 31st Dec. 2013 in Sinofin Database;	1,418 Firms
2. Firms operating in the financial sector, based on GICS code "40";	(167) Firms
3. Firms with missing data;	(197) Firms
Final Sample Size:	*1,054 Firms*
1. Total number of RPTs (related good sales, related asset sales, related service sales, loan to related parties, and loan from related parties);	18,346 Transactions
2. RPTs with missing transaction direction data;	(2,939) Transactions
3. RPTs with missing transaction amount data;	(47) Transactions
Final No. RPT:	*15,360 Transactions*

Table 15 Variable definitions

Restatement	Dummy variable equal to 1 if a subsequently announced restatement affected the financial statement in 2014 and 0 otherwise.
RPT Good Sales	The total amount of related goods sales divided by the total revenue.
RPT Asset Sales	The total amount of related assets sales divided by the total assets.
RPT Service Sales	The total amount of related service sales divided by the total revenue.
RPT Loan to	The total amount of loans to related parties divided by the total assets.
RPT Loan from	The total amount of loans from related parties divided by the total assets.
Gray Power	An index includes four indicators: (1) The ratio of gray directors to total number of directors. Gray directors are those excluded from voting for each RPT decisions. (2) Dummy variable equal to 1 if the board chair is a gray director. (3) The relative tenure of gray directors to the board. (4) The ratio of gray directors to board shareholding of the focal firm.
Nonaffiliated Directors	The ratio of directors who are independent directors and are not representatives of large shareholders to the total number of directors.
Past Performance	Dummy variable equal to 1 if the firm reported negative ROE in the previous year and 0 otherwise.
Big 4	Dummy variable equal to 1 if the firm's auditor is a Big 4 auditor and 0 otherwise.
Audit Committee	Dummy variable equal to 1 if the firm has an audit committee and 0 otherwise.
Employee Supervisors	The percentage of employee representatives to the total number of directors on the board.
Share Supervisors	The percentage of directors within the supervisory board who are employed by or receive compensation from one of the ten large shareholders of the focal firm to the total number of directors on the board.
SOE	Dummy variable equal to 1 if the ultimate controlling shareholder is a state asset management bureau, a SOE affiliated with the central government, or an SOE affiliated with the local government, and 0 otherwise.
Large Shareholder Wedge	The difference between the control rights and cash flow rights of the ultimate controlling shareholder.
Firm Size	Natural log of firm's total equity.
Firm Age	Natural log of years since IPO.
Leverage	Total debt/total assets.
Province	Dummy variables representing 31 provinces in main land China.
Industry	Dummy variables representing 9 industries: Energy, Materials, Industrial, Consumer Discretionary, Consumer Staples, Health Care, Utilities, Information Technology, and Telecommunication Services.

Table 16 Descriptive statistics and comparisons between firms with and without restatement in our sample

Panel A: Descriptive statistics on RPTs.

RPT Types	No. RPT	Min	Max	Mean	SD
Good Sales	4,938	2,218	1,486,196,358	39,767,358	130,251,276
Asset Sales	109	2,294	1,074,157,322	58,093,337	183,470,057
Service Sales	1,806	2,217	1,258,576,191	20,660,487	93,154,854
Loan to	3,114	3,127	1,471,000,000	63,042,244	117,539,020
Loan from	5,393	3,000	1,500,000,000	88,982,095	162,506,406
Total	*15,360*				

Panel B: Variables descriptive.

