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## ABSTRACT

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### **Boards of Directors in Russian Publicly Traded Companies in 1998-2014: Structure, Dynamics and Performance Effects\***

This paper provides new evidence on the structure, dynamics and performance effects of corporate boards in publicly traded companies in Russia. It takes advantage of a new and unique longitudinal dataset of virtually all Russian companies whose shares were traded in the RTS/MICEX/MOEX over 1998-2014. The analysis highlights a number of strong trends in the evolution of boards of directors, such as the declining participation of insider directors and the increasing participation of foreign and female directors. It also shows that board characteristics are linked to company performance (the market-to-book ratio, Tobin's Q, ROE and ROA), suggesting that boards of directors play a non-trivial role in corporate governance in Russia. Testing for structural breaks in the relationship between board composition and firm performance provides some evidence of the changing role of corporate boards over time.

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**Keywords:** board of directors, publicly traded companies, corporate performance, Russia

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## **1. Introduction**

According to a widespread definition, corporate governance “deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment” (Shleifer and Vishny, 1997, p. 737). Failures of corporate governance, resulting in managerial slack and shortages in external financing, have often been named among the key factors that impede productivity improvements on the micro level and economic growth on the macro level. This is certainly true of the countries of Central and Eastern Europe (Bergloef and von Thadden, 1999; McGee, 2008). Estrin and Wright (1999), for example, argue that the problems of transition in the former USSR are strongly related to the delays in introducing effective corporate governance.

There are several mechanisms that help to realign the interests of managers with those of shareholders or the interests of large shareholders with those of minority owners. These include product market competition, the market for corporate control, managerial remuneration, institutional shareholders and the board of directors, among others. Among such mechanisms, the board of directors – an institution specifically devised to mitigate governance conflicts within a firm – is often regarded as playing a key role (Nordberg, 2011). Not surprisingly, the issues of board structure and processes – defined in terms of board size, the presence of non-executive independent directors, separation of the posts of the chairman and the CEO, gender composition and the establishment of various committees – have been central to recent corporate governance debates and reforms across the globe. Interestingly, substantial controversy regarding many of these aspects of corporate boards persists in the empirical literature, even though the bulk of the available evidence comes from a relatively homogenous group of rich countries, primarily the US and Western Europe. Much less is known about the countries of Central and Eastern Europe and other emerging markets, most likely due to the lack of high quality micro-data from the region (e.g. Ararat et al., 2014).

In this paper, we study the structure, dynamics and performance effects of corporate boards in Russian publicly traded companies over 1998-2014. Although a number of papers have focused on the structural characteristics of Russian corporate boards and even tried to evaluate their effect on firm performance, no existing study simultaneously (a) provides a long-term perspective, (b) relies on a representative sample of large Russian companies traded on the stock market and (c) applies modern econometric techniques. We highlight this gap in a brief survey of the existing

literature on Russian corporate boards published in both English and Russian. Our subsequent analysis attempts to fill this gap.

Importantly, the contribution our analysis is potentially larger than filling this particular gap for a single country. The reason is that Russia provides an excellent laboratory for studying corporate governance issues, including those related to corporate boards, due to (a) enormous governance problems, (b) large economic shocks that repeatedly hit the country's economy and (c) extensive reforms of corporate governance introduced in recent decades. For example, regarding Russia, Shleifer and Vishny (1997) note that in the mid-1990s company managers had immense opportunities to divert both profits and assets to themselves. Goetzmann et al. (2003, p. 27) even labeled Russia "a Wild West of corporate control". In the last two decades, the country has been hit by several large shocks: the crises in 1998 and 2008 and a recession commencing in 2014. Finally, Russia has been actively reshaping its corporate governance environment, including the extensive amendments to the Federal Law "On joint-stock companies", especially in 2001, as well as the adoption of the corporate governance codes in 2002 and 2014. In sum, Russian data contain substantial variation in economic and governance variables and therefore could be effectively used to answer questions of general interest, in addition to country-specific ones.

The empirical analysis in this paper is based on a new and unique longitudinal dataset that was hand-collected by us. The dataset covers all Russian companies that were traded on the Russian stock market (the RTS, the MICEX as well as the MOEX since the merger of the first two in 2011) over 17 years, from 1998 to 2014.<sup>1</sup> The data on corporate boards and other company characteristics are taken from the firms' quarterly reports to the regulator.<sup>2</sup> These data contain information on full names, years of birth, ownership stakes and places of work over the previous five years for (nearly) all directors sitting on the supervisory boards of Russian public companies. They also provide information on the executive bodies of Russian firms, which allows us to identify, for example, inside and outside directors. The number of company-years in the constructed dataset is close to 4,000, while the number of records (director positions) approaches 40,000.

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<sup>1</sup> The RTS stands for the Russian Trading System, which was created as an over-the-counter market in 1995 and subsequently transformed into a stock exchange with the largest coverage of Russian stocks. The MICEX denotes the Moscow Interbank Stock Exchange, the largest (in terms of the volume of trades) stock market in the 2000s. The MOEX stands for the Moscow Exchange created as a result of the merger between the RTS and the MICEX in December 2011.

<sup>2</sup> The Federal Commission on Securities Market (1996-2004), the Federal Financial Markets Service (2004-2013) and the Central Bank of Russia (since 2013).

Using these new and unique data, the paper attempts to answer several research questions. First, what are the key structural characteristics of corporate boards in publicly traded companies in Russia? Second, what are the dynamics of these characteristics in the turbulent economic environment of the last two decades? Third, how are these structural characteristics related to company performance? Finally, is there evidence of the changing role of Russian corporate boards over the last two decades?

Our findings document the ubiquity of medium-sized boards, the prevalence of non-executive directors, small ownership stakes held by board members and a relatively small representation of female and foreign directors. We also find that board composition in Russian firms significantly changed during the period under study, with the main trends being the reduction of board size, the decline in director ownership and the increase in the proportion of female and foreign directors (at least until 2008). The characteristics of corporate boards proved to be related to company performance. For example, there seems to be a positive association between market-based performance measures on the one hand and the proportion of foreign directors as well as directors' appointments in other firms on the other. In contrast, the evidence in favor of outside and female director representation as well as director stock ownership is relatively weak. There are also signs of changes in the functioning of corporate boards: The structural characteristics of boards have different effects on firm performance in 1998-2001 compared with the baseline period of 2002-2008; there is also some evidence that the 2009-2014 period is different from the baseline.

The remainder of this paper is organized as follows. In section 2, we provide a brief institutional background regarding boards of directors in Russian companies. Section 3 offers a survey of academic articles focusing on Russian corporate boards. Section 4 describes the data. In Section 5, we discuss the methodological approaches of the study. Subsequently, Section 6 describes the results pertaining to the structure and dynamics of boards, whereas Section 7 presents the main results of our econometric analysis. Finally, section 8 draws some conclusions.

## **2. Institutional background: Boards of directors in Russian firms**

The key features of the governance structure of Russian companies are set in the Civil Code, adopted in 1994, as well as the Federal Law N 208 FZ "On joint-stock companies", passed in 1995, both of which have since undergone numerous changes and amendments. There are additional regulations adopted by government and its agencies, as well as by stock exchanges, some of which

are optional. The most prominent example of the latter is the Code of Corporate Conduct adopted by Russia's Federal Commission on Securities Markets (see FCSM, 2002). Introduced in 2002, the code provided a set of voluntary commitments by corporate stakeholders, including shareholders and managers of companies. In 2014, this code was replaced by the Code of Corporate Governance developed by the Central Bank of Russia (see CBR, 2014), which significantly expanded the list of "best practices" and clarified their meaning (see, e.g. Braendle, 2015).

As in most countries across the world, the two main bodies responsible for the governance of companies in Russia are the general shareholder meeting and the board of directors. Russia belongs to the group of countries that allow both one- and two-tier corporate boards (Ferreira and Kirchmaier, 2013). In either case, companies have to establish a supervisory board (often simply called "board of directors" in Russian) and an executive body, which may be represented by a unitary CEO (typically called "general director" in Russian) or a collective executive body (management board) that includes the CEO.<sup>3</sup> In the latter case, law explicitly requires companies to define the authority of the collective executive body in their corporate charters. From now on, following the letter of law and most of the literature, we will associate the term "board of directors" with the supervisory board.<sup>4</sup>

The board of directors is responsible for the overall governance of the company and acts under the authority granted to it by law and the corporate charter. In particular, the board of directors is responsible for setting priorities for company operations, convening general shareholder meetings and setting their agenda, deciding on bond issues, putting forward recommendations on the amount of dividends, as well as other matters. Depending on the corporate charter, the appointment and dismissal of the executive body may be the responsibility of either the board of directors or the shareholder meeting. Certain strategic issues such as large transactions have to receive unanimous approval of the board members. Importantly, the boards of directors in Russian companies have no executive functions.

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<sup>3</sup> More precisely, the board of directors (supervisory council) is not mandatory for companies with fewer than 50 shareholders (article 64 of the Federal Law "On joint-stock companies"). This rule has no implications for our analysis because we study publicly traded firms, which have hundreds and thousands of shareholders.

<sup>4</sup> The term "board of directors" is understood as the supervisory board in Iwasaki (2008), Muravyev et al. (2014) and most studies published in national journals. However, the cross-country study by Ferreira and Kirchmaier (2013), which includes Russia, defines this term as a combination of both tiers, the supervisory and management boards.

Russian corporate law contains provisions regulating the size and composition of corporate supervisory boards, as well as the procedure of their election (article 66 of the Federal Law “On joint-stock companies”). The key regulations are summarized below:

- The minimum number of directors is set at five (this norm has applied since 2004). In addition, companies with more than 10,000 voting shareholders must have no fewer than nine directors, while companies with 1,000 to 10,000 voting shareholders must have at least seven directors.

- Members of the board of directors are elected at a shareholder meeting for the period until the next annual shareholder meeting, which is to be held between March and June each year. Board members may be reelected an unlimited number of times. These norms imply that staggered boards are not allowed in Russia.

- The board is elected by cumulative voting, which ensures the representation of small blockholders. Under cumulative voting, the number of votes of each shareholder is multiplied by the number of directors on the board, whereby all such votes can be cast for one or several candidates running for the election.

- If a company has a collective executive body (management board), its members cannot occupy more than 25% of seats on the board of directors.

In Russia, the regulations concerning board composition have been relatively slack. For example, the 1995 law does not contain any explicit provisions regarding the representation of independent directors on boards (e.g. the number or proportion of such directors) and it only provides a relatively loose definition of independence.<sup>5</sup> Some rules concerning board composition are imposed by the Russian and foreign exchanges. For example, the MICEX listing rules that took effect on October 1, 2005 required the presence of at least three independent directors on the corporate boards of companies included in the quotation list of the first (highest) level. The set of criteria employed by the MICEX to identify independent directors is somewhat stricter than that used in the law. Further provisions regarding board composition are contained in the corporate governance codes from 2002 and 2014, with the most recent code having relatively elaborated criteria for board independence. Nonetheless, many of the rules remain lax; for example, the composition of the board of directors “should be balanced” along dimensions such as director

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<sup>5</sup> According to the law, independent directors are those who do not have executive posts in the company, are not among close relatives of the executives and are not among the affiliated persons of the company (except for the membership in the supervisory board).



experience, knowledge and professional skills. Most importantly, the rules introduced in the corporate governance codes are not binding and can be avoided by companies at no explicit cost.

### **3. Review of the literature on corporate boards in Russia**

Despite Russia being a major emerging market, relatively little is known about its corporate boards and their effect on company performance in particular. Overall, no more than two dozen academic articles have scrutinized the issue using sample data and statistic/econometric tools. This scarcity of evidence was already noted in the mid-2000s (e.g. Iwasaki, 2008), but as we show below, not much has changed since then.

In order to position our study within the existing literature, we conducted a comprehensive search of articles that deal with boards of directors in Russian firms. In particular, we screened all international academic journals indexed in the Web of Science, Scopus and EconLit as well as all Russian journals indexed by the Russian Science Citation Index over 2000-2015.<sup>6</sup> For space reasons, we report full details of this survey in Appendix A. Overall, we found only eight(!) articles in international journals that provide substantial empirical evidence on Russian corporate boards and four additional articles with a multi-country focus including some results for Russia.<sup>7</sup> Additionally, seven articles were found in Russian journals. The research questions asked in these studies are very diverse: from determinants of board composition (e.g. Basargin and Perevalov, 2000; Iwasaki, 2008) to the effect of board structure on audit fees (Prokofieva and Miniandy, 2011). Nevertheless, the dominating theme is the relationship between (some of) the structural characteristics of corporate boards and company performance (14 papers out of 19).

The samples and data sources are very diverse. In particular, earlier studies tended to rely on original surveys using convenience and “quasi-random” samples that are unlikely to be representative of the population or important sub-populations of Russian firms (Basargin and Perevalov, 2000; Judge et al., 2003; Peng et al., 2003).<sup>8</sup> Several papers rely on the large-scale

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<sup>6</sup> The Russian Science Citation Index is a joint product of the Web of Science and the Scientific Electronic Library, [www.elibrary.ru](http://www.elibrary.ru), as accessed on November 29, 2016.

<sup>7</sup> The latter group includes Przybyłowski et al. (2011), Ivashkovskaya and Stepanova (2011), Saeed et al. (2014) and Aras (2015).

<sup>8</sup> The focus of some studies on medium-sized firms, often in the manufacturing industry and from a few regions only is very misleading. The Russian privatization created many open joint-stock companies that would not have emerged as public companies in a normal market environment. These firms had very concentrated ownership structures and were out of the stock market, but their governance bodies, reporting requirements, etc. were patterned after the classic public widely held company.

survey by Hitotsubashi University and the Higher School of Economics, which involved stratified sampling among industrial and communications enterprises with more than 100 employees from 64 regions (Iwasaki, 2008, 2013, 2014; Frye and Iwasaki, 2011). More recent analyses tend to draw samples from the population of companies traded on the stock market (e.g. Maslennikova and Stepanova, 2010; Stepanova and Kouzmin, 2011). In these cases, the exact sample composition is typically affected by the coverage of Russian firms in specific databases (e.g. Bloomberg, Osiris and Ruslana) as well as the availability of detailed data on corporate boards, ownership and key financials. In some studies published in national journals, the procedure of sample selection is not fully transparent (Ilchyuk, 2006; Stepanova and Balkina, 2013).

The sample size in all such studies is below 1,000; the largest one (over 800 firms) comes from the survey by Hitotsubashi University and the Higher School of Economics (Iwasaki, 2008). The data are mostly cross-sectional: only eight studies feature panel data. The two panel data analyses that rely on a reasonably large number of observations (approaching 1,000) are Muravyev et al. (2014), which is a study of dual-class stock firms traded on the stock market, and Dulyak (2015), which samples large firms, both traded and non-traded. The number of periods in the panel data studies is typically small, with the largest being 12 years in Muravyev et al. (2014).

The small sample sizes, cross-sectional nature and unavailability of “hard” data often impose severe restrictions on the empirical methods available to the researcher. For example, the lack of key financials in some surveys forces the authors to rely on second-best (and even subjective!) measures of firm performance, such as the frequency of dividend payments (Frye and Iwasaki, 2011) and Likert-scale indicators of year-to-year changes in profits (Peng et al., 2003) or the position of the firm relative to the industry (Judge et al., 2003). More recent analyses focusing on the link between board characteristics and firm performance use more traditional accounting- and market-based indicators such as ROE and Tobin’s Q. Interestingly, many Russian authors choose a single performance indicator and do not present any sort of comparative analysis (e.g. Ilchyuk (2006) relies on the profit margin and Berezinets et al. (2013) employ Tobin’s Q).

Regarding the methods used, six papers rely on simple regression analysis that does not go beyond OLS, eight papers are based on the standard fixed- and random-effects estimators, while seven papers present (or at least refer to) the results obtained using more advanced econometric techniques, such as the Heckman selection and Tobit models, 2SLS and quantile regression. The

issue of endogeneity (broadly understood as encompassing reverse causation, omitted variables and measurement error) is not discussed in most studies.

The results of these analyses are difficult to summarize in a compact form due to the different research questions asked. Nevertheless, we can illustrate the variety of findings for one key research question concerning the effect of non-executive and independent directors on firm performance. This issue is raised, at least indirectly, in 12 papers, of which eight papers report some positive association between the number and/or proportion of such directors on the board and firm performance, two papers find that non-executive/independent directors make no difference and the remaining two papers provide some evidence of a negative role of non-executive/independent directors.

Overall, our brief survey of studies of Russian corporate boards suggests that the analyses are often based on small, non-representative and/or not very interesting samples, the data employed are usually cross-sectional and when panel data are used, they typically only span a few periods. Performance measures are often non-conventional, with very few papers relying on market-based indicators. The findings are diverse and not very consistent across the studies. Overall, we conclude that the evidence remains scarce and weak, although recent papers show notable progress towards better sampling strategies and more developed methodologies of empirical analysis, whereby their findings appear increasingly credible.

#### **4. Data**

The empirical analysis in this paper is based on a novel hand-collected dataset of publicly traded Russian companies over 1998-2014.<sup>9</sup> Specifically, we sample all companies whose shares were listed/traded on the RTS and/or the MICEX as well as the MOEX since the merger of the first two in 2011.<sup>10</sup> Importantly, a company enters the sample if its shares were traded/listed on the last working day of each calendar year, whereby its year-end market capitalization can be (at least theoretically) computed.

