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“Status projection”—a study of the foundation of independent directors among China’s listed companies

Linzhuo Li 

Correspondence:
newlqlz@126.com
Department of Sociology, Tsinghua
University, Haidian, Beijing, China

Abstract

A key issue for a state in transition when a new institution is imported into its domestic economic field is the relationship between the process dynamics of the formation of the new institution and the corresponding development of the network between firms. For China, such problems as the loss of the initial goal of the imported institution are particularly serious. This article studies the foundation of independent directors and the interlocking network of China’s listed companies created by independent directors. The article has two main findings: first, the institution creates a heterogeneous network. During the process, institutional actors with different backgrounds contribute to the structural heterogeneity of the interlocking network. Second, the heterogeneous network has feedback on the effectiveness of the institution. The heterogeneous network may either strengthen or weaken the new institution depending on the types of network ties. In the analysis, this article shows how political networks and professional networks are shaped by different independent directors with different former status and the different effects these networks have on the institution of independent directors.

Keywords: Isomorphism, Network heterogeneity, Political networks, Professional networks, Status projection

Background

Question

Over the past 20 years, building on the concept of corporate governance, the Chinese government has introduced a set of new institutions to regulate China’s listed companies in its emerging stock market. A major criticism of these institutions is that most of them did not function as well expected. For instance, the institution of independent directors is designed to solve the problem of insider control. In reality, however, many believed independent directors were just “eye candy,” and there were debates among researchers on the effectiveness of this institution. These debates and such puzzles of isomorphism as embedding an imported institution into China’s economic and political environment suggest that the institutionalization process in an economic field is not merely about legitimacy, as neoinstitutionalists would suggest. Therefore, to better understand the institutionalization processes of imported institutions, one needs to analyze how and in what sense such institutions become effective.

On the other hand, when we focus on the institution of independent directors, an interesting phenomenon is that when independents began to sit on boards of listed companies, they inevitably reshape the interlocking networks of board directors among firms. The interlocking of boards has long been taken as an important indicator of the market structure. As past studies have shown, interlocking networks of American corporations in different historical periods well reflect the market structure of that period. In early times, the interlocking network centered on railway giants and telegraph and telephone companies (Roy 1983); large commercial banks and insurance companies later became the core (Mintz and Schwartz 1981). Upon seeing such reshaped networks, network analysts immediately ask which factors influence the network and what is the effect of the network.

When we combine the network approach with the question of institutionalization in considering the relationship between networks and institutions, the institutionalization of independent directors provides an excellent example of a new explanation of the interlocking of boards in China, enhances our knowledge of isomorphism, and discovers more connections between network theory and the theory of neoinstitutionalism.

Therefore, the article is an exploratory effort that reveals how the institutionalization of independent directors reshaped boards' interlocking networks and what the consequences of such networks are in terms of the effectiveness of the institution.

Actors in the institutionalization process

Let us first look at the interlocking network of independents. As is known to all, listed companies are giants in China's economy. According to a piece of news in 2011,¹ at the end of the first half of 2011, the total revenue of listed companies in China's A-share markets had reached about 10 trillion—around half of the entire country's half-year GDP. Meanwhile, these giants' various kinds of managerial problems continued to be disclosed. Beginning in 2000, China introduced the institution of independent directors in seeking to regulate serious insider control problems and protect the interest of small shareholders.

A rapid wave of institutionalization was seen among firms soon after the 2001 opinion² was issued by CSRC (China Securities Regulatory Commission); by 2003, most listed companies had filled their boards with new independent directors.³ Together with the fact that the CSRC forbids nonindependent directors,⁴ this ensured the status of independent directors. At 2006, three fourths of board interlocking ties were created by independents (Duan 2009; Duan and Zhong 2008).

With the foundation of a new institution, there comes a new network, but how can we explain the differences in companies' network positions at the firm level? Which companies were more likely to be linked with others? The existing literature includes thorough discussions on board interlocking. Mizruchi summarizes this literature in his reviews (1996). According to him, there are five major theories. The first is collusion theory (Mizruchi 1982; Baker and Faulkner 1993), which states that firms form alliances by sharing directors in order to reduce intercompetition. This theory, he argues, is difficult to test empirically since we usually cannot be certain that we can recognize firms' real motivations. The second is co-optation and monitoring (Pfeffer 1972; Burt 2009), which views boards' interlocking as an attempt to reduce environmental uncertainty. The third theory is legitimacy (Selznick 1984; DiMaggio and Powell 1983; Meyer and

Rowan 1997): firms interlock with important firms to increase their own legitimacy. Mizruchi believes this predicts firm behavior similar to that predicted by co-optation theory. The fourth is career advancement (Stokman et al. 1988): directors as individuals create interlocks to enlarge their own networks. The last theory is social cohesion (Mills 1999; Domhoff 2006), which asserts that interlocks are forms of upper-class social cohesion. Each of these theories only deals with a particular historical period; for instance, Mizruchi points out that collusion theory is suitable only for explaining interlocking on American corporate boards before 1914.

These theories can be seen from three angles. The first is the organization vs. the individual (Zheng 2012; Lu and Chen 2009). This view believes that collusion, legitimacy, and co-optation all start from the motivation of firms, while social cohesion and career advancement focus on the motivation of managers themselves. The second angle is the market vs. the state (Ma 2012; Lee 2007). From this angle, all five theories discussed above neglect the role of the state. They are therefore categorized as market based. In contrast, the state should be included in the analysis. Using the concept of control (Fligstein 2001), some researchers believe the interorganizational network can be understood as the result of the state's control of the economy (Ma 2012). The third angle is levels of network, which means that interlocking networks can be divided into primary and secondary interlocks. The term "primary interlocks" refers to interlocks by nonindependents, while "secondary interlocks" refers to interlocks by independents. In addition, there are also explanations derived from the geographical closeness of interlocking companies (Kono et al. 1998); these are not included in our discussion due to their lack of sociological imagination.

As Mizruchi suggests, although the five theories discussed above have some internal conflicts, they can well explain the interlocking of boards among American corporations. However, once we apply these theories to China's case, one immediately sees the limit of their explanatory power. First, these theories mainly deal with primary interlocks—for example, legitimacy theory predicts that the company in question would actively seek to put its own board members on the boards of other companies, yet most boards' interlocks in Chinese listed companies have changed into secondary interlocks. Therefore, these theories cannot explain China's case very well. Second, some tests on existing theories made by Chinese researchers show poor support of these theories. Third, these theories do not account for the background of institutionalization, nor do they address institutional actors.

