

Multi-Level State Capitalism: Chinese State-Owned Business Groups*

Jakob Arnoldi,¹ Anders Ryom Villadsen,¹ Xin Chen,² and Chaohong Na³

¹Aarhus University, Denmark, ²Shanghai Jiao Tong University, China, and ³Yunnan University of Finance and Economics, China

ABSTRACT We argue that vertical interlocks in Chinese state-owned business groups are important mechanisms for coordination and information exchange between the apex firm and affiliated firms, and that they are also mechanisms for government owners of the business groups to exercise control. By combining resource dependence theory with elements from transaction cost economics and agency theory, we propose that the need for interlocks increases the higher the level of government ownership. The central government is therefore more likely to use vertical interlocks than the provincial governments, which again are more likely to use vertical interlocks than the municipal governments. We develop three hypotheses based on these arguments. A regression analysis of a hand-collected data set finds strong support for our hypotheses. Our results shed light on coordination and governance issues within the state-owned sector in China and on an important means for mitigating these issues used by the government owners and firms affiliated with state-owned groups.

KEYWORDS business groups, China, government, interlocks

INTRODUCTION

It is well known that the Chinese government exercises corporate control through networks created by appointments of both firm managers and government officials (Arnoldi & Villadsen, 2015; Krug & Hendriscke, 2008; Li, Cui, & Lu, 2014; Lin, 2011; Lin & Milhaupt, 2013). What has not been covered in the literature is how some of these appointments, if they occur within business groups, lead to *vertical interlocks*, which have important implications for corporate control. A vertical interlock exists when one person simultaneously holds managerial positions in two firms in different layers of the same pyramidal group. Typically, the person in question would

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Corresponding author: Jakob Arnoldi (jaar@mgmt.au.dk)

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have a managerial or director position in the business group apex firm, and a senior managerial position in a lower tier firm in the same group (for further explanations, see below). While horizontal (director) interlocks are, in general, abundantly analyzed in the management literature, vertical interlocks, although mentioned, have received virtually no attention (see below). This article concerns such vertical interlocks and explains how they are used as means for resource dependence minimization, coordination and control within Chinese state-owned business groups.

Business groups may have, and in China they generally do have, a multi-layer pyramidal structure (Fan, Wong, & Zhang, 2013; Liu, Zheng, & Zhu, 2010; Sutherland & Lutao, 2012). This means that a controlling apex (or parent) firm owns a number of firms that each owns yet another number of firms, etc. Listed firms may appear in one or several of these layers; however, listed are generally at lower levels of the pyramid. Our data indicate that in Chinese government-owned groups there are on average 3.6 pyramidal layers between listed and apex firms. When interlocks occur within pyramidal business groups, they tend to connect firms at different hierarchical levels (different levels in the chains of ownership). Typically, they connect the apex firm with a firm in the lower tiers of the pyramid. In the case of government ownership, the government will be able to exert control over the group at large through the apex firm (Lu & Yao, 2006).

Based on the proposition that the Chinese government should not be theorized as a unitary actor because different levels of government have different interests and challenges (Arnoldi & Villadsen, 2015; Krug & Hendriscke, 2008; Li et al., 2014), we hypothesize that central government-owned business groups are more likely to contain interlocks than groups under provincial government ownership and that province-owned business groups in turn are more likely to contain interlocks than municipal-owned groups. The reason is that the need for coordination increases the higher the level of government ownership. We also hypothesize that the need for coordination increases the longer the chains of ownership separating the apex firm and the affiliated firms. Finally, we hypothesize that the risk of expropriation by the government owners moderates the relationship between the government level and the propensity for creating interlocks. Lower levels of government are more incentivized to expropriate minority shareholders and we argue that interlocks afford the affiliated firms' protection against such expropriation. Our empirical analyses lend support to our hypotheses.

Our research has several important contributions. Firstly, the varying use of interlocks indicates that coordination and governance of the state-owned business groups are complex and that the complexity increases with the government level and the length of ownership chains. A large body of research has described the close collaborations between local government officials and business leaders through personal ties (Keister & Zhang, 2009; Liu, 2008; Walder, 1993, 1995). However, beyond a certain size and geographical range of a business group, such informal and tie-based coordination may become suboptimal (Boisot & Child, 1996) as indicated by research that shows performance differences

between local and central government-controlled firms. This has led one study to conclude that agency costs differ across the levels of government ownership (Chen, Firth, & Xu, 2009). Yet, despite aforesaid results and rudimentary evidence pointing to marked differences in how the government at different levels interacts with firms, very little research has explored (problems of) coordination or governance in relation to the government level (Yi & Xi, 2006 is the only exception we are aware of). With the persistent involvement of the government in corporate life in China, this is a large gap in our current knowledge about the management of Chinese SOEs. Secondly, there is a large body of literature on the network types of governance used by the Chinese government. A part of this literature are studies of *horizontal* directorate interlocks between Chinese firms (Au, Peng, & Wang, 2000; Li, Tian, & Yan, 2013; Lin, Peng, Yang, & Sun, 2009; Luo, 2003; Yang & Cai, 2011; Zhang, 2016). However, very little research exists on the use of *vertical* interlocks within business groups (see review below), which we in this article suggest is one solution to the coordination or governance problems mentioned above. We thus contribute to the literature on interlocks in China but also to the literature on vertical interlocks in business groups more generally as there globally are very few studies of vertical interlocks.

THEORETICAL BACKGROUND AND HYPOTHESES

Interlocks – A Brief Review of the Literature

The predominant view on interlocks in the literature is, based on resource dependence theory, that they are mechanisms used by firms to minimize environmental uncertainties and as channels of information exchange and learning (Davis, 1996; Haunschild, 1993; Haunschild & Beckman, 1998; Lu & Shi, 2012; Zajac, 1988). Additionally, research on transforming economies has theorized interlocks as a type of embeddedness, which helps firms to reduce the impact of institutional voids (Keister, 1998; Li et al., 2013). The interlocks commonly described in the literature are formed when directors have seats on the boards of two or more independent firms. Nevertheless, the interlocks may also be internal with the executive of one firm having a board seat in another firm (Mizruchi, 1996; Pombo & Gutiérrez, 2011). In both cases, the interlocks are horizontal and inter-organizational. However, while most of the literature focuses on horizontal interlocks in these two forms, vertical interlocks are also mentioned. Traditionally, vertical interlocks have been defined as board interlocks between firms that have transactional (customer-supplier) relationships (Buchwald & Bischoff, 2016; Schoorman, Bazerman, & Atkin, 1981; Zajac, 1988).