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<sup>9</sup> Mandatory disclosure requirements for Russian companies (the obligation to publish the so-called quarterly reports using a standardized template) were only introduced in 1998. Prior to that, information on corporate boards was fragmentary and only available for a few firms. Therefore, it is virtually impossible to find micro-data that would allow exploring further back into the history of Russian corporate governance than 1998.

<sup>10</sup> We thus exclude companies whose operations were mostly in Russia but whose shares were only traded abroad, e.g. in London or Frankfurt (examples being Globaltrans, Integra Group and Rambler Media Limited).

Several additional filters are applied to the sample. First, we drop companies that were traded on the RTS board, a small and rather illiquid over-the-counter market. Second, we restrict our attention to non-financial firms, dropping banks and other financial institutions from the sample. Companies from the financial sector are identified by the first two digits in their industry code (“okved” in Russian); all companies with the main two-digit code equal to 65, 66 or 67 are excluded. Therefore, the sample is the entire population of Russian non-financial firms publicly traded on the Russian stock exchanges over 17 years, from 1998 to 2014. The overall number of firms in the sample is 575, although the average number of firms traded in a given year is only 235. This gives the number of relevant observations just below 4,000. However, the real estimation sample is somewhat smaller (typically around 3,000 observations) due to missing data on one or another key variable.

For all sampled firms, we collect basic information such as the postal address and industry affiliation, details regarding their corporate boards, management bodies and ownership structures. The principal source of the data is the companies’ quarterly reports to the regulator and their annual reports. Most of the necessary information was assembled from the SKRIN and SPARK databases ([www.skrin.ru](http://www.skrin.ru) and [www.spark-interfax.ru](http://www.spark-interfax.ru), respectively; both links valid as of November 29, 2016). These sources provide data from quarterly and annual reports of the companies in semi-processed and aggregated forms. The information on corporate boards, management bodies and ownership is extracted from the second quarter reports (which are usually prepared in early July and contain data as of June 30). This ensures that the data reflect the results of the general shareholder meetings held between March and June each year (e.g. the data capture the appointment of new CEOs and new boards of directors that typically run the firm for most of the calendar year). Therefore, by construction our board variables contain predetermined values with respect to year-end stock-type variables such as market capitalization.

Using this data collection procedure, we obtain a large array of variables characterizing various aspects of firms’ operations. In particular, we have information on the distribution of ownership among large shareholders (the reporting threshold in Russia is 5%), the ownership stakes of affiliated persons (including the CEO and other directors, regardless of the size of their stakes) and the composition of corporate boards (including directors’ names, years of birth and positions held during the previous five years). Using these sources, we generate the most important variables

describing corporate ownership patterns, the size and composition of corporate supervisory boards as well as the characteristics of CEOs and, where relevant, management boards.

We augment these data with key financials of each sampled firm, again using the SKRIN and SPARK databases as principal sources. For earlier periods (1998-2002), we also consult the “Alba” and “Gnosis” databases, which contain data from the firms’ financial reports. We use consolidated data whenever possible; only in the case of their non-existence or unavailability we rely on non-consolidated data.<sup>11</sup>

The financial variables are not deflated as they are used in the form of ratios. The only exception is sales revenues, the natural logarithm of which is employed as a measure of firm size. We convert this variable to the 1998 Rubles using the annual producer price index (for manufacturing) available from the Russian Statistical Agency ([www.gks.ru](http://www.gks.ru); link valid as of November 29, 2016).

Regarding stock exchange data, we have daily trading data from the RTS archives (these were available until 2014 on the RTS website, [www.rts.ru](http://www.rts.ru)) as well as the MOEX/MICEX (detailed data were kindly provided to us by the MOEX market data team). From these data, we can retrieve the closing prices on the last trading day of each year, market capitalization<sup>12</sup> and liquidity measures such as the number of transactions and bid-ask spreads.

The basic characteristics of the sample are shown in Figure 1. The distribution of observations over time is fairly even (Panel A); the decline in the early-2000s and the subsequent increase in 2005/6 are largely due to the reorganization of two sectors, telecommunications and power utilities, pushed by government. In the former case, there was a wave of mergers of regional telecommunication companies, with the number of telecommunication companies in the sample dropping from 78 in 2001 to a mere 16 in 2003. In the latter case, there was a series of splits of local monopolies into power generating and distribution companies, with a wave of horizontal mergers in the sector following shortly thereafter.

Firms from three sectors, namely power utilities, manufacturing and telecommunications, represent more than half of the sample (Panel B). As noted above, there is a substantial reduction in the number (and also in the fraction) of telecommunication companies, especially after 2002, a

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<sup>11</sup> The main results of the study only marginally change when we replace consolidated financial data with non-consolidated ones for all firms.

<sup>12</sup> The RTS archives do not provide market capitalization data before 2003. These missing values are computed as the product of the closing price and the number of shares at the year-end. The information on the number of shares was obtained from the quarterly reports of the companies.

notable increase in the number of power utilities in the mid-2000s, when they amounted to 40% of the sample, as well as a gradual increase in the number of companies in the service sector (wholesale and retail trade, real estate and other services). Further details are available in Appendix B.

The geographic classification of the sampled firms is based on the so-called federal districts introduced in 2000 by president Putin. The only change that we make to the federal district map is to separate Moscow and St. Petersburg from the Central and North-Western Districts, respectively (Panel C). The Central region and Moscow dominate the sample. Interestingly, the share of the Central region and Moscow increase over time, from 15.7% in 1998 to almost 38% in 2014, probably reflecting the general trend towards centralization of economic activity in the country. Further details are available in Appendix B.

The data at hand allow us to define a number of key variables characterizing corporate boards and firm performance. The definitions of the variables and their descriptive statistics are shown in Table 1. While the construction of most of the variables is straightforward (e.g. the number of directors, total ownership stake of directors, performance measures), some require extra work. For example, insider directors are identified based on (a) their presence on the management board (by matching the names on the two boards) and (b) their current employment in the firm in other capacities (by checking the biographies). The gender of directors is identified based on patronymic names, which in Russian have gender-specific endings (usually “-ovich” for men and “-ovna” for women). The gender of directors for which patronymic names were not available (e.g. foreigners) was identified based on first names and in some cases by consulting extra sources on the internet (e.g. company websites). Thus, the computer processing of the data was supplemented by manual checks when necessary.

Regarding financial variables, we exclude observations with negative equity. We subsequently clean the variables measuring firm performance of outliers by winsorizing 2.5% of observations in each tail of the relevant distribution. The results of the analysis only marginally change if these observations are deleted rather than being winsorized. The dynamics of the financial variables (see Figure 2) follow the macroeconomic trends as well as the dynamics of the Russian stock market (e.g. Tobin’s Q was growing in the 2000s, dropped in 2008 and recovered in the subsequent years). This suggests good quality of the collected financial data.

## 5. Methods

The empirical part of this paper relies on the tools of descriptive analysis as well as statistics and econometrics. In particular, the tools of descriptive analysis are used to summarize key variables characterizing corporate governance in publicly traded Russian companies and trace their dynamics during the two decades.

In order to investigate how the characteristics of corporate boards are related to firm performance, we adopt a simple regression framework in which board variables (those on the right-hand side of the regression model) are related to the standard measures of performance (the left-hand side variables). The latter will include both market-based indicators (Tobin's Q and the market-to-book ratio, both logarithmized) and accounting indicators (ROA and ROE).

To explore the relationship between the board and firm performance, we consider a standard econometric model that can be written as follows:

$$Perf_{it} = \alpha_i + \mathbf{X}_{it}\delta + \mathbf{W}_{it}\beta + \gamma_t + \varepsilon_{it}, \quad i=1, \dots, N; \quad t=1, \dots, T. \quad (1)$$

where  $Perf_{it}$  stands for the performance of firm  $i$  in year  $t$  (the market-to-book ratio, Tobin's Q, contemporaneous as well as one-year-ahead ROE and ROA<sup>13</sup>),  $\alpha_i$  is a firm-specific intercept, the vector  $\mathbf{X}_{it}$  includes variables characterizing the corporate board of firm  $i$  in year  $t$ , the vector  $\mathbf{W}_{it}$  denotes a set of control variables used in similar analyses (e.g. firm size, leverage and ownership) and  $\gamma_t$  is a time effect. The firm-specific effects  $\alpha_i$  help to control for unobserved time-invariant characteristics of firms that may affect firm performance. Overall, the set of control variables  $\mathbf{W}_{it}$  (as well as firm and time fixed effects) aim to ensure that the *ceteris paribus* conditions, which are central for interpreting the link between board structure and firm performance in a causal sense, hold.

We use several estimation techniques to uncover the link between board structure and performance. The baseline is the fixed-effects (FE) regression, which provides consistent estimates regardless of the correlation of  $\alpha_i$  with the other regressors. Subsequently, we switch to the random-effects (RE) estimator, which is more efficient than the FE one but requires uncorrelatedness of  $\alpha_i$  with the regressors. We test the consistency of the RE estimator using the robust version of the

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<sup>13</sup> The rationale for using one-year-ahead variables is that accounting-based performance measures might react to changes in the board structure with substantial delays, as compared with market-based performance indicators (e.g. Carton and Hofer, 2006). Using one-year-ahead accounting-based measures also makes our board variables predetermined with respect to performance, which is not true in the case of contemporaneous performance measures.

Hausman test.<sup>14</sup> In all cases, we estimate (1) using the cluster robust estimator of variance, which addresses potential heteroskedasticity and within-cluster correlation of the error terms.

Finally, given that the financial performance of a business firm is often viewed as a stochastic process, we consider a model with a lagged dependent variable. Our dynamic model takes the following form:

$$Perf_{it} = \alpha_i + \eta Perf_{it-1} + \mathbf{X}_{it}\delta + \mathbf{W}_{it}\beta + \gamma_t + \varepsilon_{it}, \quad i=1, \dots, N; \quad t=2, \dots, T. \quad (2)$$

where  $Perf_{it-1}$  denotes the lagged performance of firm  $i$ .

In general, the presence of the lagged dependent variable on the right-hand side of the model makes the FE estimator not only biased but also inconsistent. To address this issue, we make use of the dynamic panel data (DPD) estimator, in particular its two-step system GMM version (Blundell and Bond, 1998; Roodman, 2009). It combines equations in differences of the variables (instrumented by lagged levels) with equations in levels of the variables (instrumented by lagged differences). In addition to solving the problem of endogeneity of the lagged dependent variable, this estimator also allows tackling the potential endogeneity of other right-hand side variables. Therefore, it is particularly appealing when traditional instrumental variables are not available.<sup>15</sup> We will consider the variables that characterize corporate boards –  $\mathbf{X}_{it}$  – as endogenous and use their second lags as instruments.<sup>16</sup>

The reliability of the DPD results crucially depends on the assumption that the instruments are valid. This can be checked with the help of the Hansen test of overidentifying restrictions, which we will report together with the main estimates. A rejection of the null hypothesis would indicate inconsistent estimates. In addition, we will also report test statistics for second-order serial correlation in the error process (the Arellano-Bond test). In a DPD context, second-order serial correlation is at odds with the assumption that the instruments are orthogonal to the errors.

The selection of variables for the regression model (vectors  $\mathbf{X}_{it}$  and  $\mathbf{W}_{it}$ ) is based on theoretical considerations, previous empirical work (including on Russia) and data availability. In

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<sup>14</sup> Stata command “rhausman”, see Kaiser (2014).

<sup>15</sup> It should be noted that some recent papers raise concerns about the benefits of the DPD estimators in the context of corporate finance and governance studies. For example, the simulations by Dang et al. (2015) show that the GMM estimators are unreliable as well as quite sensitive to the presence of unobserved heterogeneity, residual serial correlation and changes in control parameters.

<sup>16</sup> Instrumenting the other firm-level variables (those included in  $\mathbf{W}_{it}$ ) as well as using additional lags as instruments is problematic given the already large number of endogenous regressors, many time periods and relatively few units (firms). In our setting, it is easy to get the number of instruments well above the number of units, which violates the usual rule of thumb for the system GMM estimator (Roodman, 2009).



particular, we consider all possible characteristics of corporate boards available in the dataset, with some of them entering the baseline model and others (especially those with a significant number of missing values) employed in the extensions. In terms of control variables, we characterize the management body of the firm by two variables: a dummy for a unitary CEO and a variable for the number of managers (which naturally takes the value of one in the case of a unitary CEO). We also control for key characteristics of the ownership structure of Russian firms as well as the dual-class stock structure of equity. As is standard in corporate finance and governance studies, we also include financial leverage and firm size. Next, we include a dummy for the issue of ADRs and a measure of liquidity (in the regressions with market-based indicators of company performance). The latter is potentially important as liquidity is known to affect share prices (e.g. Amihud and Mendelson, 1986) and hence market capitalization, while most Russian companies are rather illiquid. Finally, in the RE regressions, we include dummies for the macro regions and industries. These time-invariant control variables naturally drop out in the FE regressions. Further details on the selection of variables and choice of the functional form are provided in Appendix C.

## **6. Structure and dynamics of corporate boards**

The key characteristics of corporate boards, which are summarized in Table 1 as well as Figures 3-5, allow us to identify a number of interesting patterns.<sup>17</sup> First, the distribution of the number of directors shows large spikes at 7, 9 and 11 directors, which are the thresholds established in corporate law for companies with specific numbers of shareholders (see Section 2). This pattern is consistent with the broad conclusion in Iwasaki (2008, p. 544) that “the majority of Russian firms retain boards at the lower limit of membership stipulated by the corporate law” derived for non-listed companies.

Second, the proportion of insider directors on boards is 22%, which conforms to the norm of law that insiders cannot occupy more than 25% of the seats on the board. However, there are many cases in which the threshold is exceeded, due to the presence on boards of managers and other employees who are not members of the management body (the working definition of insider directors used in our analysis is broader than that in law, as the latter only focuses on the members of the executive board). Related to this, the share of directors who are strictly not independent is

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<sup>17</sup> More detailed statistics on the evolution of corporate boards in the companies sampled are shown in Appendix D.

28%.<sup>18</sup> The distribution has a similar shape to that of insider directors, as expected: The two variables differ by directors with ownership stakes greater than 1% (and there are few such persons) as well as by directors who are government employees, which also constitute a relatively small category. Indeed, they only occupy 5% of the seats on average.

Third, the fraction of women directors amounts to 12.4% and about 40% of the firms do not have any women on the board. Foreign directors are fairly rare; their fraction is just 5.3% on average. Most firms do not have any foreigners on the board. The average age of the members of the board is 45.4 years, although the range of this variable is remarkable, from 26 to 68 years. On average, directors hold two directorships, but the range is again large, from one to 35. The proportion of new directors appointed in a given year amounts to about one-third, although this does not necessarily mean that the boards are completely renewed every three years. The rotation seems to be more concentrated among outsider directors.

The total ownership stake of directors is very small: the mean equals 2.71% and the median is just 0.005%. There are only a few cases with substantial ownership by directors. Insider directors own more than outsider directors; the averages amount to 1.52% and 1.19%, respectively, while the medians are equal to zero in both cases.

Our final remarks about board composition are related to the characteristics of the chairmen. First, their ownership stakes are low, at less than 1% on average. Most of the chairmen are outsiders (which is in line with the recommendations of the corporate governance codes). They are slightly older than the average director (48.3 versus 45.4 years, respectively). Only 6% of them are women (compared with 12.4% among all directors) and only 3% are foreigners (compared with 5.3% among all directors).

The dynamics of these characteristics, which are visualized in Figures 4 and 5, allow us to distinguish several interesting trends. First, Figure 4 suggests a general tendency to elect smaller boards. The largest boards were observed in the early 2000s (9.3 directors, on average); more recent years saw the numbers below 8.5. Second, the share of insider directors experienced a sharp decline until 2005, from 35% to a mere 15%; since then, it has been slightly growing. Third, the data show an upward trend in the proportion of female directors, from less than 10% at the end of the 1990s

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<sup>18</sup> This category comprises insider directors, those related to the government and those holding at least 1% of shares of the company. While this category is non-conventional, it is the only extended category that we can define based on the data at hand. The complement to this category encompasses both independent and grey directors. Importantly, the data do not allow us to identify independent directors based on any of the conventional definitions used in Russia and internationally.

to over 14% in more recent years. The proportion of foreign directors steeply increased between 1998 and 2008, from 2% to nearly 8%, before stabilizing around 7% after the global crisis of 2008. Fourth, and perhaps most interesting, the average age of directors follows a U-shape pattern with a clear minimum in 2005-2006. In 1998, the average age was above 48 years, in 2005 it was close to 43 years and in 2014 it was close to 48 years again. While one may hypothesize that this pattern reflects a peak in director turnover in the early-2000s, this conjecture is not supported by the data. The peak of director turnover occurred around the 2008 crisis and was accompanied by an increase in the average age of directors. Fifth, the average number of posts per director has an inverted U-shape form, with a clear maximum in the middle of the first decade of the new century. The industry-level analysis indicates that this spike was largely driven by the split of the regional power utilities into multiple firms, in which corporate boards overlapped to a considerable extent. Finally, the total ownership stake of directors declined until 2004, before stabilizing in 2004-2008 and increasing thereafter, especially in the 2010s.

The dynamics of key variables characterizing the chairmen are similar to those for all directors (see Figure 5). One notable exception is the declining fraction of chairwomen after 2002, from the maximum of 12% in 2000-2001 to a mere 5% in recent years.

