

***Center for Economic Institutions***  
***Working Paper Series***

CEI Working Paper Series, No. 2007-1

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determinants in a transition economy:  
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*Revised on Oct. 2007*

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CEI Working Paper Series No. 2007-1

First Draft: January, 2007

Current Version: October, 2007

## Endogenous board formation and its determinants in a transition economy: evidence from Russia<sup>\*</sup>

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### Abstract

Using a unique dataset of joint-stock companies in Russia, we studied the endogenous formation of corporate boards and its determinants. The findings reported in this paper strongly suggest that the theories and empirical methods of financial and organizational economics help accurately pinpoint the determinants of board size, proportion of outsider directors, and outsideness of chairman appointment of Russian firms. We also found that their board structure can be reasonably explained by the bargaining hypothesis. Furthermore, our empirical evidence demonstrated that Russia's legal system and peculiarities as a transition economy also have a great deal of influence in determining board formation.

JEL classification numbers: D21, D23, G34, K22, L22, P31

Key words: board formation, endogeneity, agency theory, bargaining model, Russia

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<sup>\*</sup> This paper is a product of a Japan-Russia joint research project titled "Corporate Governance and Integration Processes in the Russian Economy" that was launched by the Institute of Economic Research, Hitotsubashi University (Tokyo), and the Institute for Industrial and Market Studies, State University, Higher School of Economics (Moscow). The research was financially supported by grants-in-aid for scientific research from the Ministry of Education and Science of Japan (No. 16530149; No. 17203019) in FY2006 and FY2007. I thank Svetlana Avdasheva, Tatiana Dolgopyatova, Jeffrey M. Netter, Fumikazu Sugiura, and Andrei Yakovlev for their valuable comments and suggestions and Jim Treadway for his editorial assistance.

## **1. Introduction**

Despite the fact that a general shareholder meeting is a supreme decision-making organ within a corporation, few challenge the argument by Jensen (1993) that a board of directors plays the most important role in an internal control system. In a modern corporate system separating management from ownership, “boards are the overlap between the small, powerful group that runs the company and huge, diffuse, and relatively powerless group that simply wishes to see the company run well” (Monks and Minow, 1996, p.167). Accordingly, the primary mission of the directors is to supervise the corporate management on behalf of shareholders by adhering to their duties of due care and loyalty. In other words, if the responsibility of senior managers is to make decisions at their own discretion regarding business operations, that of the board of directors is to exercise control over such management decisions. Only this division of power prevents the management from being the sole evaluator of the business performance as well as ensures the safeguard of invested shareholder capital (Baysinger and Hoskisson, 1990).

In Russia, competition in a product market is not sufficiently intense in many industries (Broadman, 2000). The capital market and the market of corporate control also remain underdeveloped (Sugiura, 2007). Under such circumstances, Russia is expected to establish internal controls that are as strong and functional as those of developed countries in order to effectively promote discipline in corporate management. Russian investors have a propensity to underestimate the roles of corporate boards due to the much stronger ownership concentration and much higher proportion of managerial ownership in their companies than in their Western counterparts. As Williamson (1983) maintains, different governance mechanisms may be substituted for each other to reduce the agency costs incurred in the relationship between owners and managers. At the same time, each of these governance mechanisms plays a complementary role that is specifically effective in certain aspects or stages of agency problems. The same logic is applicable to boards of directors relative to issues such as the protection of minority shareholders. This means that corporate boards are being required to protect minority shareholders, which has been a significant challenge in corporate governance in Russia. In addition, insider control itself does not represent the general characteristics of a current Russian firm’s organization. The ownership structure of large and middle-scale enterprises tends to be diffused year by year. Many of Russian firms now hire professional managers (Dolgopyatova, 2007). Growing interest in monitoring top management through corporate board reflects these irreversible movements in the Russian business sector. Therefore, the importance of management supervision by the board members in Russian companies cannot be overemphasized.

Meanwhile, the role of a board of directors cannot be limited to the monitoring of management even in a broad sense that would include CEO appointment and turnover, the assessment of financial performance, and the determination of managerial remuneration. A board of directors is hierarchically superior to management. In fact, it provides strategic management expertise, advice, and recommendations regarding management activities (Baysinger and Butler, 1985). In addition, as suggested by Hermalin and Weisbach (1988), a corporate board is a competitive training site for CEO candidates. Accordingly, a corporate board is not necessarily comprised of persons whose roles are limited to

managerial supervision. Moreover, as Bathala and Rao (1995) argue, outsider directors do not always account for the majority of board members because corporations naturally use other governance mechanisms when alleviating a conflict between owners and managers in order to optimize board functions. In fact, board structure differs depending on the region, country, economic system, industrial sector, market, corporate form, and business activity of the company.

To understand this organizational diversity, the economics of corporate boards has established a firm theoretical foundation that is based on agency theory (Jensen and Meckling, 1976; Fama, 1980; Fama and Jensen, 1983), but the theory of property rights (Demzets, 1967; Alchian and Demzets, 1972) and other management theories, such as the resource-dependent theory (Pfeffer and Salancik, 1978; Pfeffer, 1981) and the stewardship theory (Barney, 1990; Muth and Donaldson, 1998), are espoused. In addition, the development of empirical tools has continued through interaction mainly with research works on American and European companies, which share the set of standards that is now applicable to post-communist economies as well. Nevertheless, to the best of our knowledge, there has never been any thorough study on the determinants of board structure in Russia and other transitional countries.<sup>1</sup>

To increase the knowledge of transition economies, we identify the economically and statistically significant factors determining the formation of a board of directors in Russian companies through a comprehensive reexamination of the theoretical and empirical implications of board structure in developed countries. This is the primary objective of this paper. In this research field, Hermalin and Weisbach (1998) propose a bargaining hypothesis in which the structure of a corporate board is determined through a bargaining process between the CEO and outside board members, presenting a different theoretical model from the traditional agency theory, which implicitly assumes a pre-established harmony in the self-organization of the firm. As is discussed later, the bargaining hypothesis and the agency theory assume different positions regarding the manner in which the bargaining power of corporate managers and their countervailing parties affects their company's board structure. Judging the applicability of these two approaches to Russian firms from this viewpoint is a matter of great importance for understanding the organizational behavior of business firms in a transition period and is the second objective of this paper.

These two objectives raise the question of which dimension of a firm's organization and which business activities are essential for the empirical analysis of Russian corporations. To address this issue, the potential determinants of board structure are classified into two categories. The first is *governance variables* in a narrow sense, which include those relating to a firm's organization, such as ownership structure and company

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<sup>1</sup> Several studies have dealt with corporate boards in the Russian former state-owned enterprises and newly established corporations. They include the pioneering works by Dolgopyatova (1995), Blasi and Shleifer (1996), Afanasiev *et al.* (1997), and Filatotchev *et al.* (1999). Most of the prior studies, however, are just shown to imply the existence of a close association between ownership structure and board structure in Russian corporations (Iwasaki, 2007a). In addition, there are virtually no empirical works that examine the determinants of board structure in other transition economies.

size. The second is *business-activity variables*, consisting of those relating to business type, competition environment, fund-raising activities, and financial performance. Furthermore, the governance variables are divided into *bargaining variables*, which reflect the bargaining power of managers and that of interested parties who are in conflict with the managers, and other governance variables for the examination of the second objective of this research. In this paper, the impacts of the three variable groups are empirically compared within the structure of corporate boards.

As a third objective, we propose and empirically validate several theoretical hypotheses concerning the interrelation of board structure with the special features of corporate law and the transition economy in Russia. While Russian corporate law adopts the Anglo-American type of corporate model in general, it introduces several unique regulations regarding the governance mechanism in joint-stock companies, including placing a lower limit on board size, prohibiting the vesting of the two titles of company top manager and board chairman in one person, and not allowing other executive directors to concurrently assume one-fourth or more of the board membership (Black and Kraakman, 1996; Iwasaki, 2007b). An investigation of the impact of these legal arrangements on board structure would definitely be worthwhile. Moreover, Russian law requires an investor to choose a legal form of incorporation for a joint-stock company. The choice is between an open or a closed arrangement, in which the degree of share transferability to third parties differs considerably (Iwasaki, 2007c). This provision is also likely to affect the structure of a board of directors in Russia. In addition, for researchers of transition economies, it is an intriguing subject to study how influential the succession of the “common properties of the working class” in the socialist era is over the internal organization and management system in former state-owned enterprises in comparison to newly established private firms in the transition period (Djankov and Murrell, 2002). In addition, the potential impact of integration with so-called business groups on corporate governance in their affiliate companies cannot be overlooked. In Russia, holding companies and other types of business alliances have mushroomed all over the country as a result of the enterprise privatization of the 1990s, and these business groups play a crucial role in the management of a country’s big businesses (Guriev and Rachinsky, 2005). An empirical study of the above specific features in the Russian economy in terms of their effects on board structure will contribute valuable findings and theoretical viewpoints to the study of transition economies as well as to the field of financial and organizational economics.

To investigate three objectives stated above, we conduct an empirical analysis of the determinants of (a) board size, (b) proportion of outsider directors (board composition), and (c) appointment of board chairmen (board leadership structure) dealing with their endogeneity. We assume that these three board components are interrelated and simultaneously determined. This is called *endogenous board formation*. Recent theoretical and empirical work gives considerable attention to this structural aspect in corporate boards (Lehn *et al.*, 2005; Raheja, 2005; Adams and Ferreira, 2007; Boone *et al.*, 2007; Coles *et al.*, 2007; Harris and Raviv, 2007; Linck *et al.*, 2007). We concur with these findings. An empirical analysis of the corporate governance model, however, is beset with great difficulties to specify its real structure, and it is particularly problematic when we

estimate econometric models with endogenous dependent variables. As a second-best solution, we first perform a single-equation regression to specify the determinants of each board component. Next, we construct a simultaneous-equations model of endogenous board formation on the basis of the independent variables found to be comparatively significant and robust at the first step of empirical analysis and estimate the model by the two-stage least squares method (2SLS). This procedure follows the empirical strategies adapted by Boone *et al.* (2007), Coles *et al.* (2007), and Linck *et al.* (2007).

As the basis for the empirical analysis in this paper, we utilize the results of a large-scale enterprise survey conducted in 2005 throughout Russia by a Japan-Russia joint research team from Hitotsubashi University in Tokyo and Higher School of Economics in Moscow. The survey was performed from February to June 2005, and 822 members of top management from industrial and communications enterprises from 64 federal districts were interviewed.<sup>2</sup> All samples were joint-stock companies, and the average number of workers per company was 1,884 (standard deviation: 5,570; median: 465). The total number of workers of these surveyed firms was 1,549,008, and they accounted for 10.3% of the average workforce in both the industrial and the communication sectors through 2004 according to official statistics (Rosstat, 2005). Furthermore, regarding the regional and sectoral composition of the surveyed firms, they formed a representative sample of Russian medium- and large-scale enterprises. The survey results include information on the size of the boards, basic attributes of board directors, and methods used for the appointment of board chairmen, which made it possible to carry out a detailed investigation of 741 board chairmen and 4,818 directors.<sup>3</sup> In addition, databases belonging to SKRIN and SPARK Co., both of which are major company information agencies in Russia, were used in this study to obtain data on the financial performance and the percentage of ownership shares held by the managers and board members of our sample firms. This was done so that the empirical analyses would be compatible with those in earlier studies of listed companies in developed countries.

The remainder of this paper is organized as follows: Section 2 describes the legal framework of the board structure in Russian joint-stock companies. Section 3 reports the general characteristics of board structure based on the results of the joint enterprise survey. Section 4 presents testable hypotheses. Section 5 conducts empirical analysis of the determinants of board formation and examines the overall robustness of the estimation results. Section 6 summarizes the findings and concludes the paper.

## **2. Legal framework of the board structure in Russian joint-stock companies**

In Russia, the legal basis for joint-stock companies is provided by the provisions of the Civil Code and the Federal Law on Joint-Stock Companies (Law on JSCs) and supplemented by the Corporate Governance (CG) Code.<sup>4</sup> The overall legislative structure

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<sup>2</sup> Of those interviewed in this survey, 94.8% were company presidents (or CEOs or general directors) or vice presidents. The remaining respondents were board chairmen (1.6%) and senior managers responsible for corporate governance affairs (3.6%).

<sup>3</sup> For more details, see Dolgopyatova and Iwasaki (2006).

<sup>4</sup> These provisions refer to Part I, Chapter 4 (Art. 96 to 104) of the Civil Code of November 30, 1994 (effective January 1, 1995), the Federal Law on Joint-Stock Companies of December

of Russia's joint-stock companies, including the roles of the board of directors and its sharing of power with the executive body, has been examined in detail by Iwasaki (2007b). Therefore, the focus of this section is on matters closely connected with board structure.

According to corporate law, not all joint-stock companies founded in Russia are required to establish a board of directors. Article 64 of the Law on JSCs provides that the general shareholder meeting of a joint-stock company whose voting shares are held by fewer than 50 persons may perform the same functions as those of the board of directors. This measure is construed as a legal device for enabling comparatively small companies directly managed by their shareholders to avoid establishing an unnecessary corporate organ and reduce management costs (Tsepov, 2006).

The number and appointment of board members are determined exclusively by an ordinary resolution of a shareholder meeting (Law on JSCs, Art. 48(1), Para. 4). Nevertheless, there are strict legal requirements as to the minimum number of directors. They provide that companies with 10,000 or more voting shareholders must have no fewer than 9 directors; those with 1,000 or more but fewer than 10,000 voting shareholders must have no fewer than 7 directors; and those with fewer than 1,000 voting shareholders must have no fewer than 5 directors (Art. 66(3)).<sup>5</sup> On the other hand, there is no statutory upper limit. The term of office for directors is one year (defined as the date of appointment to the date of the next year's shareholder meeting), and all of their seats must be contested at a regular shareholder meeting to be held no earlier than two months and no later than six months from the commencement of the fiscal year (Art. 47(1)). In other words, a staggered board is not allowed in Russia, differently from the cases of the U.S. and France, where such a system is quite common. All directors must be elected through cumulative voting, a system that aims to protect the interests of minority shareholders (Art. 66(4)).<sup>6</sup> Every shareholder who holds one-fiftieth or more of the total issued shares (2% or more voting equity) has a right to nominate directors (Art. 53(1)). Shareholders with one-tenth or more of the total issued shares also have the right to convene an extraordinary shareholder meeting and file a motion seeking the replacement of incumbent directors (Art. 55(1)).

A board chairman is elected among the directors approved at a shareholder meeting by a simple majority. Directors may replace their chairman at any time by a resolution

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26, 1995 (effective January 1, 1996), and the resolution of the Federal Commission for the Securities Market dated April 4, 2002, regarding the recommendation of the adoption of the Corporate Governance Code. This section was written by taking into account the laws and regulations that were effective in Russia during the period of the 2005 enterprise survey.

<sup>5</sup> The regulations applicable to joint-stock companies with fewer than 1,000 voting shareholders as to the number of board members are comparatively new rules enforced by the amendment of the Law on JSCs in February 2004. There had been no regulations of this kind before the amendment. Telyukina (2005) explains that the purpose of this amendment, by which stricter statutory upper limits were placed on the number of board members, was to further protect the interests of minority shareholders.

<sup>6</sup> The February 2004 amendment of the Law on JSCs made it mandatory for all joint-stock companies to elect board members by cumulative voting, a measure that aimed at strengthening the protection of the interests of minority shareholders. Until the amendment, the cumulative voting procedure had been enforceable only on joint-stock companies with 1,000 or more voting shareholders.

adopted by the majority of their votes unless otherwise stipulated in the articles of incorporation (Law on JSCs, Art. 67(1)).

The most distinctive feature of the management and supervisory bodies of Russian joint-stock companies lies in comparatively strict restrictions regarding managers assuming board memberships. The Law on JSCs strictly prohibits the top manager (single executive organ) from serving as his company board chairman and members of the collective executive organ (the management/administration division), which consists of senior managers, from accounting for one-fourth or more of the board membership (Law on JSCs, Art. 66(2)).<sup>7</sup> In addition, members of the audit committee established as a subordinate organ to the general shareholder meetings for the purpose of investigating financial and management activities may not become board members (Art. 85(6)). In major industrialized countries, the systems of corporate governance can be divided into two types: “a two-tier system,” in which the executive function is separate from the supervisory function, and “a single-tier system,” in which a single organ assumes both of these functions. In the case of Russia, the governance system can be characterized as a hybrid (Polkovnikov, 2002): it is not as independent as supervisory organs in German stock companies but is more independent than those found in Anglo-American corporations, as seen in the restrictions on the assumption of concurrent posts by executive officers.

The Law on JSCs, however, includes no provision preventing the board chairman from being elected from among insider directors; moreover, it allows joint-stock companies to determine at their own discretion whether to establish a collective executive organ (Art. 69(1)). Soon after the enactment of the Law on JSCs in 1996, it became clear that joint-stock companies might easily evade the restrictions on managers assuming board memberships by not establishing a collective executive organ. As explained in another paper (Iwasaki, 2007b), the adoption of a corrective executive organ requires an amendment of the articles of incorporation and is determined by a supermajority resolution at a general shareholder meeting (passed by a majority of not less than three-quarters of the votes of present shareholders owning a majority of voting shares); this makes it highly possible for managers to attempt to reject requests from outside shareholders to increase the level of managerial monitoring in collusion with affiliated companies and employees. It is also likely that a top manager with significant ownership could appoint an individual under his influence to a board chairmanship.