Significant for our study, an alternative notion of vertical interlocks has been put forward – not less significant in conjunction with a critique of the most common theoretical understanding of interlocks. It has been suggested that an emphasis on soft types of influence and information exchange may be less suited

for analysis of interlocks in non-Western countries where business groups are dominant (Maman, 1999). In such settings, the ultimate organizational boundary is not necessarily the individual firm but rather the business group. Maman (1999) therefore suggests that interlocks in such settings can be used for a much more direct type of control of individual firms affiliated with the business group. Such interlocks are vertical, not as a result of upstream or downstream value-chain relationships, but of hierarchical relationships.

There is not much existing empirical research on such vertical interlocks that entail a hierarchical relationship. In a European context, Rommens, Cuyvers, and Deloof (2007) find that firms that are affiliated with business groups are more likely to have vertical interlocks and that the likelihood of interlocks increases with the size of the business group. Based on that finding, they argue that vertical interlocks facilitate coordination between the parent firm and the affiliated firms in the business group. A study using Chinese data (Opie, Tian, & Zhang, 2017) finds that vertical interlocks in state-owned Chinese business groups linking a lower-tier listed firm with the apex firm restrain overinvestment by the listed affiliated firm. The explanation given is that interlocks afford the apex firm control over the listed firm. In another study of Chinese business groups (Chen, Li, Su, & Yao, 2012) vertical interlocks are conceptualized as a tool for control used by the apex firm in relation to affiliate firms. In addition, Ma and DeDeo (2016) find interlocks in the Chinese non-profit sector that also have a hierarchical nature and involve government control. Moving beyond state-owned firms and government control, Chen, Arnoldi, and Na (2015) find that interlocks afford listed firms, affiliated with family-owned business groups, protection against expropriation through loan guarantees. This indicates that interlocks can also be a resource for the affiliated firm and not just be a control mechanism for the apex firm. Finally, and leaving China, Pombo and Gutiérrez, (2011) do include vertical interlocks in their data on Colombian business groups; however, they do not make any distinction between vertical and horizontal interlocks within the groups.

Resource Dependence, Control, and Coordination

As just seen, what distinguishes horizontal and vertical interlocks is that the latter are formed within the boundaries of some degree of organizational and hierarchical control in that an apex firm in the business group exerts hierarchical control over other affiliated firms (Yiu, Lu, Bruton, & Hoskisson, 2007). In the case of state-owned groups, the apex firms are in turn controlled by the government which through the apex firms exerts significant control over the groups at large (Lu & Yao, 2006). These factors have two implications. First, as already alluded to, vertical interlocks are likely to have control functions due to the asymmetrical power relations between the two interlocking firms. The apex firm obtains information about the affiliated firm through the interlock and will be able to influence the interlocking chair. For that reason, the coordination and information

exchange, which is emphasized in resource dependence theory needs to be complemented by a control aspect (Maman, 1999). Simply put, resource dependence theory can best account for *horizontal* interlocks between resource dependent but otherwise *autonomous* firms. But in the case of *vertical* interlocks, the relationship is not only one of resource dependence but also a *hierarchical* relationship with one firm exercising control over the other. Second, the hierarchical relationship between vertically interlocking firms also changes the distribution of agency. Resource dependence theory attributes agency to the firms that possess interlocks by assuming that these firms actively try to manage outside dependencies by creating such interlocks (Hillman, Withers, & Collins, 2009; Pfeffer & Salancik, 2003). In the case of vertical interlocks, that would mean seeing interlocks as the willfully acquired possessions of affiliated firms. However, in the case of firms affiliated with business groups, the vertical interlocks may well have been imposed on affiliated firms by apex firms in a bid to enhance their control and influence over the affiliated firms. Thus, it is difficult to assume *a priori* that affiliated firms possess interlocks to apex firms that are of their own doing. That does not rule out, though, that interlocks are actively pursued by affiliated firms. This is because affiliated firms can use interlocks as a means for establishing communication with, and exert influence on, the apex firm (on which they are extraordinarily dependent due to the said hierarchical imbalance). In fact, it is possible that an apex and affiliated firm pursue the interlocks simultaneously because they both have (different) motives for creating the interlocks. An apex firm may allow an affiliated firm, which is seeking to minimize resource dependence, an interlock and thus representation in the apex firm because it at the same time improves the coordination with, or the control over, the affiliated firm.

Resource dependence theory lends itself well to combinations with other theories (Hillman et al., 2009). In order to capture the abovementioned control aspect and the fact that agency will lie with the apex firms when it comes to the creation of interlocks, we supplement resource dependence theory with (elements of) agency theory and transactions cost theory. We suggest that vertical interlocks within business groups can be used firstly by the affiliated firms to manage or *minimize dependencies* on the apex firms (agency lying with the affiliated firm). Nevertheless, vertical interlocks can also, secondly, be used to exchange information and thus improve *coordination* between the apex and the affiliated firms (agency; both apex and affiliated firms). Thirdly, the apex firm may use the interlocks for *control* purposes (agency; apex firm). Importantly, while we in the below will discuss these three functions separately, we expect them to overlap and potentially reinforce each other (as was the case with agency, which we discussed above). For example, interlocks between two firms will mean more efficient exchange of information; however, more exchange of information may also foster more personal trust and loyalty, which will reduce the need for control.

Starting with the latter, control is, according to both agency theory (Jensen & Meckling, 1976) and transaction costs economics (Williamson, 1981, 1983, 1988)

needed to reduce opportunistic behavior. Vertical interlocks create channels of information between the apex firm and the affiliated firms and can thus facilitate such control of the affiliated firms by the apex firm. Interlocks may also function as control mechanisms because they facilitate personal loyalty (or in a term often used in agency theory: *alignment*). An interlocking tie is created through the appointment of a manager or director to a role as manager or director in another business group firm. If the second position is lucrative or otherwise attractive, that appointment should foster loyalty to the appointing controlling firm and its management. The apex firm thus gains a loyal manager at the affiliated firm.