It is worth noting that the above pictures result from two effects: trends in the structure of corporate boards per se and changes in the composition of the sample over time. Therefore, it is important to look at the dynamics of the variables in a subsample of firms that have been continuously traded on the Russian stock exchange (overall, there are 46 such firms in the sample). Such an examination suggests that the trends in many of the key variables are similar to those observed in the full sample (the details can be found in Appendix E). This is true of the size of the board, the number of posts per director, the average age of directors and the fractions of female and foreign directors. The trends are distinct for the total ownership stake of directors (among the continuously traded firms, there is no spike in this variable in recent years) and the proportion of insider directors (which declines over time among the continuously traded firms). Thus, the dynamics of these variables in the full sample are likely to be driven by changes in the population of publicly traded companies over time. In terms of chairmen, we observe virtually no females in this post among the continuously traded firms and a notable drop in the proportion of foreign chairmen after 2012. Moreover, there is no evidence of the increasing participation of the chairmen in company equity in recent years.

The remarkable variation – both across companies and over time – documented here will be explored in the next section in an attempt to establish statistical relationships between board characteristics and company performance.

## 7. Performance effects of corporate boards

Table 2 shows the results of estimating the baseline model using the FE approach. The columns of the table correspond to the performance measures chosen: the market-to-book ratio, Tobin's Q, ROE, one-year-ahead ROE, ROA and one-year-ahead ROA.<sup>19</sup> These baseline results indicate a non-linear relationship between board size and accounting-based performance. We observe the maximum performance at about 11 directors.<sup>20</sup> It is worth noting that the number of firms with a board size exceeding 11 is relatively small, given that the number 11 corresponds to the 90% percentile of the distribution of board size. Therefore, it may be more appropriate to interpret the estimated quadratic function as a monotonic relationship with some curvature. In particular, there seems to be an increasing but diminishing effect of board size on accounting-based performance. The relationship between board size and market-based performance seems to follow a U-shaped pattern, although it lacks statistical significance.

The fraction of insider directors on the board has no effect on market-based performance. While being unrelated to current accounting performance, it is negatively associated with one-year-ahead accounting measures. The result is in line with most of the studies that generally fail to provide convincing evidence on the pros and cons of insider directors versus outsider directors. Interestingly, the share of outsider directors in the company's equity is positively related to both market- and accounting-based performance measures. For insider directors' ownership stakes, the effect is mostly statistically insignificant, except in the case of contemporaneous performance, where the coefficient is positive and statistically significant. This latter results may indicate the lack of emphasis by insiders on the long-term objectives of the firm.

The fraction of foreign directors is positively related to the market-to-book ratio and Tobin's Q, albeit the relevant coefficient is statistically insignificant in the latter case. The fraction of directors who are related to government has no effect on either accounting- or market-based performance. Interestingly, the fraction of female directors is positively related to market-based

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<sup>19</sup> In these and all other regressions, the market-based performance measures are logarithmized.

<sup>20</sup> This is based on the turning point of the quadratic function in board size; for example,  $0.032/(2*0.022)=8$  for ROE and  $0.030/(2*0.001)=15$  for ROA.

performance as well as contemporaneous ROE. Similar results concerning the proportion of females on the corporate boards of Russian firms were reported by Berezinets et al. (2013). Given the relatively small fraction of women directors in Russian companies, this finding suggests that increasing the gender diversity of the boards may improve their performance.

The average age of directors as well as the intra-firm variance have no effect on firm performance regardless of how it is measured. The average number of posts held by the firm's directors is positively related to the market-to-book ratio and Tobin's Q, but has no effect on the accounting measures. The market seems to react favorably to the appointment of directors who are executives/directors in other firms, perhaps because posts in other firms may be viewed as a signal of the director's good quality (e.g. Muravyev et al., 2016).

Regarding firms' management bodies, there is some evidence that a unitary executive body represented by a CEO (in contrast with a management board) is not a good idea. In particular, the coefficient on the unitary CEO dummy is negative and statistically significant in the regressions with the market-to-book ratio and one-year-ahead ROE.

Most of the control variables are statistically significant and have the expected signs. However, some seem to be wrongly signed. In particular, the estimated coefficient on the dual-class stock dummy is positive and statistically significant in the regressions with market-based performance measures, which runs contrary to the theoretical and empirical findings that issuing multiple classes of shares is generally a bad idea (e.g. Hart, 1995; Maury and Pajuste, 2005). We attribute this result to the fact that the coefficient is estimated on a handful of observations (the within variation in this variable is very small as most firms in the sample do not change their structure of equity by introducing non-voting stock or converting it into voting one).

Estimating the baseline models using the RE estimator provides similar results.<sup>21</sup> In particular, this is true of the effects of the variables regarding director ownership, the number of posts and the proportions of female and foreign directors. Additionally, we observe a negative effect of the average age of directors and no effect of the management body structure. Interestingly, the dummy for dual-class stock firms now has a negative and statistically significant coefficient in the regressions with market-based measures of firm performance, confirming our presumption that most variation in this variable is between (cross-sectional) rather than within (time-series).

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<sup>21</sup> They are available in Appendix F.

However, the (robust version of) the Hausman test rejects the RE estimator. Therefore, in what follows we rely on the FE regressions.

Table 3 shows the estimated results for the baseline models augmented with the characteristics of chairmen. The coefficients on the newly-included variables are statistically insignificant, both individually and jointly (see the F-test reported at the foot of the table). The only exception is the coefficient on the dummy for insider chairmen in the regression with the market-to-book ratio, which is positive and statistically significant at the 10% level. Finally, despite a significant drop in the number of observations, our previous findings survive the specification change. We conclude that chairmen do not play an important role in Russian firms and thus our subsequent analysis excludes the characteristics of chairmen from the list of regressors.

In a similar vein, there is no statistically significant relationship between the proportion of new directors appointed to the board on the one hand and contemporaneous as well as one-year-ahead performance of firms on the other.<sup>22</sup>

Next, we test for the presence of structural breaks in the relationship between board characteristics and firm performance. In addition to the main variables characterizing corporate boards, the regression models now incorporate their interactions with two dummy variables, one for the 1998-2001 period and the other for the 2009-2014 period. We expect the structural break in 2001-2002 due to the major changes in the Russian corporate law and the adoption of the Code of Corporate Conduct in 2002.<sup>23</sup> The second potential structural break is associated with the effect of the 2008 financial crisis and the wave of legislative activity in its aftermath, such as the adoption of the laws on consolidated financial reporting and insider information.<sup>24</sup>

The estimation results are shown in Table 4. As noted above, the baseline period is 2002-2008 and we compare it with the periods of 1998-2001 and 2009-2014. We run F-tests for the statistical significance of the two sets of the interacted variables (the results of the tests are shown at the foot of the table). The results provide some support to the hypothesis that the effect of board characteristics on firm performance varies over time. For example, the effect of board size is less pronounced in 1998-2001 compared to the other periods. The negative effect of the average age of directors is only visible after 2008. While these are examples of the relationships that strengthen

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<sup>22</sup> The results are available in Appendix F.

<sup>23</sup> The significance of the 2001 changes in corporate law is shown, for example, in Muravyev (2013).

<sup>24</sup> The years 2008-2009 are regarded as an important milestone in the evolution of Russian corporate boards in the study by Dulyak (2012).

over time, other estimates suggest a declining role of particular factors. This is especially true in the case of female directors (the association with firm performance becomes weaker over time) and to some extent regarding foreign directors. Finally, some effects may change sign, as is the case with the ownership stake of insider directors. In the first period before 2002, the point estimate is 0.043, whereas in the baseline period it drops to -0.019 and more recently the effect is essentially absent (the point estimate is 0.001).

As noted above, these differential effects may be related to the profound changes in the economic and institutional environment, which influence the role of various corporate governance mechanisms, including the board of directors, in Russia. However, they may also be driven by the firms' gradual optimization of their governance structures, in the spirit of Demsetz and Lehn (1985).<sup>25</sup> In this context, in order to estimate the true effect of board characteristics on firm performance, one needs to remove the endogenous component in the board variables. As discussed in Adams et al. (2010), this is a non-trivial task.

As noted in the methodology section, we attempt to tackle the problem using the DPD estimator, which accounts for the potential persistency of firm financial performance and endogeneity of board variables. Table 5 shows the estimation results obtained using the two-step system GMM version of this estimator. The models pass the Hansen test of overidentifying restrictions and the Arellano-Bond test for the second-order autocorrelation in the errors, as witnessed by the appropriate p-values reported at the foot of the table. The estimation results suggest that firm financial performance exhibits considerable persistency, with the coefficient on the lagged dependent variable being in the range of 0.286 to 0.536. Most importantly, several of the findings obtained using the standard FE estimator survive this modification of the original model, with the estimated coefficients remaining significant both economically and statistically. This is generally the case with foreign ownership, board size and the number of posts held by directors. However, some of the previously reported results are found to be non-robust. Most notably, the positive effect of female directors documented earlier in the analysis is no longer statistically significant, regardless of the dependent variable used. The same is true of the effect of ownership by directors, both insiders and outsiders. Alternative specifications of the DPD

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<sup>25</sup> In particular, Demsetz and Lehn (1985, p. 1155) argue that “the structure of corporate ownership varies systematically in ways that are consistent with value maximization”, which implies the endogeneity of ownership in firm performance regressions.

estimator, for example, with more lags, confirm these results.<sup>26</sup> We interpret these findings as testifying the endogenous nature of the board variables in Russian data. This conclusion implies that the results of many of the previous analyses of Russian corporate boards that did nothing or little to address endogeneity may be invalid or should be treated with caution at least.

## **8. Summary and conclusion**

Based on a unique dataset that covers virtually all publicly traded Russian companies over 1998-2014, our analysis has arrived at several important conclusions.

First, it shows the key structural characteristics of corporate boards in Russian companies, in particular the ubiquity of medium-sized boards, the prevalence of non-executive directors, small ownership stakes held by board members and a relatively small representation of female and foreign directors. In determining the structure of corporate boards, companies adhere to the thresholds established by law, which is particularly visible in the case of board size.

Second, our data also show that board composition in Russian firms significantly changed during the period under study. The main trends are a reduction of board size, a decline in director ownership and an increase in the proportion of female directors and foreign directors (at least, until 2008). The share of insider directors declined, at least until the mid-2000s. The data also suggest substantial rejuvenation of the boards until the mid-2000s. Since then, the average age of directors sitting on corporate boards of publicly traded firms in Russia has increased.

Third, several characteristics of corporate boards are related to company performance. There is a positive association between company performance on the one hand and the fraction of foreign directors on the other, for which the evidence is quite robust. The appointment of directors who hold directorships in other firms also seems to improve firm value. The evidence in favor of insider-outsider director representation and female director representation as well as regarding ownership by outsider directors is not very robust. In particular, the DPD analysis treating board variables as endogenous indicates the lack of statistical significance of the respective variables. Nevertheless, our findings cast doubts on the widely held belief that boards play a limited role in most Russian companies (e.g. Dolgopyatova et al., 2016).

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<sup>26</sup> The estimates for the specification with the second and third lags of endogenous variables as instruments are available in Appendix F.



Fourth, the analysis provides evidence of changes in the functioning of Russian corporate boards. Indeed, the structural characteristics of corporate boards have different effects on firm performance in 1998-2001 compared with the baseline period of 2002-2008; there is also some evidence that the 2009-2014 period is different. Some features of corporate boards have evidently gained in importance (e.g. board size and the within-firm variance of director age) while others have lost significance (e.g. the proportion of female and foreign directors).

In addition, the results differ depending on whether performance is measured using market- or accounting-based indicators. This may stem from the fact that different performance measures characterize different aspects of the firm's operations. One issue is that the contemporaneous accounting-based indicators are of a short-term nature, while the market-based indicators reflect the long-term performance of the firm. Another issue is that different performance indicators may capture different redistributive aspects within firms, in particular investor expropriation (e.g. Kuznetsov and Muravyev, 2001). Indeed, the market-based indicators reflect company value for small shareholders and incorporate the risks of expropriation of small shareholders by large owners, while the accounting-based measures may fail to do so. Overall, the results clearly suggest that focusing on a single performance measure is insufficient, at least in the Russian context.

Several caveats are due. First, the data used in this study represent some sort of a compromise between the wide coverage of firms and greater detail for each firm. As the disclosure requirements become stricter over time, increasingly more interesting details appear in the annual and quarterly reports as well as other documents submitted by Russian companies to the regulator and stock exchanges. However, it is very difficult to collect such information in earlier periods. A notable example is the virtual lack of data on board committees, at least until the mid-2000s. Another example is the lack of information necessary to identify independent directors in accordance with the broad list of criteria set by recent regulations, the 2014 corporate governance code in particular. By focusing on the 17-year period from 1998 to 2014, we have to discard some of the important aspects of Russian corporate boards. In this respect, further research may advance by collecting and analyzing more detailed data from more recent periods.

Second, our study is of an exploratory nature, with an important aim of tracing various characteristics of corporate boards over a long period and analyzing their relationship with firm performance. This limits our attention to other important issues. For example, we do not investigate the determinants of changes of board composition in Russia. Addressing this issue would require

a comprehensive review of the legal and business environments in the country, which is more appropriate for a separate paper. Next, although we have experimented with a large number of econometric specifications, there is a scope for more consideration of specific governance variables. For example, in the case of female directors it is common to consider dummy variables for the presence of at least one/two/three women on the board, in addition to the proportion of female directors. This can be motivated by the critical mass theory suggesting that the effect of female directors may only become significant when firms appoint several (typically, three) women to the board. Further research may also accomplish this task.

Third, and most important, we acknowledge the limits in the interpretation of our findings in the causal sense, although we made every effort in terms of controlling for various important characteristics of firms, including those unobserved by the researcher (via the firm fixed effects), as well as by resorting to the DPD analysis that tackles endogeneity with the help of instruments from within the panel dataset. Therefore, further research could focus on addressing endogeneity issues using exogenous shocks to the corporate governance variables, such as the introduction of mandatory rules regarding independent directors, gender balance and the like (e.g. Ahern and Dittmar, 2012).

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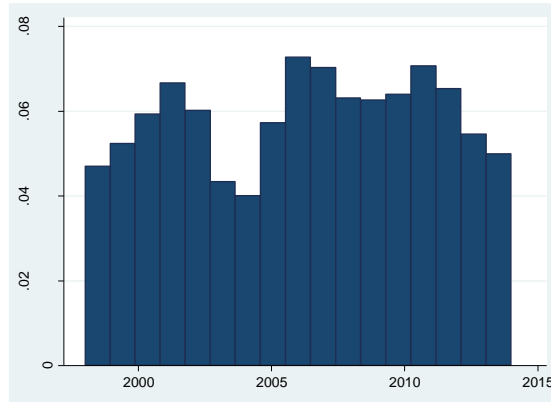
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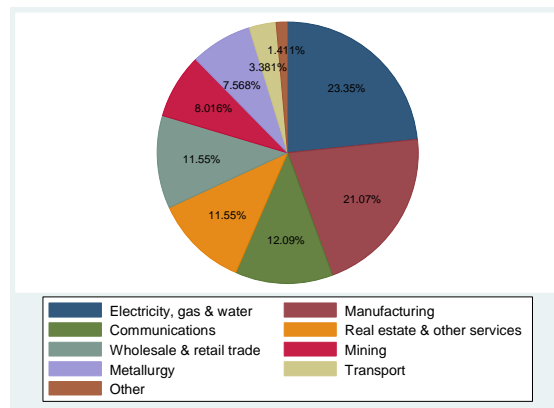
## FIGURES AND TABLES

**Figure 1. Basic characteristics of the sample.**

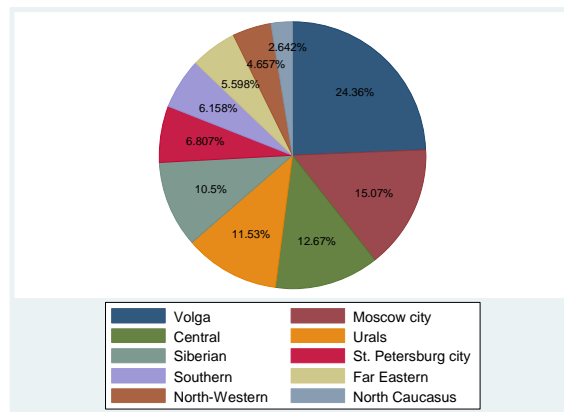
Panel A. Distribution of observations by year.



Panel B. Distribution of observations by industry.

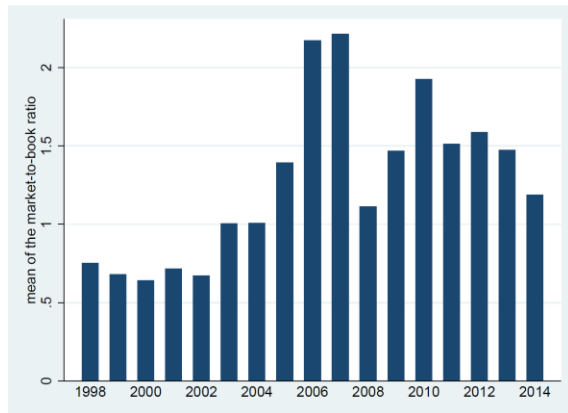


Panel C. Distribution of observations by macro-region.