The CG Code is a kind of government decree issued by the Federal Commission for Securities Market (FCSM) in April 2002. The CG Code, which was compiled by government officials and experts on the basis of the OECD’s *Corporate Governance Principles*, stipulates rules to be followed by all joint-stock companies operating in Russia with regard to matters pertaining to corporate management, basic principles of corporate governance (Chapter 1), and the settlement of internal disputes (Chapter 10). The CG Code

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<sup>7</sup> A collective executive organ headed by a company president is an internal executive organization, and its function is, together with a single executive organ, to supervise daily management matters except for those that fall within the authority of the shareholder meetings and the board of directors (Law on JSCs, Art. 69(2)). It is assumed that the role of a collective executive organ is to clarify managerial responsibilities and to make the board of directors more independent from the management of the company (Iwasaki, 2007b).



devotes much space to matters regarding the board of directors setting forth detailed rules on board structure as well as the appointment of board members (Chapter 3, Section 2). The CG Code, however, contains very few numerical targets of board composition; one of those mandates that joint-stock companies include in their articles of incorporation is the provision that they have at least three “independent directors”<sup>8</sup> who account for no less than one-fourth of the board membership (Section 2.2.3).<sup>9</sup> The CG Code has not had a significant effect yet because it is a relatively new government decree with no legal binding force. Nevertheless, it is also a fact that some securities exchanges closely examine whether domestic corporations that have applied for listing their stock or issuing their bonds are compliant with the code, in accordance with administrative directions issued by the FMCS.<sup>10</sup> Therefore, the CG Code possibly has some influence on Russian companies seeking to raise funds from capital markets.

### **3. The structure of Russian corporate boards: a statistical overview**

With the aforementioned features of the legal framework of the corporate board of Russian joint-stock companies in mind, we here attempt to describe the general characteristics of board structure using the results of our enterprise survey.

As already mentioned, in Russia, joint-stock companies with fewer than 50 voting shareholders may determine at their discretion whether or not to set up a board of directors. Of the 298 surveyed firms whose total number of shareholders immediately before the survey was known to us, 46 (15.4%) had fewer than 50 shareholders, including 3 (1.0%) without a board of directors. The average (median) number of shareholders for these three firms was only 1.3 (1), much smaller than 18.1 (14) for the other 43 enterprises.<sup>11</sup> This difference is statistically significant ( $t=-1.665$ ,  $p=0.051$  (one-sided); Wilcoxon  $Z=-2.356$ ,  $p=0.019$ ). Hence, there are only a few companies with an extremely small shareholder base

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<sup>8</sup> The CG Code defines an “independent director” as one who meets seven criteria for independence, which include (a) that the director has not been a manager or an employee of the company over which he assumes the directorship or its parent company for three years before the date of appointment; (b) that the director is not an affiliate of the company; and (c) that the director is not a representative of the government.

<sup>9</sup> The CG Code strongly recommends joint-stock companies to set up a subordinate committee of the board of directors. A 2001 joint survey by the FCSM and the Institute for Stock Market and Management covering 56 major enterprises, however, revealed that only one of those surveyed firms had such a subordinate committee. Thus, this governance system has not yet been widely adopted, even among large companies in Russia (The Federal Commission for Securities Market and the Institute for Stock Market and Management, 2002).

<sup>10</sup> This was confirmed by an interview survey at the Russian Trade System (RTS) Stock Exchange, which was jointly conducted by the author and Naohito Abe in August 2003 (Iwasaki, 2003).

<sup>11</sup> These numbers are based on the SKRIN database on the total number of shareholders as of Q4 2004 or Q1 2005. These data do not provide the exact number of voting shareholders at the time of our survey; however, this would not result in a serious bias in the analyses conducted in this paper because the list of shareholders expected to be present at a shareholder meeting must be finalized 45 to 65 days prior to the date of the meeting (Law on JSCs, Art. 51(1)), our survey was conducted before the high season of shareholder meetings, and nonvoting shares are not very common in Russia.

that do not have a corporate board despite the institutional consideration allowing small firms not to set one up.

Of the 822 surveyed firms, 730 (88.8%) responded to our questions regarding their board size and the basic attributes of their board members. As **Table 1** demonstrates, as of the first half of 2005, joint-stock companies in Russia had an average number of 6.6 board members (standard deviation: 2.4, median: 7), of which only 76 firms or 10.4% had 10 or more board members. These figures have been stable throughout the transition period and are consistent with the results of past surveys by Blasi and Shleifer (1996), Dolgopyatova (2003), and Yasin (2004). Compared with approximately 18,600 enterprises in 19 countries throughout the world surveyed in 22 prior studies, the average board size of Russian companies is smaller than that of large listed firms in the U.S. and other major developed countries but almost the same as that of initial public offering (IPO) firms in those large nations and that of listed companies in small countries (**Table 2**). Considering that most of the enterprises covered by the joint survey were unlisted companies, Russian corporations are expanding the scale of their internal organs, following the path of major Western countries.

**Figure 1** demonstrates that the board sizes of Russian enterprises are influenced by the abovementioned legal restrictions as to the minimum required number of board members according to the number of shareholders. In fact, of the 730 joint-stock companies, as many as 520 firms, or 71.2%, have a total of 5, 7, or 9 board members. Looking again at the 273 samples of which the total number of shareholders is known to us, 196 (71.8%) of them fall into the same category. We classified these 196 firms into three subgroups, i.e., 5-, 7-, and 9-board member companies, and then calculated the average number of shareholders for each of these subgroups. The average number of shareholders for 5-, 7-, and 9-board member companies was 605.4 (standard deviation: 1,356.0; median: 200), 3,212.2 (16,856.6/854), and 3,988.6 (5,052.3/2,073.5), respectively. This suggests that, against the expectations of lawmakers, there were many joint-stock companies with 9 board members and far fewer than 10,000 shareholders. In fact, although a Kruskal-Wallis test, which is a nonparametric multiple comparison method, identified significant differences in the medians among these three subgroups ( $\chi^2=34.250$ ,  $p=0.000$ ), no significant difference was found by a Scheffe multiple comparison test between the 7-board member subgroup and the 9-board member subgroup ( $\chi^2=3.484$ ,  $p=0.175$ ).<sup>12</sup> Furthermore, 25 (9.16%) of these 273 companies either had fewer than 5 board members, in violation of the Law on JSCs, Article 66(3), or had a smaller or larger number of board members than the applicable minimum number stipulated in the same provision. Likewise, as shown in Figure 1, 67 (9.18%) of a total of 730 respondents had fewer than 5 board members. These facts suggest that the actual board sizes in Russian companies are greatly affected by their managerial judgments on various factors as well as by the social characteristics of transition Russia, such as indifference to legal amendments or lack of law-abiding behavior on the part of citizens and corporations.

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<sup>12</sup> A standard ANOVA test indicated that the differences in mean values among the three subgroups were not significant ( $F=1.110$ ,  $p=0.332$ ), while a Bartlett test strongly rejected the null hypothesis of equality of the variances ( $\chi^2=249.202$ ,  $p=0.000$ ). Hence, the analysis here relies solely on the results of a nonparametric test.

Table 1 also shows the breakdown of 4,818 board members from the 730 surveyed firms by classifying them into six groups with basic statistics of specific attributes. From this point forward, a director appointed from among company managers, rank-and-file employees, and representatives of a labor union is referred to as an “insider director,” and a director identified by other circumstances is referred to as an “outsider director.”<sup>13</sup>

According to the survey results, the board of directors in a typical joint-stock company consists of an average of 3.2 insider directors and 3.4 outsider directors. Contrary to general belief, Russian corporate boards do not appear to be insider-dominated. A significant percentage (90.0%) of insider directors is appointed from among senior managers. Insider directors of this type account for 43.9% of all directors. They hold positions in 640 (87.7%) of the 730 surveyed enterprises. However, 152, or 23.8%, of these 730 companies have only one insider director with a managerial background (probably, a top manager). Companies with (an) insider director(s) representing the interests of workers or of a labor union account only for 16.0% (117 companies) of all our samples, which was a surprising finding.

On the other hand, of outsider directors, 75.6% represent private outsider owners. Of those, 240, or 12.9%, assume directorships for the interest of minority shareholders. This outcome could be considered a positive effect of mandatory cumulative voting. Of the 730 surveyed firms, 481 (65.9%) have an average number of 3.9 (standard deviation: 2.3; median: 4) directors representing private outside shareholders. As for independent directors,<sup>14</sup> they account for 6.5% of all directors and 12.7% of all outsider directors. However, only 138 (18.9%), or nearly one-fifth, of the 730 surveyed enterprises have (an) independent director(s). Despite active efforts by the FCSM, independent directors are still not common in Russia. As in the case of independent directors, the number of state representatives is quite small, accounting for 6.0% of all directors and 11.7% of all outsider directors. Although no statistical background is provided here due to space limitations, we confirmed that state representatives were sent in large numbers to large-scale formerly state-owned enterprises operating in strictly regulated industries.

The results of struggles among these interested parties reflect the extent of outsider directorship. Among the 730 responding enterprises, the average proportion of outsider directors was 48.9% (median: 55.6%). As shown in Table 2, this level is nearly the same as that for listed firms in the U.K., U.S., China, and the Asia-Pacific region, much lower than that for companies in Europe, and much higher than that for Japanese companies. Since most of the surveyed firms are unlisted, it appears that the typical Russian company has the same level of openness as its counterpart in industrialized countries despite the commonly held opinion that they are insider-dominated. On the other hand, as shown in **Figure 2**, there are few firms with statistically typical boards among our samples. Rather, the majority of Russian companies are either governed by a board of directors with an extremely high proportion of outsider directorship or completely dominated by insider directors. As reported by Barnhart *et al.* (1994), Peasnell *et al.* (2005), and Roosenboom

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<sup>13</sup> Here, due to constraints of the methodology used in the survey, no distinction was made between affiliated and non-affiliated individuals with regard to outsider directors (except for independent directors), as in many earlier studies involving developed countries.

<sup>14</sup> Here, independent directors fit the definition in the CG Code mentioned in Section 2.

(2005), the extent of outsider directorship of listed and unlisted companies in developed countries has a bell-shaped distribution in general. Moreover, Table 2 indicates that the standard deviation of the outsider directorship ratio in our samples (35.3%) is much higher than those in other studies. Therefore, it would be quite appropriate to perceive the reality of Russian enterprises from the viewpoint of polarization in terms of the proportion of outsider directors.

As reported earlier, Russian law prohibits a top manager from assuming the formal leadership of his company's board; however, that does not prevent an insider director from becoming a board chairman. Furthermore, in Russia, vertical or horizontal business integrations, including participation in holding companies or other company groups through stock ownership, are becoming more prevalent in a dynamic context, prompting corporate managers to accept individuals from these business groups or partners as board chairmen. Needless to say, it is likely that a business group or partner affiliated with an enterprise could place its representative on its board of directors to have him perform a pure monitoring role as an outsider chairman. However, when two companies are affiliated through cross shareholding or joint ownership and maintain a good relationship with each other, it would also be possible for one company to place its representative on the other company's board in defiance of the will of the other company's management team. Taking this into account, we refer to board chairmen appointed from among those working in a business group or a business partner to as "quasi-outsider chairmen" and position them as the intermediate category between "insider chairmen," who are promoted from within the company, and "outsider chairmen," who have other characteristics.<sup>15</sup> The relationship among the three types of board chairmen in terms of appointment route is hereinafter expressed as "the outsideness of chairman appointment." A higher degree of outsideness in a board chairman suggests a higher degree of board independence.

According to the answers from 741 enterprises that responded to the question regarding the manner in which they appointed their board chairmen, 340, or 45.9%, of all chairmen are insiders. Outsider chairmen (229 or 30.9%) and quasi-outsider chairmen (172 or 23.2%) follow. This picture corresponds almost precisely to the balance of power between managerial directors and outsider directors in average Russian enterprises, suggesting that the negotiation between company managers and opposition parties has significant influence over the appointments of board chairmen, as asserted by Hermalin and Weisbach (1998).

As already discussed, we assume endogeneity among board size, the proportion of outsider directors, and the outsideness of chairman appointment. The correlation matrix in **Table 3** indicates the possibility of such a relationship among these board components. They are positively associated, and the correlation between the board size and the proportion of outsider directors and that between the proportion of outsider directors and the outsideness of chairman appointment are statistically significant at the 1% level.

With its components being simultaneously determined, the structure of a board of

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<sup>15</sup> On the other hand, supplemental examinations confirmed that the empirical evidence and the conclusions reached in this study and presented from this section forward were not greatly affected even when quasi-outsider chairmen were treated as insiders.

directors can be influenced by various factors, including a firm's organization and business environment. The level of such influence can be assessed by comparing various industries. In fact, the surveyed firms belong to one of eight industrial sectors or to the communications sector; a Hotelling  $T^2$  test identified a significant difference at the 1% level ( $T^2=25.185$ ,  $F=8.371$ ,  $p=0.000$ ) in the mean vector of three board components between industrial firms and communications firms. **Table 4** also reveals subtle but certain sector-to-sector differences in the mean of each board component. Moreover, both a comparative analysis of industrial and communications firms and an analysis of variance of the 9 sectors identified statistically significant differences in all board components. As Boone *et al.* (2007) point out, the board components are susceptible to influence by various factors differentiating one sector from another, implying that the attention should be paid to industry fixed effects<sup>16</sup> in an empirical analysis of board formation.

#### **4. The logic of board formation in the context of a Russian transition economy**

Now, we have a clear understanding of the institutional framework and the general characteristics of the board structure in Russian joint-stock companies. In the second part of this paper, we theoretically and empirically examine the determinants of their board formation. In this section, testable hypotheses are presented for verification on the basis of the results of the 2005 enterprise survey. In addition, the traditional determinants of board structure in Russia are interpreted, along with references to the particularities of Russia's corporate law and its economy in transition.

As we stated in the Introduction, the factors affecting board structure can be divided into governance variables and business-activity variables. The former include those relating to firm organization, such as ownership structure and company size, and the latter, those relating to business type, market environment, fund-raising activity, and financial performance.<sup>17</sup> The governance variables contain variables reflecting the bargaining power of managers and that of interested parties who are in conflict with the managers. These variables are called "bargaining variables" (Arthur, 2001). In order to examine the applicability of the bargaining hypothesis to a Russian firm in comparison with the traditional agency theory, we adapt this terminology and separate bargaining variables from other governance variables.

By hypothesizing an endogenous relationship among the dependent variables, namely, the board size (*BOASIZ*), the proportion of outsider directors, i.e. board composition (*BOACOM*), and the outsideness of chairman appointment, i.e. board leadership structure (*BOALEA*), the formula for the determination of board formation can be expressed in the following three functions:

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<sup>16</sup> They are related to the production technologies, the intensity of state regulations and the industry protection measures, the level of market concentration, and the degree of public interest in the industry (i.e., mass media and local citizens), among others.

<sup>17</sup> The business-activity variables include broadly defined governance variables, such as competition environment and capital structure.

$$\begin{aligned}
BOASIZ &= f(BOACOM, BOALEA, BARVARs, GOVVARs, BUSVARs), \\
BOACOM &= g(BOASIZ, BOALEA, BARVARs, GOVVARs, BUSVARs), \\
BOALEA &= h(BOASIZ, BOACOM, BARVARs, GOVVARs, BUSVARs),
\end{aligned}$$

where *BARVARs*, *GOVVARs*, and *BUSVARs* denote the bargaining variables, other governance variables, and business-activity variables, respectively.

In the following three subsections, we consider specific factors included in the above three variable groups and their possible impacts on board structure in more detail. In Subsection 4.4, we discuss the possible interrelations within a board structure.

#### **4.1. Bargaining variables**

According to Hermalin and Weisbach (1998), the ownership share of board members and CEO tenure are the most representative bargaining variables. Nevertheless, it would be more appropriate to regard the influence of a management group and that of major outside shareholders as bargaining variables as well by taking into account that Russian enterprises are managed in a more collective manner than Anglo-American corporations and are significantly influenced by a handful of large shareholders. In other words, the conflict model “CEO versus outsider directors” presented by Hermalin and Weisbach needs to be expanded to read “managers’ group versus outsider directors plus major outsider shareholders” in order to thoroughly understand the actual state of a Russian firm.

The agency theory hypothesizes that the existence of major outsider shareholders renders supervision by outsider directors less necessary because these large shareholders have a sufficient incentive and capability to actively perform monitoring functions by exercising their influence when necessary or because they can discipline managers effectively by increasing the possibility of takeover by third parties (Rediker and Seth, 1995). In fact, a number of earlier studies have identified a negative correlation between ownership concentration by outside investors and board independence (Li, 1994; Mayers *et al.*, 1997; Prevost *et al.*, 2002; Erikson *et al.*, 2005). However, shareholders can use their bargaining power to reinforce the monitoring function of the board to increase their ability to collect managerial information or strengthen their authority to dismiss managers who fail to elevate corporate values. This is particularly true if shareholders live in countries where the corporate control market is still underdeveloped or selling all of their shares would be too costly (Whidebee, 1997). In fact, a significant amount of empirical evidence from other studies on listed companies in Japan supports this hypothesis; in Japan, the capital market is less effective for the development of corporate governance than it is in Europe and the U.S. Other supporting evidence comes from research dealing with unlisted firms and emerging markets (Kaplan and Minton, 1994; Mak and Li, 2001; Roosenboom, 2005). The current state of the Russian economy is clearly closer to that of Japan and emerging markets. Furthermore, in the case of Russia, where social distrust of corporate managers is quite high, it is highly possible that large shareholders would maximize their presence in their invested companies by using any channel available to them. Therefore, the ownership share of major outsider shareholders is probably positively correlated with board size and independence, although the marginal effects of their additional share on the expansion of their voting rights may decrease. In addition, as is the case with managers and directors, shareholders are possibly subject to entrenchment effects. Consequently, it is

presumed that ownership by large shareholders has a nonlinear impact on board structure.