	Full Sample N=1054				Restatement=1 N=129		Restatement=0 N=925		*t-test*/χ^{2a}	
	Min	Max	Mean	SD	Mean	SD	Mean	SD	t/χ^2	*p*
Restatement	0	1	0.122	0.328						
RPT Good Sales	0	0.997	0.082	0.221	0.133	0.291	0.075	0.209	2.769	0.006***
RPT Asset Sales	0	0.909	0.048	0.181	0.025	0.129	0.051	0.186	-1.523	0.128
RPT Service Sales	0	0.969	0.017	0.096	0.013	0.091	0.017	0.097	-0.408	0.683
RPT Loan to	0	0.977	0.070	0.201	0.116	0.261	0.064	0.190	2.777	0.006***
RPT Loan from	0	0.990	0.128	0.268	0.166	0.296	0.123	0.263	1.707	0.088*
Gray Power	0	3.469	1.247	0.842	1.298	0.893	1.239	0.835	0.745	0.456
Nonaffiliated Directors	0.125	0.600	0.360	0.081	0.361	0.084	0.360	0.080	0.132	0.895
Past Performance	0	1	0.104	0.306	0.062	0.242	0.110	0.313	3.192	0.074*
Big 4	0	1	0.044	0.204	0.039	0.194	0.044	0.206	0.087	0.768
Audit Committee	0	1	0.975	0.155	0.969	0.174	0.976	0.152	0.230	0.632
Employee Supervisors	0	0.800	0.358	0.112	0.350	0.099	0.359	0.113	-0.882	0.378
Share Supervisors	0	1	0.359	0.248	0.338	0.269	0.362	0.245	-1.056	0.291
SOE	0	1	0.644	0.479	0.589	0.494	0.652	0.477	1.911	0.167
Large Shareholder Wedge	0	0.336	0.056	0.084	0.053	0.084	0.056	0.084	-0.392	0.695
Firm Size	18.618	23.348	20.251	0.884	20.261	0.879	20.250	0.885	0.140	0.889
Firm Age[b]	1	21	13.633	4.655	13.271	5.191	13.683	4.576	-0.941	0.347
Leverage	-6.566	0.997	0.581	0.978	0.360	1.127	0.612	0.952	-2.746	0.006***

[a]The continuous variables are compared using *t-test*, and binary and categorical variables are compared using χ^2 test. [b]Before logarithm transformation. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 17 Pearson correlation matrix (Full sample: n=1054)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.Restatement	1																
2.Gray Power	0.023	1															
3. RPT Good Sales	0.085***	0.211***	1														
4. RPT Asset Sales	-0.047	0.106***	0.038	1													
5.RPT Service Sales	-0.013	0.033	0.125***	0.025	1												
6.RPT Loan to	0.085***	0.089***	0.259***	0.050	0.086***	1											
7.RPT Loan from	0.053*	0.119***	0.263***	0.101***	0.158***	0.467***	1										
8.Nonaffiliated Directors	0.004	-0.094***	-0.006	-0.019	0.017	-0.016	-0.007	1									
9.Bad Performance	-0.052*	0.031	0.013	-0.010	-0.004	-0.027	0.021	-0.020	1								
10.Big 4	-0.009	0.077**	0.097***	0.160***	0.108***	0.025	0.026	0.057*	0.018	1							
11.Audit Committee	-0.015	-0.011	0.012	-0.005	0.026	-0.019	-0.017	-0.005	-0.026	0.004	1						
12.Employee Supervisors	-0.027	0.067**	0.028	-0.015	0.016	0.017	-0.032	-0.020	0.057*	0.045	-0.001	1					
13.Shareholder Supervisors	-0.033	0.083***	0.127***	0.073**	0.030	-0.009	0.081***	-0.052*	-0.041	0.018	-0.054*	-0.063**	1				
14.SOE	-0.043	0.070**	0.168***	0.003	0.095***	0.043	0.062**	-0.027	0.020	0.071**	-0.042	0.079***	0.283***	1			
15.Large Shareholder Wedge	-0.012	0.077**	0.043	0.061**	-0.032	0.011	0.021	-0.042	-0.001	0.058*	-0.038	0.042	0.002	-0.206***	1		
16.Firm Size	0.004	0.143***	0.310***	0.117***	0.157***	0.254***	0.272***	0.069**	-0.031	0.281***	-0.027	0.054*	0.104***	0.150***	-0.022	1	
17.Firm Age	-0.036	-0.049	0.009	-0.017	-0.006	0.030	-0.005	0.030	0.036	-0.094***	0.006	-0.010	0.113***	0.147***	0.072**	-0.109***	1
18.Leverage	-0.084***	-0.053*	-0.338***	-0.103***	-0.238***	-0.433***	-0.386***	-0.055*	0.068**	-0.232***	0.030	0.001	-0.068**	-0.073**	0.037	-0.533***	0.066**

*, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 18 Mediating effects of related parties transactions on the relationship between the power of gray directors and the restatement (Full Sample: n=1054)

Panel A: Tests of the effects of the independent variable on the mediation variables, Path a (IV→M)

		Model 1: RPT Good Sales			Model 2: RPT Asset Sales			Model 3: RPT Service Sales			Model 4: RPT Loan to			Model 5: RPT Loan from		
	Exp. Sign	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*
Constant		-0.697	0.192	0.000***	-0.133	0.170	0.434	-0.014	0.090	0.881	-0.061	0.172	0.723	-0.398	0.235	0.090*
Gray Power	+	0.043	0.008	0.000***	0.015	0.007	0.028**	0.002	0.004	0.562	0.018	0.007	0.010**	0.024	0.009	0.011**
Nonaffiliated Directors	+	-0.053	0.079	0.505	-0.054	0.070	0.438	0.002	0.037	0.965	-0.090	0.070	0.201	-0.071	0.096	0.462
Bad Performance	+	0.019	0.021	0.360	-0.011	0.018	0.555	0.005	0.010	0.590	0.000	0.019	0.986	0.037	0.025	0.145
Big 4	–	-0.020	0.033	0.533	0.121	0.029	0.000***	0.022	0.015	0.149	-0.084	0.029	0.004***	-0.120	0.040	0.003***
Audit Committee	–	0.062	0.041	0.127	0.002	0.036	0.946	0.021	0.019	0.274	-0.001	0.036	0.981	0.011	0.050	0.817
Employee Supervisors	–	-0.020	0.057	0.728	-0.043	0.051	0.402	-0.006	0.027	0.818	0.000	0.051	0.994	-0.099	0.070	0.157
Shareholder Supervisors	+	0.047	0.027	0.084*	0.041	0.024	0.087*	-0.005	0.013	0.720	-0.054	0.024	0.024**	0.026	0.033	0.432
SOE	+	0.043	0.015	0.004***	-0.009	0.013	0.497	0.013	0.007	0.065*	-0.002	0.013	0.901	0.006	0.018	0.741
Large Shareholder Wedge	+	0.139	0.078	0.075*	0.079	0.069	0.252	-0.006	0.036	0.871	0.051	0.070	0.461	0.132	0.095	0.165
Firm Size	+	0.032	0.009	0.000***	0.009	0.008	0.236	0.001	0.004	0.741	0.011	0.008	0.163	0.029	0.011	0.007***
Firm Age	+	0.012	0.011	0.260	-0.001	0.010	0.957	0.002	0.005	0.765	0.023	0.010	0.017**	0.012	0.013	0.373
Leverage	–	-0.060	0.008	0.000***	-0.010	0.007	0.140	-0.022	0.004	0.000***	-0.086	0.007	0.000***	-0.098	0.009	0.000***
$F/R^2/\Delta R^2$		5.745***/0.184/0.024***			2.065***/0.093/0.004*			2.360***/0.061/0.000			6.679***/0.212/0.006			5.377***/0.172/0.005		

Panel B: Tests of the effects of the independent and the mediation variables on the dependent variable, Path b and c' (IV+M→DV)

		Restatement=1			Restatement=1			Restatement=1			Restatement=1			Restatement=1		
	Exp.Sign	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*
Constant		3.349	3.059	0.274	2.498	3.070	0.416	2.521	3.053	0.409	2.582	3.061	0.399	2.647	3.053	0.386
RPT Good Sales	+	1.056	0.427	0.013**												
RPT Asset Sales	+				-0.978	0.738	0.185									
RPT Service Sales	+							-1.068	1.231	0.385						
RPT Loan to	+										0.984	0.486	0.043**			
RPT Loan from	+													0.238	0.377	0.528

Table 18 (cont'd) Mediating effects of related parties transactions on the relationship between the power of gray directors and the restatement (Full Sample: n=1054)