Vertical interlocks facilitate communication and information exchange between firms because a single person can directly convey information from one organization to another. That single person can only help interpret and explain information and through that improve the mutual understanding. That is, the interlocking manager/director can help avoid misunderstandings and miscommunications that would otherwise occur because managers and directors interpret information (differently) based on (differing) organization-dependent context and cognitive frames. In the terms of transaction costs economics, the issue is bounded rationality (Foss & Weber, 2016; Weber & Mayer, 2014). Information exchange is surrounded by interpretative uncertainty due to different persons, different parts of organizations or different levels of management possessing different cognitive frames for assessing information and making decisions (Foss & Weber, 2016). Thus, top management may make suboptimal decisions or lower tier management may implement decisions suboptimally due to mutual misunderstandings and divergent interpretations of information. While the theoretical focus is on intra-firm hierarchies, it also includes interfirm coordination, for example between MNC subsidiaries (Verbeke & Yuan, 2005). This problem can obviously also occur in business groups where various forms of information and resource exchanges and transfers between member firms often occur (Keister, 2001; Lu & Yao, 2006). Inefficient coordination due to bounded rationality would reduce the efficiency of such exchanges and transfers.

The issues surrounding coordination are closely related to issues concerning resources and resource dependency. By establishing an interlock with the apex firm, the affiliated firm gains representation within the apex firm and may thus influence firm decisions and get information about the apex firm as well as other firms in the business group. The influence from the interlock may help the affiliated firm gain access to resources. For example, if the business group contains a bank, an affiliated firm may seek to obtain loans at favorable rates via the interlock to the apex firm, which also exerts control over the bank. Generally, the affiliated firm would seek to establish interlocks with the apex firm to influence decisions that have implications for the affiliated firm. That also includes using interlocks to shield itself from various unwanted interventions by the apex firm. For example, tunneling of resources is a well-known problem in Chinese business groups (Jiang, Lee, & Yue, 2010; Peng, Wei, & Yang, 2011; Riyanto & Toolsema,

2008). By establishing an interlock, an affiliated firm could gain protection against such tunneling from the apex firm (Chen et al., 2015).

The Effects of Government Levels

Our concern in this article is whether there are differences between the levels of government when it comes to the deployment of vertical interlocks within state-owned Chinese business groups. The question thus becomes whether there is a greater need for interlocks the higher the level of government ownership? We have outlined a view of interlocks that incorporates control, coordination, as well as resource dependence aspects. Also, the view intermittently attributes agency to the apex firm and the affiliated firms. Transaction cost economics and related theories of bounded rationality suggest that successful coordination is dependent on at least some degree of shared cognitive frames and heuristics for interpreting and processing information (Foss & Weber, 2016). That theoretical view also predicts that heterogeneous organizational contexts and cultures as well as incommensurable expertise, goals or objectives between organizations will increase the bounded rationality and thus the coordination and transaction costs (Verbeke & Yuan, 2005). We expect for firms affiliated with business groups of higher level governments that heterogeneity and incommensurability will be larger. The social and cultural context is more likely to diverge, and executives and directors of the two firms are less likely to share tacit knowledge or to share personal background, etc. In total, the mentioned factors constitute barriers for coordination that are likely to be noticed by both the apex firm and the affiliated firms and thus, both parties would be incentivized to form interlocks.

As for control, we argue that apex firms under higher levels of government will have greater incentives for exerting controls via interlocks. Higher level government-owned business groups consist of firms that are likely to be dispersed across different provinces (central government) or municipalities (provincial government). Firms affiliated with these groups would, as a result, also be subjected to the political interests of their various provincial and municipal governments, which may well exert their own political influence on local affiliated firms (Meyer & Lu, 2004). If these local political interests are misaligned with the objectives of the central government owners, which can be expected (Bai, Lu, & Tao, 2006), then the complexity of governance increases markedly. For that reason, the need for control increases.

Finally, while the apex firms can seek interlocks in order to exercise control, the affiliated firms may also seek interlocks, albeit with different motives. Chinese government business group owners are known to force their political agendas on affiliated firms and this often incurs political costs for the firms (Lu & Yao, 2006). However, if the political initiatives are aimed at the firms' own local area, the firms may benefit indirectly. This would not be the case if the initiatives are aimed elsewhere. As an example, a firm from a highly-developed province

would worry that the central government would channel resources in the business group to less-developed provinces, e.g., to strengthen the infrastructure there, something which the affiliated firm would not even benefit indirectly from. We suggest that this added environmental uncertainty (potential political cost) would strengthen the incentive for affiliated firms to establish interlocks in order to receive early warnings about such contingencies and possibly also to influence political interventions. At the same time, firms with remote political owners would also see their alternative means of securing such information, for example, by direct personal ties to political stakeholders, diminish. Interlocks to the apex firm thus gain in relative importance.

As mentioned above, it is conceivable that some interlocks are formed as a result of actions taken simultaneously by the apex firm and the affiliated firms. Some of them may even be formed because the apex firm seeks control and the affiliated firm seeks reduced exposure to actions taken by the apex firm and where one of the firms is miscalculating the outcomes of the interlock. In general, interlocks can be formed due to any of the three factors and as a result of actions taken by either the apex firm or the affiliated firms or both. This leads us to the first hypothesis:

Hypothesis 1: A vertical interlock will be more likely when the business group is controlled by higher levels of government.

Above, we have theorized how higher levels of government ownership can increase the likelihood of vertical interlocks. Among other things, we theorized that business groups with affiliated firms located in provinces and municipalities, other than those of the affiliated firms, would have multiple political stakeholders with differing political agendas, the result of which would be that the firms are subjected to conflicting pressures. We also theorized that bounded rationality could be a bigger problem as the contexts, in which managers of apex and affiliated firms operate, likely will be more heterogeneous. We suggested that this would create an incentive for the government owners to establish more direct lines of control to the affiliated firms by means of interlocks. Such control issues may arise not only in connection with conflicting political interests but also arise when there are longer chains of ownership separating the apex firm and the affiliated firms (each firm represents what we refer to as a 'layer' in the pyramid). This would firstly be because longer chains of ownership mean more (minority) owners of the affiliated firms and therefore a greater probability that these could bring interests to bear on the affiliated firm that conflict with those of the government owners and the apex firm. Secondly, the longer chains may also make information and knowledge exchange between top and lower tier firms in the pyramid more cumbersome as the transmission will have to go through a longer hierarchical chain (Mookherjee, 2006). Consistent with this, Fan et al. (2013) have suggested that

layers act as decentralization devices meaning that affiliated firms become more separated and enjoy greater freedom from the apex firm.

There may also be a more indirect effect in that the diverging ownership interests will increase problems of bounded rationality as the affiliated firm managers' perceptions will be influenced by the large and heterogeneous set of owners and their respective interests. Taken together, the result is coordination problems, which will create incentives for creating interlocks to retain control and facilitate coordination. Such vertical interlocks can shortcut the chain of owners with potential diverging interests between the apex firm and the lower tier firms and can provide direct channels of information. We therefore formulate the following hypothesis:

Hypothesis 2: A vertical interlock will be more likely when the vertical chain of ownership between the apex firm and an affiliated firm is longer.