Thus to understand the network structure, one has to analyze the institutionalization process and view independent directors as institutional actors. First, the institution defines the structural positions of actors and their characteristics. According to the rule, at least one third of board members should be independents, thus creating nearly 10,000 new jobs. Such a large group of directors simply cannot be recruited within the field and has to be drawn from other fields. When a large number of executives are recruited to meet the demands of rapid institutionalization, their previous status and professional characteristics are not completely wiped out. In other words, independent directors still possess their original status in the new institution. For example, it is well known that retired government officials or professors make up a large proportion of independent directors. Therefore, in the same structural position, there can be institutional actors with different statuses.

Second, the institution allows a personalized relationship between the firm and the directors. According to the rule, the independent director, who belongs to the “outside directors” group, has to be nominated by a major shareholder.⁵ This rule has several consequences. First, the recruitment relies mainly on major shareholders’ social ties, which means the behavior of new directors is likely to be restricted by their ties. Second, the fact that major shareholders can hire independents according to their own will makes it possible for them to use independent directors as a resource in seeking potential interests, either for themselves or for the company.

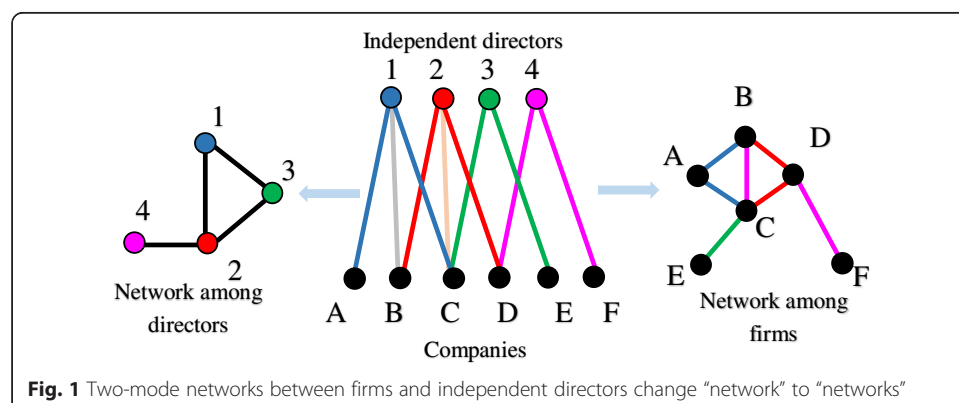
Finally, at the macro level, as independent directors coming from other fields, such as the government or universities, entered the market, new intersections of political, economic, and academic fields are created. The norms and structural features of other fields may therefore be imported into corporate governance by actors of multiple statuses. In this way the structural features of political and academic fields may be projected onto the image of the new institution.

Methods

We used two-mode networks to present the relation between firms and directors, as shown in Fig. 1. The different numbers in the graph indicate different directors, while letters stand for firms. The network in the middle of the graph is a two-mode network,⁶ and the left and right networks are transformed one-mode networks of directors and firms. Under this frame, we can define the “heterogeneity of interlocking” when interlocks are brought about by independent directors with different former statuses. This heterogeneity simply means that ties of the same form can have different properties, an idea similar to Chamberlain’s on the heterogeneity of products (Shen 2007). I argue that the heterogeneity of interlocks also exists. Since the idea of a network is an ontological expression of structural features, there is no reason to believe that such an expression cannot be further decomposed. The problem of the inability to show the heterogeneity of relations from an aggregated network could probably be solved by decomposing the network into parts according to different types of institutional actors.

One institution, two networks

Because of China’s specific economic and political environment, scholars have pointed out that organizations in China often face dual pressures in response to different

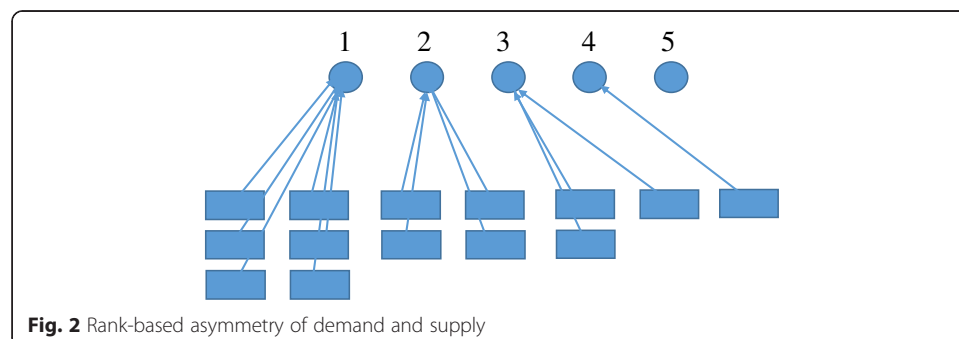


environments (Shen and Sun 2000). Among the listed companies, we found that firms often hire independent directors from various other fields. This article focuses on only two types of independent directors: directors with political backgrounds, that is, former government officials, and accounting specialists, mainly professors from accounting departments and professional managers. Focusing on these two groups is both easy for comparison and sufficient to show possible network heterogeneity. For simplicity, the interlocking networks linked by independent directors with political backgrounds will henceforth be called “political networks,” while the networks linked by specialists will be called “professional networks.” Thus, we are able to decompose the interlocking network based on the backgrounds of the directors.⁷ (The more detailed procedure of decomposing the networks is provided in the Appendix). How do institutional actors shape the structure of two-mode networks? I selected data on listed companies in China’s Shanghai and Shenzhen stock market in 2011 for analysis.⁸

Political networks: projection of political hierarchy

Because of their political backgrounds, retired government officials still have political rank when they become independent directors. The bureaucratic system has made the rank of an official the most fundamental criteria of measuring his power. This indicates that officials of different ranks, even when retired, bring different amounts of resources to firms. Some scholars have pointed out that a main reason why listed companies in China invite retired officials to sit on boards is that they connect to resources and can provide protection for the company (Liao et al. 2009).⁹ Some researchers have found that local governments often provide listed companies with financial subsidies (Chen and Li 2001; Chen 2003). Although these findings are from 10 years ago, path dependence still exists. In fact, in the analysis, I found that politically independent directors mainly come from the following departments: Bureau of Finance, State/Local Tax Bureau, Bureau of Legislation, Bureau of Industry, Bureau of Economy and Trade, the State-owned Asset Commission, and the CSRC. It can be inferred that independent directors from these departments can provide firms with financial resources, policy information, and even judicial protection.

Inviting higher-level retired officials brings better resources and protection. The collective demands will consequently be such that officials of higher rank are in more demand. As the rank decreases, politically independent directors will be less appealing. In this way, the bureaucratic hierarchy affects firm-director relations, as is shown in the two-mode network in Fig. 2 (circles stand for officials; numbers above the circles indicate officials’ ranks, 1 is the highest; and arrows stand for intentions of inviting officials



to the firm). The asymmetry results from the differences of power by rank. For interlocking networks, directors of higher rank will attract more links and therefore bring about more interlocks.