Gray Power	+	0.043	0.124	0.729	0.104	0.121	0.390	0.098	0.121	0.421	0.081	0.122	0.506	0.089	0.121	0.462
Nonaffiliated Directors	−	-0.108	1.250	0.931	-0.211	1.240	0.865	-0.207	1.242	0.868	-0.097	1.243	0.938	-0.201	1.240	0.872
Bad Performance	+	-0.448	0.398	0.260	-0.434	0.397	0.274	-0.420	0.397	0.289	-0.427	0.398	0.283	-0.432	0.397	0.276
Big 4	−	-0.493	0.564	0.382	-0.408	0.568	0.473	-0.503	0.564	0.373	-0.400	0.563	0.477	-0.490	0.566	0.386
Audit Committee	−	-0.586	0.592	0.323	-0.490	0.592	0.408	-0.477	0.591	0.420	-0.520	0.590	0.378	-0.498	0.591	0.399
Employee Supervisors	−	-0.558	0.917	0.543	-0.603	0.913	0.509	-0.598	0.911	0.511	-0.642	0.907	0.479	-0.559	0.912	0.540
Share Supervisors	+	-0.511	0.419	0.222	-0.407	0.417	0.328	-0.465	0.417	0.265	-0.427	0.417	0.306	-0.466	0.417	0.264
SOE	+	-0.220	0.239	0.355	-0.157	0.237	0.507	-0.150	0.236	0.524	-0.154	0.237	0.516	-0.164	0.236	0.487
Large Shareholder Wedge	+	-0.187	1.259	0.882	0.032	1.259	0.980	-0.034	1.255	0.979	-0.124	1.262	0.922	-0.097	1.260	0.939
Firm Size	?	-0.190	0.142	0.180	-0.152	0.142	0.284	-0.152	0.141	0.282	-0.166	0.142	0.244	-0.162	0.142	0.252
Firm Age	?	-0.082	0.153	0.591	-0.071	0.152	0.639	-0.065	0.152	0.669	-0.089	0.153	0.561	-0.069	0.152	0.652
Leverage	−	-0.201	0.108	0.063*	-0.286	0.103	0.005**	-0.288	0.103	0.005**	-0.173	0.113	0.127	-0.247	0.108	0.023*
-Log likelihood/χ^2		711.309/72.154**			714.999/68.464*			716.134/67.329*			713.196/70.267**			716.644/66.819*		
$R^2/\Delta\chi^2$		0.126/6.34**			0.120/2.65			0.118/1.51			0.123/3.92			0.117/1.00		

Panel C: Tests of the indirect mediation effects, Path ab (IV→M→DV).

		Sobel's test				Bootstrap=5000			
Mediation Variable:	Exp.Sign	B	SE	Z	*p*	CI(P)[a]		CI(B)[b]	
RPT Good Sales	H(+)	0.051	0.021	2.397	0.017**	0.006	0.094	0.009	0.097
RPT Asset Sales	H(+)	-0.030	0.040	-0.751	0.453	-0.305	0.002	-0.267	0.001
RPT Service Sales	H(+)	-0.002	0.006	-0.304	0.761	-0.043	0.013	-0.084	0.008
RPT Loan to	H(+)	0.021	0.011	1.891	0.059*	0.003	0.043	0.005	0.048
RPT Loan from	H(+)	0.019	0.013	1.448	0.148	-0.007	0.045	-0.003	0.048

Notes: Industry and Province dummies included in models, but not reported. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. [a]Percentile confidence interval. [b]Bias-corrected confidence interval.

Table 19 Descriptive statistics and mediation regressions using the matching pair sample

Panel A: Descriptive statistics and comparisons between firms with and without restatement in the matching pair sample.

	Restatement=1 (N=129)		Restatement=0 (N=129)		*t-test*	
	Mean	SD	Mean	SD	t	*p*
RPT Good Sales	0.133	0.291	0.004	0.012	5.002	0.000***
RPT Asset Sales	0.025	0.129	0.047	0.186	-1.110	0.268
RPT Service Sales	0.013	0.091	0.006	0.042	0.882	0.379
RPT Loan to	0.116	0.261	0.021	0.084	3.937	0.000***
RPT Loan from	0.166	0.296	0.073	0.195	2.977	0.003***
Gray Power	1.298	0.893	1.018	0.745	2.738	0.007***

Panel B: Tests of the effects of the independent variable on the mediation variables, Path a (IV→M)