Business groups are often associated with tunneling of financial resources from the listed affiliated firms to other firms in a business group, thus constituting expropriation of the minority shareholders of the listed firms (Bertrand & Mullainathan, 2003; Young, Peng, Ahlstrom, Bruton, & Jiang, 2008). Interlocks may play a role in regard to tunneling for two reasons. Firstly, for an apex firm wishing to tunnel, a vertical interlock would afford additional control over the affiliated firm, which would in turn increase the apex firm's ability to tunnel. For example, tunneling often occurs, on the apex firm's initiative, in the shape of inter-corporate loans or transfers of goods from one affiliated firm to another (Jiang et al., 2010). The apex firm could use its control over an interlocking manager in the loan-giving or transferring firm to ensure that manager's support for the loan or transfer. Therefore, apex firms may actively create interlocks with tunneling in mind (Liu et al., 2010). Vertical interlocks may however also, secondly, afford the affiliated firm protection against tunneling by the apex firm as the representation that the affiliated firm gains in the apex firm can be used to influence decisions to tunnel or deter the apex firm from attempting to tunnel. Supporting this, one of the few existing studies of vertical interlocks finds that vertical interlocks reduce the volume of loan guarantees issues (which are another often used vehicle for tunneling) by a listed affiliated firm to other group-affiliated firms (Chen et al., 2015). No matter which of the two explanations is the dominant in a specific case, the bottom line is that we can expect interlocks to become more predominant in situations where tunneling is likely.

Having thus associated interlocks with tunneling, we can now turn to other factors which are associated with tunneling. In the context of Chinese state-owned business groups, we argue that two things likely will impact on the likelihood of tunneling. Firstly, divergence between cash flow rights and ownership rights (henceforth 'divergence') creates a greater incentive for tunneling because the financial gain of tunneling increases with divergence. This is because greater divergence means greater potential to tunnel resources away from a firm at the expense

of its minority shareholders (Bhaumik & Gregoriou, 2010; Claessens, Djankov, & Lang, 2000). Divergence arises in business group pyramids because an apex firm may have considerable control rights of a firm in a pyramidal group with several ownership chains between the apex firm and the listed affiliated firm but only limited cash flow rights as the direct ownership share is limited. Such divergence means that the apex firm has control rights required to instigate the tunneling activities but at the same time can let minority shareholders shoulder the financial burden of same. Secondly, we argue that lower level governments are more responsive to any incentive to tunnel as they are less resource endowed. Tunneling primarily occurs in state-owned business groups when the government owner wishes to transfer resources from a wealthy listed affiliated firm to another affiliated firm in order to 'prop up' that other firm (Chen, Li, & Shapiro, 2011; Wang & Ye, 2014). This will likely be politically motivated, for example, when the government wishes to help a firm on the brink of bankruptcy because the government is worried about layoffs of workers and potential social unrest. There are also, of course, more direct ways in which a government can prop up firms, for example, by letting them win public tenders. However, local governments are less likely to possess sufficient financial resources needed to provide more direct financial support to firms and are therefore more likely to take recourse to more illicit means such as tunneling (He, Mao, Rui, & Zha, 2013).

Thus, we argue that lower levels of government have fewer alternative means for propping, are therefore more likely to conduct tunneling, and are more responsive to any financial incentives to tunnel. Above, we proposed that interlocks are more likely when the likelihood of tunneling is high. We can now propose that the probability of interlocks increases with higher divergence and that this effect is stronger the lower the level of government. Following our reasoning above, we propose two reasons for that: Local government-owned business groups would, given they have fewer alternatives, be more attracted to tunneling the greater the financial incentives (divergence) and as a result of that, seek to create the means for tunneling (e.g., interlocks). Affiliated firms that, due to the divergence of control and cash flow rights in their ownership structure, are at risk of tunneling would be the most likely to seek representation in the apex firm through an interlock in order to avoid such tunneling. And these affiliated firms would be even greater incentivized if their ultimate owner was a local government, which would be more likely to conduct tunneling due to resource constraints. In total, this leads us to expect that the likelihood of tunneling (in our case, incentives for tunneling) negatively moderates the effect that higher government level may have on the likelihood of interlocks. Interlocks are more feasible the higher the level of government, but the differences between higher and lower levels of government are lessened as the incentives for tunneling, namely divergence, increase. Or put in another way, while lower levels of government-owned business groups generally have the least reasons for creating interlocks, they will begin to have good reasons if divergence is high. Thus, we arrive at the following hypothesis:

Hypothesis 3 The relationship between the government level and the likelihood of interlocks will be moderated by divergence between ownership and cash flow rights so that lower levels of government will be relatively more prone to form interlocks when such divergence is high.

METHOD

In order to explore vertical interlocks in state-controlled Chinese business groups, we collected a dataset from multiple sources. Financial data of listed firms were obtained from the Wind database. We used the background descriptions of executives from annual reports to hand-collect data on vertical interlocks. Information about the control chain of business groups was also collected from annual reports. In total, we have data from 3,085 firm-year observations in the period 2007-2010. Our data set contains all listed firms affiliated with state-owned pyramidal business groups, except for those firms that are affiliated with business groups controlled directly by SASAC without an apex firm. We chose listed firms as the unit of analysis as this enables us to assess the existence of a vertical interlock while at the same time controlling for a number of firm-specific factors, which may confound the influence of a variable of interest.

Variables

Our dependent variable is a vertical interlock between the upper controlling firm of a business group and a listed firm at a lower level in the pyramid. We operationalize an interlock as the situation where the chairman of the board of an affiliated firm is also occupying a managerial role in the business group. We chose to focus on chairmen of the board as our focus of attention because of their typical pervasive involvement in business activities and roles as the main executives of Chinese firms. Further, interlocks would logically not involve ordinary board members as a board would then have a member with (at least) a semi-formal authority, in this way out-ranking the actual chairman because of his/her position in the controlling apex firm. While we thus expect all interlocking positions in the affiliated firms to be held by chairmen, the interlocking positions in the business group could be at different managerial levels. From our hand-collected data, we generated three dummy variables covering different types of vertical interlocks and indicating the position concurrently held by a listed firm chairman in the business group. We estimated separate models for them, as we have no a priori expectation as to which type of interlock might be the most important. Our first dependent variable is equal to 1 if the interlocking position of an affiliated chairman is higher or equal to the level of a divisional manager of the upper controlling firm in the business group and 0 otherwise (*divisional manager or higher*). The next is equal to 1 if the interlocking position of an affiliated chairman is higher or equal to the vice general manager level of the upper controlling firm in a business group (*vice general manager or higher*) and 0 otherwise. The final is equal to 1 if the interlocking position of an

affiliated chairman is higher or equal to the general manager level of the upper controlling firm in a business group and 0 otherwise (*general manager or higher*). This means that the variables indicate the hierarchical position in the business group. They are overlapping in the way that all interlocks are contained in the first variable. The final two variables are more restrictive and focus on interlocks formed at increasingly higher levels.