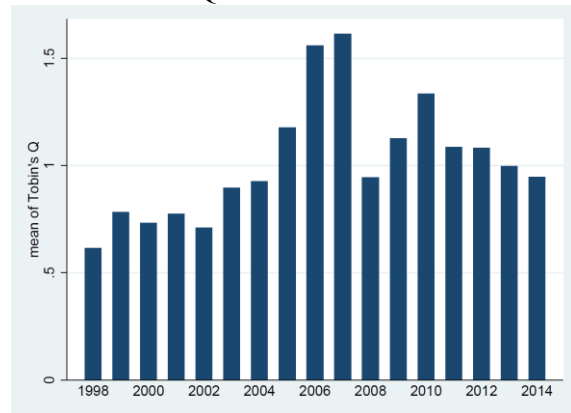


**Figure 2. Dynamics of firm performance indicators.**

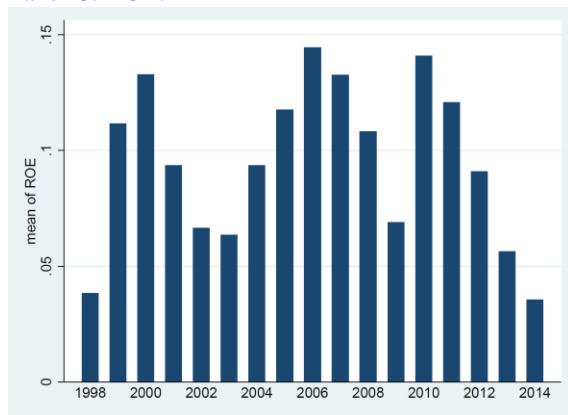
Panel A: Market-to-book ratio.



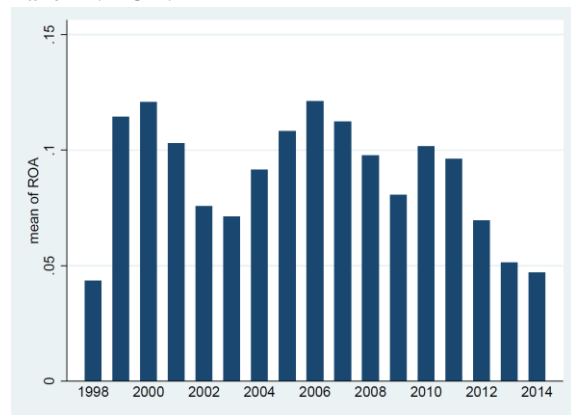
Panel B: Tobin's Q.



Panel C: ROE.

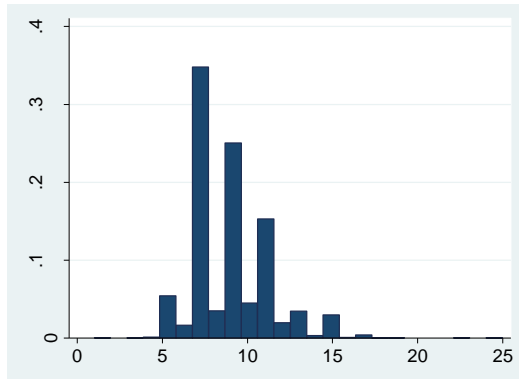


Panel D: ROA.

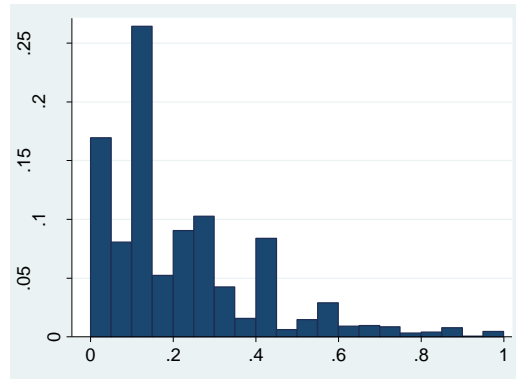


**Figure 3. Distribution of key characteristics of corporate boards.**

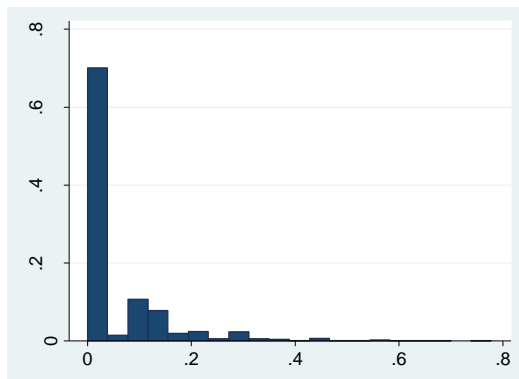
**Panel A. Board size (Number of directors).**



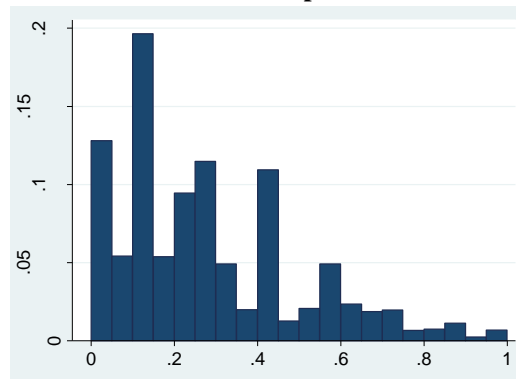
**Panel B. Share of insider directors.**



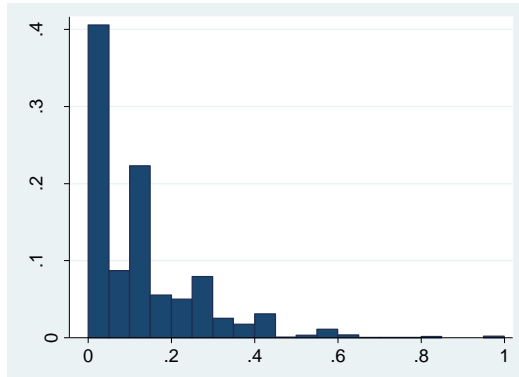
**Panel C. Share of state-related directors.**



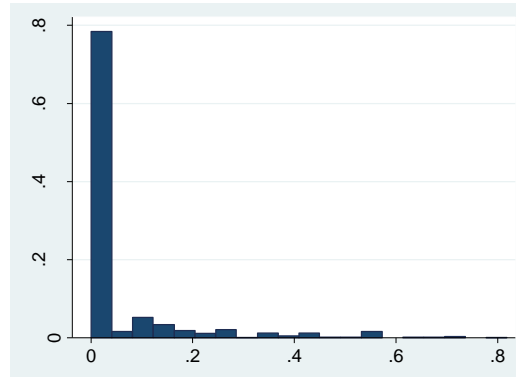
**Panel D. Share of not independent directors.**



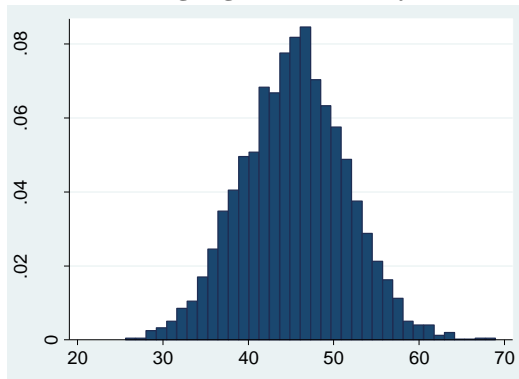
**Panel E. Share of female directors.**



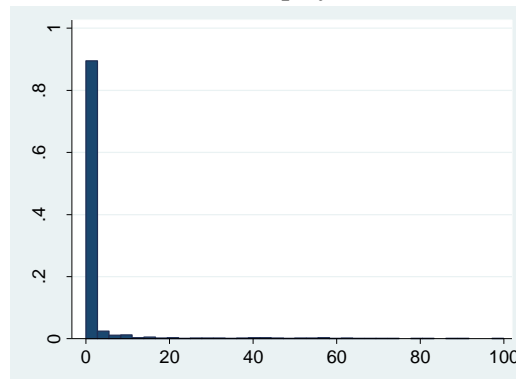
**Panel F. Share of foreign directors.**



**Panel G. Average age of directors, years.**



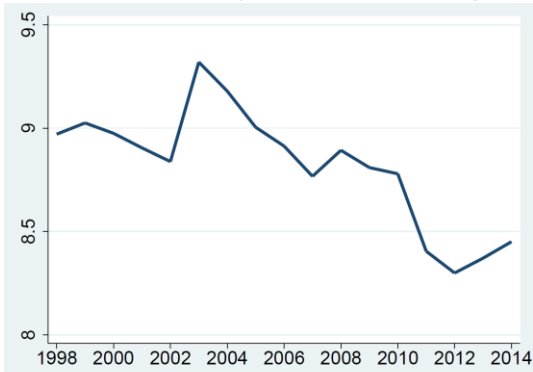
**Panel H. Total ownership by directors, %.**



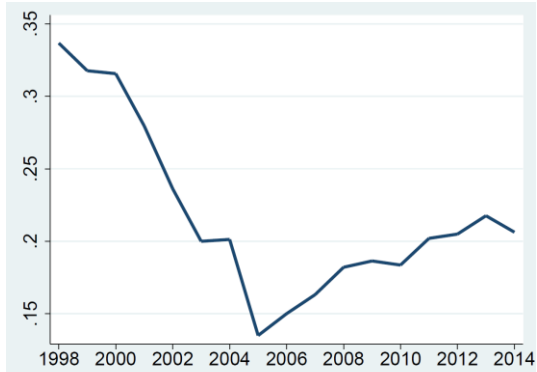


**Figure 4. Dynamics of key characteristics of corporate boards.**

**Panel A. Board size (Number of directors).**



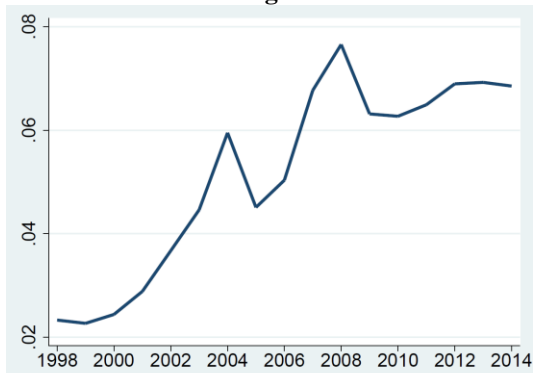
**Panel B. Share of insider directors.**



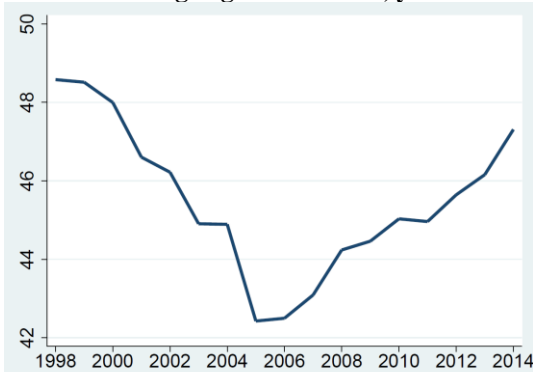
**Panel C. Share of women directors.**



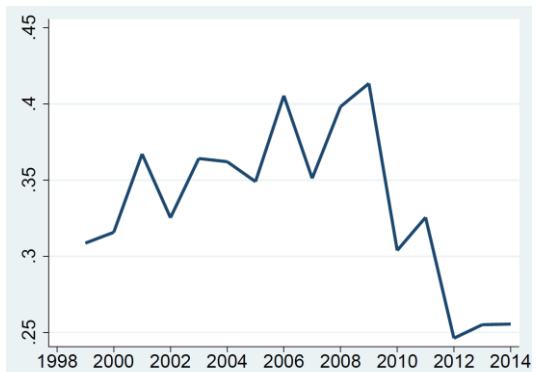
**Panel D. Share of foreign directors.**



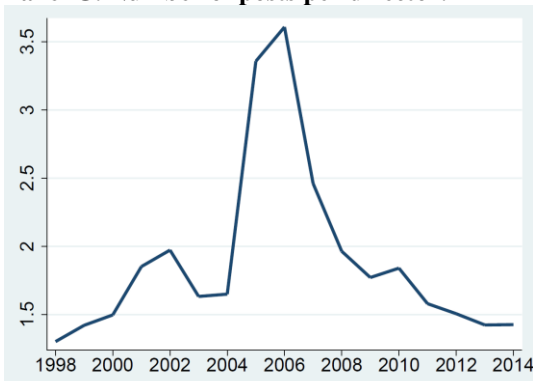
**Panel E. Average age of directors, years.**