Many researchers provide detailed arguments for the possible influence of CEO ownership on board composition.<sup>18</sup> The traditional agency theory assumes that CEO shareholding reduces the need for the corporate board to perform its monitoring function, as it creates the effect of sharing common interests between CEO and outside owners (convergence effect). The bargaining hypothesis explains that a CEO's increased bargaining power decreases the chances of outsider directors being appointed. Thus, both theories support the idea that CEO shareholding reduces board size and independence. Furthermore, these theories jointly lead to expectations that CEO shareholding and board independence are negatively correlated, which is based on the assumption that a CEO with a significant level of ownership actively and effectively hinders the appointment of outsider directors and the separation of CEO and board chairman positions due to an entrenchment effect that is greater than the convergence effect as well as the CEO's significant voting power. The bargaining hypothesis, however, is distinguished from the agency theory in the next point. The former predicts that, when the level of CEO ownership share is not sufficiently high to give the CEO complete control over the director appointment process, outsider directors and owners exercise their bargaining power to the full extent to counter the CEO's entrenchment behavior, resulting in an economically significant non-linear relationship between CEO ownership share and board size/independence. Consequently, if the bargaining model is highly applicable in Russia, the function of the relationship between the CEO ownership share and board size/independence is negatively linear and positively quadratic. This prediction is also applicable to shareholding by a management group. On the other hand, it can be hypothesized that the ownership share of outsider directors affects board structure in the same way as that of major outsider owners. These assumptions are very important with regard to the second objective of this research.

On the other hand, as reported in the previous section, in Russia, business alliances are now burgeoning both at the Federal level, as represented by financial-industrial groups led by commercial banks, major industrial enterprises, and newly emerged financial cliques called "oligarchs," and at the regional level. In fact, our survey indicates that 323 (39.3%) of the 822 surveyed firms are affiliated with a certain business group through shareholding. The most important and, probably, most dominant owners for these business groups are holding companies and core group firms whose corporate governance functions are drawing attention from researchers involved in Russian economic studies (Iwasaki, 2007a). While persons or organizations leading these business groups are responsible for monitoring their group companies, it is also a fact that they share the same destiny with affiliates. In other words, although holding companies or core group firms can provide an effective monitoring role over their subordinates, collusion among them with their affiliated firms is always possible, leading to a reduction in their shareholder wealth. In theory, it is difficult to determine which is greater, the monitoring or the collusion effect. In this regard, prior studies, such as those by Kuznetsov and Muravyev (2000), Perotti and

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<sup>18</sup> For instance, see Bathala and Rao (1995), Denis and Sarin (1999), Hanson and Song (2000), Arthur (2001), Filatotchev and Bishop (2002), Roosenboom (2005), and Fich (2005).

Gelfer (2001), and Guriev and Rachinsky (2005), empirically confirmed that affiliation with a business group helped a company improve its managerial discipline and promote its restructuring activity. Similarly, it is now commonly accepted among researchers that membership in a business group promotes more sensible corporate governance than that observed in independent enterprises.<sup>19</sup> Hence, we also expect that participation in a business group will enhance the monitoring role of a corporate board in member firms.

The tenure of the top manager can also be a bargaining variable. A CEO with a wide range of personal connections and firm-specific skills that have been developed through a lengthy managerial career always has strong bargaining power. Such a long-standing top manager is expected to use his bargaining power to the full extent in order to give board membership to his loyal followers. Hence, it is presumed that a top manager with long tenure will be able to control the monitoring function of the corporate board. In contrast, a newly appointed top manager is more likely to have a large company board with a high proportion of outsider directors for a short time; this is likely to be due to his weak influence on the director appointment process or his strategy to ask for managerial advice and counseling from outsiders until the company management is on track under his leadership (Weisbach, 1988). In the case of Russia, social attention is now centered on the new generations replacing the “red executives,” or former communist company managers, who had dominated the business sector during the socialist era. Therefore, we attempt to test the possible positive correlation between the appointment of new top managers and the independence of the corporate board in their companies.

#### **4.2. Other governance variables**

In addition to bargaining variables, we give attention to six additional elements reflecting the organizational characteristics of Russian corporations as governance variables: (a) soon-to-retire top managers; (b) the legal form of incorporation; (c) the upper limits on shareholding and voting rights set by the articles of incorporation; (d) the adoption of the collective executive organ; (e) the political background behind a company’s foundation; and (f) company size.

First, over the past dozen years after the collapse of the Soviet Union, a large number of Russian corporate managers of the socialist generation have been approaching retirement age. Therefore, the manner in which power is transferred to their successors is significant, since the managers could have considerable impact on the process for appointing directors. According to Hermalin and Weisbach (1988) and Baker and Gompers (2003), a company in the U.S. with a soon-to-retire CEO is more likely to accept the CEO’s successor as a member of its corporate board, resulting in a significant increase in the proportion of insider directors, although the impact of the acquisition of board membership by the successor on board size may be trivial. Other empirical studies also assert that a retiring CEO has a strong tendency to assume board chairmanship, probably with the objective of making it easier to transfer power to the successor he deems most desirable (Mark and Li, 2001; Booth *et al.*, 2002). The hypothesis of the negative impact of soon-to-retire top managers on board independence is worth testing with our dataset with

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<sup>19</sup> Avdasheva (2006) analyzed business integration issues using our survey results and arrived at conclusions similar to those reached in earlier studies.



respect to Russian corporations.

The second focus of the agency theory perspective is placed on the corporate forms of Russian joint-stock companies. Mayers *et al.* (1997) conducted a comparative analysis of joint-stock and mutual companies in the U.S. insurance sector and confirmed that the boards of directors of mutual companies perform a stronger monitoring function than those of joint-stock companies in order to achieve an adequate level of managerial discipline. In their view, this is because, due to their limited share transferability, mutual companies have weaker alternative governance mechanisms to replace the role of corporate boards than joint-stock companies. In the case of Russia, a person who intends to set up a joint-stock company must choose a legal form of incorporation between either an open company, whose shares can be freely traded, or a closed company, whose shares can be traded only among the promoters and other designated investors, in accordance with the provisions of the Civil Code (Article 97) and the Law on JSCs (Article 7).<sup>20</sup> It is presumed that this difference in corporate form may affect board structure in a similar way to the aforementioned distinction between mutual companies and joint-stock companies. Hence, we predict that the choice of an open joint-stock company is negatively correlated with board size and independence.

Thirdly, attention must be given to the possible effect of provisions in articles of incorporation regarding the ownership and voting rights of shareholders. Russian corporate law allows a joint-stock company, regardless of its corporate form, to set an upper limit on the number or face value of shares or voting rights held by one shareholder in its articles of incorporation (Law on JSCs, Art. 11(3)). Due to this legal arrangement, there are, indeed, many Russian enterprises that impose severe restrictions on the ownership and voting rights of shareholders. In fact, the joint survey revealed that 104 (14.4%) of the 723 responding firms had an upper limit on ownership per shareholder and that 125 (17.2%) of the 726 responding firms had an upper limit on the voting rights by one shareholder. These restrictions, probably set for the purpose of allowing managers to monopolize their discretionary authority are likely to significantly undermine the voice of shareholders and, therefore, affect board structure in favor of the interests of the managers.

Fourthly, we must look at the possible impact of establishing a collective executive organ on board composition. As explained in Section 2, the Law on JSCs has a provision that prohibits 25% or more board membership from being represented by collective executive organ members. If managers are strictly compliant with the purpose of this provision, the establishment of a collective executive organ may restrain the selection of insider directors. As already noted, however, there is a serious loophole in this provision. Hence, we predict that the adoption of a corrective executive organ is negatively related to board size and positively related to board independence, but the statistical significance of its association is relatively low.

The fifth point is closely connected with the current state of the Russian transition economy. It is common knowledge that the vast majority of middle- and large-scale

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<sup>20</sup> For more details on this point, see Iwasaki (2007b). In addition, Iwasaki (2007c) conducted an empirical analysis of the organizational choice of corporate form by Russian joint-stock companies using the same dataset as that used in this paper.

enterprises in Russia are privatized enterprises, many of which are still under state ownership.<sup>21</sup> These former state-owned enterprises, which used to be called “common properties shared by workers” in the Soviet era, still draw much more public attention than *de novo* private firms. Therefore, compared with 100% privately owned companies established during the transition period, traditional former state-run enterprises are likely to have more outsider directors in order to be properly accountable to the state and the public as well as receive various kinds of support from the government (Li, 2004; Beiner *et al.*, 2004). Consequently, former state-owned corporations and newly established enterprises that spun off from state-owned corporations or privatized corporations and are using their assets are expected to have corporate boards with a higher level of independence than ordinary private enterprises *ceteris paribus*.

The sixth point is company size, which is a primary governance variable. The expansion of the organizational size of a company is accompanied by the complication of firm organization and the expansion of the relationship among the company, state, and society. In addition, company size expansion requires managers to improve their skills in various management areas, resulting in an increase in board size (Mayers *et al.*, 1997; Denis and Sarin, 1999; Baker and Gompers, 2003). On the other hand, there is disagreement among researchers as to whether additional directorships are more likely to be held by insiders or by outsiders (Eisenberg *et al.*, 1998; Shivdasani and Yermack, 1999; Agrawal and Kneober, 2001; Peng, 2004). Furthermore, it is not obvious how company size affects the probability of a CEO concurrently assuming board chairmanship (Brickley *et al.*, 1997; Arthur, 2001; Booth *et al.*, 2002). Thus, we assume that the organizational size of a company has a positive impact on both the board size and the extent of outsider directorship and that the statistical significance of the impact on board size is greater than that on the proportion of outsider directors. In addition, considering that the appointment of a board chairman may be decisively dependent upon the bargaining process between managers and their opponents, we presume that it is difficult to find a significant impact of company size on the outsideness of chairman appointment.

#### **4.3. Business-activity variables**

As business-activity variables, we include (a) business diversification, (b) outside financing, (c) market competition, (d) R&D/innovation strategy, (e) financial performance, (f) debts, and (g) business internationalization. The effects of these seven factors on board structure can be summarized as follows.

Business diversification increases the chances that an expert familiar with the new market will become a board member although it is not clear from which group of persons the expert will be selected. In other words, business diversification is expected to have a significantly positive correlation with the number of appointed directors, whereas its effect on the proportion of outsider directors is not clear.<sup>22</sup>

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<sup>21</sup> Of our randomly selected sample of 822 firms, 570 (69.3%) are previously state-owned enterprises, and 79 (9.6%) are newly established companies spun off from state-run enterprises or privatized enterprises. In addition, of the 563 surveyed firms with inherited assets from the state, 105 (18.7%) have state ownership, although the degree of state ownership varies from company to company.

<sup>22</sup> In fact, empirical evidence of prior studies is mixed. See Harmalin and Weisbach (1988), Li

Financing from capital markets encourages managers to make decisions in the interests of investors and helps resolve agency problems. Information disclosure for fund-raising also has the effect of constraining the opportunistic behavior of managers. Furthermore, obtaining financing from capital markets increases the potential risk of hostile takeovers, leading to an improvement of managerial discipline. Hence, it can be assumed that outside financing replaces the monitoring function of corporate boards. Conversely, however, it is possible that issuing stocks or corporate bonds on security markets leads to the appointment of fund-raising directors or the addition of outsiders with expert knowledge about financial engineering (Borokhovich *et al.*, 2004). Particularly in Russia, enterprises are strongly required by financial authorities and securities exchanges to establish an effective internal governance system in compliance with the CG Code, as described in Section 2. Therefore, the results of our empirical analysis must be examined inductively to determine which hypotheses best account for the current state in Russia.

Intensified competition on product markets results in the effective improvement of managerial discipline and also replaces the monitoring role of their corporate boards. In contrast, companies with a monopolistic position within the market are expected to be more likely to appoint outsider directors in order to prevent negligent and opportunistic behavior of managers and check corporate strategies.

Performing an intensive R&D/innovation strategy encourages companies to evaluate the performance of their managers on the basis of the quality of their decisions rather than on the basis of financial results specific to the business they manage because of its technical uncertainty and risky nature (Hill and Snell, 1988). Insider directors are the most appropriate for conducting such evaluations. On the other hand, outside board members are ineffective in supervising firms with deep firm-specific knowledge and high growth opportunities because higher information asymmetry results in higher monitoring costs (Lehn *et al.*, 2005; Linck *et al.*, 2007). Hence, enterprises actively engaged in product development and innovation are expected to have a significantly smaller number and proportion of outsider directors.

Many researchers have repeatedly confirmed that a company that performs poorly compared with its rivals and other companies in the same trade has an impact on its dismissal of insider directors and its appointment of their successors from the outside regardless of differences in period and country (Hermalin and Weisbach, 1998; Kaplan and Minton, 1994; Peng, 2004; Yeh and Woidtke, 2005). Obviously, this impact is triggered by a reduction in the bargaining power of the CEO and senior managers that are responsible for poor performance. In recent years, Russian investors have been paying more attention to company performance and investment efficiency against the background of the rapid economic development and the related stock-trading boom in their country. Our empirical analysis can be expected to present trends similar to those explained in these earlier studies. Nevertheless, as reported by Yermack (1996), Eisenberg *et al.* (1998), and Perry and Shvadasani (2005), board size is rarely influenced by past performance, and this may be applicable to Russian firms. Therefore, we assume that poor financial performance in the

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(1994), Mayers *et al.* (1997), Anderson *et al.* (2000), Prevost *et al.* (2002), and Coles *et al.* (2007), for instance.

past is positively correlated with the proportion of outsider directors but has little impact on board size.

In many earlier studies, including those by Kaplan and Minton (1994) and Linck *et al.* (2007), it has been acknowledged that the higher the debt ratio of a company, the stronger the managerial monitoring function of its corporate board. This is because increased monitoring pressure on a company from creditors trying to recover their credit and from outsider owners afraid of bankruptcy has a strong effect on board structure. Non-performing accounts payable and bank loans are still a serious economic concern in Russia despite the fact that its economy has already pulled out of the transformational recession (Kornai, 1994).<sup>23</sup> It is often the case in Russia that creditors become unable to recover their loans; therefore, it is quite reasonable to assume that creditors are subject to all possible kinds of monitoring pressure from their business partners and financing institutions (Borokhovich *et al.*, 2004). For these reasons, we predict that bank loans and other debts have a statistically significant and positive impact on both the overall number of directors and the proportion of outsider directors.

The remaining business-activity variable is business internationalization. Increased overseas operations and international transactions may result in the company having more expert directors and foreign directors in order to gather information and know-how to deal with the foreign market and foreign business customs as well as secure useful contacts for expanding overseas operations. In the case of Russia, where there are strict government regulations on major export commodities, enterprises actively involved in overseas business may be more inclined to employ those who are skillful in dealing with high-ranking officials and bureaucrats in the fields of trade and tariffs. According to an analysis by Li (1994), who surveyed enterprises in 10 industrialized states, however, the share of overseas sales in total sales nonlinearly affects the proportion of outsider directors. Hence, we expect that a high level of business internationalization has an obvious and positive impact on board size and the extent of outsider directorship.

On the other hand, following the same logic as that used for previous discussions concerning the relationship between company size and chairman appointment, we assume that all of these business-activity variables have, if any, a small or neutral effect on outsideness of chairman appointment.

#### **4.4. Endogenous interrelation of board components**

There are possible interactions among board components, such as board size, proportion of outsider directors, and appointment of outsider chairman. With regard to this point, prior research<sup>24</sup> suggests that companies with a larger corporate board are more likely to have more outsider directors. The more pressure companies receive from the state and investors to improve their internal control system and increase the transparency of their management activities, the more likely they are to expand their board size and, of course, to appoint an

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<sup>23</sup> In fact, the results of the joint survey show that, as of the first half of 2005, 333 (41.0%) of 813 surveyed enterprises had arrears in their accounts payable.

<sup>24</sup> In particular, see Li (1994), Rediker and Seth (1995), Yermack (1996), Whidbee (1997), Shivdasani and Yermack (1999), Arthur (2001), Mak and Li (2001), Prevost *et al.* (2002), Lehn *et al.* (2005), Boone *et al.* (2007), and Linck *et al.* (2007).

outsider as their board chairman. Board chairmen appointed from the outside are expected to encourage the presence of outsider directors in an attempt to secure their influence over strategic decision-making and enhance their comprehensive bargaining power against company managers. If it is impossible to replace insider directors with outsider directors due to resistance by the management side, the board may be enlarged by increasing the absolute number of outsider directors. Analyzing these hypotheses holds a great deal of importance for corporate governance studies in Russia as well. Therefore, we endeavor to explore how individual board components affect each other within Russian firms while controlling the impacts of the abovementioned governance and business-activity variables.