		Model 1: RPT Good Sales			Model 2: RPT Asset Sales			Model 3: RPT Service Sales			Model 4: RPT Loan to			Model 5: RPT Loan from		
	Exp.Sign	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*
Constant		0.036	0.110	0.741	-0.112	0.084	0.181	0.005	0.039	0.903	0.160	0.107	0.135	0.007	0.130	0.958
Gray Power	+	0.057	0.015	0.000***	0.004	0.012	0.755	0.008	0.005	0.120	0.030	0.015	0.048**	0.076	0.018	0.000***
Control Variables:		Included			Included			Included			Included			Included		
F		5.576		0.000***	3.929		0.000***	0.824		0.595	1.729		0.083*	4.252		0.000***
$R^2/\Delta R^2$		0.168/0.029***			0.125/0.002			0.029/0.016*			0.059/0.015*			0.134/0.059***		

Panel C: Tests of the effects of the independent and the mediation variables on the dependent variable, Path b and c' (IV+M→DV)

		Model 1: Restatement=1			Model 1: Restatement=1			Model 1: Restatement=1			Model 1: Restatement=1			Model 1: Restatement=1		
	Exp.Sign	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*
Constant		0.424	1.237	0.732	0.191	1.150	0.868	0.303	1.144	0.791	-0.113	1.170	0.923	0.238	1.123	0.832
RPT Good Sales	+	4.333	8.700	0.005***												
RPT Asset Sales	+				-1.052	0.944	0.265									
RPT Service Sales	+							0.396	2.163	0.855						
RPT Loan to	+										3.329	1.231	0.007***			
RPT Loan from	+													1.119	0.616	0.070*

Table 19 (cont'd) Descriptive statistics and mediation regressions using the matching pair sample

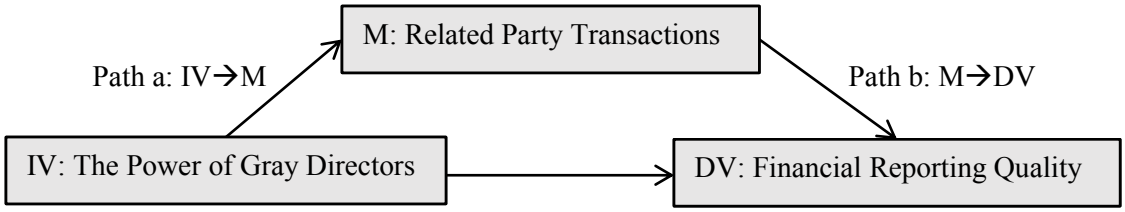
Gray Power	+	0.259	0.180	0.149	0.466	0.165	0.005***	0.460	0.165	0.005***	0.401	0.164	0.014**	0.387	0.166	0.019**
Control Variables:		Included			Included			Included			Included			Included		
-Log likelihood/χ^2		301.572/56.092***			333.532/24.132**			334.811/22.853**			328.236/29.427***			337.488/20.176**		
$R^2/\Delta\chi^2$		0.261/35.15***			0.119/3.29			0.113/2.81			0.144/21.396***			0.100/12.145***		

Panel D: Tests of the indirect mediation effects, Path ab (IV→M→DV).

		Sobel's test				Bootstrap=5000			
Mediation Variable:	Exp.Sign	B	SE	Z	*p*	CI(P)		CI(B)	
RPT Good Sales	H(+)	1.229	0.573	2.145	0.032**	0.388	2.720	0.423	2.809
RPT Asset Sales	H(+)	-0.007	0.017	-0.401	0.689	-0.031	0.036	-0.053	0.014
RPT Service Sales	H(+)	0.012	0.025	0.494	0.622	-0.003	0.357	-0.005	0.265
RPT Loan to	H(+)	0.120	0.070	1.727	0.084*	0.014	0.388	0.015	0.385
RPT Loan from	H(+)	0.103	0.054	1.918	0.055*	0.014	0.275	0.014	0.278

Notes: Control variables included in models, but not reported. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Figure 6 The mediation role of related party transactions in the relationship between the power of gray directors and financial reporting quality



Path c' (Direct effect): IV→DV

Path ab (Indirect effect): IV→M→DV

=Path c (Total effect: IT→DV)-Path c'