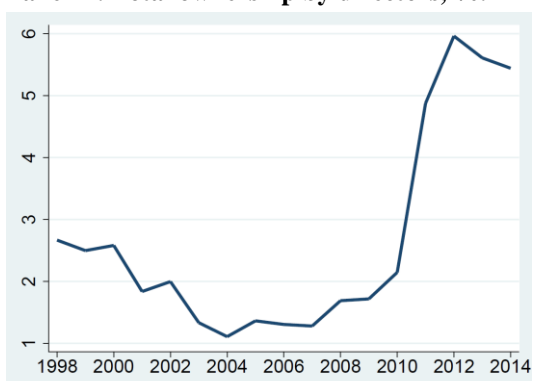
**Panel F. Share of new directors.**



**Panel G. Number of posts per director.**

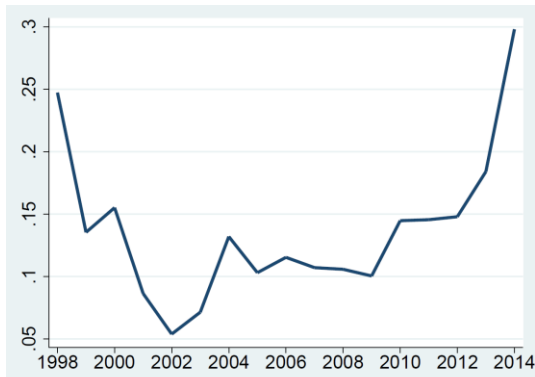


**Panel H. Total ownership by directors, %.**

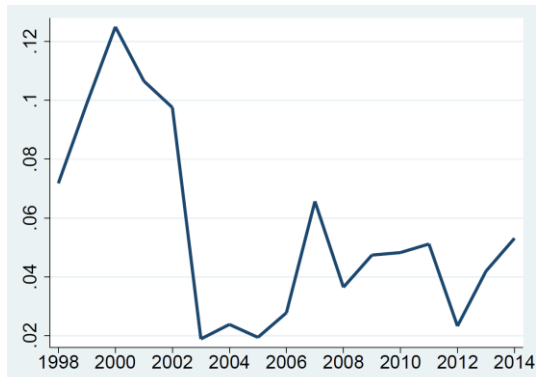


**Figure 5. Dynamics of key characteristics of board chairmen.**

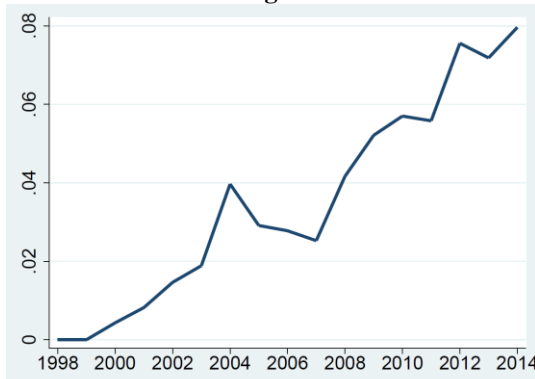
**Panel A. Share of insider chairmen.**



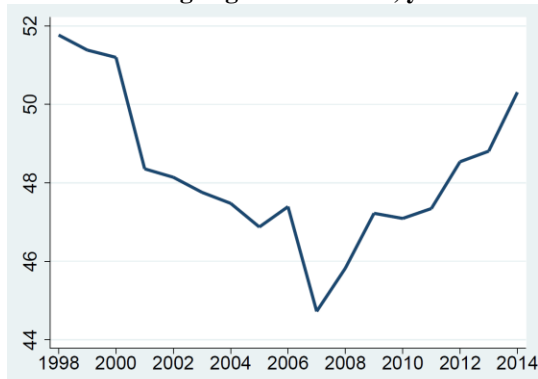
**Panel B. Share of chairwomen.**



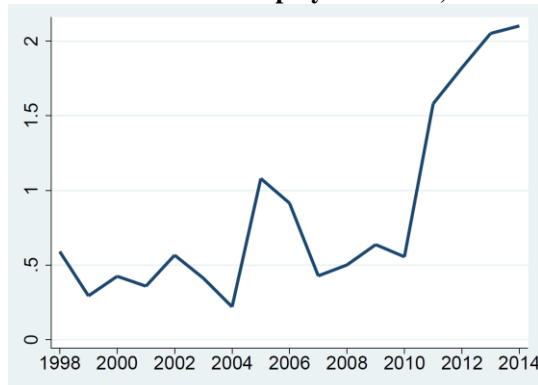
**Panel C. Share of foreign chairmen.**



**Panel D. Average age of chairmen, years.**



**Panel E. Ownership by chairmen, %.**



**Table 1. Definitions of variables and descriptive statistics.**

variable	definition	mean	sd	min	median	max	N
MtB	Market value of equity to book value of equity	1.39	1.59	0.013	0.852	10.3	3140
Q	Tobin's Q: Market value of equity plus book value of debt to book value of assets	1.09	0.660	0.142	0.941	4.77	3139
ROE	Net profit to year-average book value of equity	0.096	0.223	-1.89	0.058	1.02	3624
ROA	EBIT to year-average book value of assets	0.09	0.114	-0.22	0.063	0.634	3630
Board_size	Number of directors on the board	8.79	2.36	3	9	25	3991
Board_size_squared	Number of directors on the board squared	82.9	47.6	9	81	625	3991
Fraction_inside_dir	Fraction of insider directors	0.216	0.189	0	0.143	1	3991
Fraction_govern_dir	Fraction of state(government)-related directors	0.051	0.097	0	0	0.778	3991
Fraction_not_independ	Fraction of strictly not-independent directors (insiders + governm-related + those with more than 1% of shares)	0.278	0.217	0	0.222	1	3991
Fraction_women_dir	Fraction of female directors	0.124	0.145	0	0.1	1	3991
Fraction_foreign_dir	Fraction of foreign directors	0.053	0.128	0	0	0.818	3991
Fraction_new_dir	Fraction of new directors (not on board in the prev. year)	0.334	0.261	0	0.286	1	3267
Director_ownership	Total ownership stake of directors in company equity, %	2.71	10.3	0	0.005	100	3991
Inside_dir_ownership	Total stake of insider directors in company equity, %	1.52	6.76	0	0	100	3991
Outside_dir_ownership	Total stake of outsider directors in company equity, %	1.19	6.55	0	0	89.5	3991
Director_age	Average age of directors	45.4	6.12	25.6	45.5	68.1	3991
Director_age_variance	Variance of the directors' age	9.38	2.86	1.11	9.34	24.3	3987
Posts_per_director	Average number of directorships per director	1.92	1.41	1	1.43	13.4	3991
Chairman_insider	Dummy for insider Chairmen	0.134	0.34	0	0	1	3011
Chairman_foreign	Dummy for foreign Chairmen	0.034	0.18	0	0	1	3059
Chairwoman	Dummy for Chairwomen	0.061	0.24	0	0	1	3059
Chairman_ownership	Ownership stake of Chairman, %	0.802	4.51	0	0	61.9	3050
Chairman_age	Age of the Chairman	48.3	11.1	24	48	84	3045
Number_managers	No of managers	5.3	5.42	1	2	49	3863
Unitary_CEO	Dummy for a single CEO (no management board)	0.496	0.5	0	0	1	3863
Shareholder1_ownership	Ownership of the largest shareholder, fraction	0.504	0.209	0.068	0.49	1	3899
Shareholder2_ownership	Ownership of the second largest shareholder, fraction	0.159	0.106	0	0.155	0.5	3899
Dual_class_stock_firm	Dummy for dual class stock firms	0.445	0.497	0	0	1	3976
ADR	Dummy for ADR issue	0.093	0.29	0	0	1	3976
Size_of_firm	Firm size, log of sales deflated to 1998 prices	14	2.36	0.2	14.1	23.7	3833
Leverage	Financial leverage	0.442	0.25	0.003	0.416	0.961	3731
Liquidity	Measure of liquidity, 1-(bid-ask)	0.795	0.279	0	0.935	1	3577

**Table 2. Fixed-effects regression results, the baseline estimates.**

	(1)	(2)	(3)	(4)	(5)	(6)
	log(MtB)	log(Q)	ROE	ROE(t+1)	ROA	ROA(t+1)
Board_size	-0.036 (0.089)	-0.058 (0.037)	0.032** (0.016)	0.044** (0.018)	0.030** (0.012)	0.023*** (0.007)
Board_size_squared	0.001 (0.004)	0.003* (0.001)	-0.002** (0.001)	-0.002*** (0.001)	-0.001** (0.001)	-0.001*** (0.000)
Fraction_inside_dir	0.141 (0.169)	0.006 (0.082)	-0.030 (0.036)	-0.085** (0.039)	0.002 (0.028)	-0.032* (0.019)
Fraction_foreign_dir	0.692*** (0.265)	0.189 (0.149)	-0.008 (0.064)	-0.082 (0.068)	0.057 (0.079)	-0.009 (0.033)
Fraction_govern_dir	0.345 (0.292)	0.110 (0.153)	-0.024 (0.055)	-0.008 (0.062)	-0.002 (0.039)	-0.026 (0.032)
Fraction_women_dir	0.521** (0.227)	0.239** (0.102)	0.083* (0.043)	0.046 (0.043)	0.049 (0.030)	-0.006 (0.023)
Director_age	-0.007 (0.006)	0.000 (0.003)	0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Director_age_variance	-0.003 (0.009)	-0.004 (0.004)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)
Inside_dir_ownership	-0.003 (0.005)	-0.002 (0.002)	0.003*** (0.001)	0.001 (0.001)	0.001*** (0.000)	0.001 (0.000)
Outside_dir_ownership	0.019*** (0.003)	0.007*** (0.001)	0.004** (0.002)	0.003*** (0.001)	0.001*** (0.000)	0.001*** (0.001)
Posts_per_director	0.078*** (0.019)	0.043*** (0.010)	-0.002 (0.005)	-0.006 (0.004)	-0.001 (0.002)	-0.003 (0.002)
Number_managers	-0.000 (0.008)	0.003 (0.004)	0.001 (0.001)	0.002 (0.002)	0.001 (0.001)	0.002** (0.001)
Unitary_CEO	-0.185* (0.099)	-0.048 (0.046)	-0.013 (0.020)	-0.033* (0.019)	-0.006 (0.014)	-0.006 (0.010)
Shareholder1_ownership	0.069 (0.143)	0.081 (0.071)	0.015 (0.028)	-0.024 (0.034)	0.015 (0.024)	0.009 (0.016)
Shareholder2_ownership	0.458** (0.229)	0.270** (0.112)	-0.085** (0.040)	0.009 (0.050)	-0.044* (0.027)	0.000 (0.025)
Leverage	1.175*** (0.172)	0.713*** (0.085)	-0.296*** (0.039)	-0.005 (0.041)	-0.207*** (0.038)	-0.029 (0.018)
Dual_class_stock_firm	0.351** (0.157)	0.067 (0.076)	0.006 (0.028)	-0.134*** (0.029)	-0.021 (0.028)	-0.119*** (0.016)
Size_of_firm	-0.161*** (0.046)	-0.069*** (0.023)	0.033*** (0.005)	0.003 (0.004)	0.014*** (0.004)	0.003 (0.002)
ADR	-0.089 (0.129)	0.055 (0.063)	-0.045** (0.018)	-0.060*** (0.021)	-0.034*** (0.013)	-0.024** (0.012)
Liquidity	1.471*** (0.191)	0.526*** (0.063)				
year dummies	yes	yes	yes	yes	yes	yes
R <sup>2</sup>	0.418	0.443	0.128	0.078	0.096	0.104
N	2898	2898	3431	3127	3535	3128

The reported results are obtained using the fixed effects estimator with cluster-robust standard errors (clustering on firms). All regressions include year dummies, which are not reported due to space constraints. Standard errors in parentheses. Asterisks indicate significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 3. Fixed-effects regression results, specifications with chairman characteristics.**

	(1)	(2)	(3)	(4)	(5)	(6)
	log(MtB)	log(Q)	ROE	ROE(t+1)	ROA	ROA(t+1)
Board_size	-0.005 (0.101)	-0.039 (0.037)	0.030 (0.019)	0.058*** (0.019)	0.020** (0.010)	0.031*** (0.008)
Board_size_squared	0.000 (0.004)	0.002 (0.001)	-0.001* (0.001)	-0.002*** (0.001)	-0.001* (0.000)	-0.001*** (0.000)
Fraction_inside_dir	-0.043 (0.185)	-0.022 (0.097)	-0.016 (0.043)	-0.112** (0.044)	-0.008 (0.025)	-0.029 (0.022)
Fraction_foreign_dir	0.793** (0.351)	0.271 (0.187)	-0.069 (0.075)	-0.178* (0.092)	-0.026 (0.039)	-0.047 (0.034)
Fraction_govern_dir	0.255 (0.329)	0.067 (0.171)	-0.063 (0.063)	0.024 (0.060)	-0.042 (0.035)	-0.024 (0.035)
Fraction_women_dir	0.650** (0.296)	0.263* (0.144)	0.092* (0.052)	0.066 (0.054)	0.029 (0.028)	-0.010 (0.027)
Director_age	-0.013* (0.008)	0.002 (0.004)	0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)
Director_age_variance	0.002 (0.011)	-0.001 (0.006)	-0.003 (0.002)	-0.002 (0.002)	-0.002* (0.001)	-0.001 (0.001)
Inside_dir_ownership	-0.002 (0.006)	-0.001 (0.002)	0.004*** (0.001)	0.002** (0.001)	0.002*** (0.001)	0.001 (0.001)
Outside_dir_ownership	0.016*** (0.005)	0.004* (0.002)	0.004* (0.002)	0.004*** (0.001)	0.002** (0.001)	0.002*** (0.001)
Posts_per_director	0.073** (0.029)	0.045*** (0.014)	0.001 (0.006)	-0.006 (0.006)	-0.000 (0.003)	-0.002 (0.003)
Chairman_insider	0.126* (0.076)	0.012 (0.036)	-0.003 (0.017)	0.004 (0.019)	-0.014 (0.009)	-0.003 (0.009)
Chairman_foreign	0.063 (0.186)	0.056 (0.095)	-0.078 (0.054)	-0.047 (0.066)	-0.035 (0.030)	-0.004 (0.029)
Chairwoman	0.208 (0.167)	0.099 (0.066)	-0.007 (0.027)	-0.022 (0.032)	0.001 (0.013)	0.002 (0.012)
Chairman_age	0.005 (0.003)	0.000 (0.002)	0.000 (0.000)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)
Chairman_ownership	0.005 (0.007)	0.004 (0.003)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)
Number_managers	-0.001 (0.009)	0.005 (0.004)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002** (0.001)
Unitary_CEO	-0.259** (0.103)	-0.042 (0.050)	-0.023 (0.021)	-0.037* (0.022)	-0.004 (0.014)	-0.005 (0.011)
Shareholder1_ownership	0.106 (0.162)	0.146* (0.086)	-0.003 (0.032)	-0.037 (0.038)	-0.005 (0.020)	0.006 (0.018)
Shareholder2_ownership	0.513* (0.276)	0.392*** (0.143)	-0.058 (0.049)	0.035 (0.061)	-0.009 (0.029)	0.016 (0.031)
Leverage	1.367*** (0.203)	0.782*** (0.103)	-0.291*** (0.042)	-0.005 (0.045)	-0.207*** (0.033)	-0.028 (0.021)
Dual_class_stock_firm	0.326* (0.178)	0.056 (0.077)	0.003 (0.033)	-0.133*** (0.030)	-0.021 (0.019)	-0.115*** (0.018)
Size_of_firm	-0.195*** (0.051)	-0.092*** (0.029)	0.030*** (0.005)	0.000 (0.005)	0.016*** (0.004)	0.002 (0.002)
ADR	-0.085 (0.143)	0.037 (0.073)	-0.035 (0.022)	-0.062*** (0.022)	-0.026* (0.014)	-0.026** (0.013)
Liquidity	1.140*** (0.180)	0.406*** (0.073)				
year dummies	yes	yes	yes	yes	yes	yes
R <sup>2</sup>	0.427	0.440	0.136	0.091	0.162	0.111
N	2110	2110	2622	2423	2677	2422
F-test for Chairs: p-value	0.1487	0.4669	0.7117	0.8348	0.4933	0.8777

The reported results are obtained using the fixed effects estimator with cluster-robust standard errors (clustering on firms). All regressions include year dummies, which are not reported due to space constraints. Standard errors in parentheses. Asterisks indicate significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 4. Fixed-effects regression results, specifications with structural breaks.**

	(1)	(2)	(3)	(4)	(5)	(6)
	log(MtB)	log(Q)	ROE	ROE(t+1)	ROA	ROA(t+1)
Board_size	-0.028 (0.115)	-0.033 (0.055)	0.050** (0.021)	0.059** (0.026)	0.035*** (0.014)	0.026*** (0.009)
Board_size*bf02	0.004 (0.153)	-0.010 (0.084)	-0.049** (0.024)	-0.039* (0.024)	-0.002 (0.014)	-0.013 (0.011)
Board_size*af08	0.031 (0.160)	0.010 (0.075)	0.017 (0.027)	-0.004 (0.033)	-0.005 (0.020)	0.005 (0.013)
Board_size_squared	0.001 (0.005)	0.001 (0.002)	-0.003*** (0.001)	-0.003** (0.001)	-0.002*** (0.001)	-0.001*** (0.000)
Board_size_squared*bf02	-0.000 (0.006)	0.001 (0.003)	0.003** (0.001)	0.002* (0.001)	0.000 (0.001)	0.001 (0.001)
Board_size_squared*af08	-0.000 (0.008)	0.000 (0.004)	-0.000 (0.001)	0.000 (0.002)	0.000 (0.001)	-0.000 (0.001)
Fraction_inside_dir	-0.194 (0.212)	-0.105 (0.113)	-0.065 (0.044)	-0.054 (0.047)	-0.034 (0.030)	-0.022 (0.027)
Fraction_inside_dir*bf02	0.073 (0.374)	-0.162 (0.198)	0.089 (0.067)	-0.001 (0.076)	0.069 (0.043)	0.008 (0.042)
Fraction_inside_dir*af08	0.458* (0.244)	0.082 (0.128)	0.046 (0.058)	-0.050 (0.064)	0.033 (0.042)	-0.011 (0.032)
Fraction_foreign_dir	0.534 (0.375)	0.256 (0.227)	-0.020 (0.079)	-0.125 (0.092)	0.010 (0.057)	-0.016 (0.044)
Fraction_foreign_dir*bf02	2.775*** (0.824)	1.070** (0.523)	0.266* (0.138)	0.088 (0.144)	0.077 (0.072)	-0.023 (0.057)
Fraction_foreign_dir*af08	0.571 (0.425)	0.047 (0.258)	0.039 (0.078)	0.098 (0.076)	0.139 (0.101)	0.031 (0.035)
Fraction_govern_dir	-0.091 (0.330)	-0.188 (0.193)	0.013 (0.072)	0.102 (0.064)	0.017 (0.046)	0.003 (0.036)
Fraction_govern_dir*bf02	0.993* (0.581)	0.309 (0.329)	-0.193** (0.077)	-0.220*** (0.075)	-0.134** (0.053)	-0.118** (0.050)
Fraction_govern_dir*af08	0.031 (0.508)	0.252 (0.271)	0.103 (0.102)	0.021 (0.162)	0.101 (0.079)	0.070 (0.066)
Fraction_women_dir	0.789** (0.339)	0.468*** (0.174)	0.042 (0.053)	0.001 (0.056)	0.011 (0.031)	-0.025 (0.030)
Fraction_women_dir*bf02	1.909** (0.743)	0.700* (0.386)	-0.005 (0.084)	-0.003 (0.097)	0.051 (0.055)	0.054 (0.065)
Fraction_women_dir*af08	-0.738* (0.434)	-0.437** (0.198)	0.083 (0.068)	0.032 (0.071)	0.068 (0.054)	0.003 (0.034)
Director_age	-0.010 (0.009)	-0.000 (0.004)	0.001 (0.002)	0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)
Director_age*bf02	0.018 (0.018)	0.015 (0.009)	-0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)	0.002 (0.001)
Director_age*af08	-0.018** (0.009)	-0.012*** (0.005)	-0.003 (0.002)	-0.001 (0.002)	-0.003** (0.001)	-0.002** (0.001)
Director_age_variance	0.009 (0.014)	0.002 (0.008)	0.001 (0.003)	-0.001 (0.003)	0.002 (0.002)	-0.001 (0.001)
Director_age_variance*bf02	0.006 (0.024)	-0.007 (0.014)	0.002 (0.004)	-0.000 (0.004)	0.001 (0.002)	0.001 (0.002)
Director_age_variance*af08	0.003 (0.017)	0.007 (0.009)	-0.007** (0.003)	-0.005 (0.004)	-0.007** (0.003)	-0.000 (0.002)
Inside_dir_ownership	-0.019*** (0.007)	-0.009*** (0.002)	0.001 (0.002)	0.000 (0.001)	0.001 (0.001)	0.001* (0.001)
Inside_dir_ownership*bf02	0.062*** (0.021)	0.025* (0.013)	0.002 (0.004)	0.002 (0.002)	0.003 (0.002)	0.001 (0.001)
Inside_dir_ownership*af08	0.020** (0.009)	0.010*** (0.003)	0.002 (0.002)	-0.000 (0.002)	0.001 (0.001)	-0.001 (0.001)