**Table 5** summarizes the theoretical discussions in this section. The prediction on the squared term of bargaining variables is set assuming the bargaining hypothesis is greater applicable to Russian firms than the traditional agency theory. In the next section, we conduct empirical analyses to verify our testable hypotheses.

## 5. Empirical analysis

This section vindicates the economic logic of board formation explained in Section 4 in the case of Russian joint-stock companies using the following datasets based on the results of the 2005 joint survey and on the SKRIN and SPARK open resources.

With regard to the variables of board components, *BOASIZ* (board size) takes the total number of directors on board, *BOACOM* (proportion of outsider directors) is defined as the number of outsider directors divided by the total number of board members, and *BOALEA* (outsideness of chairman appointment) takes a value of 1 for firms with a quasi-outsider chairman and 2 for firms with an outsider chairman. The default category is firms with an insider chairman. In the regression analyses, the log of *BOASIZ* is used.

As for ownership of outside investors and corporate officers, both of which are major bargaining variables, we utilize the 6-point scale of the combined ownership share of corporate ownership and foreign investors (*OWNOUT*),<sup>25</sup> a large management shareholder dummy with a value of 1 if the company has a specific manager or a specific managerial group as its major shareholder (*MANSHA*), and shares of CEO ownership, managerial group ownership, director ownership, and chairman ownership in the total number of outstanding shares (*OWNCEO*, *OWNMAN*, *OWNDIR*, and *OWNCHA*, respectively). Although it is impossible to separate the ownership by outsider directors from those by all directors due to data constraints, we dare check the impact of director ownership on board structure for comparison with that of managerial ownership. Instead, we examine the effect of shareholding by an outsider chairman as an alternative angle of director ownership.

The presence of a business group as a major owner is represented by a group firm dummy (*GROFIR*) for participation in a business group through share ownership, as well

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<sup>25</sup> *OWNOUT* excludes all domestic individual shareholders in order to eliminate the impact of ownership by managers and employees families, relatives, and acquaintances, all of whom are categorized as outside owners in a formal sense, and in order to accurately identify the level of ownership concentration by corporate owners and foreign owners, whose number is usually small in a Russian corporation.

as by a core group firm dummy (*GROCOR*) and an affiliate firm dummy (*GROAFF*), in consideration of the possible asymmetrical effects of business integration due to differences among member firms in their position within the group. Moreover, a new appointment of a top manager is represented by a dummy variable (*NEWCEO*), which takes 1 for the firms with a top manager appointed in or after 2001.

The dummy variables used for investigating the impacts of other governance variables are *CEOAGE*, indicating that the enterprise has a top manager of retirement age (61 or older), *OPECOM*, which captures open joint-stock companies, *LIMOWN*, which assigns a value of 1 to companies that have an upper limit on ownership per shareholder in its articles of incorporation,<sup>26</sup> *COLEXE*, which is equal to one if a company adopts a collective executive organ, and *PRICOM* or *SPIOFF*, which denotes that the company is a former state-owned (or ex-municipal) privatized enterprise or a newly established firm spun off from a state-owned enterprise or a privatized firm, respectively. Furthermore, *COMSIZ*, the natural logarithm of the total number of employees, is used in a series of regression analyses as a proxy for company size.

Concerning the business-activity variables, the level of business diversification is measured by *BUSLIN*, which denotes the number of business lines in accordance with the 2-digit industrial classifications in the Russian All-Union Classifier of the National Economy Branches (“OKONKh”).<sup>27</sup> Financing from capital markets is expressed as *MARFIN*, a dummy variable, with 1 assigned to the enterprises that issued stocks or company bonds on domestic or foreign securities exchanges, and market competitiveness is expressed as *NONCOM*, a dummy variable for non-competing companies, with 1 assigned to the enterprises that responded that they were not competing with any domestic company, foreign-affiliated company, or overseas company from any country or region.

The impact of R&D/innovation activities on board structure is measured using *NEWPRO*, a dummy variable that has a value of 1 if a company successfully developed brand-new products or worked out innovation businesses. The variables of past financial performance include the rate of return on assets (*ROAAVE*), the average rate of gross profit on sales (*PROAVE*), and the frequency of dividend payments (*DIVPAY*). These performance indices are predetermined variables reflecting the business results of our samples for a period of several years prior to the 2005 joint survey, which makes it possible to avoid any possible simultaneous bias between board structure and firm performance. *ROAAVE* and *PROAVE* take industry-adjusted values using a method proposed by Eisenberg *et al.* (1998) and represent the distances from the median performance in each industry. The formula is:

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<sup>26</sup> Of the surveyed firms with upper limits on ownership per shareholder, 63.5% also have restrictions on voting rights per shareholder in their articles of incorporation. Thus, we will focus only on the effects of setting a limit on ownership per shareholder. Similar results were obtained when, instead of using *LIMOWN*, a dummy variable with a value of 1 for the samples with limits on voting rights per shareholder was used and when, instead of using *LIMOWN*, a dummy variable for those with restrictions on either per-shareholder ownership or per-shareholder voting rights was utilized.

<sup>27</sup> These 2-digit classifications best measure the level of the non-related diversification (conglomerate) strategy.

$$Performance_{adj} = sign(\Delta Performance) \times \sqrt{|\Delta Performance|},$$

where  $\Delta Performance$  is the value obtained by subtracting the median performance in the corresponding industry from the sample firm's performance.

The impact of debts on board structure is tested using *BANCRE*, a variable for the use of bank credits by the surveyed firms and their average length, and *ARREAR*, a variable accounting for the proportion of overdue accounts payable in total debts. *EXPSHA*, the share of total exports in total sales, represents the degree of business internationalization.

The definitions, descriptive statistics, and sources of the above datasets are listed in **Table 6**. In the regression analyses, we also control the fixed effects in each industry using 8 dummy variables. As Boone *et al.* (2007) argue, inclusion of industry fixed effects in regression models has the potential to control the endogeneity of board components.

### 5.1. Board size

Yermack (1996) maintains that a firm's value is dependent upon the monitoring function level and decision-making quality of its corporate board, whereas its performance is significantly determined by its board size. We will start our empirical analyses from this aspect of corporate boards.

Column (a) of Table 6 shows the correlation coefficients between board size and independent variables that we have adopted. All of the ownership variables – the major bargaining variables – have predicted signs with statistical significance. The coefficient of *GROCOR* is relatively smaller and less statistically significant than that of *GROAFF*. This implies that, in Russia, it is quite usual for core firms to place their representatives on the corporate boards of their affiliate companies for monitoring purposes, while, on the other hand, it is quite rare for the subordinates to have their own representatives in the strategic decision-making process by core firms. A new top manager's appointment dummy, *NEWCEO*, is positively correlated with board size, as we predicted, but at a lower significance level than the ownership variables.

The coefficients of many of the other governance variables also support our theoretical hypothesis. Unexpectedly, however, the existence of a collective executive organ is positively and significantly correlated with board size. Moreover, the correlation coefficients for newly established firms spun off from state-owned or privatized firms contradict the hypothesis, although the correlation is statistically insignificant.

Looking at the business-activity variables, those for the number of business lines, gross profit rate, frequency of dividend payments, proportion of overdue loans, and overdue accounts payable in total debts have positive correlation coefficients with board size, which is consistent with our assumptions. *MARFIN* is also positively and significantly correlated with board size. Hence, it is presumed that issuing stocks or corporate bonds in securities markets may have the effect of encouraging the company to expand its governance system and that this impact may be greater than a managerial discipline enhancement effect exerted from the capital market itself.

In order to verify whether the above relationships can be obtained even after controlling for other factors, we estimate the regression model expressed as  $BOASIZ = f(x\beta)$  by ordinary least squares (OLS), where *BOASIZ* is the dependent

variable and  $x$  and  $\beta$  are the vectors of the independent variable and the vector of the parameter including the constant term, respectively. A Poisson regression analysis is also conducted using the raw number of directors ( $NUMDIR$ ) as the dependent variable, in order to examine the robustness of the OLS estimations for the basic model. OLS estimators are biased and inconsistent in the regression models in which non-negative count data, such as number of directors, are used as the dependent variable. To deal with this problem, the Poisson regression model taking  $NUMDIR$  as a dependent variable assumes that:

$$\Pr[NUMDIR_i = n_i] = \frac{e^{-\lambda_i} \lambda_i^{n_i}}{n_i!}, n_i = 0, 1, 2, \dots,$$

where  $\log \lambda_i = x_i \beta$ . The log of the likelihood function is given by:

$$\log L = \sum_{i=1}^N [-\lambda_i + n_i x_i \beta - \log n_i!].$$

A consistent and effective maximum-likelihood estimator can be obtained by maximizing this expression with respect to  $\beta$

We estimate eight models to examine the impacts of the governance variables on board size as well as eight additional models, in which the governance variables are fixed to those of the basic model, to test the effects of the business-activity variables. We use White's heteroskedasticity-consistent standard errors in case that the null hypothesis of homoscedasticity is rejected at the 5% level by a Breush-Pagan test, whereas the Poisson regression model analysis always uses robust standard errors. The estimation results are summarized in **Table 7**.<sup>28</sup>

Panel A of Table 7 demonstrates that the governance variables that have a significant impact on board size, in accordance with the theoretical hypothesis at a 10% or higher significance level, are observed only in the ownership share of outsider shareholders, the corporate establishment resulting from the privatization of a state-owned enterprise, as well as in company size measured by the total number of employees. In contrast to privatized firms, enterprises spun off from state-owned enterprises or from privatized firms show no statistically significant difference in their average board size from that of private firms newly established during the transition period. In addition, although the estimation results are not presented here, the squared  $OWNOUT$  is not significant; thus, its non-linear effects are not found. On the other hand, the ownership by executive directors,  $OWNMAN$ , is positive, and its squared value is negative, contrary to our predictions. In addition, both of these variables are statistically quite significant. These estimation results will be examined again when we report the results of the empirical analysis on the proportion of outsider directors.  $OWNDIR$ , which is estimated as a reference for comparison with the effects of managerial ownership, shows similar results to  $OWNMAN$ . As for a board chairman, the effect of shareholding by outsider chairmen could be investigated by introducing a new dummy variable labeled  $OUTCHA$ , which takes a value of 1 for firms with an outsider chairman and substitutes  $BOALEA$ , and the intercept variable between his

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<sup>28</sup> The correlation coefficients between independent variables are far below the 0.70 threshold for possible multicollinearity in all combinations (Lind *et al.*, 2004). Moreover, the variance inflation factors (VIFs) for individual independent variables in relation to  $BOASIZ$ , except for the squares of the ownership variables, are much smaller than a threshold of 10.0.



ownership share and *OUTCHA* into the regression model. The estimation results of Model H show that the impact of ownership by an outsider chairman is positive on board size, as we predicted, although its statistical significance fell short of the 10% level.

*GROFIR*, a dummy variable for affiliation with a business group, is significant at the 5% level for Model D through Model H, not controlling for the ownership share of outside shareholders. Nevertheless, it is difficult to evaluate these results, as they may reflect the influence of ownership by the business group as a major shareholder rather than that of business integration. Appointment of a new top manager, top manager of retirement age, upper limit on ownership, and legal form of incorporation do not affect board size. Surprisingly, our estimation results imply that firms with a collective executive organ have, on average, more directors than those without one. However, *COLEXE* is far from statistically robust.

Panel B of Table 7 shows the estimation results regarding the impacts of the business-activity variables. Outside financing through stock listing or bond issuance has the impact of enlarging board size, as does having a business diversification strategy. This means that, in Russia, the linkage between corporate management and the capital market tends to increase board function, even if outside financing may substitute for the corporate board to enhance managerial discipline. The use and average length of bank credits and proportion of overdue accounts payable give debtor companies the incentive to increase the number of directors. Business internationalization has a non-linear impact on board size in Russian firms. This is consistent with Li (1994) regarding firms in developed countries. Namely, an increase in foreign business activity has a negative impact on board size for firms selling 50% or less of their production abroad but reveals a positive impact for firms selling more than 50% of their production in foreign markets. Both market competitiveness and R&D/innovation activities are neutral on board size. Past financial performance has no significant impact on board size, which is in agreement with earlier studies by Yermack (1996) and others. As Lubotsky and Wittenberg (2007) point out, the attenuation bias may result from regressions with multiple proxies for a single, unobserved independent variable. Notwithstanding, the results of the estimation of Model P suggest that the effects of business-activity variables are robust when some that do not have an extremely high correlation efficient are concurrently built into the regression model.

Consistently with our predictions, the endogenous variables of both *BOACOM* and *BOALEA* are positive, although they do not reach the 10% significance level. The problem of whether the same results can be obtained after taking into consideration possible endogenous biases remains. We will return to this issue in Subsection 5.4.

## **5.2. Board composition**

Next, we will analyze the determinants of the extent of outsider directorship, a board component most closely related with the functions and monitoring strength of corporate boards. Column (b) of Table 6 shows the correlation coefficients between *BOACOM* and a series of independent variables. All bargaining variables except for *GROCOR* are significantly correlated with the proportion of outsider directors, which is consistent with the theoretical hypothesis. Regarding the other governance variables, a corporate charter's maximum ownership restriction is negatively correlated with *BOACOM*. The total number

of employees is positively related to *BOACOM* suggesting that the larger company size is, the more outsider directors the company appoints. Both results also support our predictions. The correlation coefficient between *COLEXE* and *BOACOM* has a positive sign with statistical significance at the 5% level, suggesting that establishing a collective executive organ encourages the appointment of outsider directors. Many business-activity variables are also significantly associated with the proportion of outsider directors. Business diversification, outside financing from capital markets, and monopolistic position in a product market provide Russian enterprises with the incentive to increase the extent of outsider directorship. On the other hand, the variables representing the intensity of R&D/innovation activity and the share of exports in total sales have no or weak relationship with *BOACOM*. Not all correlation coefficients for the variables of past financial performance support our theoretical prediction.

Arthur (2001), Prevost *et al.* (2002), and many others have pointed out that the relative position of outsider directors in a corporate board is related in a non-linear form with ownership by outside investors and corporate officers. To test the possibility of this relationship, analyses of variance were performed using the six ownership variables classified according to the proportion of outsider directors. The results are shown in **Table 8**. This table suggests a non-monotonic association between the proportion of outsider directors and stock ownership by corporate officers and directors. However, the results of the Scheffe multiple comparison test using 10 sample groups divided according to the percentage of outsider directors indicate that the differences in the means between these individual sub-groups are not statistically significant in most cases. There may be a considerably higher level of variance within each sub-group due to the influence of other factors. Therefore, the above points also need to be tested using a multivariate analysis technique with due consideration given to the impact of the ownership variables on the outsider director appointment process.

Here, the regression analysis is designed to estimate a model expressed as  $BOACOM = g(x\beta)$ , the proportion of outsider directors from among all directors being the dependent variable. To check the robustness of the estimation results, we also estimate alternative regression models, which take *NUMOUT*, representing the absolute number of outsider directors, or *OUTDOM*, a qualitative variable with a value of 1 assigned to companies with outsider-dominated corporate boards, as dependent variables.

As shown in Figure 2, *BOACOM* is far from the normal distribution (Shapiro-Wilk  $W=0.974$ ,  $z=6.111$ ,  $p=0.000$ ). In addition, 245 (33.6%) of the 730 sample firms have either a lower threshold of 0.0 or an upper threshold of 1.0. The OLS estimators of a regression model with such an independent variable may become inconsistent. To mitigate this problem, we use a tobit model with both upper and lower threshold instead of OLS. As for models using *NUMOUT* and *OUTDOM* as the dependent variables, we use the Poisson model and a logit model, respectively.

The log likelihood function for the Tobit model taking *SHAOUT* as a dependent variable with both upper and lower thresholds is:

$$\log L = \sum_{SHAOUT_i > 1} \log \left[ \Phi \left( \frac{-(1 - \chi_i \beta)}{\delta} \right) \right] + \sum_{SHAOUT_i < 0} \log \left[ \Phi \left( \frac{-\chi_i \beta}{\delta} \right) \right]$$

$$+ \sum_{0 \leq SHAOUT_i \leq 1} \log \left[ \frac{1}{\delta} * \phi \left( \frac{SHAOUT_i - \chi_i \beta}{\delta} \right) \right],$$

where  $\Phi(\cdot)$  stands for the standard normal distribution function. On the other hand, the log of the likelihood function for the Logit model assuming  $\Pr[OUTDOM = 1] = e^{x\beta} / (1 + e^{x\beta}) = \Lambda(x\beta)$  is given by:

$$\log L = \sum OUTDOM_i * \log[\Lambda(x_i \beta)] + \sum (1 - OUTDOM_i) * \log[1 - \Lambda(x_i \beta)],$$

where  $\Lambda(\cdot)$  denotes the logistic cumulative distribution function.

The estimation results are summarized in **Table 9**. Panel A of Table 9 shows that all the bargaining variables take signs that are consistent with the bargaining hypothesis, and most of them reject the null hypothesis that the coefficient is equal to zero at the 10% or less significant level. The signs of the squared ownership variables are opposite to those in the direct figures. The result that ownership by outside investors, corporate managers and outsider board chairman is highly likely to be non-linearly related to the proportion of outsider directors strongly suggests that the bargaining hypothesis is applicable to analyze Russian corporate boards in the transition period.