The main independent variable is the level of the government controlling the business group. We measure this with a single variable indicating the government hierarchy. Central government control takes the value of 1; provincial government the value of 2; municipal government the value of 3.

Layers, that is the length of the ownership chain between the apex firm and the listed affiliated firm, is measured simply as the number of entities between a given listed firm in our sample and the business group apex firm (in some groups, there are more than one listed affiliated firm and more than one of them may have interlocks). This measurement of layering has been used in previous research (Fan et al., 2013). The average number of layers between the listed firms in our sample and their respective apex firm is 3.65. In hypothesis 3, we expected the effect of the government level to depend on the incentives to tunnel funds away from the affiliated firm. In order to assess this, we generated the variable *Controlcash*, which is a measure of divergence between voting rights and cash flow rights of the ultimate controller, defined as the largest shareholding in percent, minus the percent of cash flow rights owned by the ultimate controller. A high value of this variable indicates a high incentive for a business group apex firm to redirect resources away from the listed firm. Having low cash flow rights, the apex firm gets little of the value generated by the firm and tunnelling may be attractive as other owners must bear the cost when resources are redirected away from the firm. Control rights can be higher than the cash flow rights because of the nested ownership structures of pyramidal business groups. An apex firm may have limited formal cash flow rights over firms low in the pyramid but high controlling rights due to it owning firms between the listed firm and itself.

A number of control variables are included in the analyses. We include measures of *firm size*, *age*, *ROA*, *risk*, *leverage*, *size of largest shareholder*, *CEO duality* and *board size*. Together these variables control for a range of size and performance-related factors, which may affect our results. We also include the variable index, which is the *NERI Index of Marketization* of China's provinces. This indicates the degree of market development in the home province of the listed firm and is an important control as market development may mitigate agency problems, eliminating the need for vertical interlocks.

Due to the binary nature of the dependent variable, all models are estimated as logistic regressions. To assess whether multicollinearity might be a problem, we calculated variance inflation factors. These were all well below the usual threshold of 10. For model 9, the most inclusive model, the average VIF is 1.18 and the maximum is 1.40.

Table 1. Descriptive statistics

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Divisional manager or higher	3085	0.738	0.440	0	1
Vice-general manager or higher	3085	0.714	0.452	0	1
General manager or higher	3085	0.496	0.500	0	1
Government level	3085	1.989	0.812	1	3
Number of layers	3085	3.693	0.988	2	9
Control-cash	3085	0.045	0.078	0	0.371
Size	3085	21.807	1.217	14.937	28.003
ROA	3085	0.056	0.072	-0.229	0.308
Risk	3085	8.179	2.233	1.962	16.313
Leverage	3085	0.529	0.199	0.084	1.180
Size of largest shareholder	3085	0.389	0.151	0.021	0.864
Age	3085	9.748	3.848	1.014	19.047
CEO duality	3085	0.095	0.293	0	1
Board size	3085	9.601	1.971	4	18
Modernization Index	3085	8.499	1.899	0.380	11.800

RESULTS

In Table 1 and Table 2, descriptive statistics and correlations are reported. Table 1 indicates that interlocks of all three types are common. Chair3 indicates that about 50 percent of the chairmen are at least at general manager level in the business group apex. Chair2 includes chairmen who are vice general or general managers in the business group apex. Chair1 further includes divisional managers. The latter variable indicates that among the chairmen in the affiliated firms, about 74 percent has a role of *at least* divisional managers in the apex firm. In Table 2, it is worth noting that none of the correlations is excessively high indicating that multicollinearity is not a great concern.

Results of the quantitative analyses predicting vertical interlocks are found in Table 3. Models 1–3 present the direct effects of the government level (hypothesis 1). Models 4–6 introduce a variable indicating the number of layers between a given firm and its business group apex to assess hypotheses 2 further. Models 7–9 introduce the interaction of the government level and Controlcash (hypothesis 3). Please recall that we included three different dependent variables indicating different types of interlock. Models 2 and 3 strongly indicate that the government level is related to the likelihood of vertical interlocks, especially by higher positions in the apex firms. This supports hypothesis 1. Models 4 and 5 in turn support hypothesis 2, which stated that the number of layers would increase the likelihood of interlocks. We also note that the results of models 4–6 give no indication of a mediated relationship where the effect of government level is mediated by the level of decentralization indicated by number of layers between an apex firm and a given affiliated firm. In that case, we would expect the coefficients of government level to drop in models 4–6 (Baron & Kenny, 1986).

Table 2. Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Divisional manager or higher	1														
2 Vice-general manager or higher	0.941***	1													
3 General manager or higher	0.591***	0.628***	1												
4 Government level	0.065***	0.025	-0.023	1											
5 Number of layers	0.061***	0.058**	-0.02	0.310***	1										
6 Control-cash	0.086***	0.092***	0.026	0.102***	0.370***	1									
7 Size	0.138***	0.152***	0.191***	0.157***	-0.066***	-0.035	1								
8 ROA	0.082***	0.090***	0.061***	0.037*	-0.031	0.021	0.174***	1							
9 Risk	0.028	0.025	-0.004	0.061***	0.013	0	-0.064***	-0.032	1						
10 Leverage	0.02	0.021	0.005	-0.03	-0.003	0.011	0.176***	-0.325***	0.100***	1					
11 Size of largest shareholder	0.130***	0.124***	0.169***	0.102***	-0.071***	0.086***	0.270***	0.151***	-0.034	-0.067***	1				
12 Age	0.032	0.027	0.015	-0.072***	0.073***	0.016	0.031	-0.098***	0.032	0.117***	-0.169***	1			
13 CEO duality	-0.207***	-0.187***	-0.169***	-0.119***	-0.004	-0.033	-0.090***	-0.049**	-0.005	0.003	-0.085***	0.01	1		
14 Board size	0.038*	0.035*	0.058**	0.059***	0.029	0.027	0.262***	0.075***	-0.035*	0.055**	-0.018	-0.109***	-0.045*	1	
15 Modernization Index	0.068***	0.055**	0.004	-0.031	0.094***	-0.041*	0.135***	0.01	-0.044*	-0.039*	0.040*	0.194***	-0.002	-0.045*	1

Table 3. Vertical Interlocks between listed firms and business group apex firms.