At the same time, we should also recognize that the bureaucratic structure takes a pyramid form, creating a negative relationship between the level of officials and the population at that level. As a result, the population of officials increases geometrically as the level goes down linearly. This affects the accessibility of officials. The higher the rank of an official, the less likely that listed companies will have access to that official. In addition, in some cases, inviting high-rank retired officials creates some risk¹⁰ since this is more likely to be criticized by the media and CSRC. Therefore, accessibility increases as bureaucratic rank decreases (see Fig. 3).

Combining the two conditions of accessibility and rank, we find that officials at the middle level of the bureaucratic system are the most popular candidates for independent director positions (see Figs. 4 and 5).

To see if this is true in general, I checked the distribution of politically independent directors by rank (see Fig. 5). We can see that most came from the middle of the bureaucratic order (first, the department level and, second, the division level). The number of political directors decreases as the rank goes up to the ministry level or down to the section level.

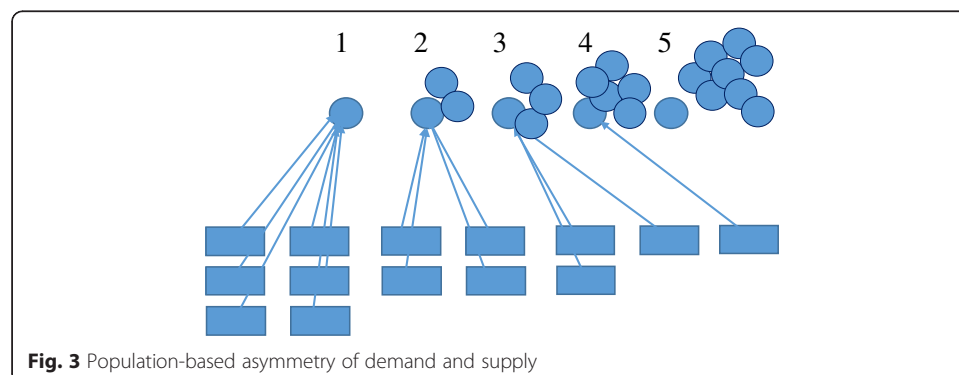
The average number of interlocks created by officials are shown in Table 1.

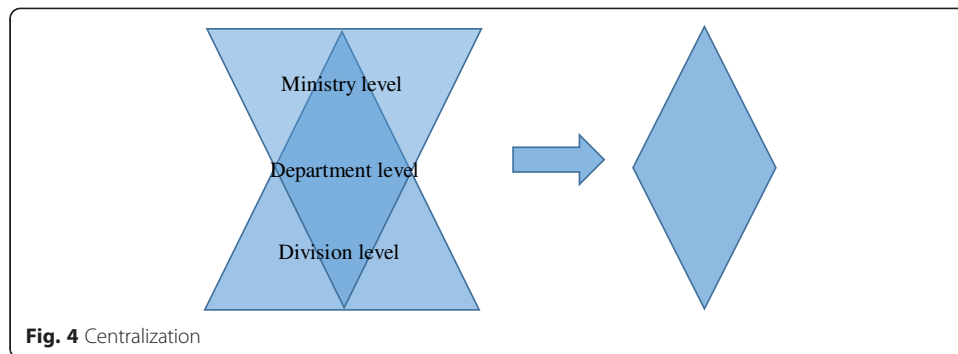
The average number of interlocks can be calculated as 1.3 per person for officials at the ministry level, 2.4 at the department level, 1.7 at the division level, and 1.5 at the section level.¹¹

We found that in political networks, about 75 percent of interlocks are created by department-level political directors, 21 percent by divisional-level directors, only about 3 percent by ministry-level directors, and 1 percent by the lowest-level officials. Because of the differences in rank and accessibility, most firms invite department-level officials to sit on boards; on average, their ability to bring about interlocks seems to be higher than that of other officials. They become the major linkages in political networks.

Professional networks: projection of flat reputation structure

Unlike political directors, professional accounting specialists vary in their backgrounds. They come relatively evenly from three areas: academia, senior members in associations of certified public accountants, and managers from other industries. Firms show no





preference of one type over another. The diversity of professional independent directors also lies in the fact that the criteria of a “good” specialist director is not as clear as that of a good political director, which can easily be identified from his position in the bureaucratic system. In interviews, some professional directors from academia confirmed that while large listed companies usually prefer professors from prestigious universities, small listed companies do not since they are more practical.

More statistical analyses are needed. In an incomplete demonstration, here I selected for analysis the group of independent directors from academia that are found to have the highest level of interlocks (all of them were board members for four or more listed firms in 2011). Since there are three main levels of universities from which these independents are drawn, I wanted to determine whether there is a similar rank-based distribution among universities. From highest to lowest, the well-accepted three levels are “985 project” key universities (39), “211 project” universities (around 100), and other universities and colleges. The logic of the analysis is that if a similar logic of rank exists as in political networks, we would find that at the top (in this case, a group of 26 professors who seem to be the most appealing to companies), it is unlikely that there will be many professors from the lowest-level universities (Table 2).

As can be seen, the level of university does not appear to play a major role since universities at the lowest level compose more than one third of the top group. It is more likely that the personal fame of the professors themselves is a more significant

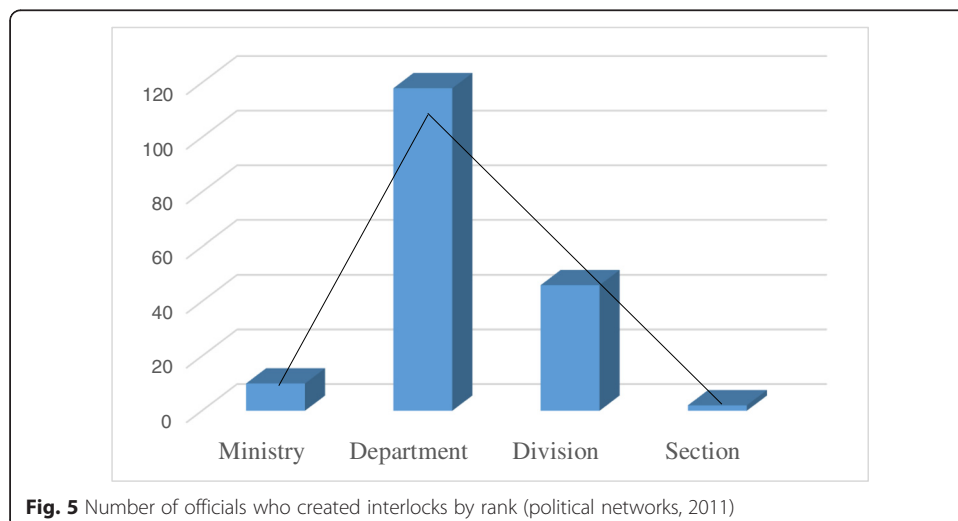


Table 1 Average number of officials and interlocks by bureaucratic rank (political networks)

Rank	Ministry level (Bu)	Department level (Ting)	Division level (Chu)	Section level (Ke)
No. of officials (no. of interlocks)	10 (13)	118 (283)	46 (78)	2 (3)

determinant since almost all professors listed on the top are either chairs of the department or heads of the school. For professional directors, the level of the organization is not as important. This “flat” structure of professional interlocking networks contrasts to political networks, for which the level of the organization is a major factor.