**Figure 3** simulates the form and degree of the impacts of ownership variables on outsider director appointments by the type of shareholder based on their marginal effects obtained from the tobit regression analyses. Basically, the bargaining power of outside investors and an outsider chairman, both of which are represented by their ownership shares, positively affects the presence of outsider directors in corporate boards. However, ownership by an outsider chairman involves very strong entrenchment effects. The outsider directorship enhancement effect derived from shareholding by an outside chairman starts to diminish when his ownership exceeds 45%, and the entrenchment effects overwhelm the convergence effects when his ownership is more than 90%.<sup>29</sup> The impact of ownership by outside investors also has an inverted U-shaped form, but it does not affect the extent of outsider directorship negatively at any level of shareholding. In contrast, executive officers always use their bargaining power to restrain the appointment of outsider directors. A management group must have more than 57% ownership, and a top manager, more than 85% ownership in order for the negative impact of their ownership to start to decrease; this is because the marginal convergence effect of such managerial ownership, which increases in proportion to its fraction, is greater than its marginal entrenchment effect, which decreases in proportion to its fraction. Furthermore, regardless of their level of ownership, managerial shareholders are always reluctant to appoint outsider directors. Figure 3 reveals how cautious they are about inviting directors from the outside. Returning to the results of the analysis of the determinants of board size mentioned in Subsection 5.1, it was unexpectedly found that ownership by corporate officers was positively correlated with the number of directors.<sup>30</sup> Considering this point, as

<sup>29</sup> Interestingly, similar simulation results were also obtained when the board chairmen coming from business groups to which the individual surveyed firms belonged or from their closely affiliated business partners were categorized as outside chairmen. It is noteworthy, however, that this method amplifies the inverted U-shaped effect of ownership by a board chairman.

<sup>30</sup> The estimated *OWNCEO* values in Model D of Table 7(a) are significant at the 10% level

well as the negative effect of shareholding by senior managers on outsider director appointment, we presume that typical Russian corporate managers attempt to counter the pressures from outside investors by securing a sufficient number of insider directors in comparison with outsiders rather than by eliminating outsiders from their boards.

On the other hand, the remarkable differences in statistical significance between *GROCOR* and *GROAFF* demonstrate a stark gap between core firms of business groups and their affiliates in terms of the organizational philosophy of the groups. Again, it is reasonable to conjecture that, in Russia, director exchanges within a business group are usually one-way from its core company to its affiliated member firms and that, therefore, not much emphasis is placed on the opinions of the managers of such controlled firms in the strategic decision-making process of the business group. Even though this working hypothesis requires empirical verification, it provides an important clue to the understanding of the ongoing dynamic trend of business integration in the Russian economy.

The effectiveness of the bargaining model in Russia is suggested by the significant positive relation of *NEWCEO* to the extent of outsider directorship as well as by the strong and statistical significance explanatory power of the ownership variables.

In contrast to the bargaining variables, none of the other governance variables has a significant and robust impact on the promotion of outsider directors. In other words, both *CEOAGE* and *COMSIZ* lose their effect when managerial ownership is controlled. Contrary to the theoretical hypothesis, *COLEXE* is negatively associated with the proportion of outsider directors but at a low level of significance. Political paths affecting company start-ups also reveal a neutral impact on the appointment of outsider directors.

Panel B of Table 9 indicates that, among the business-activity variables, the intensity of R&D/innovation activity, past financial performance, and debts are consistent with our theoretical predictions and statistically robust. *ROAAVE* and the two other financial performance variables, as well as *BANCRE* and *ARREAR*, may have considerable impact on the balance of the bargaining power between managers and their opponents, suggesting the effectiveness of the bargaining model as an analytical tool for understanding corporate governance issues in Russia. *BUSLIN* and *MARFIN* are positive but insignificant, which means that it is almost statistically random whether it is an insider or an outsider who is going to become a new director to carry out outside fundraising or business diversification activities in Russia with an underdeveloped market of human resources.

The endogenous variable *BOASIZ* was considerably significant in the Poisson regression model B but fell short of the 10% significance level in the other models. On the other hand, *BOALEA* was positive and significant at the 1% level in all models, which is consistent with the simulation results shown in Figure 3. We regard the strong interrelationship between the outsideness of board chairman and the extent of outsider directorship as supporting empirical evidence that the bargaining model is highly appropriate to predict the structure of a corporate board in Russian firms.

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(one-sided  $t=1.305$ ,  $p=0.098$ ) if top manager's ownership is assumed to be positively correlated with the number of directors.

### 5.3. Board leadership structure

Lastly, we deal with the outsidership of chairman appointment. Looking at the correlation coefficients in Column (C) of Table 6, it becomes clear that the all bargaining variables, except *GROCOL*, and three other governance variables, *CEOAGE*, *LIMOWN*, and *COLEXE*, support our hypothesis in a statistically significant fashion. On the other hand, none of the business-activity variables is found to be significantly associated with the chairman appointment routes, which is also consistent with our prediction.

The ordered logit analysis of the regression model  $BOALEA = h(x\beta)$ , which takes the outsidership of chairmen appointment as the dependent variable, also supports the results of univariate analyses (Table 10). The presence of outsider directors has a considerable impact on increasing the chances of board chairmen being appointed from within the group. In contrast, soon-to-be-retired top managers are strongly opposed to the board chairmanship being taken over by an outsider director in an attempt to retain their influence after their retirement or to hand over their managerial power to their loyal followers. It is also confirmed that *OWNCEO* and *OWNMAN* are negatively and significantly correlated with the outsidership of chairman appointment, although *MANSHA* is not significant in the regression models. Although the details are not presented here, it was verified that *OWNCEO* is the only ownership variable with a non-linear impact on the appointment of board chairmen. In contrary to the governance variables, none of the business activity variables (not shown in Table 10) is significantly related to the dependent variable.

Contrary to our prediction, *OWNOUT* is insignificant for Models A through Model C. These results are possibly connected with the fact that this variable partly covers the shareholding by business groups as major owners, as indicated by the negative significance of the variables related with business integration. Therefore, we estimated a model taking *INDFIR*, a new dummy variable with 1 assigned to independent companies, instead of *GROFIR*, and its intercept variable with *OWNOUT*. The estimation results of Model D indicate that the effect of ownership by outside investors on the appointment of an outsider chairman is exactly the opposite in group-affiliated firms and independent firms. These findings suggest that business groups are reluctant to have the board chairmen of their affiliates appointed from among persons other than the managers or other insiders of those affiliates. Unfortunately, it is impossible to ascertain whether this is due to an opportunistic collusion within each business group or to the intent of each group to increase its monitoring efforts. Further study needs to be conducted to explore the ambivalent organizational relationship between business groups and their member firms.

The results of our empirical analyses presented in this subsection reveal that the appointment of a chairman, the key person on corporate boards, is decisively dependent on the power balance between managers and their opposing parties, providing evidence for the relatively high effectiveness of the bargaining model developed by Hermalin and Weisbach (1998) through comparisons with empirical studies on the determinants of board size and proportion of outsider directors.

#### 5.4. Endogeneity of board formation

Although we assume that there is an endogenous relationship among board size, the proportion of outsider directors, and the outsidership of chairman appointment, the regression analyses conducted in the previous subsections did not give any special consideration to the possible simultaneous-equation bias behind this relationship. This kind of bias may distort the estimation results that would lead to a false conclusion. Hence, we need to verify the existence of any influence.

A simultaneous-equation bias can be handled by using the method of instrumental variables or the simultaneous-equations model method. The IV method, however, involves the difficulty of eliminating the arbitrariness of the instrumental variables that have been selected by the analyst. This problem is rather serious when performing an empirical analysis of a corporate governance model, as its estimation results are greatly affected by the choice of the instrumental variables due to the lack of a theoretical model with a strong enough formulation to be applicable throughout the world beyond the boundaries of nation states and legal systems (Whitebee, 1997; Hossain *et al.*, 2001). Furthermore, when using the IV method for an analysis, in which several variables are, in turn, assigned to several regression models as endogenous variables and there is no possibility to utilize lagged endogenous variables, the analyst must select a considerable number of instrumental variables. In a practical sense, this is a very difficult procedure.

In view of the above situation, we utilize the simultaneous-equations model to treat simultaneous-equation biases. However, this method may unexpectedly provide false results due to a small but grave error in the model specification affecting the system as a whole. As long as the true structure of a given corporate governance model is unknown, it is rather risky to randomly select the independent variables to be evaluated (Barnhart and Rosenstein, 1998). Against this background, we adopt, as the second-best way of model specification, the following models using the three endogenous variables and the 17 independent variables whose coefficients were found to be comparatively robust at higher than the 10% significance level in the single-equation models as well as industry dummy variables (*INDDUMs*). The results are shown below:

$$BOASIZ = f(BOACOM, BOALEA, OWNOUT, PRICOM, COMSIZ, BUSLIN, \\ MARFIN, BANCRE, EXPSHA, EXPSHA^2, INDDUMs),$$

$$BOACOM = g(BOASIZ, BOALEA, OWNOUT, OWNOUT^2, MANSHA, GROFIR, \\ NEWCEO, CEOAGE, COMSIZ, NEWPRO, ROAAVE, BANCRE, \\ INDDUMs),$$

$$BOALEA = h(BOASIZ, BOACOM, OWNOUT, INDFIR, OWNOUT \times INDFIR, \\ CEOAGE, PRICOM, COMSIZ, INDDUMs).$$

We estimate this simultaneous-equations model by the 2SLS method. Estimations are conducted both for the case in which the independent variables are limited to the governance variables and for the case in which the business-activity variables are also included in the independent variables. With regard to the variable of the outsidership of chairman appointment, we use the log of *BOALEA*+1 to achieve a better fit for the 2SLS

estimations.<sup>31</sup>

**Table 11** shows the results. We confirm that the explanatory power and statistical significance of the individual independent variables are not as severely affected as to require that the primary analysis results obtained from the single-equation estimations be reviewed even if these simultaneous-equations models are used to deal with the endogeneity of board formation. Nevertheless, *PRICOM*, a dummy for the political background behind the corporate establishment, and *COMSIZ*, a proxy of company size, considerably lose their significance in the regression models in which *BOACOM* or *BOALEA* is used as the dependent variables. We also find that *NEWCEO* remarkably decreases its statistical significance when the business-activity variables are introduced. A Hausman specification test suggests that there are no comparatively and statistically significant advantages and disadvantages between 2SLS and 3SLS models. In fact, no distinctive differences have been identified between these two methods regarding the estimation results.

Overall, we confirm an endogenous relationship that exists between the proportion of outsider directors and the outsidership of board chairman in the sense that these board components are positively related to each other. We also verified that almost all exogenous variables estimated to be comparatively significant and robust in single-equation regression models have economically and statistically meaningful impacts on board structure, consistently with the theoretical hypothesis, even when we explicitly deal with the endogeneity of board formation.

### 5.5. Robustness check

Finally, we examine the overall robustness of the estimation results, including those by the 2SLS model. To this end, we conducted supplementary analyses of the individual regression models shown in this section placed under various sample restrictions and confirmed that these restrictions had no grave impact on the findings presented in this paper. Specifically, supplementary regression analyses were performed in the following five different settings: (a) when the samples are limited to industrial firms; (b) when the enterprises involved in fuel/energy, metallurgy, and communication sectors and subject to unique state restrictions concerning firm organization and business activities are excluded from the observations; (c) when the samples are limited to those with a company size within the mean  $\pm 1$  standard deviation of all surveyed firms to exclude very large enterprises from the observations; (d) when the samples are limited to those yet to issue their securities; and (e) when the samples are limited to non group-affiliated firms. Moreover, no distinctive differences are observed in the estimation results even after replacing *ROAAVE* and *PROAVE*, the industry-adjusted variables of past financial performance, which represent the simple difference between the actual value and the mean value for each industry (i.e.,  $\Delta Performance$ ), except that the significance levels for some

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<sup>31</sup> As we mentioned in Subsection 5.2, the proportion of outsider directors in our samples is not normally distributed. Nevertheless, we confirmed that the supplementary OLS estimates taking *BOACOM* as the dependent variable shows very similar results to that of the tobit models reported in Table 9. Thus, we use *BOACOM* as the endogenous dependent variable for the 2SLS estimation.

of the models decrease slightly.

Furthermore, we re-estimated the models using alternative estimation methods, including a generalized least squares (GLS) method, a probit model, an ordered probit model, a truncated regression model, and Heckman's two-step estimation method,<sup>32</sup> and the results showed no obvious differences from those of the original analyses reported in this section. On the basis of these results, we can safely say that the results of the quantitative analyses in this paper are statistically robust in the above sense.

## **6. Concluding remarks**

In this paper, we conducted a comprehensive analysis on the determinants of the board formation in Russian firms using the results of a Japan-Russia joint enterprise survey conducted across the country in the first half of 2005. The findings strongly suggest that the long years of study by many researchers in the fields of organizational economics and corporate finance in industrialized countries are quite effective for analyzing the industrial economy and organization of firms in Russia, a state which is still in transition to a market economy even after more than a dozen years since the collapse of the Soviet Union. To be more specific, the theories and empirical methods of financial and organizational economics help accurately pinpoint the determinants of board size, proportion of outsider directors, and outsidership of chairman appointment in Russian firms. Conversely, it can be said that corporate managers and investors in contemporary Russia organize their monitoring and supervisory systems in accordance with the economic and organizational logics applied to mature capitalist economies. The long-standing and difficult attempt to shift to a market economy in Russia is now starting to bear fruit.

However, the results of the empirical analysis do not support all the testable hypotheses proposed in Section 4. In other words, our empirical evidence demonstrates the higher explanatory power and statistical significance of the bargaining variables in comparison to other governance variables and business-activity variables as the determinants of board structure in Russian firms. Moreover, the estimation results of the bargaining variables strongly suggest that, if it is more reasonable to interpret the board structures of listed companies in developed countries by the classical agency theory, which implicitly assumes the self-organizing nature of a well-balanced corporate governance system, it is also more reasonable to interpret the board formation in Russian enterprises by the bargaining hypothesis developed by Hermalin and Weisbach (1998). This is supported by the fact that the bargaining variables of Russian firms, such as those for the ownership shares of management executives, outside investors, and outsider chairmen, as well as the tenure of the top manager, have distinctive explanatory power pertaining to the determination of board formation process, strongly suggesting that, in Russia, corporate boards are possibly a site for struggle for hegemony over corporate management among managers, outside investors, and their board representatives, who seek to maximize their

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<sup>32</sup> Heckman's two-step estimation method deals with the possible bias that may arise in the tobit model when the coefficients for the independent variables for the existence of an outsider director are different from the coefficients for the independent variables for the proportion of outsider directors.



power and benefits.

This image is intuitively consistent with our understanding of the modern Russian economy. Even today, several years since Vladimir Putin took the oath of office for the presidency of Russia under the banner of the “rule of law,” the country is still unable to cast off its negative image as unreliable. The awareness of Russian people of the importance of contracts and property rights and the business ethics of Russian managers are improving but still remain poor. In this social environment, it is no wonder that investors do not expect much from other owners and creditors concerning their managerial discipline and choose to directly monitor corporate managers using all channels available in an attempt to maximize their interests. In response, corporate managers always behave opportunistically by being on the alert against those hostile investors. It is true that such a deep-seated mutual distrust serves as a mechanism to make business enterprises functional. However, engaging in a heated battle for hegemony over the board of directors tends to be excessively time- and energy-consuming, contrary to the case of a society that is capable of achieving effective managerial discipline by harmoniously and autonomously organizing different corporate governance mechanisms. In this sense, the distinctively high applicability of the bargaining hypothesis to Russian firms may reflect the immaturity of the Russian socio-economic system.

Furthermore, this study demonstrated that Russia’s legal system and its peculiarities as a transition economy have a great deal of influence in determining the board structure. The management alliance with business groups that intensively took place all over Russia as a byproduct of the enterprise privatization in 1990s also considerably affects the governance system in their affiliated companies. In addition, the political backgrounds of start-ups, as well as several rules set by the corporate law and the CG Code, have statistically significant impacts on the decision-making process of Russian firms regarding board structure. On the other hand, the federal administrative directives that have been issued to encourage companies to add more independent directors and the provisions of the Law on JSCs preventing corporate managers from concurrently holding the post of board chairman have not yet produced the desired outcome, partly because they are not sufficiently enforced and partly because of their institutional flaws. Until a certain level of mutual trust is established among Russian citizens, increased state regulations on the structure and functions of corporate boards and other statutory corporate organs may be effective for alleviating the aforementioned problems. From this standpoint, and in many other respects, it is to be hoped that the legal and institutional framework of Russian joint-stock companies will become more sophisticated.