	<i>Model 1</i> <i>Divisional</i> <i>manager or</i> <i>higher</i>	<i>Model 2</i> <i>Vice-general</i> <i>manager or</i> <i>higher</i>	<i>Model 3</i> <i>General</i> <i>manager or</i> <i>higher</i>	<i>Model 4</i> <i>Divisional</i> <i>manager or</i> <i>higher</i>	<i>Model 5</i> <i>Vice-general</i> <i>manager or</i> <i>higher</i>	<i>Model 6</i> <i>General</i> <i>manager or</i> <i>higher</i>	<i>Model 7</i> <i>Divisional</i> <i>manager or</i> <i>higher</i>	<i>Model 8</i> <i>Vice-general</i> <i>manager or</i> <i>higher</i>	<i>Model 9</i> <i>General</i> <i>manager or</i> <i>higher</i>
Government level (1 = central; 2 = provincial; 3 = local)	0.014 (0.801)	-0.118** (0.031)	-0.272*** (0.000)	-0.034 (0.566)	-0.178*** (0.002)	-0.297*** (0.000)	-0.065 (0.320)	-0.224*** (0.001)	-0.419*** (0.000)
Number of layers				0.131** (0.015)	0.160*** (0.002)	0.065 (0.151)	0.125** (0.021)	0.152*** (0.004)	0.044 (0.337)
Control-cash*gov. level							0.832 (0.261)	1.213* (0.091)	2.648*** (0.000)
Control-cash. Divergence	2.428*** (0.000)	2.655*** (0.000)	0.499 (0.323)	1.891*** (0.004)	1.994*** (0.002)	0.221 (0.683)	0.232 (0.885)	-0.470 (0.765)	-5.199*** (0.000)
Size	0.171*** (0.000)	0.220*** (0.000)	0.313*** (0.000)	0.180*** (0.000)	0.233*** (0.000)	0.319*** (0.000)	0.181*** (0.000)	0.233*** (0.000)	0.322*** (0.000)
ROA	2.355*** (0.001)	2.530*** (0.000)	0.607 (0.323)	2.394*** (0.001)	2.575*** (0.000)	0.620 (0.313)	2.395*** (0.001)	2.577*** (0.000)	0.616 (0.317)
Risk	0.043* (0.079)	0.038 (0.115)	0.010 (0.636)	0.044* (0.071)	0.039 (0.102)	0.011 (0.615)	0.045* (0.065)	0.041* (0.089)	0.015 (0.480)
Leverage	0.432* (0.084)	0.343 (0.159)	-0.185 (0.411)	0.426* (0.090)	0.334 (0.172)	-0.190 (0.400)	0.415* (0.098)	0.318 (0.194)	-0.224 (0.322)

Table 3. Continued

	<i>Model 1</i> <i>Divisional</i> <i>manager or</i> <i>higher</i>	<i>Model 2</i> <i>Vice-general</i> <i>manager or</i> <i>higher</i>	<i>Model 3</i> <i>General</i> <i>manager or</i> <i>higher</i>	<i>Model 4</i> <i>Divisional</i> <i>manager or</i> <i>higher</i>	<i>Model 5</i> <i>Vice-general</i> <i>manager or</i> <i>higher</i>	<i>Model 6</i> <i>General</i> <i>manager or</i> <i>higher</i>	<i>Model 7</i> <i>Divisional</i> <i>manager or</i> <i>higher</i>	<i>Model 8</i> <i>Vice-general</i> <i>manager or</i> <i>higher</i>	<i>Model 9</i> <i>General</i> <i>manager or</i> <i>higher</i>
Size of largest shareholder	1.420*** (0.000)	1.146*** (0.000)	1.750*** (0.000)	1.484*** (0.000)	1.228*** (0.000)	1.787*** (0.000)	1.481*** (0.000)	1.224*** (0.000)	1.765*** (0.000)
Age	0.029** (0.023)	0.024** (0.047)	0.036*** (0.001)	0.028** (0.027)	0.023* (0.057)	0.035*** (0.001)	0.028** (0.027)	0.023* (0.059)	0.034*** (0.002)
CEO duality	-1.270*** (0.000)	-1.168*** (0.000)	-1.207*** (0.000)	-1.282*** (0.000)	-1.183*** (0.000)	-1.216*** (0.000)	-1.287*** (0.000)	-1.190*** (0.000)	-1.247*** (0.000)
Board size	0.020 (0.407)	0.014 (0.548)	0.028 (0.180)	0.017 (0.479)	0.011 (0.654)	0.027 (0.205)	0.017 (0.467)	0.011 (0.629)	0.029 (0.166)
Modernization Index	0.057** (0.023)	0.033 (0.171)	-0.030 (0.186)	0.050** (0.047)	0.025 (0.307)	-0.034 (0.135)	0.051** (0.044)	0.026 (0.286)	-0.031 (0.168)
Constant	-5.433*** (0.000)	-5.926*** (0.000)	-7.474*** (0.000)	-5.910*** (0.000)	-6.522*** (0.000)	-7.722*** (0.000)	-5.853*** (0.000)	-6.438*** (0.000)	-7.530*** (0.000)
<i>N</i>	3068	3068	3081	3068	3068	3081	3068	3068	3081
pseudo <i>R</i> ²	0.085	0.082	0.083	0.086	0.084	0.083	0.087	0.085	0.088

Exact p-values in parantheses.

* = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Notes: Dependent variables indicate different types of interlocks by the position held in the upper controlling firm. T-statistics in parentheses.

Table 4. The interaction between government level and control right – cashflow divergence*

	<i>Controlling government level</i>		
	<i>Central</i>	<i>Provincial</i>	<i>Local</i>
Marginal effect of control-cashflow divergence on likelihood of interlock	–0.56 [–0.91;–0.21]	0.02 [–0.22;0.26]	0.59 [0.26–;0.92]

Notes: * Average marginal effects (AME) calculated based on model 9. Confidence intervals in brackets.

Coefficients are very similar and remain statistically significant at the same levels. We also note that there is no statistically significant effect of the government level on the likelihood of interlocks at the lowest hierarchical level (model 1) and no effect of layers on interlocks at the highest hierarchical level (model 6).