Table 2 Professors with the highest level of interlocks (total 26) and the ranks of their universities (2011)

	Position	University rank
University/college name		
University of Chongqing	Chair, Dept. of Accounting	985
Shanghai University of Finance and Economics	Vice-president, School of Accounting	211
Jiangxi University of Finance and Economics, Shenzhen University	President, School of Economics	Other
Southwestern University of Finance and Economics	President, School of Accounting	211
Zhejiang University of Finance and Economics	President, School of Accounting	Other
Hunan University	President, School of Accounting	985
Shenzhen University	President, School of Accounting	Other
Beijing National Accounting Institute	Chair, Dean's Office	Other
Shanghai Lixin Accounting Institute	Vice-president, School of Accounting	Other
Renmin University of China	Vice-party secretary, School of Business	985
Shanghai University of Finance and Economics	Professor, Dept. of Accounting	211
Shanghai Lixin Accounting Institute	Dean's Assistant	Other
Shanghai University of Finance and Economics	Associate professor, Dept. of Accounting	211
Xiamen University	Associate professor, Dept. of Accounting	985
Renmin University of China	Chair, Dept. of Accounting	985
Fuzhou University	Vice-president, School of Management	Other
South China University of Technology	Vice-president, School of Economics & Trade	985
Southwestern University of Finance and Economics	Head of Dept. of Accounting	211
Zhongnan University of Economics and Law	Vice-president, School of Accounting	211
Xiamen University	Vice-chair, Research Center of Accounting	985
Nanjing University	Vice-chair, School of Management	985
Fuzhou University	Chair, Dept. of Accounting	Other
Hangzhou University of Electronic Science & Technology	Vice-chair, Dept. of Accounting	Other
Hefei University of Technology	Dept. of Accounting	211
Hangzhou University of Electronic Science & Technology	Vice-president, Dept. of Finance and Economics	Other
Hunan University	President, School of Accounting	985
Sum		
University Level	985	211
Number (percentage)	9 (34.6 %)	7 (27 %)
		10 (38.5 %)

To conclude, at the micro level we saw that independent directors, carrying norms and structural features from their original positions, formed heterogeneous relationships with firms. At the macro level, the institution of independent directors connected other fields with the economic field, creating new exchange opportunities among them; the interlocking network of firms consequently reflected such intersections. The political network absorbed a strong organizational feature from the bureaucratic system into its structure, while the professional network reflected a relatively weak role of the level of organizations.

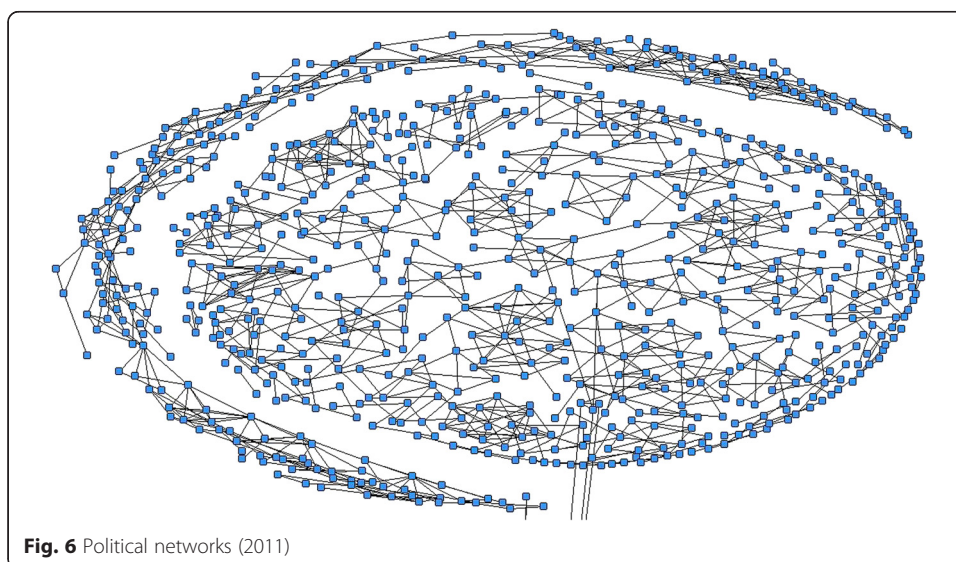
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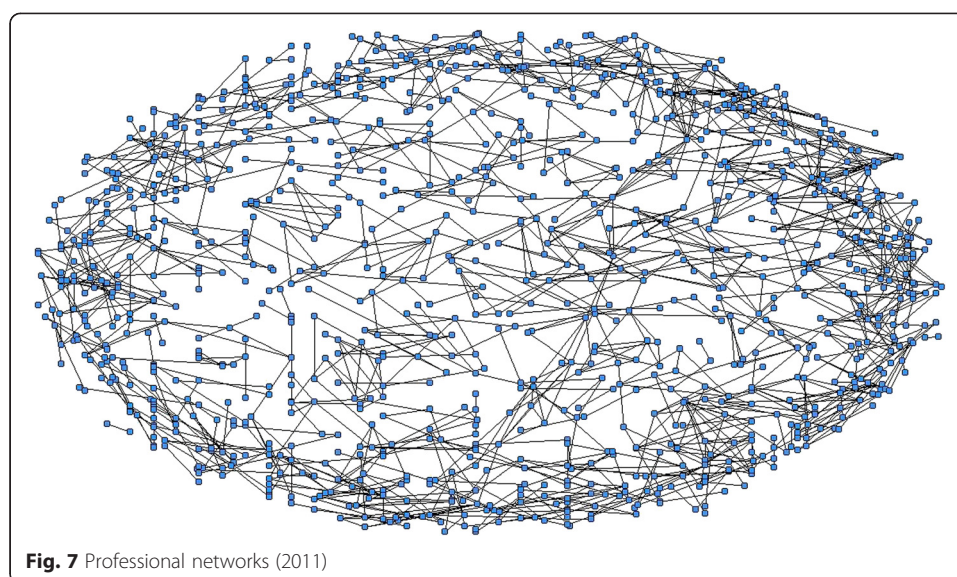
Heterogeneous networks among firms

The analysis above explains how two different types of interlocks are created. From the institutional approach, we no longer use connectivity as the only criteria but decompose the network to show its features. After transforming the two-mode network into a one-mode interorganizational network, we see significant differences between political networks and professional networks.