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**Table 1.** Descriptive statistics on board size and number of directors by their attributes of 730 surveyed firms

	Mean	S. D.	Median	Min.	Max.	25 percentile	75 percentile	Total	Share (%)
Board size	6.64	2.40	7	3	23	5	7	4,818	100.0
Insider directors	3.22	2.43	3	0	21	1	5	2,352	48.8
Managers	2.90	2.21	3	0	15	1	5	2,117	43.9
Representatives of employees and labor unions	0.32	1.15	0	0	21	0	0	235	4.9
Outsider directors	3.42	2.94	3	0	17	1	5	2,466	51.2
Representatives of non-employee private shareholders	2.55	2.59	2	0	17	0	4	1,865	38.7
Independent directors	0.43	1.13	0	0	10	0	0	314	6.5
Representatives of federal government agencies	0.18	0.77	0	0	8	0	0	135	2.8
Representatives of local governments	0.21	0.75	0	0	6	0	0	152	3.2

*Source* : The joint enterprise survey.

**Table 2.** International comparison of board size and proportion of outsider directors

	Analysis period	Sample size	Board size (no. of directors)			Proportion of outsider directors (%)		
			Mean	S. D.	Median	Mean	S. D.	Median
North America								
U.S. IPO firms <sup>a</sup>	1978-87	1,116	6.07	1.87	6			
U.S. IPO firms <sup>b</sup>	1988-92	1,019	6.21			62		
U.S. listed firms <sup>c</sup>	1989-95	508	11.88	2.95	12	55.3	17.1	56.2
U.S. large industrial firms <sup>d</sup>	1999	100	11.79	2.94	12	71.8	12.1	73.0
U.S. large commercial banks <sup>d</sup>	1999	100	16.37	5.01	16	81.3	6.9	83.1
U.S. large public firms <sup>d</sup>	1999	100	11.46	2.74	11	80.5	11.7	83.3
U.S. listed firms <sup>e1</sup>	1990-2003	9,436	8		7	65.2		70.0
Canadian listed firms <sup>f</sup>	1996	79	12.34		12	74		79
Canadian public firms <sup>g</sup>	2000	38	10.81	3.07	11	89.4	10.6	90.0
Europe								
U.K. listed firms <sup>h</sup>	1993-96	1,271	8.01	2.64	8	42.7	14.4	42.9
U.K. listed firms <sup>i</sup>	1994	250	8.07	2.84	8	39		
U.K. listed firms <sup>f</sup>	1996	66	12.03		12	48		50
French IPO firms <sup>j</sup>	1993-99	299	5.30	2.32	5	53.1		
French listed firms <sup>f</sup>	1996	42	12.93		13	81		82
German listed firms <sup>f</sup>	1996	33	15.06		16	60		58
Italian listed firms <sup>f</sup>	1996	56	9.23		9	74		81
Spanish listed firms <sup>f</sup>	1996	28	12.29		11	75		80
Swiss listed firms <sup>f</sup>	1996	17	9.12		9	90		90
Swiss listed firms <sup>k2</sup>	2001	165	6.59	2.33	6	87	15	89
Dutch listed firms <sup>f</sup>	1996	37	6.84		7			
Dutch listed firms <sup>l</sup>	1996	94	4.95	1.83	5	84.3	19.9	100
Belgian listed firms <sup>f</sup>	1996	12	13.17		11.5	76		81
Swedish listed firms <sup>m</sup>	1996-98	98	8.18	2.01		84	13	
Finish small and medium-scale firms <sup>n</sup>	1992-94	879	3.71	1.52	3			
Russian joint-stock companies <sup>o</sup>	2005	730	6.64	2.40	7	48.9	35.3	55.6
Asia-Pacific								
Japanese listed firms <sup>p</sup>	1990-2001	1,280	13.97	6.55	13	20.0	19.7	14.3
Chinese IPO firms <sup>q3</sup>	1996	113	10.13	3.18		30	24	
Chinese listed firms <sup>r</sup>	1996	530	9.8			41		
Taiwanese listed firms <sup>s</sup>	1998	251	8.19	4.18	7			
Korean listed firms <sup>t</sup>	1990-99	199	10.51	8.36				
Australian listed firms <sup>u3</sup>	1989	135	5.56	2.03	5	62	27	67
Singapore listed firms <sup>v</sup>	1995	147	8.04	2.08	8	57	21	57
New Zealand listed firms <sup>w</sup>	1991-95	63-105	6.60	2.15	6	55.7	25.7	60.0

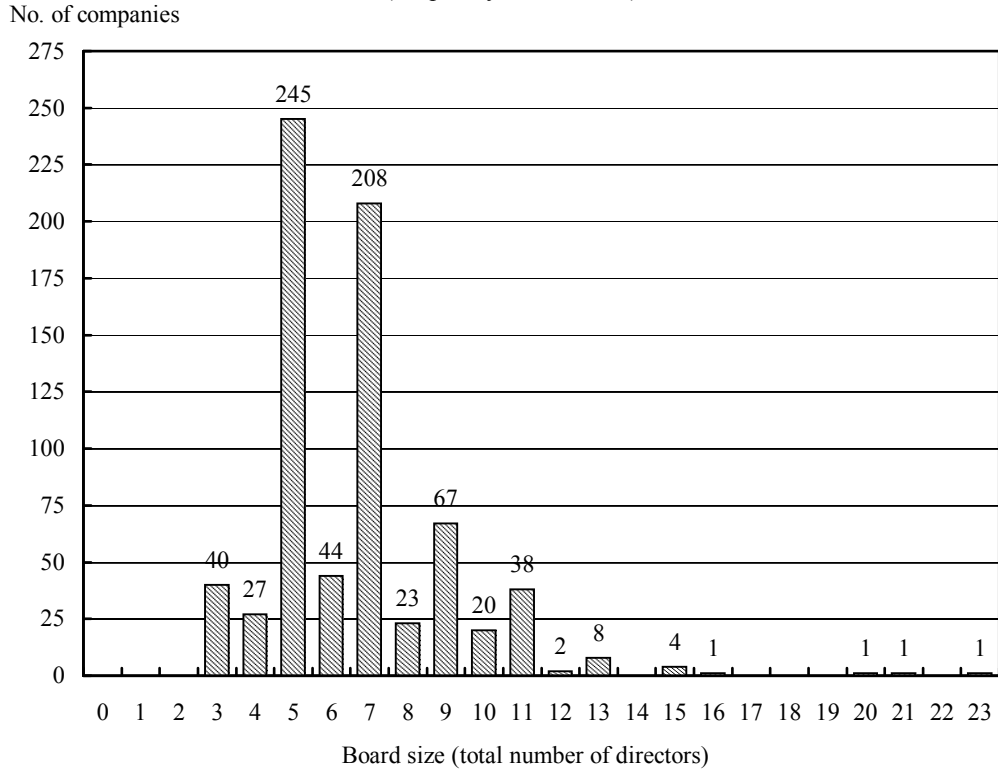
Notes: <sup>1</sup> The proportion of outsider directors is calculated by the author using the data of the percentage of executive directors.

<sup>2</sup> Board of auditors.

<sup>3</sup> The proportion of outsider directors covers only independent directors.

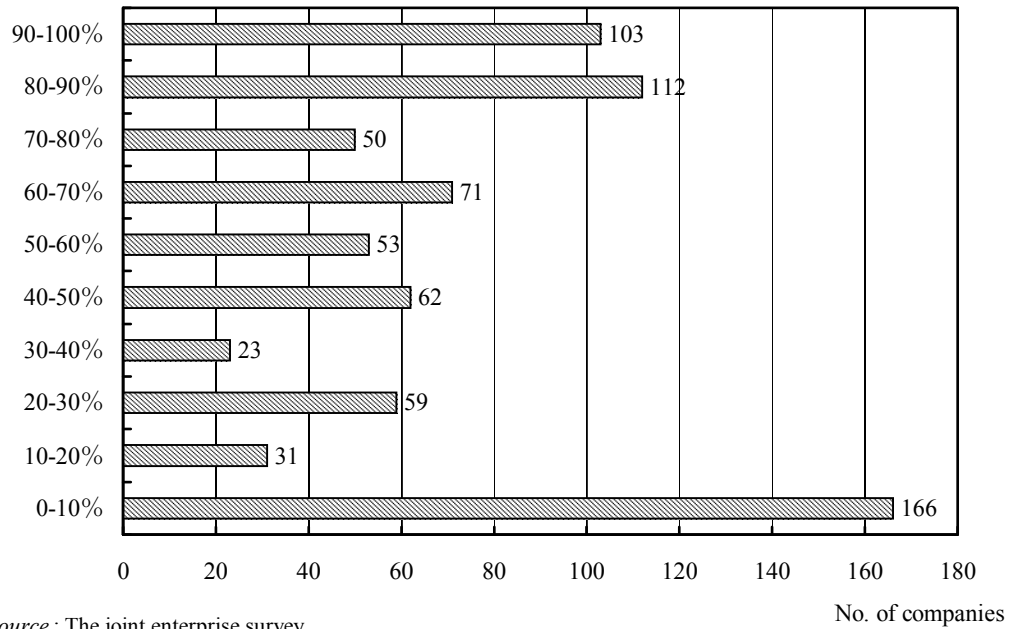
Source: a: Baker and Gompers (2003); b: Boone *et al.* (2007); c: Fich and Shivdasani (2006); d: Booth *et al.* (2002); e: Linck *et al.* (2007); f: de Andres *et al.* (2005); g: Bozec (2005); h: Peasnell *et al.* (2005); i: Vefees and Theodorov (1998); j: Roosenboom (2005); k: Beiner *et al.* (2004); l: van Ees *et al.* (2003); m: Randøy and Jenssen (2004); n: Eisenberg *et al.* (1998); o: This study; p: Abe (2003); q: Tian and Lau (2001); r: Peng (2004); s: Yeh and Woidtke (2005); t: Kim (2005); u: Arthur (2001); v: Mak and Li (2001); w: Prevost *et al.* (2002).

**Figure 1.** Board sizes of 730 joint-stock companies  
(frequency distribution)



Source : The joint enterprise survey.

**Figure 2.** Proportion of outsider directors for 730 joint-stock companies  
(frequency distribution)



Source : The joint enterprise survey.



**Table 3.** Correlation matrix of board components

	Board size	Proportion of outsider directors	Outsideness of chairman appointment
Board size (no. of directors)	1.0000		
Proportion of outsider directors <sup>1</sup>	0.2058 *** (0.000)	1.0000	
Outsideness of chairman appointment <sup>2</sup>	0.0161 (0.674)	0.3386 *** (0.000)	1.0000

Notes: <sup>1</sup> Continuous variable with  $0.00 \leq x \leq 1.00$ .

<sup>2</sup> An ordered data with a value of 1 for firms with a quasi-outsider chairman, 2 for firms with an outsider chairman (default - firms with an insider chairman).

<sup>3</sup> Figures in parentheses are *p*-values. \*\*\*: significant at the 1% level.

Source: Author's calculation based on the joint enterprise survey.

**Table 4.** Industry-to-industry comparison of board components

	Board size	Proportion of outsider directors	Outsideness of chairman appointment
Industrial sector	6.59	0.47	0.82
Fuel and energy	7.62	0.70	1.03
Metallurgy	7.12	0.53	0.65
Machine-building and metal working	6.93	0.49	0.83
Chemical and petrochemical	6.61	0.58	1.10
Wood, paper, and wood products	6.25	0.47	0.75
Light industry	6.71	0.36	0.74
Food industry	5.64	0.45	0.89
Construction materials	6.50	0.28	0.56
Communications sector	7.43	0.66	1.14
Comparison between the industrial and communications sectors			
<i>t</i> test on the equality of means <sup>1</sup>	-2.633 ***	-4.125 ***	-2.830 ***
Wilcoxon rank sum test	-2.292 **	-4.372 ***	-3.066 ***
Analysis of variance of the 9 industries			
ANOVA ( <i>F</i> )	6.230 ***	9.740 ***	3.070 ***
Bartlett test ( $\chi^2$ )	108.112 ***	5.479	8.531
Kruskal-Wallis test ( $\chi^2$ )	52.385 ***	72.814 ***	23.652 ***

Notes: <sup>1</sup> The Welch test was performed when the null hypothesis that two samples have the same population variance was rejected by *F* tests for homoscedasticity.

<sup>2</sup> \*\*\*: significant at the 1% level; \*\*: significant at the 5% level.

Source: Author's estimation based on the joint enterprise survey.

**Table 5.** Theoretical predictions of the impacts of firm organization and business activities on board components

	Type of board component		
	Board size	Proportion of outsider directors	Outsideness of chairman appointment
<b>Bargaining variables</b>			
Ownership share of large outsider shareholders/squared term	+/-	+/-	+/-
Ownership share of top manager/squared term	-/+	-/+	-/+
Ownership share of management group/squared term	-/+	-/+	-/+
Ownership share of outsider directors and chairman/squared term	+/-	+/-	+/-
Affiliation with a business group	+	+	?
New appointment of top manager	+	+	+
<b>Other governance variables</b>			
Soon-to-retire top manager	(-)	-	-
Establishment as an open joint-stock company as the corporate form	-	-	-
Restrictions on ownership shares and voting rights by the articles of incorporation	-	-	-
Adoption of a collective executive organ	(-)	(+)	(+)
Inherited state assets	+	+	+
Company size	+	?	?
<b>Business-activity variables</b>			
Business diversification	+	?	?
Financing from capital markets	?	?	?
Competitions in product markets	-	-	(-)
Intensity of R&D/innovation activities	-	-	(-)
Poor financial performance	(+)	+	(+)
Debts	+	+	(+)
Business internationalization/squied term	-/+	-/+	(-)/(+)
<b>Endogenous variables</b>			
Board size		+	(+)
Percentage of outsider directors	+		+
Outsideness of chairman appointment	(+)	+	

Note: '+' stands for a positive correlation, '-' for a negative correlation, '(+)' for a positive but statistically weak correlation, and '(-)' for a negative but statistically weak correlation, and '?' indicates that the effect is unpredictable.

**Table 6.** Definition, descriptive statistics, and data source of variables used in the empirical analyses, and correlation coefficients with board components

Definitions (variable name)	Descriptive statistics					Correlation coefficients with board components		
	Mean	S. D.	Median	Min.	Max.	(a) Board size <sup>1</sup>	(b) Proportion of outsider directors <sup>2</sup>	(c) Outsideness of chairman appointment <sub>2</sub>
Bargaining variables ( <i>BARVARs</i> )								
Ownership share of outsider shareholders ( <i>OWNOUT</i> ) <sup>3,4</sup>	1.87	2.14	0	0	5	0.238 ***	0.412 ***	0.164 ***
Large managerial shareholder dummy ( <i>MANSHA</i> )	0.48	0.50	0	0	1	-0.136 ***	-0.521 ***	-0.204 ***
Ownership share of top manager ( <i>OWNCEO</i> ) (%)	6.41	13.41	0.04	0.00	97.12	-0.141 ***	-0.296 ***	-0.195 ***
Ownership share of management group ( <i>OWNMAN</i> ) (%)	15.93	21.94	4.22	0.00	100.00	-0.193 ***	-0.338 ***	-0.188 ***
Ownership share of directors' group ( <i>OWNDIR</i> ) (%)	14.72	21.02	3.42	0.00	100.00	-0.203 ***	-0.332 ***	-0.182 ***
Ownership share of a board chairman ( <i>OWNCHA</i> ) (%)	3.34	9.64	0.00	0.00	90.10	-0.167 ***	-0.102 **	-0.037
Business group participation dummy ( <i>GROFIR</i> )	0.39	0.49	0	0	1	0.162 ***	0.344 ***	0.101 ***
Core business group member dummy ( <i>GROCOR</i> )	0.05	0.23	0	0	1	0.038	0.013	0.049
Business group affiliation dummy ( <i>GROAFF</i> )	0.34	0.47	0	0	1	0.150 ***	0.354 ***	0.083 **
Dummy for newly appointed top manager ( <i>NEWCEO</i> ) <sup>5</sup>	0.39	0.49	0	0	1	0.068 *	0.216 ***	0.067 *
Other governance variables ( <i>GOVVARs</i> )								
Dummy for firms with top manager of retirement age ( <i>CEOAGE</i> ) <sup>6</sup>	0.10	0.30	0	0	1	0.038	0.016	-0.114 ***
Open joint-stock company dummy ( <i>OPECOM</i> )	0.68	0.47	1	0	1	-0.063 *	0.021	0.084 **
Dummy for firms with upper limits on ownership shares ( <i>LIMOWN</i> )	0.14	0.35	0	0	1	-0.083 **	-0.126 ***	-0.115 ***
Dummy for firms with a collective executive organ ( <i>COLEXE</i> )	0.34	0.47	0	0	1	0.203 ***	0.079 **	0.066 *
Dummy for former state-owned or ex-municipal privatized companies ( <i>PRICOM</i> )	0.69	0.46	1	0	1	0.117 ***	-0.045	-0.103 ***
Dummy for firms separated from state-owned or privatized enterprises ( <i>SPIOFF</i> )	0.10	0.29	0	0	1	-0.037	-0.001	-0.024
Total number of employees ( <i>COMSIZ</i> ) <sup>1</sup>	1884.44	5570.00	465	106	74000	0.322 ***	0.207 ***	0.013

(continued)

Business-activity variables (*BUSVARs*)

Number of business lines ( <i>BUSLIN</i> ) <sup>7</sup>	2.15	2.05	1	1	12	0.210 ***	0.165 ***	0.015
Dummy for firms which issued shares or bonds on capital markets ( <i>MARFIN</i> )	0.13	0.34	0	0	1	0.351 ***	0.281 ***	0.044
Dummy for non-competing firms in product markets ( <i>NONCOM</i> ) <sup>8</sup>	0.08	0.27	0	0	1	0.017	0.101 ***	0.012
Dummy for development of new products or services in 2001-04 ( <i>NEWPRO</i> )	0.62	0.48	1	0	1	0.021	-0.038	-0.019
Annual average ROA in 2001-04 ( <i>ROAAVE</i> ) <sup>9</sup>	0.12	0.90	0.00	-8.08	4.26	-0.029	-0.114 ***	-0.050
Annual average gross profit rate on sales in 2001-04 ( <i>PROAVE</i> ) <sup>9</sup>	4.86	19.43	0.00	-25.28	197.91	0.271 ***	0.135 ***	0.046
Frequency of dividend payments in 2001-03 ( <i>DIVPAY</i> )	0.93	1.31	0	0	3	0.161 ***	0.017	-0.052
Firms which used bank credits and their average lending period ( <i>BANCRE</i> ) <sup>10</sup>	2.53	1.45	3	0	5	0.166 ***	0.093 **	0.015
Share of overdue accounts payable in total debts ( <i>ARREAR</i> ) <sup>11</sup>	0.92	1.44	0	0	5	0.083 **	0.103 ***	0.019
Share of exports in total sales ( <i>EXPSHA</i> ) <sup>12</sup>	0.88	1.20	0	0	5	0.053	0.072 *	-0.046

Notes: <sup>1</sup> A unit is the number of directors. In the regression analyses, its natural logarithm is utilized.