Turning to the substantial significance of the results, model 5 and 6 suggested that the controlling government level impacts the likelihood of interlocks. The two models reflect different operationalizations of interlocks. Based on model 5, central government-controlled business groups have a predicted likelihood of interlock of 0.765. As suggested by the negative coefficient, this likelihood is lower for provincial (0.732) and local (0.696) government-controlled business groups. Based on model 6 and the most restrictive operationalization of interlocks, focusing on the very top executives, differences between government levels are even stronger. The predicted likelihood of an interlock is 0.567 when a business group has a central government controller, 0.493 for a provincial, and only 0.419 when the controller is local government. This clearly indicates the importance of considering the level of government when analyzing state-owned enterprises or business groups. Holding all the other variables in our model constant, there is a non-negligible difference of around 15 percentage points between central and local government-controlled groups.

Hypothesis 3 proposed that a large divergence between control rights and cash flow rights mitigates the relation between the government level and vertical interlocks. The positive and significant interaction terms in models 8 and 9 indicate that lower levels of government are more likely to develop interlocks when divergence is large as suggested in hypothesis 3. To better assess this result, we calculated the average marginal effect of control cash for the three levels of government based on the main variables in model 9.

Table 4 illustrates how the effect of government level on the probability of a vertical interlock with the same person serving as chairman of an affiliated firm and general manager in the apex firm depends on the control right – cash flow right divergence. For central government-controlled business groups, the marginal effect of control right – cash flow right divergence is negative. Contrary to this, and as suggested in hypothesis 3, this marginal effect is significantly positive for local government-controlled groups. This indicates that as the divergence increases,

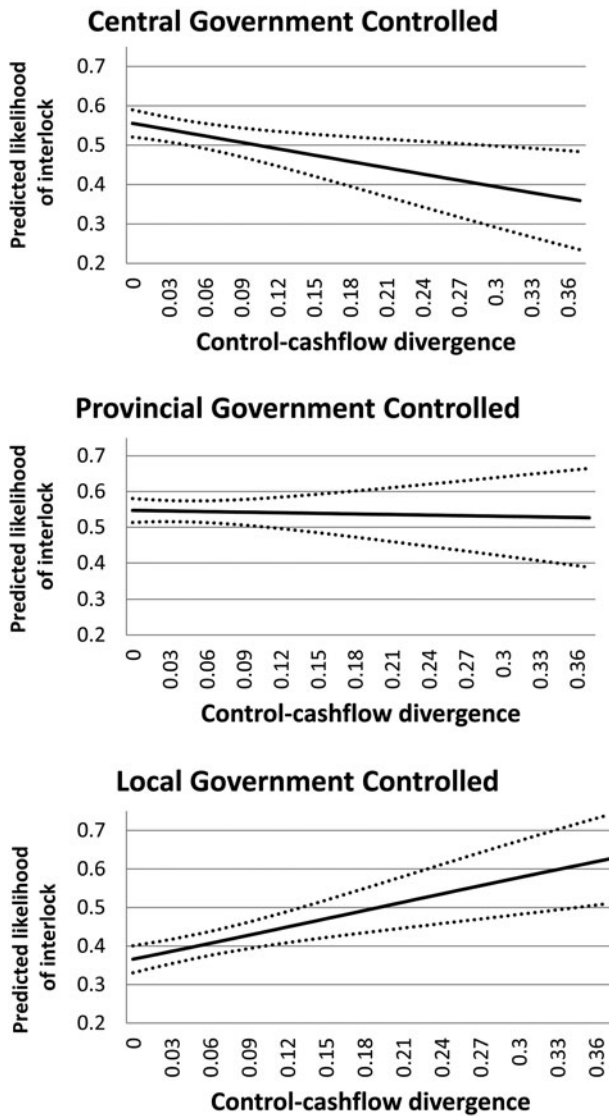


Figure 1. Control-cashflow divergence and predicted likelihood of interlock
 Note: * Predictions based on model 9.

interlocks become increasingly more likely for local government-controlled business groups, while they become increasingly unlikely for central government-controlled groups. Together, this contributes to the expected diminishing difference in the likelihood of interlocks between government levels. To further illustrate this point, we have in Figure 1 depicted the predicted likelihood of a vertical interlock for the three levels of government based on the results from model 9.

The graphs illustrates how control cash affects the likelihood of a vertical interlock differently for the various levels of government.

Reflecting the previous results, the moderating effect is more pronounced for higher position interlocks. This may indicate that interlocking positions to higher

managerial levels in the apex firm are necessary in order for resource transfers to occur or that affiliated firms at risk of expropriation seek higher level interlocks in the apex firms as an attempt to find protection. We want to note that pseudo R^2 changes are quite modest. This suggests that the main effect of the government level is a relatively stronger predictor than the number of layers and the interaction with divergence.

DISCUSSION

While Chinese state capitalism by now has been scrutinized in many studies, we still have quite modest knowledge about how the Chinese government engages in the governance and management of the business groups they control. Comparative knowledge of how different levels of government govern and manage differently is even more sparse. This article sets out to contribute to these research gaps with a focus on vertical interlocks in state-controlled business groups. We show that the use of interlocks varies significantly across three levels of government ownership – municipal, provincial and central – with the likelihood of interlocks increasing in that order. We believe that the fact that there is variance across three (as opposed to just central versus local) discrete levels of government, with provincial government occupying a middle position between central and municipal government, is a particular strength of the analysis. It shows that the prevalence of interlocks is due to factors that are in some way scaleable and not due to intrinsic properties of either central or local government.

Drawing on resource dependence theory and elements from transaction cost economics and agency theory, we argue that the vertical interlocks serve as means for information exchange that improves coordination. Such information exchange may from the point of view of apex firms be used to exercise (further) control while it from the point of view of affiliated firms may be used to minimize resource dependence and contingencies. We furthermore argue that the need for coordination, control and resource minimization increases with higher levels of government due to bounded rationality, divergent ownership interests, opportunistic behavior and exposure to political contingencies. That is a long and diverse list of factors. Our theorizing has been kept deliberately broad both in regard to these factors and in regard to the question of agency because we believe that the empirical reality reflects all of these factors. We do not find any grounds to assume that all vertical interlocks in our sample are created only (by the apex firm) with the purpose of exerting control. But neither is it conceivable that all interlocks are the creation of affiliated firms attempting to reduce exposure to external contingencies. Our findings regarding the length of ownership chains and the moderating effects of divergence (H2 and H3) indicate that coordination, control and opportunistic behavior are all at play. We see no reason why multiple factors cannot be at play simultaneously and why interlocks cannot be created due to the simultaneous actions of the apex firm and the affiliated firms. We thus

assume that our sample contains interlocks intended to fulfill a variety of different purposes and that many of the interlocks in our sample are aimed at fulfilling more than one purpose and created due to actions taken by either the apex or the affiliated firms or both. Moreover, we assume that, even if case-by-case knowledge about the interlocks were available, we would have difficulties in disentangling the different functions and actions. In sum, we feel confident saying that interlocks cannot be established without some degree of action by apex firms (and in extension their government owners). However, this does not rule out that actions and initiatives towards creating the same interlocks can be more or less simultaneously taken by the affiliated firms.