	(0.008)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
Outside_dir_ownership	0.017***	0.006***	0.003**	0.003***	0.002**	0.001**
	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Outside_dir_ownership*bf02	0.100*	0.030	0.001	0.002	-0.001	0.001
	(0.058)	(0.044)	(0.003)	(0.002)	(0.001)	(0.001)
Outside_dir_ownership*af08	0.007	0.003	0.000	0.001	-0.000	-0.000
	(0.009)	(0.004)	(0.001)	(0.002)	(0.001)	(0.001)
Posts_per_director	0.153***	0.100***	0.007	0.000	0.005**	0.002
	(0.023)	(0.012)	(0.005)	(0.004)	(0.002)	(0.002)
Posts_per_director*bf02	-0.098	-0.041	-0.008	-0.017	0.006	-0.009
	(0.082)	(0.043)	(0.011)	(0.013)	(0.007)	(0.007)
Posts_per_director*af08	0.126*	-0.015	-0.004	-0.005	-0.009	-0.007
	(0.065)	(0.024)	(0.010)	(0.011)	(0.006)	(0.005)
Number_managers	-0.010	-0.003	0.000	0.002	0.001	0.002**
	(0.008)	(0.004)	(0.001)	(0.002)	(0.001)	(0.001)
Unitary_CEO	-0.131	-0.034	-0.000	-0.016	0.001	0.001
	(0.094)	(0.047)	(0.019)	(0.020)	(0.014)	(0.010)
Shareholder1_ownership	0.216	0.161**	0.037	-0.037	0.031	0.004
	(0.147)	(0.072)	(0.028)	(0.034)	(0.024)	(0.016)
Shareholder2_ownership	0.692***	0.404***	-0.085**	-0.004	-0.041	-0.001
	(0.250)	(0.118)	(0.040)	(0.049)	(0.028)	(0.023)
Leverage	1.069***	0.667***	-0.305***	-0.016	-0.208***	-0.031*
	(0.176)	(0.090)	(0.040)	(0.042)	(0.039)	(0.018)
Dual_class_stock_firm	0.266*	0.013	0.011	-0.107***	-0.036	-0.103***
	(0.153)	(0.074)	(0.028)	(0.029)	(0.026)	(0.016)
Size_of_firm	-0.180***	-0.081***	0.033***	0.004	0.014***	0.002
	(0.041)	(0.022)	(0.005)	(0.004)	(0.004)	(0.002)
ADR	0.189	0.195***	-0.021	-0.002	-0.018	-0.006
	(0.125)	(0.063)	(0.016)	(0.018)	(0.011)	(0.012)
Liquidity	1.604***	0.597***				
	(0.191)	(0.068)				
bf02	-1.655	-0.824	0.217	0.221	-0.040	-0.029
	(1.329)	(0.679)	(0.169)	(0.172)	(0.105)	(0.091)
af08	0.146	0.332	0.010	0.083	0.162*	0.047
	(0.865)	(0.429)	(0.161)	(0.188)	(0.091)	(0.071)
R <sup>2</sup>	0.292	0.265	0.107	0.038	0.084	0.072
N	2898	2898	3431	3127	3535	3128
F-test for 2002-, p-value	0.0014	0.2769	0.0953	0.0353	0.1523	0.0480
F-test for 2008+, p-value	0.0100	0.0066	0.1615	0.8975	0.0168	0.0405

The reported results are obtained using the fixed effects estimator with cluster-robust standard errors (clustering on firms). Each variable characterizing the board of directors enters the model directly and also in the form of interactions with a pre-2002 dummy (variable bf02) and a post-2008 dummy (variable af08). The coefficients on the interacted variables therefore show the deviations of the estimated effects in 1998-2001 and 2009-2014 from the baseline level, which is associated with 2002-2008. Standard errors in parentheses. Asterisks indicate significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 5. GMM-SYS dynamic panel data regressions results.**

	(1)	(2)	(3)	(4)
	log(MtB)	log(Q)	ROE	ROA
Lagged_dependent_var	0.456 <sup>**</sup> (0.038)	0.536 <sup>***</sup> (0.039)	0.286 <sup>***</sup> (0.055)	0.431 <sup>***</sup> (0.042)
Board_size	-0.053 (0.100)	-0.030 (0.047)	0.048 <sup>**</sup> (0.023)	0.018 (0.012)
Board_size_squared	0.003 (0.005)	0.001 (0.002)	-0.002 <sup>**</sup> (0.001)	-0.001 <sup>*</sup> (0.001)
Fraction_inside_dir	0.057 (0.228)	0.206 <sup>**</sup> (0.097)	0.092 (0.058)	0.035 (0.031)
Fraction_foreign_dir	1.082 <sup>**</sup> (0.300)	0.410 <sup>***</sup> (0.148)	0.051 (0.074)	0.062 <sup>*</sup> (0.037)
Fraction_govern_dir	0.811 <sup>*</sup> (0.417)	0.408 (0.259)	0.053 (0.063)	0.053 (0.041)
Fraction_women_dir	0.472 (0.325)	0.091 (0.144)	0.114 (0.074)	0.047 (0.033)
Director_age	0.005 (0.008)	0.002 (0.004)	-0.003 (0.002)	-0.001 (0.001)
Director_age_variance	-0.019 (0.016)	-0.013 <sup>*</sup> (0.008)	-0.005 (0.003)	-0.002 (0.001)
Inside_dir_ownership	0.002 (0.005)	-0.001 (0.003)	0.001 (0.001)	0.000 (0.001)
Outside_dir_ownership	0.004 (0.007)	-0.000 (0.003)	0.002 (0.001)	0.001 (0.001)
Posts_per_director	0.102 <sup>***</sup> (0.025)	0.047 <sup>***</sup> (0.011)	-0.018 <sup>***</sup> (0.006)	-0.012 <sup>***</sup> (0.003)
Number_managers	-0.002 (0.006)	-0.000 (0.002)	-0.000 (0.001)	0.000 (0.001)
Unitary_CEO	0.074 (0.063)	-0.003 (0.028)	0.014 (0.014)	0.008 (0.007)
Shareholder1_ownership	-0.244 <sup>**</sup> (0.121)	-0.084 (0.058)	-0.035 (0.027)	-0.036 <sup>***</sup> (0.013)
Shareholder2_ownership	0.018 (0.177)	0.017 (0.092)	-0.027 (0.044)	-0.028 (0.023)
Leverage	0.880 <sup>**</sup> (0.104)	0.357 <sup>***</sup> (0.046)	-0.119 <sup>**</sup> (0.025)	-0.085 <sup>***</sup> (0.011)
Dual_class_stock_firm	-0.070 (0.052)	-0.034 (0.022)	0.017 (0.012)	0.010 <sup>*</sup> (0.005)
Size_of_firm	-0.047 <sup>**</sup> (0.022)	-0.024 <sup>**</sup> (0.011)	0.019 <sup>***</sup> (0.004)	0.012 <sup>***</sup> (0.002)
ADR	0.072 (0.083)	0.061 <sup>*</sup> (0.035)	0.004 (0.014)	-0.001 (0.008)
Liquidity	0.662 <sup>**</sup> (0.148)	0.341 <sup>***</sup> (0.057)		
Year dummies	yes	yes	yes	yes
AB test for AR(2), p-value	0.753	0.124	0.137	0.014
Hansen test, p-value	0.567	0.705	0.491	0.535
<i>N</i>	2392	2391	2901	2908

The reported results are obtained using the two-step system GMM estimator for dynamic panel data (DPD) with second lags of endogenous regressors playing the role of instruments. All regressions include year dummies, which are not reported due to space constraints. Robust standard errors are in parentheses. Asterisks indicate significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



## APPENDICES

### **Appendix A. Review of previous studies on corporate boards in Russian companies.**

Table 1 provides an overview of the empirical papers that deal with boards of directors in Russian companies. For this particular survey we apply the following selection criteria. First, to ensure good quality of the studies included in the analysis we only consider articles published in peer-reviewed academic journals, both international (in English) and national (in Russian), between 2000 and 2015. For international publications, we restrict ourselves to empirical articles in academic journals indexed in the Web of Science, Scopus and EconLit, excluding journals mentioned in the Jeffrey Beal list of potential, possible or probable predatory scholarly open-access publishers/journals (<https://scholarlyoa.com/>, accessed on November 29, 2016). For sources in Russian, we require that they are original articles published in national journals included in the Russian Science Citation Index.<sup>27</sup> Unpublished (working) papers, chapters in books as well as reports by international organizations (e.g. OECD) or audit and consultancy firms (e.g. PWC and KPMG) are excluded from the survey.

Second, the relevant articles are identified using key words “corporate board” and/or “board of directors” as well as “Russia”. In addition to that, we examine all sources mentioned in the lists of references of the identified articles as well as papers giving citations to the identified articles. This allows us to find works that contain substantial results on corporate boards even if these works do not exclusively focus on boards of directors.

Third, we restrict our attention to empirical papers that are based on sample data (with the number of observations equal or greater than 30) and apply the tools of regression analysis. This excludes conceptual papers that contain no empirical analysis, such as Melkumov (2009), monographic studies (e.g. Dolgopyatova et al., 2015), other purely qualitative analyses (e.g. Dulyak 2013). Papers based on extremely small samples (Bokov and Vernikov, 2008), studies claiming the use of statistical/regression analysis but presenting no relevant results (Kokoreva and Stepanova, 2012), as well as those relying on descriptive tools and simple statistical methods, such as Demirbas and Yukhanaev (2011) are also ignored.

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<sup>27</sup> The database of the Scientific Electronic Library, [www.elibrary.ru](http://www.elibrary.ru).

Finally, multi-country studies are generally included if they contain substantial results regarding corporate boards in Russia. Of course, the last criterion is rather vague and for that reason we prefer to be as inclusive as possible. For example, we include the paper by Przybylowski et al. (2011) even though the size of the Russian sample is just 10 companies (the overall sample consists of 40 firms). However, despite the presence of the terms “board of directors” and “Russia” in the key words, we exclude Black et al. (2012) as, in contrast to other countries studied, it has almost no information on Russian boards.

**Appendix A Table 1. Review of previous studies on corporate boards in Russian companies.**

N	Authors and title	Main research questions	Data sources and sample	Data: type, period, no obs.	Methods and key variables	Main results
<b>International journals, Russia only studies</b>						
1	Judge, Naoumova, Koutzevol (2003) Corporate governance and firm performance in Russia: an empirical study	Relationship between board structure and firm performance.	Questionnaire-based survey. Convenience sample of Russian managers from Tartarstan, Bashkortostan and the Moscow region. 116 questionnaires distributed, 113 questionnaires received, only 45 with complete data	Cross-sectional data from 2002. No. obs.=45.	Descriptive and regression analysis (OLS). Main dep. var.: first principal component of the 8 items relating the firm to its competitors and measured by five-point Likert scale.	Informal CEO duality is negatively related to firm performance. The more the firms engage in retrenchment activities, the more negative the relationship between proportion of inside directors and firm performance. Retrenchment strategy was positively related to overall firm performance
2	Peng, Buck and Filatotchev (2003) Do outside directors and new managers help improve firm performance? An exploratory study in Russian privatization	Tests two standard agency theory hypotheses, namely, (1) outside board members and (2) new managers are positively related to firm performance.	Questionnaire-based survey. “Quasi-random” sample of industrial firms in six major industrial regions. 314 responses, of which 230 from open JSC.	Cross-sectional data from late 1995 and early 1996. Max No. obs.=303.	Ordered probit regression analysis. Dep. vars.: relative changes in pre-tax profits and return on investment measured by seven-point Likert scale.	No evidence that the presence of outside directors and new managers is associated with improved firm performance. Casts doubt on the global validity of the agency theory.
3	Iwasaki (2008) The determinants of board composition in a transforming economy: Evidence from Russia	Determinants of corporate board composition (especially, outsider directorship) and its relation to special features of corporate law, privatization and business groups.	Questionnaire-based survey by Hitotsubashi University and the Higher School of Economics. Stratified sampling of industrial and communications enterprises with more than 100 employees from 64 regions. 859 firms sampled, 822 complete responses from top managers.	Cross-sectional data from 2005. No. obs.=730.	Descriptive, correlation and regression analysis (Tobit and 2SLS models as well as quantile regression, and Heckman two-step model). Dep. var.: the proportion of outsider directors.	Boards are formed in accordance with the economic and organizational logics applied to mature capitalist economies. Bargaining variables are major determinants Russia's legal system and its peculiarities as a transition economy have a certain influence on board composition.
4	Frye and Iwasaki (2011) Government directors and business–state relations in Russia	Impact of government directors on corporate boards for firm behavior.	Same as in Iwasaki (2008)	Same as in Iwasaki (2008).	Descriptive, statistical, regression analysis (OLS, probit, Heckman selection models). Dep.vars.: firm performance (frequency of dividend payments); the degree of compliance with the corp. gov. code; benefit provision from firms to the state and vice versa.	Government directors on corporate boards are consistent with a “collusion” ideal type of relations between firms and the state than with a managerial discipline or rent-extraction ideal type. The state sends directors to firms that both extract resources from the state, but that also provide important benefits and services to the state.

5	Prokofieva and Muniandy (2011) Board Composition and Audit Fee: Evidence from Russia	Does board composition (presence of independent directors and state representatives) influence audit fee in the Russian capital market?	Top 147 non-finance companies listed on Russian Trading System (RTS) stock exchange which disclose the information regarding their audit fees according to Osiris Database. Data hand collected from publicly available Russian annual reports, financial statements and company announcements.	Cross-sectional data from 2008, No. obs.=147.	Standard regression analysis (OLS). Dep.var.: natural log of audit fees charged to the client.	Audit fees are positively associated with the presence of an independent chairman, as well as with the proportion of independent directors and State representatives on the board. This is consistent with the demand-side perspective of audit services: good corporate governance practices demand for a higher level of audit assurance and result in higher audit fees.
6	Iwasaki (2013) Firm-Level Determinants of Board System Choice: Evidence from Russia	The determinants of the choice and size of the collective executive board, a core element of the multi-tier board system of Russian firms.	Same as in Iwasaki (2008)	Same as in Iwasaki (2008)	Regression analysis: probit and maximum likelihood sample selection models. Dep.vars.: dummy for a collective executive board; size of the executive board.	Company executives' need for a collective management system drives the formation of a collective executive board. Outside investors are generally indifferent toward its adoption as a means to strengthening control over top management. Russian firms in the pursuit of the internationalization of their business activities tend to avoid the establishment of a collective executive board.
7	Iwasaki (2014) Global financial crisis, corporate governance, and firm survival: The Russian experience	Corporate governance the determinants of survival of Russian firms around the 2008 financial crisis.	Same as in Iwasaki (2008) plus a follow-up survey conducted between October and December of 2009.	Same as in Iwasaki (2008); follow-up survey in 2009.	Regression analysis based on the Cox proportional hazard model. Dep. var.: firm survival.	Independence of company's governance bodies, their human resource abundance, and influence over corporate management affect the survival probability of the surveyed firms. The board and the audit committee are likely to play a vital role in reducing the potential exit risk. There is a significant difference in the viewpoints of economic logic for firm survival held by independent firms and group companies.

8	Muravyev, Berezinets, Iilina (2014) The structure of corporate boards and private benefits of control: Evidence from the Russian stock exchange	The effect of board size and composition on the private benefits of control as well as on accounting and market indicators of firm performance.	All Russian dual class stock companies traded in the RTS in 1998-2009. SKRIN and SPARK databases, quarterly and annual reports of companies to the regulator; stock trade data from the RTS.	Unbalanced panel of over 100 firms observed in 12 years (1998-2009). Max. no. obs.=993.	Regression analysis of panel data (FE and RE specifications). Dep.vars.: the voting premium, market-to-book ratio, Tobin's Q, ROE, ROA, SGA (sales, general, and administr. expenses divided by sales revenues - a proxy for managerial discretionary expenses).	Quadratic relationship between board size and private benefits of control implying the optimality of medium-sized (about 11 directors) boards. Director ownership helps to mitigate governance problems. Non-executive/independent directors are associated with larger private benefits and thus do not help improve corporate governance. Regressions with accounting performance measures as dependent variables suggest a positive role of these directors in corporate governance.
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**International journals, multi-country studies including Russia**

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9	Przybyłowski, Aluchna, Zamojska (2011) Role of independent supervisory board members in Central and Eastern European countries	Role and evolution of independent directors, with a particular focus on Central and Eastern Europe. Empirical analysis of the link between the presence of independent directors and firm performance.	The 10 biggest companies listed on stock exchanges in the four most important markets of the CEE: the Czech Republic, Poland, Hungary and Russia. Data sources not mentioned.	Cross-sectional data from 2007, 40 observations in total of which 10 from Russia.	Standard regression analysis (OLS). Key var.: number of independent supervisory board members and ROE.	Results for all countries: Independent members of the board play relatively minor role. The presence of independent members positively correlates with ROE and is negatively influenced by ownership concentration. Appointing independent members is primarily dependent on company founders.
10	Ivashkovskaya and Stepanova (2011) Does strategic corporate performance depend on corporate financial architecture? Empirical study of European, Russian and other emerging market's firms.	How does financial architecture which is a mix of ownership structure, capital structure and board composition affect corporate performance?	Companies from emerging capital markets countries (Poland, Romania, Hungary, Czech Republic, Russia) and developed countries (Spain, Germany, and Italy) included into national stock exchange indices. Exact selection criteria not mentioned. Bloomberg and Bureau Van Dijk's Amadeus database.	Cross-sectional data on 178 companies from 8 countries, in 2007.	Standard regression analysis (OLS). Dep. var.: Tobin's Q.	Participation of at least one independent director in the board has a positive influence on the corporate performance in Russia and Eastern European countries.
11	Saeed, Belghitar, Yousaf (2014) Firm-level determinants of gender diversity in the boardrooms: Evidence from some emerging markets	The impact of organizational characteristics on gender diversity in the boardrooms.	The sample was formed from 295 firms listed on MICEX-RTS according to the Osiris database; 81 non-financial firms with available data are found. The final sample contains 72 firms from Russia.	Panel data of 72 Russian firms observed over 2005–2012. No. obs. = 388 (for Russia).	Descriptive statistics. Regression analysis, incl. the first-difference generalized method of moments (Arellano & Bond GMM) in attempt to address endogeneity.	The share of female directors in Russian firms is small, around 6%, but increasing over time. Gender diversity is higher in larger firms, decreases with firm risk and is lower in firms with state ownership.