<sup>2</sup> The definition is the same as that in Table 3.

<sup>3</sup> "Ownership share" means an ownership share rated on the following 6-point scale: 0: 0%; 1: 10.0% or less; 2: 10.1 to 25.0%; 3: 25.1 to 50.0%; 4: 50.1 to 75.0%; 5: 75.1 to 100.0%.

<sup>4</sup> Excluding domestic individual shareholders.

<sup>5</sup> "New top manager" denotes a top manager (CEO, company president, or general director) appointed during the period from 2001 to 2004.

<sup>6</sup> "Top manager of retirement age" denotes a top manager aged 61 or older as of the survey date.

<sup>7</sup> Based on the OKONKh two-digit classification.

<sup>8</sup> "Non-competing firms" denote the enterprises that responded that they were "not competing" with any domestic company, any domestic foreign-affiliated country, any CIS company, any company in an industrialized country, or any overseas company.

<sup>9</sup> Industry-adjusted.

<sup>10</sup> "Firms which used bank credits and their average lending period" falls under one of the following 6 categories: 0: Did not use any bank credits during the period from 2001 to 2004; 1: Used bank credits, and their average lending period was less than 3 months; 2: Used bank credits, and their average lending period ranged from 3 months to less than 6 months; 3: Used bank credits, and their average lending period ranged from 6 months to less than one year; 4: Used bank credits, and their average lending period ranged from one year to less than 3 years; 5: Used bank credits, and their average lending period was more than 3 years.

<sup>11</sup> "Share of overdue accounts payable in total debts" falls under one of the following 6 categories: 0: 0%; 1: 5% or less; 2: 5.1 to 10.0%; 3: 10.1 to 20.0%; 4: 20.1 to 30.0%; 5: More than 30%.

<sup>12</sup> "Share of exports in total sales" falls under one of the following 6 categories: 0: 0%; 1: 10% or less; 2: 10.1 to 25.0%; 3: 25.1 to 50.0%; 4: 50.1 to 75.0%; 5: More than 75%.

<sup>13</sup> \*\*\*: significant at the 1% level; \*\*: significant at the 5% level; \*: significant at the 10% level.

Source: The SKRIN databases were used for the ownership shares of managers and directors (*OWNCEO*, *OWNMAN*, *OWNDIR*, *OWNCHA*) and numbers of business lines (*BUSLIN*). The SPARK's databases were used for the annual average ROA and the annual average gross profit rate on sales (*ROAAVE*, *PROAVE*). All of the other variables were created on the basis of the results of the joint enterprise survey.

**Table 7.** Regression analysis of the impacts of the governance and business-activity variables on board size

Panel A: impacts of governance variables								
Models	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Estimation methods	OLS	Poisson	OLS	OLS	OLS	OLS	OLS	OLS
Dependent variable	<i>BOASIZ</i>	<i>NUMDIR</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>
Const.	1.0915 *** (0.107)	1.1671 *** (0.119)	1.0848 *** (0.107)	1.1915 *** (0.114)	1.1811 *** (0.121)	1.1985 *** (0.119)	1.2363 *** (0.111)	1.2428 *** (0.112)
<i>BOACOM</i>	0.0483 (0.053)	0.0375 (0.060)	0.0513 (0.054)	0.0421 (0.050)	0.0495 (0.049)	0.0493 (0.049)	0.0455 (0.049)	0.0454 (0.047)
<i>BOALEA</i>	0.0040 (0.016)	0.0017 (0.016)	0.0040 (0.016)	0.0207 (0.017)	0.0196 (0.017)	0.0197 (0.017)	0.0186 (0.017)	
<i>OUTCHA</i>								0.0360 (0.033)
<i>OWNOUT</i>	0.0229 *** (0.007)	0.0188 ** (0.008)	0.0228 *** (0.007)					
<i>MANSHA</i>	0.0024 (0.032)	-0.0104 (0.036)	0.0016 (0.032)					
<i>OWNCEO</i>				0.00298 (0.0023)				
<i>OWNCEO</i> <sup>2</sup>				-0.00007 * (0.0000)				
<i>OWNMAN</i>					0.00305 * (0.0019)			
<i>OWNMAN</i> <sup>2</sup>					-0.00005 ** (0.0000)			
<i>OWNDIR</i>						0.00407 ** (0.0018)		
<i>OWNDIR</i> <sup>2</sup>						-0.00007 *** (0.0000)		
<i>OWNCHA</i>							-0.00228 (0.0027)	-0.00319 (0.0032)
<i>OWNCHA</i> <sup>2</sup>							-0.00001 (0.0000)	0.00000 (0.0000)
<i>OWNCHA</i> × <i>OUTCHA</i>								0.00287 (0.0054)
<i>OWNCHA</i> <sup>2</sup> × <i>OUTCHA</i>								-0.00003 (0.0001)
<i>GROFIR</i>	0.0289 (0.029)	0.0267 (0.032)		0.0617 ** (0.030)	0.0709 ** (0.031)	0.0673 ** (0.031)	0.0606 ** (0.030)	0.0677 ** (0.031)
<i>GROCOR</i>			0.0801 (0.067)					
<i>GROAFF</i>			0.0196 (0.031)					
<i>NEWCEO</i>	0.0080 (0.025)	0.0020 (0.025)	0.0097 (0.025)	-0.0309 (0.026)	-0.0302 (0.026)	-0.0312 (0.026)	-0.0227 (0.026)	-0.0220 (0.026)
<i>CEOAGE</i>	0.0442 (0.042)	0.0569 (0.050)	0.0453 (0.042)	-0.0221 (0.047)	-0.0198 (0.047)	-0.0217 (0.047)	-0.0104 (0.048)	-0.0102 (0.049)
<i>OPECOM</i>	-0.0429 * (0.026)	-0.0331 (0.026)	-0.0416 (0.026)	-0.0283 (0.027)	-0.0341 (0.027)	-0.0365 (0.027)	-0.0323 (0.027)	-0.0339 (0.028)
<i>LIMOWN</i>	-0.0286 (0.039)	-0.0256 (0.039)	-0.0263 (0.039)	-0.0217 (0.036)	-0.0294 (0.037)	-0.0323 (0.037)	-0.0245 (0.036)	-0.0262 (0.036)
<i>COLEXE</i>	0.0468 * (0.028)	0.0464 (0.028)	0.0472 * (0.028)	0.0315 (0.029)	0.0346 (0.029)	0.0316 (0.029)	0.0292 (0.029)	0.0308 (0.030)
<i>PRICOM</i>	0.1534 *** (0.035)	0.1425 *** (0.035)	0.1539 *** (0.035)	0.0943 ** (0.041)	0.0897 ** (0.041)	0.0934 ** (0.041)	0.0924 ** (0.041)	0.0908 ** (0.041)
<i>SPIOFF</i>	0.0491 (0.049)	0.0377 (0.049)	0.0526 (0.049)	0.0402 (0.055)	0.0410 (0.055)	0.0446 (0.055)	0.0358 (0.055)	0.0355 (0.056)
<i>COMSIZ</i>	0.0920 *** (0.012)	0.0920 *** (0.014)	0.0930 *** (0.012)	0.1014 *** (0.012)	0.1012 *** (0.012)	0.0999 *** (0.012)	0.0966 *** (0.012)	0.0964 *** (0.012)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	536	536	536	397	398	396	397	397
Adj. R <sup>2</sup> /Pseudo R <sup>2</sup>	0.30	0.05	0.30	0.35	0.36	0.36	0.36	0.36
Log likelihood	-	-1139.73	-	-	-	-	-	-
F-test/Wald test ( $\chi^2$ )	14.30 ***	319.21 ***	13.85 ***	14.07 ***	14.85 ***	15.03 ***	17.22 ***	15.75 ***
Breush-Pagan test ( $\chi^2$ )	100.80 ***	-	102.49 ***	42.57 ***	39.86 **	39.74 **	40.22 **	41.65 ***

(continued)

Panel B: impacts of business-activity variables

Models	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)
Estimation methods	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Dependent variable	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>	<i>BOASIZ</i>
<i>BUSLIN</i>	0.0117 ** (0.006)	0.0110 * (0.006)	0.0105 (0.006)	0.0115 * (0.006)	0.0111 * (0.006)	0.0115 ** (0.006)	0.0118 ** (0.006)	0.0120 * (0.007)
<i>MARFIN</i>	0.1044 ** (0.050)	0.1053 * (0.056)	0.0977 * (0.057)	0.1043 ** (0.050)	0.1035 ** (0.051)	0.1072 ** (0.049)	0.1023 ** (0.049)	0.1113 * (0.057)
<i>NONCOM</i>	-0.0234 (0.050)	-0.0441 (0.065)	-0.0448 (0.063)	-0.0363 (0.054)	-0.0287 (0.054)	-0.0376 (0.053)	-0.0531 (0.052)	-0.0313 (0.059)
<i>NEWPRO</i>	-0.0277 (0.028)							0.0048 (0.030)
<i>ROAAVE</i>		-0.0043 (0.018)						0.0003 (0.018)
<i>PROAVE</i>			0.0004 (0.001)					
<i>DIVPAY</i>				-0.0005 (0.011)				
<i>BANCRE</i>					0.0214 ** (0.010)			0.0230 ** (0.011)
<i>ARREAR</i>						0.0229 *** (0.009)		
<i>EXPSHA</i>							-0.0844 *** (0.032)	-0.0692 * (0.036)
<i>EXPSHA</i> <sup>2</sup>							0.0214 *** (0.007)	0.0180 ** (0.008)
Governance variables <sup>1</sup>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	488	410	412	485	484	490	491	401
Adj. R <sup>2</sup>	0.37	0.35	0.35	0.35	0.36	0.37	0.37	0.36
<i>F</i> -test	15.07 ***	11.23 ***	11.47 ***	13.81 ***	13.98 ***	15.62 ***	14.66 ***	9.09 ***
Breush-Pagan test ( $\chi^2$ )	59.61 ***	49.60 ***	50.95 ***	55.88 ***	55.38 ***	57.93 ***	56.42 ***	53.90 ***

Notes: <sup>1</sup> Including all the independent variables used for Model (A).

<sup>2</sup> The figures in parentheses show the White's heteroskedasticity-consistent standard errors. \*\*\*: significant at the 1% level; \*\*: significant at the 5% level;

Source: Author's estimation.

**Table 8.** Correlations of proportion of outsider directors with share ownership by outsider investors, managers, and directors

Proportion of outsider directors (Group no.)	Ownership variables <sup>1</sup>					
	Outsider shareholders ( <i>OWNOUT</i> )	Large managerial shareholder ( <i>MANSHA</i> )	Top manager ( <i>OWNCEO</i> )	Management group ( <i>OWNMAN</i> )	Directors' group ( <i>OWNDIR</i> )	Board chairman ( <i>OWNCHA</i> )
0-10%(G1)	0.55	0.77	13.40	27.47	25.96	5.01
10-20%(G2)	1.10	0.83	9.82	22.47	21.24	2.99
20-30%(G3)	1.55	0.79	6.49	21.19	18.06	4.97
30-40%(G4)	2.32	0.57	15.97	28.25	27.50	4.10
40-50%(G5)	1.73	0.61	10.54	22.04	21.06	4.93
50-60%(G6)	2.09	0.54	7.81	19.23	16.73	2.27
60-70%(G7)	2.33	0.41	5.03	12.12	10.16	1.85
70-80%(G8)	2.51	0.35	3.32	13.71	13.01	3.11
80-90%(G9)	3.01	0.19	2.63	7.11	6.95	2.05
90-100%(G10)	2.74	0.07	1.35	8.04	7.14	3.05
Analysis of variance						
ANOVA ( <i>F</i> )	14.600 ***	31.100 ***	5.770 ***	6.710 ***	6.570 ***	0.810
Bartlett test ( $\chi^2$ )	43.304 ***	57.059 ***	176.348 ***	40.028 ***	35.516 ***	80.793 ***
Kruskal-Wallis test ( $\chi^2$ )	109.462 ***	202.107 ***	66.602 ***	83.852 ***	89.405 ***	61.079 ***
Scheffe multiple comparison test ( $\chi^2$ )						
G1/G10	62.927 ***	119.842 ***	28.286 ***	40.939 ***	40.885 ***	19.615 **
G1/G5	11.072	4.247	0.386	1.392	1.151	1.682
G6/G10	3.780	30.737 ***	12.488	7.792	8.996	0.450
G1/G6	16.988 **	8.202	0.840	6.689	5.393	9.438
G5/G10	8.733	44.088 ***	15.219 *	18.216 **	19.095 **	6.160
G5/G6	0.629	0.568	0.073	1.592	1.282	2.526
G4/G7	0.066	1.766	3.101	4.665	5.397	10.743
G3/G8	3.793	20.133 **	0.937	1.613	1.302	2.355
G2/G9	15.295 *	37.793 ***	22.187 ***	22.974 ***	26.066 ***	16.088 *

Notes: <sup>1</sup> See Table 6 for the definition and descriptive statistics of variables.

<sup>2</sup> \*\*\*: significant at the 1% level; \*\*: significant at the 5% level; \*: significant at the 10% level.

Source: Author's estimation.