We can see a big clump at the rim of Fig. 6, with many other isolated nodes in the middle (due to the layout in Ucinet). The whole network shows high inequality. In contrast, professional networks are denser, with many small clusters (see Fig. 7).

We move forward from the big picture to more specific network features: the regional closeness and industrial closeness of interlocks. Industrial and regional closeness are important aspects of boards interlocking. Interlocks of firms in the same industry can lead to unfair competition, while interlocks of firms across different regions connect local markets in different regions. We tested the difference between industrial closeness and regional closeness using the QAP (quadratic assignment procedure) correlation analysis. Industrial closeness is measured by an $n \times n$ matrix: if firm i and firm j belong to the same industry, the corresponding cell is assigned the value of 1, otherwise 0. Similarly, for cells in the matrix of regional closeness, if two





firms are registered in the same province, it takes the value of 1, otherwise 0. QAP tests the correlation of each of the two networks with that of the interlocking network matrix. We can see from Table 3 that an interlock is more likely to happen within the industry in a political network than in a professional network, while professional networks show a higher level of regional closeness.¹²

These differences are due to the fact that in political networks, some ties are formed by companies who invite retired officials in the corresponding ministry of the central government to be board members. Because of this, these officials link firms in the same industry in different provinces, increasing the degree of industrial closeness as well as the degree of cross-region connections. As an example, Table 4 shows a case in which five companies shared an independent director who was a retired official of the Ministry of Information.

These firms all belong to the same industry but are located in various provinces, showing the characteristic of “industrial sheltering.” This differs from those in professional networks. Quoting a firm manager: “[These officials] can bring benefits to us just by sitting there and doing nothing. ... Firms choose retired officials as directors or supervisors because of their influence and coordination in the industry.”¹³

Table 3 QAP analysis of industrial closeness and regional closeness of ties (2011)

Industrial closeness	Coefficient	<i>p</i> value
Professional networks	−0.000	0.415
Political networks	0.004	0.000***
Regional closeness	Coefficient	Significance
Professional networks	0.026	0.000***
Political networks	0.013	0.000***

For all the QAP analyses below, firms that are both politically connected and professionally connected were dropped since the partial correlation is unidentifiable for these pairs

***0.1 % level

Table 4 An example of political interlock (2011)

Company name	Registration place	Industry	Law firm	Duration
Taiji (002368)	Beijing, Haidian	Electronics and information: computer and external equipment, IC, software and communication devices	Tianyuan law firm	2008–2014
JieSai (002544)	Guangdong, Guangzhou	Communication technology: communication systems and devices, computers and components, software	Haiwen law firm	2010–2012
Wanda (300168)	Shanghai, Guiping	Electronics and information: technical advice in computer industry, computers and components	Jintiancheng law firm	2010–2013
Gaohong (000851)	Guizhou, Guiyang	Communication: network products, communication equipment, computer hardware/software and external equipment	Tianxing law firm; Hairen law firm	2006–2012
Caihong (600707)	Shanxi, Xi'an	Electronic components: color monitor components, electronic products and components, raw material	–	2005–2012

Data from Oriental Fortune (www.eastmoney.com), CSMAR

The influence of networks on the institution: corporate governance and synchronization of stock price volatility

The analysis above shows the heterogeneity of two networks, each reflecting the norms and structures of another field because of different institutional actors. What would the consequences of network heterogeneity be? Following the same logic, here I change the direction of analysis to test the influence of network heterogeneity on the functionality of the institution.

First, let us look at corporate governance. The institution of independent directors has been designed to be a fundamental part of corporate governance; we thus expect that the more effective the institution, the better the performance in corporate governance. One difficulty in evaluating the effectiveness is that institutionalization has made firms highly homogeneous since most listed companies have the same number and the same proportion of independent directors on their boards. We are unable to judge whether one firm is better than another in terms of the effectiveness of independent directors simply from their form. However, firms still differ in their network positions in both political and professional networks.

According to social network theory, ties can channel information and provide constraints. If an independent director connects several companies, there may be more frequent flows of information among these companies; the company may thus be able to design a better strategy for governance. In addition, the independent director tends to be less constrained than when he is hired by only one company, therefore better ensuring his independence (Chen and Xie 2012). In this sense, we expect that interlocks improve the effectiveness of independent directors and contribute to corporate governance. In addition, due to the existence of network heterogeneity, interlocks may have different functions. In political networks, firms often choose officials in pursuit of financial interest and protection. This can lead to “substitution of legitimacy” since a political connection may increase the survival opportunity of a company and therefore decrease the pressure of legitimacy on corporate governance. Consequently, it is likely that in political networks, interlocks may not have positive effects on corporate governance.

To test this hypothesis, I compared the relatedness of the ten largest shareholders in different network positions. This indicator has been widely used to reflect the shareholder structure of listed companies and is related to the degree of potential insider transaction problem (therefore a negative signal of corporate governance). According to the guidance of the CSRC, every listed company must report their situation.¹⁴ If independent directors are effective, the connection between the ten largest shareholders will decrease. We created a dummy variable (Related_top10) and assigned the value of 1 to indicate no connections and 0 otherwise.

The independent variable is a dummy variable indicating whether a firm is linked to others in each network (Poli_interlock; Pro_interlock). Control variables included number of political independent directors (Num_PoliD); number of professional directors (Num_ProD), whether the firm is state owned (state own); number of employees (take log); number of shareholders (take log), whether the stock of the company is given special treatment (ST); and industry (1–13). The statistical summary of variables is shown in Table 5.

The result of logit regression is shown in Table 6.