12	Aras (2015) The Effect of Corporate Governance Practices on Financial Structure in Emerging Markets: Evidence from BRICK Countries and Lessons for Turkey	Review of governance practices, including board structure, and estimation of their effect on financial profitability and financial leverage in the BRICK countries.	Bloomberg Professional Database. 84 nonfinancial firms listed on the Eastern Europe MICEX.	Panel data from 2005-2012. N=1735 for all countries. Country-specific N is not shown.	Descriptive analysis. Standard panel data regressions for the entire sample (all countries at once). No controls for endogeneity. Dep.var.: ROA and financial leverage.	For Russia: Descriptive statistics for board size, percent independent directors, percent of women directors, board average age, etc. for the sampled companies. For all countries: all governance variables studied (apart from board size and audit committee meeting frequency) have a significant effect on ROA. Some are also important determinants of financial leverage.
<b>Russian journals</b>						
13	Basargin, V., and Perevalov, Yu. (2000) Analysis of the regularities in the formation of corporate control at privatized enterprises.	The dynamics of the boards of directors; determinants of the representation of outside shareholders in corporate boards.	Sample of 43 privatized large and medium-sized industrial enterprises located in Sverdlovsk region.	Panel data from the 1990s. N=247.	Descriptive analysis. Standard panel data regressions. Dep. var.: proportion of outsider directors on the board.	The share of outsider directors is positively related to the presence of certain types of large shareholders, namely, foreigners, investment funds and natural persons.
14	Ilchyuk (2006) Study of the econometric link between performance and board structure in Russian companies over 1999-2004.	The effect of board structure on the company performance.	More than 200 largest (the exact criterion unknown) Russian companies over the period 1999-2004. No further details regarding the sample. Data collected from quarterly reports of companies to the regulator.	Unbalanced panel data, 1999-2004. No.obs.=409.	Descriptive analysis, cluster analysis, regression analysis (FE and RE models). Profit margin as the only dependent variable.	There are several clusters of corporate boards, which are identified based on the dominating stakeholders. No evidence of a negative effect of management on firm performance. There is no universal model of corporate governance that is associated with best performance.
15	Maslennikova and Stepanova (2010) The Influence of Ownership Structure over Corporate Performance in Russia and Brazil.	The impact of ownership structure on corporate performance through the integrated concept of corporate financial architecture.	The sample includes 40 largest (the exact criterion unknown ) non-financial Russian companies that at the end of 2008 were traded in the RTS stock exchange. Data comes from the Ruslana database maintained by Van Dijk, Bloomberg, as well as a from company reports.	Cross-section of 40 Russian companies from 2008.	OLS regression analysis. Dep. vars.: ROA and Tobin's Q.	Directors' share ownership does not affect Tobin's Q. Small boards are associated with higher Tobin's Q. Higher share of independent directors is associated with better company performance. Only the last result survives in the Russian sub-sample, however.

16	Stepanova and Kouzmin (2011) Corporate governance and operational efficiency: evidence from Russia.	The impact of corporate governance on operational efficiency of Russian companies.	Russian companies that were publicly traded on the MICEX in 2007. 54 companies in total. Factiva database, company reports and database of the Laboratory of corporate finance of the Higher School of Economics.	Cross-sectional data from 2007. No. obs.=54.	Regression analysis: Tobit model. Dependent variable: Firm efficiency as measured using frontier efficiency methods (DEA and SFA).	Larger ownership stakes in the hands of board members are associated with poorer performance of firms. Larger ownership stakes in the hands of managers are associated with improved performance of firms.
17	Berezinets, Ilina, Cherkasskaya (2013) Board Structure and Financial Performance of Russian Public Companies.	The relationship between board structure and financial performance of Russian public companies, measured by the market-based indicator – Tobin's Q.	Russian companies that were traded at the RTS through the period 2007-2011. Data are assembled from the SKRIN database.	Unbalanced panel, 207 companies over 5 years (2007 to 2011), with 834 obs. in total.	Regression analysis: FE models. The only dependent variable is Tobin's Q.	Non-linear association between board size and Tobin's Q (minimum at 11 directors). Gender diversity is positively linked with Tobin's Q. No relation between the number of independent directors and Tobin's Q. The presence on the board of audit committee, remuneration committee, and strategy committee does not affect company performance.
18	Stepanova and Balkina (2013) Corporate financial architecture at different lifecycle stages: Performance effect in Russia	The relationship between the corporate financial architecture and strategic performance of Russian companies measured by Tobin's Q.	All Russian non-financial companies in operation for at least 6 years with enough data to compute sales growth rates between 2002 and 2011. The initial sample includes 261 firms. The final sample includes only 81 firms. Key financials are taken from Worldscope. Corporate governance data are taken from the annual and quarterly reports.	Unbalanced panel data of 81 companies and 8 years; No. obs.=477.	Regression analysis: FE models. The only dependent variable is Tobin's Q (market capitalization plus book value of debt divided by total assets).	The effect of board characteristics on company performance differs depending on the stage of the company's life cycle. Overall, board independence is positively associated with company performance. However, this effect is negative for companies in the recession stage.
19	Dulyak (2015) Empirical Analysis of the Boards of Directors' Impact on the Corporate Performance of Russian Companies	The impact of board composition and structure as well as of personal characteristics of the board members on corporate performance.	The universe includes medium-sized and large non-financial firms (with sales revenues at least 400 mln Rubles) registered as open joint-stock companies (not necessarily public) and in operation for at least 5 years (3789 firms). A random sample of 200 firms is drawn. The data are assembled from the SPARK-Interfax database.	Panel data of 200 Russian large and medium joint-stock companies in 2007-2011. No. obs.=738.	Fixed-effects regressions. Dependent variables: economic profit and return on assets.	Firm performance depends on a number of characteristics of corporate boards (the share of executive directors, the number of directors with the working experience in the same industry, chairman working in the boards of other companies).

## Appendix B. Additional descriptive statistics.

**Appendix B Table 1. Industry composition of the sample over time.**

Industry	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Mining	17	14	17	18	17	17	16	17	17	15	16	19	17	20	19	18	18	292
	8.33	7.00	7.14	7.17	7.87	10.06	9.88	7.20	6.72	5.30	6.13	7.12	6.37	7.09	7.28	7.76	8.53	7.31
Manufacturing	42	40	43	49	41	42	39	37	44	49	59	59	61	66	57	55	50	833
	20.59	20.00	18.07	19.52	18.98	24.85	24.07	15.68	17.39	17.31	22.61	22.10	22.85	23.40	21.84	23.71	23.70	20.86
Metallurgy	12	14	17	18	12	13	11	14	15	17	21	21	22	22	20	15	15	279
	5.88	7.00	7.14	7.17	5.56	7.69	6.79	5.93	5.93	6.01	8.05	7.87	8.24	7.80	7.66	6.47	7.11	6.99
Electricity, gas & water	37	37	47	51	48	48	48	97	92	95	59	58	59	60	54	44	43	977
	18.14	18.50	19.75	20.32	22.22	28.40	29.63	41.10	36.36	33.57	22.61	21.72	22.10	21.28	20.69	18.97	20.38	24.47
Wholesale & retail trade	8	8	10	9	8	8	10	31	39	46	46	45	46	48	43	41	32	478
	3.92	4.00	4.20	3.59	3.70	4.73	6.17	13.14	15.42	16.25	17.62	16.85	17.23	17.02	16.48	17.67	15.17	11.97
Transport	6	6	6	8	7	8	6	7	8	8	8	7	8	8	8	8	8	125
	2.94	3.00	2.52	3.19	3.24	4.73	3.70	2.97	3.16	2.83	3.07	2.62	3.00	2.84	3.07	3.45	3.79	3.13
Communications	64	62	77	78	66	16	16	14	15	15	15	15	14	7	8	8	8	498
	31.37	31.00	32.35	31.08	30.56	9.47	9.88	5.93	5.93	5.30	5.75	5.62	5.24	2.48	3.07	3.45	3.79	12.47
Real estate & other services	18	19	21	20	17	17	16	19	22	38	36	40	36	39	39	32	28	457
	8.82	9.50	8.82	7.97	7.87	10.06	9.88	8.05	8.70	13.43	13.79	14.98	13.48	13.83	14.94	13.79	13.27	11.45
Other	0	0	0	0	0	0	0	0	1	0	1	3	4	12	13	11	9	54
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.38	1.12	1.50	4.26	4.98	4.74	4.27	1.35
Total	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	232	211	3,993
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0



**Appendix B Table 2. Regional composition of the sample over time.**

Region	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
North-Western	13 6.37	14 7.00	20 8.40	19 7.57	17 7.87	9 5.33	8 4.94	9 3.81	10 3.95	11 3.89	6 2.30	6 2.25	7 2.62	7 2.48	7 2.68	7 3.02	6 2.84	176 4.41
Central	19 9.31	18 9.00	27 11.34	34 13.55	28 12.96	13 7.69	13 8.02	51 21.61	42 16.60	44 15.55	34 13.03	33 12.36	33 12.36	34 12.06	27 10.34	25 10.78	25 11.85	500 12.52
Volga	57 27.94	54 27.00	63 26.47	67 26.69	62 28.70	51 30.18	47 29.01	61 25.85	66 26.09	67 23.67	65 24.90	65 24.34	62 23.22	59 20.92	52 19.92	46 19.83	38 18.01	982 24.59
Southern	12 5.88	11 5.50	14 5.88	18 7.17	15 6.94	12 7.10	11 6.79	15 6.36	15 5.93	17 6.01	14 5.36	15 5.62	15 5.62	17 6.03	19 7.28	18 7.76	16 7.58	254 6.36
North Caucasus	6 2.94	6 3.00	7 2.94	8 3.19	8 3.70	4 2.37	4 2.47	8 3.39	8 3.16	9 3.18	7 2.68	7 2.62	7 2.62	7 2.48	6 2.30	5 2.16	5 2.37	112 2.80
Urals	28 13.73	30 15.00	31 13.03	28 11.16	19 8.80	20 11.83	20 12.35	27 11.44	29 11.46	28 9.89	27 10.34	28 10.49	28 10.49	30 10.64	29 11.11	25 10.78	22 10.43	449 11.24
Siberian	25 12.25	25 12.50	27 11.34	26 10.36	23 10.65	14 8.28	12 7.41	15 6.36	23 9.09	28 9.89	28 10.73	28 10.49	31 11.61	35 12.41	29 11.11	20 8.62	19 9.00	408 10.22
Far Eastern	13 6.37	11 5.50	15 6.30	18 7.17	12 5.56	13 7.69	13 8.02	14 5.93	12 4.74	12 4.24	10 3.83	12 4.49	11 4.12	12 4.26	12 4.60	13 5.60	12 5.69	215 5.38
Moscow city	13 6.37	12 6.00	13 5.46	16 6.37	15 6.94	17 10.06	20 12.35	24 10.17	35 13.83	50 17.67	53 20.31	55 20.60	57 21.35	65 23.05	65 24.90	60 25.86	55 26.07	625 15.65
St. Petersburg city	18 8.82	19 9.50	21 8.82	17 6.77	17 7.87	16 9.47	14 8.64	12 5.08	13 5.14	17 6.01	17 6.51	18 6.74	16 5.99	16 5.67	15 5.75	13 5.60	13 6.16	272 6.81
Total	204 100.0	200 100.0	238 100.0	251 100.0	216 100.0	169 100.0	162 100.0	236 100.0	253 100.0	283 100.0	261 100.0	267 100.0	267 100.0	282 100.0	261 100.0	232 100.0	211 100.0	3,993 100.0

## **Appendix C. Details on the selection of regressors and the choice of the functional form.**

The selection of variables for the regression model is based on theoretical considerations, previous empirical work, including on Russia, and data availability. The procedure used can be illustrated with the following examples.

There is substantial evidence of non-linearities in the association of board size and firm performance, including in Russia (e.g. Coles, 2008; Muravyev et al., 2014). We have examined several alternatives in an attempt to find the functional form that best fits the data. The baseline is a linear functional form (see Columns 1 and 4 in Appendix C Table 1); we have also checked the quadratic (see the baseline results in Table 2), logarithmic and reciprocal functional forms (not shown). All in all, the quadratic form performs best from the empirical point of view. The two coefficients on the quadratic form are jointly statistically significant in about half of the specifications (especially when accounting-based measures of firm performance are employed) while the coefficient on board size is insignificant in all the alternative specifications. The quadratic form performs better also in terms of R-squared.

Next, there are numerous issues related to the choice of control variables and their functional forms. Ownership is regarded as a key factor affecting both firm performance and board efficiency. One critical issue is ownership concentration, typically associated with the stake of the largest owner, the stake of the three largest shareholders, etc. Other sources, especially those dealing with corporate governance environments characterized with concentrated ownership, tend to emphasize the balance between the first and second largest shareholders. The idea is that the second largest owner may play a role in restricting opportunistic behavior of the largest shareholders, e.g., the extraction of private benefits of control (e.g. Lehman and Weigand, 2000). We have therefore considered several alternatives – ownership of the largest owner in the linear form, a quadratic function in the above-mentioned variable (see Columns 2 and 5 in Appendix C Table 1), a dummy for majority ownership ( $\geq 50\%$ ) and two variables measuring ownership stakes of the first and second owners. The latter specification turns out to perform much better empirically, as judged by the significance of the coefficients and R-squared. The results unambiguously hint on the (positive) role of the second largest shareholder in the corporate governance of Russian firms.

Next, some control variables may be specific to the dependent variable chosen. A good example is stock liquidity. There is substantial evidence in the literature that stock liquidity affects stock process and, therefore, market capitalization. Thus, this factor should be controlled for in the

regressions with Tobin's Q and the market-to-book ratio. However, from the theory viewpoint there is little rational for using it as a control variable in regressions with ROE and ROA. This turns to be the case empirically: while the measure of liquidity chosen is positively and statistically significantly associated with Tobin's Q and the market-to-book ratio, it has zero effect on ROE and ROA (e.g., Column 6 in Appendix C Table 1). We therefore include this control variable only in the regressions with the market-based performance measures.

Finally, the regressions with the market-based performance measures may accommodate an additional control variable that captures contemporaneous profitability of the firm. In such a setting, the interpretation of the coefficients on the board structure variables is conditional on the accounting performance of the firm: controlling for ownership, size, leverage, etc. and (!) current profitability, what is the effect of board size, etc. on the firm's market value? As might be expected, the coefficients on such variables measuring firm profitability are positive and statistically significant; however, the inclusion of these additional controls leaves the key coefficients of interest only marginally affected (e.g., Column 3 in Appendix C Table 1). We therefore follow the golden rule suggesting, other things being equal, more parsimonious models and do not include ROE and ROA as regressors in the specifications with Tobin's Q and the market-to-book ratio.

**Appendix C Table 1. Alternative specifications of the model. Fixed-effects regressions.**

	(1)	(2)	(3)	(4)	(5)	(6)
	log(Q)	log(Q)	log(Q)	ROA	ROA	ROA
Board_size	0.002 (0.013)	-0.061* (0.036)	-0.066* (0.036)	-0.000 (0.002)	0.016** (0.008)	0.015* (0.008)
Fraction_inside_dir	-0.024 (0.082)	-0.022 (0.083)	-0.009 (0.083)	-0.021 (0.019)	-0.021 (0.019)	-0.018 (0.020)
Fraction_foreign_dir	0.180 (0.148)	0.197 (0.150)	0.188 (0.144)	-0.011 (0.032)	-0.014 (0.032)	-0.009 (0.034)
Fraction_govern_dir	0.111 (0.159)	0.103 (0.153)	0.112 (0.153)	-0.052* (0.029)	-0.051* (0.029)	-0.039 (0.031)
Fraction_women_dir	0.247** (0.104)	0.241** (0.102)	0.247** (0.102)	0.024 (0.024)	0.027 (0.023)	0.028 (0.024)
Director_age	0.000 (0.003)	-0.000 (0.003)	0.001 (0.003)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Director_age_variance	-0.003 (0.004)	-0.003 (0.004)	-0.002 (0.004)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Director_ownership	0.003* (0.002)	0.003* (0.002)	0.003 (0.002)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Posts_per_director	0.043*** (0.010)	0.043*** (0.009)	0.045*** (0.010)	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)
Number_managers	0.004 (0.004)	0.003 (0.004)	0.002 (0.004)	0.001 (0.001)	0.001* (0.001)	0.001 (0.001)
Unitary_CEO	-0.045 (0.045)	-0.058 (0.046)	-0.046 (0.044)	0.008 (0.011)	0.010 (0.011)	0.006 (0.011)
Shareholder1_ownership	0.088	0.151	0.076	0.001	0.029	0.004

	(0.071)	(0.313)	(0.072)	(0.016)	(0.058)	(0.017)
Shareholder2_ownership	0.264**		0.278**	-0.032		-0.025
	(0.112)		(0.113)	(0.023)		(0.024)
Leverage	0.725***	0.720***	0.835***	-0.192***	-0.190***	-0.192***
	(0.084)	(0.085)	(0.088)	(0.020)	(0.020)	(0.021)
Dual_class_stock_firm	0.065	0.120	0.117	-0.036**	-0.045***	-0.048***
	(0.075)	(0.076)	(0.075)	(0.016)	(0.015)	(0.018)
Size_of_firm	-0.069***	-0.069***	-0.082***	0.023***	0.023***	0.022***
	(0.023)	(0.023)	(0.025)	(0.003)	(0.003)	(0.003)
ADR	0.052	0.057	0.076	-0.033***	-0.035***	-0.038***
	(0.063)	(0.063)	(0.062)	(0.011)	(0.011)	(0.011)
Liquidity	0.525***	0.521***	0.453***			0.016
	(0.064)	(0.064)	(0.066)			(0.021)
Board_size_squared		0.003*	0.003**		-0.001**	-0.001**
		(0.001)	(0.001)		(0.000)	(0.000)
Shareholder1_own_squared		-0.000			-0.000	
		(0.000)			(0.000)	
ROA			0.567***			
			(0.117)			
year dummies	yes	yes	yes	yes	yes	yes
$R^2$	0.439	0.438	0.448	0.196	0.197	0.202
$N$	2898	2898	2814	3437	3437	3151

The reported results are obtained using the fixed effects estimator with cluster-robust standard errors (clustering on firms). All regressions include year dummies, which are not reported due to space constraints. Standard errors in parentheses. Asterisks indicate significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## Appendix D. Additional descriptive statistics for the board variables.