While our results are consistent with our theorizing, we acknowledge that alternative explanations could also help predict the prevalence of interlocks. It could be argued that interlocks are simply a result of the (especially central) government handing out favors or rewards to political protégés. Thus, interlocks are not created in order to establish control but simply to accomplish political goals, independent of the business in question. Certainly, many board positions in large Chinese corporations are due to political selection if not favoritism. However, the tests of hypotheses 2 and 3 go against this explanation. The alternative explanation cannot account for the effects of layers. Also the interaction effects found in our study go against this alternative interpretation. The interaction effects indicate that factors associated with principle-principle agency problems moderate the use of interlocks.

Another explanation is that higher level (especially central) government-owned apex firms may exhibit greater resource endowment and that interlocks may afford affiliated firms' access to such resources. At the same time, it may be so that interlocks are created in order to disseminate resources or capabilities to affiliated firms, the same reason why diversified business groups are formed (Guillen, 2000). Thus, central government-owned affiliated firms may receive resources or capabilities via interlocks as part of the central government actively trying to promote economic or technological developments or the apex firms actively trying to leverage resources and capabilities within the group. This is, in our view, the most credible alternative explanation. Nonetheless, we also need to note that there is not far between the idea that interlocks are created in order to disseminate key capabilities and that interlocks are created to facilitate information exchange and coordination, which was our argument above.

Our findings show that central government does not by default exert limitless control over Chinese state-owned enterprises. It is often mentioned by commentators on the economic and political institutions of China that although China is an authoritarian regime, it is a much decentralized one (Xu, 2015). We believe that this is reflected in our results, which indicate that local government has better information channels than central government. Our findings also indicate that more extensive pyramids lead to similar problems of coordination. In addition, our findings suggest that vertical interlocks are used as remedies to these problems.

We believe that our combined results, and especially the results of hypotheses 1 and 2, show how interlocks act as coordination devices and how such need for coordination increases with the government level. Our main contributions are that we, firstly, shed some light on the nature and functions of often occurring yet neglected features of Chinese business groups and, secondly, show how higher levels of government apparently have greater need for coordination through interlocks. Our results indicate that coordination and governance of state-owned businesses is more complex the higher and more centralized the level of government. In this regard, it is worth remembering that vertical interlocks are not only found in Chinese state-owned business groups but also in the government and the Communist Party where the same persons may hold offices both at central and local levels (Keister, 1998). This indicates that interlocks are part of a network-based form of governance that is widely used by the Chinese government and especially by higher levels of government where the geographical range and length of command chains otherwise make network-based forms of governance difficult.

Limitations and Future Research Directions

Our theorizing draws on both resource dependence theory, transaction cost economics and agency theory, and lumps together problems of coordination, control and resource dependence minimization. In the above, we have explained why we have incorporated all of these factors. We do acknowledge that a finer-grained analysis would be beneficial and that our theoretical contribution for the same reason is limited. Disentangling the various functions of vertical interlocks would, however, be difficult. That said, it should be possible empirically to investigate the extent to which vertical interlocks specifically protect against tunneling. Also, qualitative studies should, to some degree, be able to shed light on the specific processes in which interlocks are created and by whom (although access would be a daunting problem). Another limitation of this study is that it concentrates on listed firms that are affiliated with business groups. It would be interesting to see if the findings extend also to non-listed firms. However, listed firms arguably constitute the greatest challenges for government control, and are among the most important in terms of economic value, and hence, we expect the main bulk of interlocks to involve listed firms. The sheer volume of this type of interlock ties suggests that it is a worthy area of future studies. Research that more directly investigates the formation of interlock ties and performance effects of such ties appears to be relevant. In addition, while this study solely concentrates on government-owned business groups, it would be interesting to extend the findings to business groups with other forms of ownership as well as to business groups in other countries.

CONCLUSION

Our study has provided insights into vertical interlocks found in Chinese state-owned business groups. Our study found systematic differences according to the

level of government, the amount of layers in the pyramidal groups and potential P–P agency problems. These differences, we have argued, indicate that vertical interlocks are used to mitigate coordination and governance problems. Furthermore, the effects of government levels indicate that the central government faces greater challenges regarding such coordination and governance. Vertical interlocks are one particular measure against such coordination problems.

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Jakob Arnoldi (jaar@mgmt.au.dk) is Professor at the Department of Management, Business and Social Sciences, Aarhus University. He holds a PhD (sociology) from University of London. He has published on Chinese business; risk; expertise; and financial technologies. His current research focuses on the interface between business and politics in China. He is affiliated with the Sino-Danish Centre for Education and Research.

Anders Ryom Villadsen (avilladsen@mgmt.au.dk) is professor at the Department of Management, Business and Social Sciences, Aarhus University. His primary research areas are workforce diversity; public management; and public-private differences. He has published in journals such as

Academy of Management Discoveries, Public Administration, Public Management Review, and Management and Organization Review. He is affiliated with the Sino-Danish Centre for Education and Research.

Xin Chen (xchen3@saif.sjtu.edu.cn) is a Professor in Accounting at Shanghai Advanced Institute of Finance, Shanghai Jiao Tong University, China. He received his PhD in Finance from University of Minnesota, United States. His research interests include corporate finance, accounting and capital Market, and security investment strategies. He has published articles in various English and Chinese journals, such as *Management and Organization Review, China Economic Review, Pacific-Basin Finance Journal, and Asian Business & Management*.

Chaohong Na (ausman@263.net) is a Professor in the Accounting School, Yunnan University of Finance and Economic, China. He received his PhD in Corporate finance from Jinan University. His research interests include business group governance, corporate finance and capital markets. He has published articles in various English and Chinese journals, such as *Management and Organization Review* and *Journal of Economic Behavior & Organization*.

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