As is shown in the table, after controlling a set of variables, political interlock has no effect on the dependent variable, but professional interlock significantly lowered the probability of relatedness between the ten largest shareholders.¹⁵ The result supports our hypothesis that the effectiveness of network ties on corporate governance is conditioned. Actors in the network are conditioned by their original status, which further determines the property of the network tie. In professional networks, interlocking ties help channel information flows and reduce network constraint, thus contributing to the functioning of independent directors. In political networks, however, interlocking

Table 5 Summary of key variables

	Mean	Standard dev	Min	Max
Related_Top10	0.91	0.28	0	1
Poli_Interlock	0.2	0.4	0	1
Pro_Interlock	0.6	0.49	0	1
State owned	0.39	0.49	0	1
Num_PoliD	1.18	0.59	0	4
Num_ProD	0.47	0.71	0	4
No. of employees (LN)	7.47	1.4	1.79	13.22
No. of shareholders (LN)	10.17	1.11	1.61	13.92
Special treatment (ST)	0.03	0.17	0	1
Industry (code) ^a	Percentage (%)	Industry code	Percentage (%)	
Industry 1(A)	1.3	Industry 8(H)	5.8	
Industry 2(B)	2.2	Industry 9(I)	2.2	
Industry 3(C)	62.5	Industry 10(J)	4.8	
Industry 4(D)	2.2	Industry 11(K)	3	
Industry 5(E)	2	Industry 12(L)	1	
Industry 6(F)	2.8	Industry 13(M)	1.7	
Industry 7(G)	8.5			

^aAccording to the main industry categories in "Guidelines for the Industry Classification of Listed Companies (2001)" by the CSRC

Table 6 Logit model of whether ten largest shareholders are related (2011, nested)

	Model 1	Model 2	Model 3
Poli_Interlock	0.0559 (0.242)	0.0586 (0.352)	0.0292 (0.355)
Pro_Interlock	−0.437** (0.210)	−0.537** (0.232)	−0.552** (0.237)
State owned	0.220 (0.206)	0.0242 (0.226)	0.0024 (0.239)
Num_PoliD		0.250 (.187)	0.230 (0.188)
Num_ProD		−0.0314 (0.198)	−0.0296 (0.206)
No. of employees (LN)		0.192*** (0.0774)	0.222 (0.0849)
No. of shareholders (LN)		0.0485 (0.101)	0.003 (0.111)
Special treatment (ST)		−1.038*** (0.410)	−1.099*** (0.427)
Industry 1			−1.202 (1.322)
Industry 2			−1.548 (1.266)
Industry 3			−0.896 (1.107)
Industry 4			−0.751 (1.318)
Industry 5			−1.009 (1.324)
Industry 6			−1.072 (1.244)
Industry 7			−1.743 (1.126)
Industry 8			−1.135 (1.165)
Industry 9			−1.398 (1.331)
Industry 10			−0.621 (1.177)
Industry 11			−0.499 (1.300)
Industry 12			−1.454 (1.310)
Constant	2.538*** (0.184)	0.566 (0.983)	1.870 (1.403)
Sample size ^a	1323	1321	1321

Industry 13 as the base category, standard deviation in parentheses

** $p < 0.05$; *** $p < 0.001$

^aSince there are great many missing values, regressions were run to test whether independent variables affected the probability of missing values. The results show that except for number of employees, none of the independent variables are correlated with missing values

ties only result from the company's pursuit of interests without responding to institutional legitimacy and thus do not contribute to corporate governance.

As for the other variables, the number of independent directors has no effect. Size of the firm measured by number of employees may increase the probability of related large shareholders. Firms given special treatment are less likely to have related large shareholders since they are under much more supervision. The results remained stable after introducing industry dummies.

Similarly, below I analyze the synchronization of stock price volatility. Independent directors are expected to reduce the insider problem through their supervision, making a firm's heterogeneous information more likely to be reflected in its stock price. Roughly speaking, this means that the performance change can be seen through the change in the stock price. Synchronization is usually measured by R2 (the higher the R2, the higher the synchronization). According to previous research, emerging economies tend to have higher R2 in the stock market (Li et al. 2012).

QAP analysis was performed to show whether interlocking firms tend to have similar R2. The matrix of R2 is defined as follows: for each pair of firms (i, j), R2 is first put into one of four intervals (0–25, 25–50, 50–70, 75–100 %). If the R2 of the two firms

Table 7 QAP analysis of interlocks and synchronization of stock price volatility (2011)

	Coef.	<i>p</i> value
Professional networks	−0.000	0.25
Political networks	0.001	0.05

Using the same method as above

falls into the same interval, then the cell (i, j) of the matrix is assigned the value 1, otherwise 0. Table 7 presents the results.

As we can see, firms with political interlocks tend to have more similar R2 than those that without. In contrast, professional interlocks are not related to similarity of R2. The reason behind this phenomenon should be discussed in future research. Here, it only implies that network heterogeneity may have different effects on the institution of independent directors.

Conclusion

How do imported institutions get established and become effective? This question has intrigued many Chinese scholars. This article chose the institution of independent directors as an example, analyzed the corresponding interlocking networks of the institution, and demonstrated the influence of previous status on the new institution.

This article makes two main arguments. First, during the process of institutionalization, actors brought in features from other fields, creating heterogeneous networks. Political networks project the hierarchical organizational structure of bureaucratic systems in the economic field while professional networks project a flat organizational structure. In this way, the new institution reshapes the networks among firms. Of the two networks, the political network may be worth more attention. Previous literature has discussed how political tradition can shape the pattern of economic activities (Dobin 2008; Stark and Vedres 2012). Following this approach, the features in political networks reveal how a bureaucratic structure can be projected onto interfirm relationships, which indicates that firm-specific characteristics (such as the nature of the firm) are not the only ones that can affect interlocking network structures (Ma 2012).

Second, the network has feedback on the institution, and heterogeneous relations can alter the direction of the network effect. The statement that institutional actors are embedded in their networks in a way that constrains their actions should be modified because of the existence of heterogeneous relations. The network effect is conditioned on its property, as is shown in the two different networks. This calls for further reflection on the institutionalization process in general. A central critique of institutionalism is its lack of discussion on actors. This study shows that when an imported institution creates a new group of actors, their original status matters. We therefore cannot neglect actors in studying isomorphism.

Both arguments point to the importance of the original status of independent directors. Structural constraints in other fields are mixed in the new institution, which evolves into a different shape. This study may shed some light on the relation between network theory and neoinstitutionalism. Scholars like Frank Dobin have called for a “friendly merger” of the two approaches, proposing that the two theories should be combined in explanation. Efforts have been made along this line but have only

concluded that institutions spread through organizational networks. From the case in this article, we found that while the institution defines the possible features of organizational networks, these networks have different effects on the institution due to network heterogeneity. In this way, a friendly merger helps us to better understand and measure institutional isomorphism from the perspective of the network.

Lastly, and interestingly enough, the institution is also constantly redefining independent director candidacies. The party may have noticed the negative influence of political directors, since in October 2013 the “18th document” restricted the possibility of government officials becoming independent directors by canceling their salaries. Whether this new regulation reshaped the interlocking network and changed the institution of independent directors remains a good research topic for the future.

Endnotes

¹See Sina Finance (<http://finance.sina.com.cn/stock/s/20110905/005510430377.shtml>).

²Guiding opinion on establishment of Independent Director Systems, 2001.