**Table 9.** Regression analysis of the impacts of governance and business-activity variables on board composition

Panel A: impacts of governance variables								
Models	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Estimation methods	Tobit	Poisson	Logit	Tobit	Tobit	Tobit	Tobit	Tobit
Dependent variable	<i>BOACOM</i>	<i>NUMOUT</i>	<i>OUTDOM</i>	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>
Const.	0.0509 (0.147)	-1.5531 *** (0.232)	-2.6343 ** (1.039)	0.0020 (0.127)	0.1957 (0.175)	0.2491 (0.176)	0.2225 (0.177)	0.1833 (0.182)
<i>BOASIZ</i>	0.0608 (0.060)	1.0500 *** (0.122)	0.3549 (0.401)	0.0773 (0.053)	0.0517 (0.071)	0.0646 (0.071)	0.0638 (0.072)	0.0656 (0.074)
<i>BOALEA</i>	0.1332 *** (0.020)	0.2180 *** (0.034)	0.5986 *** (0.132)	0.1206 *** (0.018)	0.1239 *** (0.022)	0.1250 *** (0.021)	0.1256 *** (0.022)	
<i>OUTCHA</i>								0.1463 *** (0.046)
<i>OWNOUT</i>	0.1455 *** (0.038)	0.2401 *** (0.056)	0.5195 ** (0.258)	0.1284 *** (0.033)				
<i>OWNOUT</i> <sup>2</sup>	-0.0219 *** (0.008)	-0.0358 *** (0.010)	-0.0674 (0.054)	-0.0190 *** (0.007)				
<i>MANSHA</i>	-0.3371 *** (0.037)	-0.5426 *** (0.071)	-1.8421 *** (0.236)	-0.2966 *** (0.032)				
<i>OWNCEO</i>					-0.0072 ** (0.003)			
<i>OWNCEO</i> <sup>2</sup>					0.0000 (0.000)			
<i>OWNMAN</i>						-0.0072 *** (0.003)		
<i>OWNMAN</i> <sup>2</sup>						0.0001 * (0.000)		
<i>OWNDIR</i>							-0.0072 *** (0.003)	
<i>OWNDIR</i> <sup>2</sup>							0.0001 * (0.000)	
<i>OWNCHA</i>								-0.0062 (0.006)
<i>OWNCHA</i> <sup>2</sup>								0.0001 (0.000)
<i>OWNCHA</i> × <i>OUTCHA</i>								0.0220 ** (0.010)
<i>OWNCHA</i> <sup>2</sup> × <i>OUTCHA</i>								-0.0002 * (0.000)
<i>GROFIR</i>	0.1716 *** (0.039)	0.2970 *** (0.055)	0.8822 *** (0.261)		0.1567 *** (0.043)	0.1394 *** (0.043)	0.1461 *** (0.043)	0.2032 *** (0.045)
<i>GROCOR</i>				0.0894 (0.071)				
<i>GROAFF</i>				0.1726 *** (0.036)				
<i>NEWCEO</i>	0.0827 ** (0.036)	0.1037 ** (0.052)	0.4048 (0.254)	0.0649 ** (0.031)	0.0481 (0.038)	0.0676 * (0.037)	0.0713 * (0.038)	0.0812 ** (0.039)
<i>CEOAGE</i>	0.1419 ** (0.056)	0.2111 *** (0.079)	0.6319 * (0.344)	0.1244 ** (0.049)	0.0592 (0.057)	0.0780 (0.056)	0.0784 (0.056)	0.0460 (0.059)
<i>OPECOM</i>	0.0201 (0.037)	0.0016 (0.053)	-0.0273 (0.249)	0.0151 (0.032)	0.0164 (0.039)	0.0228 (0.039)	0.0261 (0.039)	0.0074 (0.041)
<i>LIMOWN</i>	-0.0775 (0.053)	-0.0960 (0.104)	-0.5520 * (0.330)	-0.0711 (0.047)	-0.0882 * (0.053)	-0.0796 (0.053)	-0.0776 (0.054)	-0.0894 * (0.055)
<i>COLEXE</i>	-0.0452 (0.037)	-0.0991 * (0.054)	-0.2928 (0.252)	-0.0372 (0.033)	-0.0404 (0.041)	-0.0409 (0.040)	-0.0434 (0.041)	-0.0207 (0.043)
<i>PRICOM</i>	0.0179 (0.048)	0.0516 (0.069)	0.1980 (0.319)	0.0247 (0.042)	-0.0067 (0.058)	-0.0176 (0.057)	-0.0181 (0.058)	-0.0458 (0.060)
<i>SPIOFF</i>	-0.0040 (0.071)	0.0753 (0.100)	0.2741 (0.433)	-0.0001 (0.062)	-0.0803 (0.077)	-0.0874 (0.076)	-0.0867 (0.077)	-0.1031 (0.080)
<i>COMSIZ</i>	0.0295 * (0.017)	0.0567 *** (0.021)	0.3036 ** (0.129)	0.0274 * (0.015)	0.0249 (0.018)	0.0167 (0.018)	0.0185 (0.018)	0.0269 (0.018)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	536	536	536	536	397	398	396	397
Pseudo R <sup>2</sup>	0.35	0.30	0.33	0.43	0.28	0.28	0.28	0.23
Log likelihood	-296.98	-1022.85	-247.96	-222.96	-201.12	-200.52	-201.14	-214.76
Likelihood ratio test/Wald test ( $\chi^2$ )	322.83 ***	898.36 ***	172.03 ***	340.62 ***	157.09 ***	158.90 ***	156.92 ***	129.82 ***

(continued)



Panel B: impacts of business-activity variables

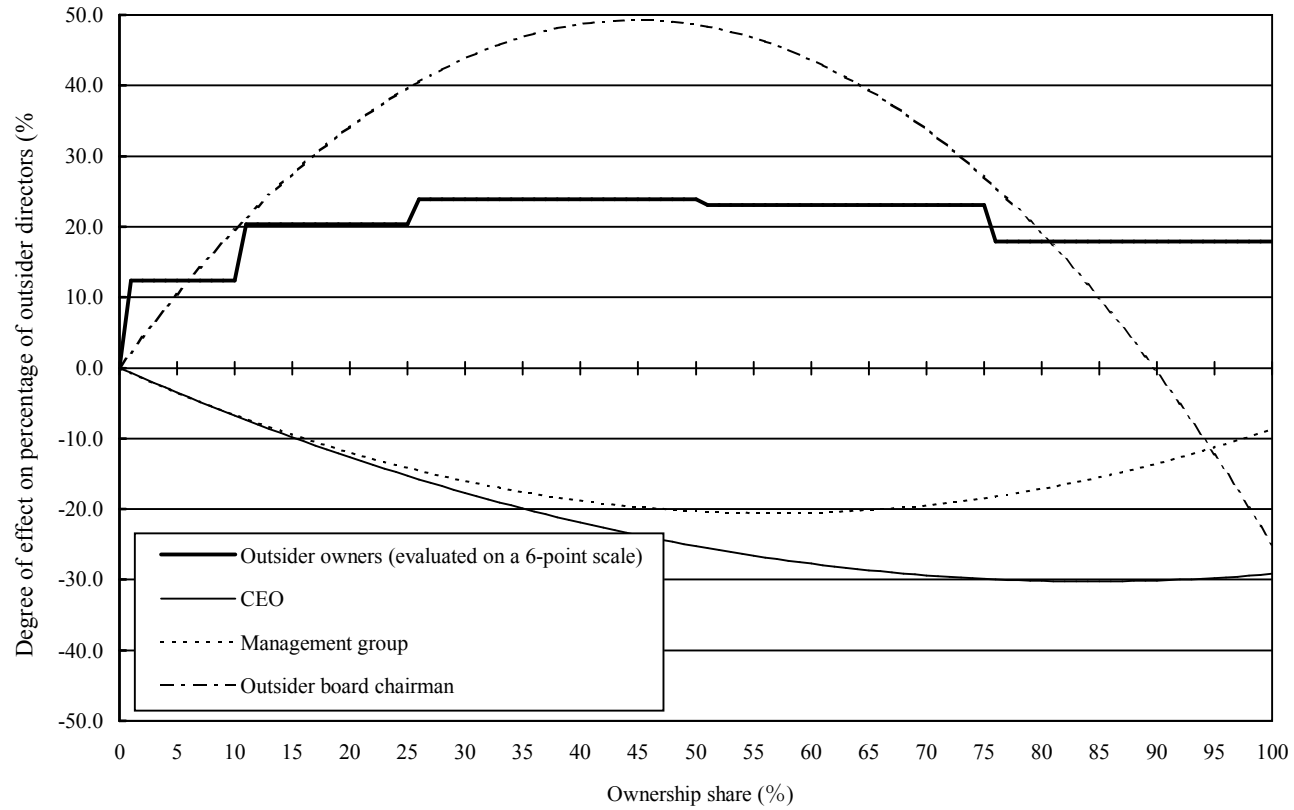
Models	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)
Estimation methods	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
Dependent variable	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>	<i>BOACOM</i>
<i>BUSLIN</i>	0.0059 (0.008)	0.0080 (0.008)	0.0087 (0.009)	0.0091 (0.008)	0.0087 (0.008)	0.0076 (0.008)	0.0080 (0.008)	0.0089 (0.008)
<i>MARFIN</i>	0.0455 (0.072)	0.0601 (0.075)	0.1027 (0.078)	0.0710 (0.072)	0.0429 (0.071)	0.0650 (0.071)	0.0575 (0.072)	0.0255 (0.075)
<i>NONCOM</i>	-0.0752 (0.076)	-0.0816 (0.078)	-0.0402 (0.079)	-0.0414 (0.075)	-0.0486 (0.075)	-0.0469 (0.074)	-0.0611 (0.075)	-0.1427* (0.080)
<i>NEWPRO</i>	-0.0991*** (0.038)							-0.0829** (0.038)
<i>ROAAVE</i>		-0.0598*** (0.019)						-0.0545*** (0.019)
<i>PROAVE</i>			-0.0028*** (0.001)					
<i>DIVPAY</i>				-0.0281** (0.014)				
<i>BANCRE</i>					0.0206* (0.012)			0.0255* (0.014)
<i>ARREAR</i>						0.0208* (0.012)		
<i>EXPSHA</i>							-0.0805* (0.042)	-0.0696 (0.044)
<i>EXPSHA</i> <sup>2</sup>							0.0196* (0.010)	0.0185* (0.010)
Governance variables <sup>1</sup>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	488	410	412	485	484	490	491	401
Pseudo R <sup>2</sup>	0.37	0.41	0.40	0.36	0.37	0.37	0.37	0.43
Log likelihood	-262.05	-200.20	-204.83	-262.77	-259.06	-263.66	-263.96	-188.18
Likelihood ratio test ( $\chi^2$ )	306.79***	276.79***	274.03***	299.09***	301.85***	303.66***	306.22	283.97

Notes: <sup>1</sup> Including all the independent variables used for Model (A).

<sup>2</sup> The figures in parentheses show the standard errors (White's

Source : Author's estimation.

**Figure 3.** Impact of ownership on proportion of outsider directors by type of owner (simulation)



*Note :* Illustrated on the basis of the marginal effects of the ownership variables that are re-estimated using the Tobit regression models (A), (E), (F), (G), and (H) presented in Table 9.

*Source :* Author's estimation.

**Table 10.** Regression analysis of the impacts of governance variables on board leadership structure

Models	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Estimation methods	Ordered logit	Ordered logit	Ordered logit	Ordered logit	Ordered logit	Ordered logit	Ordered logit	Ordered logit
Dependent variable	<i>BOALEA</i>	<i>BOALEA</i>	<i>BOALEA</i>	<i>BOALEA</i>	<i>BOALEA</i>	<i>BOALEA</i>	<i>BOALEA</i>	<i>BOALEA</i>
<i>BOASIZ</i>	0.1594 (0.341)	0.1596 (0.341)	0.1474 (0.346)	0.1210 (0.337)	0.4964 (0.444)	0.5781 (0.450)	0.5071 (0.447)	0.4768 (0.449)
<i>BOACOM</i>	2.2911 *** (0.375)	2.2934 *** (0.375)	2.3123 *** (0.380)	2.1974 *** (0.369)	2.2913 *** (0.430)	2.2144 *** (0.428)	2.3214 *** (0.429)	2.3260 (0.430)
<i>OWNOUT</i>	0.0034 (0.047)	-0.0116 (0.207)	0.0032 (0.047)	-0.1188 ** (0.052)				
<i>OWNOUT</i> <sup>2</sup>		0.0031 (0.040)						
<i>MANSHA</i>	-0.0351 (0.228)	-0.0335 (0.228)	-0.0379 (0.228)	-0.0545 (0.225)				
<i>OWNCEO</i>					-0.0292 ** (0.013)	-0.0825 *** (0.025)		
<i>OWNCEO</i> <sup>2</sup>						0.0010 *** (0.000)		
<i>OWNMAN</i>							-0.0146 ** (0.006)	
<i>OWNDIR</i>								-0.0140 (0.006)
<i>GROFIR</i>	-0.3573 * (0.207)	-0.3599 * (0.206)			-0.5023 ** (0.245)	-0.5220 ** (0.249)	-0.5265 ** (0.249)	-0.5175 (0.248)
<i>GROCOR</i>			-0.1595 (0.428)					
<i>GROAFF</i>			-0.3910 * (0.212)					
<i>INDFIR</i>				-0.2012 (0.274)				
<i>OWNOUT</i> × <i>INDFIR</i>				0.2595 *** (0.082)				
<i>NEWCEO</i>	-0.1668 (0.189)	-0.1660 (0.189)	-0.1608 (0.189)	-0.1459 (0.190)	-0.1874 (0.217)	-0.2235 (0.220)	-0.1066 (0.214)	-0.0778 (0.215)
<i>CEOAGE</i>	-0.7063 ** (0.311)	-0.7041 ** (0.312)	-0.7035 ** (0.311)	-0.6734 ** (0.316)	-0.7595 ** (0.326)	-0.7113 ** (0.332)	-0.7153 ** (0.336)	-0.7066 (0.337)
<i>OPECOM</i>	0.1935 (0.193)	0.1958 (0.196)	0.2004 (0.194)	0.2202 (0.194)	0.1275 (0.235)	0.1126 (0.238)	0.1575 (0.236)	0.1574 (0.235)
<i>LIMOWN</i>	-0.3582 (0.340)	-0.3535 (0.344)	-0.3469 (0.341)	-0.3936 (0.344)	-0.6816 * (0.365)	-0.7451 ** (0.374)	-0.6936 * (0.363)	-0.6304 (0.367)
<i>COLEXE</i>	0.3320 * (0.206)	0.3317 * (0.206)	0.3355 (0.206)	0.3009 (0.207)	0.2316 (0.239)	0.2330 (0.240)	0.2646 (0.241)	0.2357 (0.241)
<i>PRICOM</i>	-0.7241 *** (0.233)	-0.7242 *** (0.233)	-0.7208 *** (0.232)	-0.7336 *** (0.233)	-0.5425 * (0.317)	-0.5608 * (0.321)	-0.6465 ** (0.310)	-0.5928 (0.314)
<i>SPIOFF</i>	-0.5642 * (0.343)	-0.5655 * (0.344)	-0.5484 (0.344)	-0.6402 * (0.345)	-0.3715 (0.412)	-0.4428 (0.404)	-0.3627 (0.414)	-0.3411 (0.416)
<i>COMSIZ</i>	-0.1733 ** (0.077)	-0.1733 ** (0.078)	-0.1703 ** (0.077)	-0.1495 ** (0.076)	-0.1832 ** (0.090)	-0.2176 ** (0.091)	-0.1949 ** (0.091)	-0.1932 (0.090)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	536	536	536	536	397	397	398	396
Pseudo R <sup>2</sup>	0.10	0.10	0.10	0.11	0.10	0.11	0.10	0.10
Log likelihood	-509.78	-509.78	-509.63	-505.02	-378.67	-375.01	-380.47	-380.01
Wald test ( $\chi^2$ )	96.80 ***	97.41 ***	96.89 ***	92.81 ***	65.10 ***	69.84 ***	71.14 ***	69.64

Notes : The figures in parentheses show the White's heteroskedasticity-consistent standard errors. \*\*\*: significant at the 1% level; \*\*: significant at the 5% level; \*: significant at the 10% level.

Source: Author's estimation.

**Table 11.** 2SLS system estimates of endogenous board formation

Models	(A) <sup>1</sup>			(B) <sup>2</sup>		
	2SLS			2SLS		
Estimation methods	2SLS			2SLS		
Dependent variable	<i>BOASIZ</i>	<i>BOACOM</i>	<i>BOALEA</i>	<i>BOASIZ</i>	<i>BOACOM</i>	<i>BOALEA</i>
Const.	1.0468 *** (0.142)	-0.0791 (0.385)	-0.1432 (1.413)	0.9345 *** (0.150)	0.0095 (0.248)	0.4864 (0.421)
Endogenous variables						
<i>BOASIZ</i>		0.1871 (0.246)	0.7009 (1.365)		0.1957 (0.184)	0.1033 (0.411)
<i>BOACOM</i>	0.0930 (0.133)		0.5229 *** (0.142)	0.0181 (0.150)		0.6685 *** (0.143)
<i>BOALEA</i>	0.0819 (0.205)	0.3848 * (0.208)		0.0511 (0.194)	0.2504 * (0.150)	
Exogenous variables						
<i>OWNOUT</i>	0.0225 *** (0.008)	0.0671 ** (0.028)	-0.0275 (0.035)	0.0231 *** (0.008)	0.0597 ** (0.031)	-0.0342 * (0.020)
<i>OWNOUT</i> <sup>2</sup>		-0.0107 * (0.006)			-0.0072 (0.006)	
<i>MANSHA</i>		-0.2276 *** (0.046)			-0.2448 *** (0.044)	
<i>GROFIR</i>		0.1030 *** (0.031)			0.1115 *** (0.032)	
<i>INDFIR</i>			-0.0436 (0.076)			-0.0718 (0.075)
<i>OWNOUT</i> × <i>INDFIR</i>			0.0399 ** (0.020)			0.0554 ** (0.023)
<i>NEWCEO</i>		0.0613 ** (0.026)			0.0366 (0.028)	
<i>CEOAGE</i>		0.0984 ** (0.044)	-0.1293 (0.087)		0.0794 * (0.046)	-0.0668 (0.076)
<i>PRICOM</i>	0.1344 *** (0.035)		-0.1947 (0.199)	0.1097 *** (0.036)		-0.0882 (0.072)
<i>COMSIZ</i>	0.1057 *** (0.013)	0.0077 (0.028)	-0.1034 (0.148)	0.0896 *** (0.017)	0.0001 (0.024)	-0.0415 (0.048)
<i>BUSLIN</i>				0.0131 ** (0.007)		
<i>MARFIN</i>				0.1085 * (0.058)		
<i>NEWPRO</i>					-0.0604 ** (0.029)	
<i>ROAAVE</i>					-0.0305 ** (0.014)	
<i>BANCRE</i>				0.0203 * (0.011)	0.0173 * (0.010)	
<i>EXPSHA</i>				-0.0636 * (0.033)		
<i>EXPSHA</i> <sup>2</sup>				0.0170 ** (0.008)		
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	536	536	536	403	403	403
Adj. R <sup>2</sup>	0.30	0.40	0.04	0.34	0.52	0.21
Wald test ( $\chi^2$ )	18.98 ***	24.11 ***	4.66 ***	11.37 ***	19.14 ***	4.70 ***

Notes : <sup>1</sup> Hausman test for the specification of the 2SLS model and 3SLS model:  $\chi^2=1.98, p=1.000$ .

<sup>2</sup> Hausman test for the specification of the 2SLS model and 3SLS model:  $\chi^2=2.77, p=1.000$ .

<sup>3</sup> The figures in parentheses show standard errors. \*\*\*: significant at the 1% level; \*\*: significant at the 5% level; \*: significant at the 10% level.

Source : Author's estimation.