³According to the “opinion,” before June 30, 2002, at least two independents must be included in boards, and by the end of June 2003, the proportion of independent directors had to reach one third.

⁴According to Article 25 of “Law of the People’s Republic of China on the State-Owned Assets of Enterprises,” without the permission of the general meeting, directors in state-owned, state-joint-listed companies could not serve on boards of other companies in the same industry.

⁵Boards of directors and boards of supervisors can also nominate new independent directors, but they have to be approved at the general meeting.

⁶The original figure is from Latapy (Latapy et al. 2008), this one is redrawn by the author. Due to the existence of different types of relations in the data set, social network analysts have defined the mode of a network. The mode is measured by the number of types of entities. The networks we usually consider are either a one-mode network or a two-mode network. If nodes in the network all belong to the same type, as in the case of friend networks, and every pair of relations is thought to exist between the same types of individuals, the network is considered to be a one-mode network. If the network contains two types of entities such as individuals and organizations (say, professors and universities), the network is a two-mode network. In short, the key is to identify how many types of entities are taken into account: teachers and students, teachers and classes, and volunteers and volunteer organizations can all be thought of as networks consisting of two types of entities (Borgatti & Everett 1997).

⁷The detailed method of identifying the background of directors and generating heterogeneous network is shown in the Appendix.

⁸There are three reasons why I only selected the year 2011. First, for the moment 2011 is the latest year. At an early period (such as 2002–2003), institutionalization was in process and things were unclear to most people at that time; the year 2005 saw split-share reform, which greatly changed the properties of companies and their interrelations. By 2011, the institution of independent directors had passed the unstable stage. Second, the raw data containing the information on director backgrounds is difficult to code solely by computer since there are name issues and incomplete information. To improve the quality of data, I had to check the results manually after coding thousands

of records by computer; this inevitably increased the amount of work. As a trade-off, I only picked one year's data so that manual checking was possible. Third, 2011 is a turning point if we compare the number of state-owned companies and that of private companies; in that year, about half of listed companies in the A-share market were private companies for the first time (the number is 1204, as opposed to 1193 state-owned companies). Around 2000, the A-share market was mostly taken up by state-owned companies, meaning that the interrelation among firms at that time mainly followed a bureaucratic logic.

⁹Here, we do not discuss whether such protection takes the form of "option" or "magnetic field" (see <http://finance.inewsweek.cn/20130911,71144,all.html>).

¹⁰See http://news.xinhuanet.com/fortune/2013-08/15/c_125173948.htm.

¹¹This difference is not statistically significant; the confidence level is 0.15, probably due to the fact that the variance of department-level interlocks is relatively large. Thus, we cannot conclude that department-level directors are more likely to create interlocks. A better test would require obtaining the real number of retired officials at each level as a total population, which is very difficult.

¹²According to the main industry categories in "Guidelines for the Industry Classification of Listed Companies (2001)" by the CSRC. The low value of correlation is due to the fact that the relation matrix is high dimensional and sparse.

¹³See Sina Finance (<http://finance.sina.com.cn/stock/s/20130812/091016416485.shtml>).

¹⁴We assume that their yearly reports can be trusted.

¹⁵I also analyzed another indicator of corporate governance: the sensitivity of performance salary of managers, which showed similar results—professional interlocks help increase sensitivity, while political interlocks do not. The results are not listed here due to limited space.

Appendix

Notes on data and methods of heterogeneous network decomposition

The data used in this article come from two databases: CSMAR and RESSET, both of which provide a comprehensive description of corporate governance and information on managers, including job information of independent directors such as name, gender, year of birth, CV, and part-time jobs. Compared with data from RESSET, data from CSMAR is of higher quality. I thus mainly relied on data from CSMAR while using RESSET as a complementary database.

I also obtained basic information on listed companies, including their registration place (to measure regional closeness), nature of the firm (state owned or private), industry type, number of shareholders, number of employees, special treatment (ST), number of board members, number of independent directors, and so on. Some of these are used as control variables.

I performed the following work after data clearing: first, dropped non-A-share companies, namely those that are not listed in the mainland stock market; second, separated all data by year and generated yearly lists of companies without delisted ones; and third, dropped firms with incomplete information.

One of the main points in this article is to analyze interlocking networks from network heterogeneity. Therefore, extracting the heterogeneous networks from data is a key step. This presented several difficulties: first, in order to identify the type of interlocking network ties, one needs to know the background of an independent director,

but there are thousands of records for each year. Second, neither of the two databases contains a complete set of information. One thus needs to merge the information in the two databases, which is difficult to do manually. Finally, it is likely that coding the resume of independent directors to identify their backgrounds could be subjective, so one needs some objective rules.

After some trial and error, I relied on the word segmentation technique in natural language processing.

First, I did word segmentation for all resumes, then dropped all unimportant words (such as “born,” “serve as”). After this, I sorted the remaining words to create a short list of keywords of high frequency, from which one can precisely determine the background of an independent director.

For instance, a portion of a resume is shown below:

Mr. Chu Yijun, Independent Director. Born in 1964, PhD. in Accounting, Accounting Professor at Shanghai University of Finance and Economy, Doctoral Supervisor. Graduated from Shanghai University of Finance and Economy, now serves as an Accounting Professor at Shanghai University of Finance and Economy, Doctoral Supervisor, Accounting Standards Advisory Specialist of the Ministry of Finance Accounting Standards Committee, Senior Advisory Specialist in Accounting Series of the Ministry of Public Security, Chinese Accounting Association Education Branch Executing Secretary General, researcher in Ministry of Education Humanities and Social Science Key Research Center in the Academy of Accounting and Finance, Shanghai University of Finance and Economy, Managing Director of 6th Board of Management of Chinese Accounting Association Branch of Financial Cost.

Keywords extracted from this resume are “accounting,” “finance,” “professor,” and so on. These words are counted in the high-frequency word list. As is shown, some words like “accounting” occurred very frequently, indicating that this independent director is apparently a professional director from academia.

Let us now look at another piece:

Wang Xingzhong, male, Han, from Zichuan Guanghan, member of the Communist Party, born in August 1944, senior accountant, bachelor’s degree, formerly Vice-President of Economic Committee of Mianyang, Vice Chief of the Bureau of Finance in Mianyang City, Chief and also Chief of the Bureau of Local Taxation. Mianyang City Government Assistant Mayor, Vice Mayor, now retired. Independent Director of the company.

Keywords from this resume are “accountant,” “Economic Committee,” “Bureau of Finance,” “Vice Chief,” “Bureau of Local Taxation,” “government,” and “Vice Mayor.” Therefore, it is easy to determine that this man was a former government official and also an accountant.

Similarly, using the word segmentation technique, we can extract all the keywords in each record and generate a high-frequency word list in which words can be used to identify the background of a director. Shortening the high-frequency word list was done manually. Ambiguous words were dropped, leaving those that are simple and clear: the word “accounting” and “accountant” are good indicators of a professional director. Similarly, “Bureau of Finance,” “Vice Chief,” and “Vice Mayor” are good indicators of a political director.

A further step is to assign scores to each independent director. If there are many accounting-related keywords, the score for “professional director” increases, indicating

that the likelihood of the director being a professional director increases. Scoring political directors is a similar process. Note that this method allows a director to be simultaneously political and professional.

Finally, we can rely on the scores of each director to generate network matrices, following standard methods. I double-checked some of the names by looking at sex and year of birth. An interlocking relation exists between two firms if they share at least one independent director, and the corresponding cell in the network matrix is assigned a value of 1, otherwise 0. The rest was simple once the network matrix was established.

Competing interests

The author declares that there are no competing interests.

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References

- Baker WE, and RR Faulkner. 1993. The social organization of conspiracy: illegal networks in the heavy electrical equipment industry. *American Sociological Review* 58(6): 837–60.
- Borgatti SP, and MG Everett. 1997. Network analysis of 2-mode data. *Social Networks* 19(3): 243–69.
- Burt RS. 2009. *Structural holes: the social structure of competition*. Cambridge: Mass: Harvard University Press.
- Chen, Donghua. 2003. A study and analysis on local government, corporate governance: empirical evidence from subsidy in China. *The Study of Finance and Economics* 9: 15–21.
- Chen, Xiao, and Jing Li. 2001. Exploring the role of local government fiscal supports in accounting, performance of the listed companies. *Accounting Research* 12: 20–28.
- Chen, Yunsen, and Deren Xie. 2012. Board network, governance role of independent directors and executive incentives. *Journal of Financial Research* 2: 168–182.
- DiMaggio PJ, and WW Powell. 1983. The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48(2): 147–60.
- Dobin, Frank. 2008. *Forging industrial policy: the United States, Britain, and France in the Railway Age*. Cambridge: Cambridge University Press 052162990X.
- Domhoff GW. 2006. *Who rules America? Power and politics, and social change*. Boston: Mass: McGraw-Hill Humanities, Social Sciences and World Languages.
- Duan, Haiyan. 2009. China enterprise chain director relation network characteristic research. *Special Zone Economy* 7: 249–251.
- Duan, Haiyan and Weizhou Zhong. 2008. The causes of interlocking directorates in China from the network perspective—an empirical study based on Shanghai and Guangdong. *Accounting Research* 11: 69–75.
- Fligstein N. 2001. *The architecture of markets: an economic sociology of twenty-first century capitalist societies*. Princeton: Princeton University Press.
- Kono C, D Palmer, R Friedland, and M Zafonte. 1998. Lost in space: the geography of corporate interlocking directorates. *American Journal of Sociology* 103(4): 863–911.
- Latapy M, C Magnien, and ND Vecchio. 2008. Basic notions for the analysis of large two-mode networks. *Social Networks* 30(1): 31–48.
- Lee, Zongrong. 2007. Between the state power and Chinese familism: corporate control and intercorporate networks in Taiwan revisited. *Taiwanese Sociology* 13: 173–242.
- Li Liuchuang, Gaoliang Tian, Yong Ma, and Bing Li. 2012. Interlocking directorates and stock price synchronicity: an empirical study based on network perspective. *Journal of Management Science* 6: 86–100.
- Liao J, MR Young, and Q Sun. 2009. Independent directors' characteristics and performance: evidence from China. Available at SSRN 1489088.
- Lu Changcong, and Shihua Chen. 2009. Reconstructing fractures: interlocking directors and their organizational role. *Management World* 5: 152–165.
- Ma Lei. 2012. *The pattern of state intervention, property rights and interlocking directorate networks*. Doctoral dissertation, Fudan University. <http://www.cnki.net/KCMS/detail/detail.aspx?QueryID=0&CurRec=1&recid=&filename=1013102951.nh&dbname=CDFD1214&dbcode=CDFD&pr=&urlid=&yx=&v=MDk5NjFGMjZlYks0SE5qSnlwRWJQSVI4ZVgxTHV4WVM3RGxVDNkxVHJXTTFGckNVUkwZVp1WnVGaUhuUWwzSlY>
- Meyer JW, and B Rowan. 1997. Institutionalized organizations: formal structure as myth and ceremony. *American Journal of Sociology* 83(2): 340–363.
- Mills CW. 1999. *The power elite*. New York: Oxford University Press.
- Mintz Beth, and Michael Schwartz. 1981. Interlocking directorates and interest group formation. *American Sociological Review* 46(6): 851–69.
- Mizruchi MS. 1982. *The American corporate network: 1904–1974*. Beverly Hills: Sage.
- Mizruchi MS. 1996. What do interlocks do? An analysis, critique, and assessment of research on interlocking directorates. *Annual Review of Sociology* 22(1): 271–98.
- Pfeffer J. 1972. Size and composition of corporate boards of directors: the organization and its environment. *Administrative Science Quarterly* 17(2): 218–28.
- Roy, William G. 1983. The unfolding of the interlocking directorate structure of the United States. *American Sociological Review* 48(2): 248–57.
- Selznick, P. 1984. *Leadership in administration: a sociological interpretation*. Evanston: University of California Press.

- Shen, Yuan. 2007. Market, class and society—critical issues on sociology of transformation. Beijing: Chinese Social Science Press.
- Shen, Yuan, and Wusan Sun. 2000. Institutional isomorphism and the cultivation of social organizations—the case of China Youth Development Foundation and its foreign exchange activities. In Market, class and society—critical issues on sociology of transformation, ed. Shen Yuan, 301–324. Beijing: Chinese Social Science Press.
- Stark D, and B Vedres. 2012. Political holes in the economy: the business network of Partisan firms in Hungary. *American Sociological Review* 77(5): 700–22.
- Stokman FN, J Van Der Knoop, and FW Wasseur. 1988. Interlocks in the Netherlands: stability and careers in the period 1960–1980. *Social Networks* 10(2): 183–208.
- Zheng, Fang. 2012. Research on interlocking director networks from the perspective of embeddedness. Doctoral dissertation, Shangdong University. <http://www.cnki.net/KCMS/detail/detail.aspx?QueryID=0&CurRec=2&recid=&filename=1012461580.nh&dbname=CDFD1214&dbcode=CDFD&pr=&urlid=&yx=&v=MzExMTVUcldNMUZyQ1VSTCtIWnVadUZpSG5WN3JLVkYyNkhMZStIOVRfcjVFYIBJjhIWDFMdxhZUzdEaDFUM3E>

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