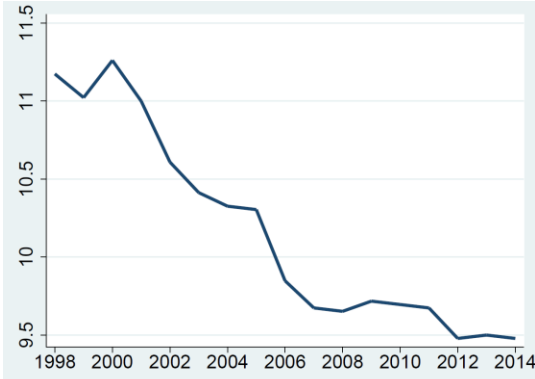
**Appendix D Table 1. Detailed descriptive statistics of the board variables over time.**

		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	
Number of directors	mean	8.97	9.03	8.97	8.9	8.84	9.32	9.18	9	8.91	8.77	8.89	8.81	8.78	8.4	8.3	8.38	8.45	8.79	
	p50	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	9
	min	5	4	5	5	5	3	4	5	3	4	4	5	4	5	3	5	4	4	3
	max	23	25	19	18	17	17	17	17	17	17	15	15	15	15	15	15	15	15	25
	sd	2.62	2.75	2.54	2.35	2.32	2.58	2.41	2.19	2.17	2.18	2.23	2.26	2.19	2.3	2.33	2.33	2.34	2.36	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Ownership stake of a director	mean	0.366	0.346	0.338	0.238	0.254	0.179	0.141	0.186	0.181	0.162	0.222	0.232	0.28	0.737	0.942	0.874	0.832	0.389	
	p50	0.057	0.0444	0.0472	0.0357	0.0263	0.0044	0.0009	0	0	0	0	0	0	0	0	0	0	0	0.0005
	min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	max	8.14	8.65	7.79	8.4	8.37	8.98	8.52	17.9	17.9	12.8	12.8	8.89	10.6	20	20	11.5	12.9	20	
	sd	1.07	1.14	1.11	0.858	0.958	0.862	0.75	1.31	1.25	1.01	1.23	1.17	1.4	2.54	2.87	2.4	2.27	1.61	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Total ownership stake of directors	mean	2.67	2.5	2.58	1.84	2	1.33	1.11	1.36	1.31	1.28	1.69	1.72	2.15	4.88	5.96	5.63	5.44	2.71	
	p50	0.495	0.406	0.455	0.32	0.216	0.04	0.0086	0	0	0	0	0	0	0	0	0	0	0.0047	
	min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	max	52.5	54.7	54.5	58.8	58.6	44.9	51.1	89.5	89.5	89.5	89.5	61.5	74.2	100	100	64.6	70.4	100	
	sd	6.94	7.6	8	6.14	7.1	5.49	5.18	8.11	7.49	7.54	8.91	8.1	10.1	15.6	16.9	14.9	14.4	10.3	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Average number of posts held by directors	mean	1.25	1.48	1.5	1.82	2.07	1.59	1.68	3.51	3.58	2.42	1.9	1.74	1.81	1.62	1.59	1.41	1.45	1.93	
	p50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	min	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	max	5	6	5	8	9	7	9	21	35	25	20	14	12	6	8	7	6	35	
	sd	0.646	1.04	0.98	1.47	1.98	1.14	1.38	4.89	5.36	3.4	1.93	1.62	1.74	1.14	1.18	0.969	1.01	2.45	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Proport. of insider directors	mean	0.337	0.318	0.316	0.28	0.236	0.2	0.201	0.135	0.15	0.163	0.182	0.186	0.184	0.202	0.205	0.217	0.206	0.216	
	p50	0.333	0.286	0.286	0.273	0.182	0.143	0.143	0.111	0.111	0.125	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	
	min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	max	1	1	1	0.889	0.889	0.889	0.889	0.889	0.8	1	1	1	1	1	1	1	0.933	1	
	sd	0.198	0.182	0.179	0.161	0.157	0.175	0.177	0.164	0.15	0.163	0.19	0.188	0.184	0.193	0.204	0.208	0.19	0.189	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Proport. of government represent.	mean	0.0927	0.0888	0.0885	0.0659	0.065	0.077	0.0713	0.034	0.0329	0.0372	0.0436	0.0511	0.0475	0.0348	0.027	0.0241	0.0199	0.0511	
	p50	0.0718	0.0718	0.0801	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	max	0.6	0.533	0.556	0.667	0.636	0.778	0.778	0.556	0.556	0.455	0.467	0.429	0.429	0.556	0.556	0.429	0.444	0.778	
	sd	0.118	0.109	0.108	0.116	0.121	0.138	0.122	0.0768	0.0743	0.0882	0.0845	0.084	0.082	0.0752	0.0679	0.0665	0.0612	0.0966	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Prop. of directors who are not independent	mean	0.443	0.421	0.416	0.352	0.311	0.288	0.275	0.174	0.188	0.207	0.232	0.246	0.242	0.257	0.253	0.26	0.242	0.278	
	p50	0.429	0.429	0.429	0.308	0.286	0.222	0.222	0.111	0.143	0.143	0.167	0.182	0.2	0.211	0.2	0.2	0.182	0.222	
	min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	max	1	1	1	1	1	0.909	0.909	0.889	0.8	1	1	1	1	1	1	1	1	0.933	1
	sd	0.228	0.202	0.196	0.194	0.192	0.23	0.215	0.19	0.173	0.189	0.209	0.201	0.201	0.215	0.214	0.22	0.198	0.217	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	

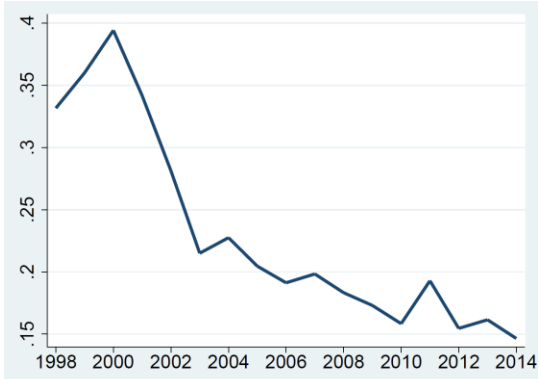
		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	
Average age of directors	mean	48.6	48.5	48	46.6	46.2	44.9	44.9	42.4	42.5	43.1	44.2	44.5	45	45	45.6	46.2	47.3	45.4	
	p50	48.8	48.6	47.9	46.6	46	44.4	44.7	41.9	42.6	42.6	44.4	44.3	44.9	44.8	45.3	45.3	46.6	45.5	
	min	32	37.1	36.3	34.9	32.3	33.6	33.4	29.8	27.4	29.2	28.3	28.8	29.1	25.6	27.8	28.8	31	25.6	
	max	60	60.2	60.4	55.7	57.1	59.5	61.1	60	63.2	60.7	64.2	64	66.7	62.3	66.5	67.1	68.1	68.1	
	sd	4.66	4.33	4.3	4.16	4.22	5.2	5.26	6.1	6.59	6.09	6.48	6.5	6.72	6.82	6.41	6.45	6.36	6.12	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Variance of directors' age	mean	8.86	9.17	9.67	10	10.1	9.89	9.59	9.5	9.47	9.82	9.16	9.04	9.05	8.93	9.25	9.04	9.06	9.38	
	p50	8.98	9.18	9.43	10.1	9.92	9.8	9.59	9.62	9.38	9.74	9.14	9.16	9.03	8.89	9.32	8.88	8.83	9.34	
	min	2.85	2.73	3.99	5.21	3.03	3.34	2.78	2.92	2.62	1.89	1.35	1.11	1.7	1.41	1.41	1.72	1.72	1.11	
	max	16.4	16.5	17.1	16.6	18.6	16.8	16.5	17.1	15.6	16.7	17.7	24.3	24.3	24.3	24.3	24.3	18.2	24.3	
	sd	2.46	2.53	2.58	2.43	2.61	2.49	2.49	2.58	2.68	2.85	2.96	3.12	3.01	3.15	3.15	3.23	3.26	2.86	
	N	203	200	238	251	216	168	162	236	253	283	261	267	267	282	261	231	209	3988	
Proport. of women directors	mean	0.0937	0.101	0.103	0.112	0.113	0.0784	0.0895	0.118	0.135	0.137	0.125	0.15	0.144	0.147	0.134	0.143	0.142	0.124	
	p50	0.0333	0.0909	0.1	0.111	0.0833	0	0.0909	0.111	0.111	0.111	0.0909	0.111	0.111	0.111	0.111	0.111	0.111	0.1	
	min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	max	0.444	0.444	0.429	0.571	0.571	0.556	0.75	0.6	0.667	1	1	1	1	1	0.8	0.8	0.8	1	
	sd	0.117	0.116	0.11	0.125	0.14	0.113	0.116	0.121	0.139	0.154	0.164	0.176	0.161	0.176	0.144	0.15	0.155	0.145	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Proport. of foreign directors	mean	0.0233	0.0227	0.0244	0.0289	0.0367	0.0446	0.0595	0.0451	0.0503	0.0677	0.0766	0.0632	0.0627	0.0649	0.069	0.0695	0.0685	0.0527	
	p50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	max	0.667	0.444	0.462	0.571	0.625	0.7	0.636	0.571	0.571	0.571	0.667	0.714	0.714	0.818	0.818	0.8	0.727	0.818	
	sd	0.0749	0.0737	0.0705	0.0782	0.102	0.122	0.138	0.117	0.118	0.141	0.156	0.142	0.142	0.151	0.158	0.151	0.149	0.129	
	N	204	200	238	251	216	169	162	236	253	283	261	267	267	282	261	231	211	3992	
Proport. of new directors	mean		0.309	0.316	0.367	0.325	0.364	0.362	0.349	0.405	0.351	0.398	0.413	0.304	0.326	0.246	0.255	0.255	0.334	
	p50		0.286	0.286	0.333	0.286	0.333	0.321	0.333	0.375	0.333	0.333	0.364	0.273	0.286	0.2	0.182	0.2	0.286	
	min		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	max		1	1	1	0.857	1	1	0.778	1	1	1	1	1	1	1	1	1	1	1
	sd		0.225	0.225	0.228	0.208	0.253	0.24	0.214	0.274	0.277	0.309	0.327	0.262	0.279	0.224	0.261	0.224	0.261	
	N	0	176	208	215	208	162	160	155	195	243	227	237	233	225	228	204	191	3267	

**Appendix E Figure 1. Dynamics of key characteristics of boards, firms with 17 obs.**

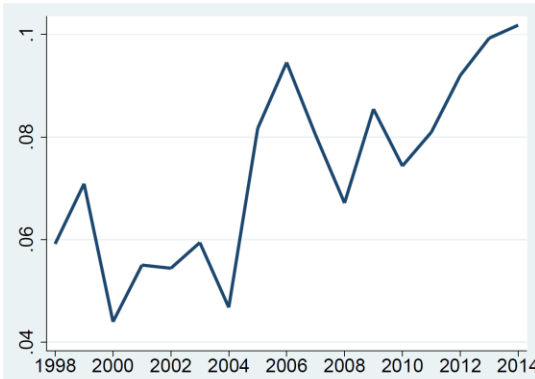
**Panel A. Board size (Number of directors).**



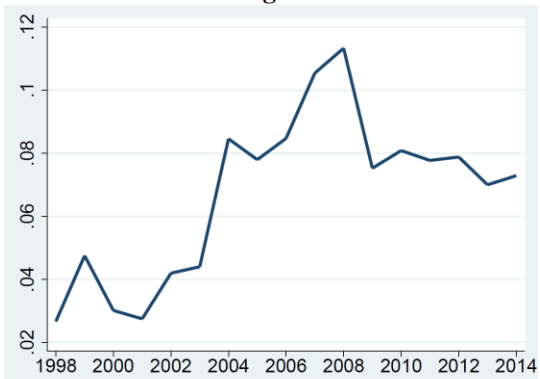
**Panel B. Share of insider directors.**



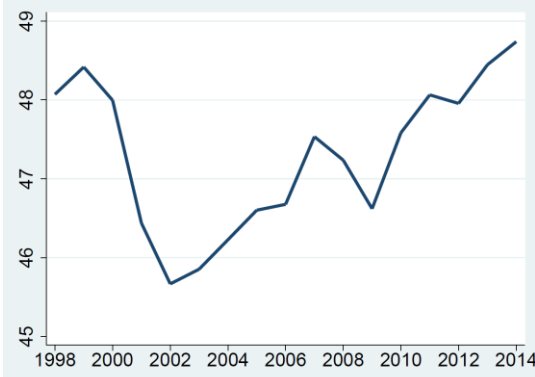
**Panel C. Share of women directors.**



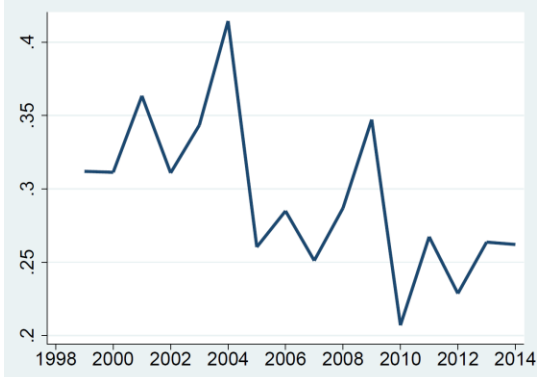
**Panel D. Share of foreign directors.**



**Panel E. Average age of directors, years.**



**Panel F. Share of new directors.**



**Panel G. Number of posts per director.**

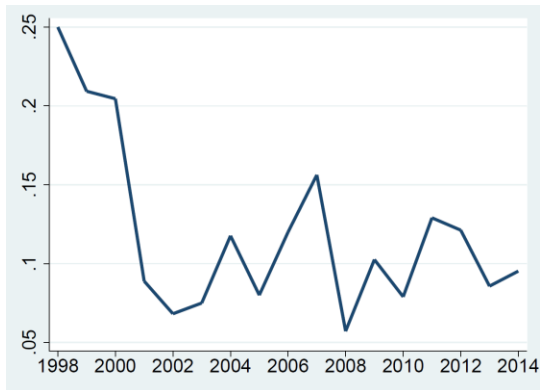


**Panel H. Total ownership by directors, %.**

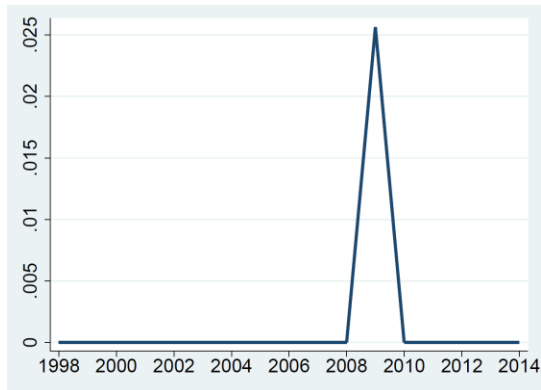


**Appendix E Figure 2. Dynamics of key characteristics of chairmen, firms with 17 obs.**

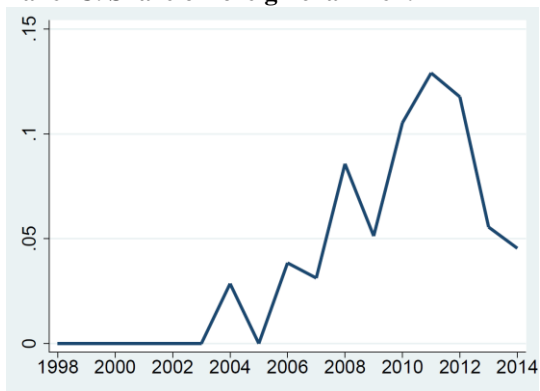
**Panel A. Share of insider chairmen.**



**Panel B. Share of chairwomen.**



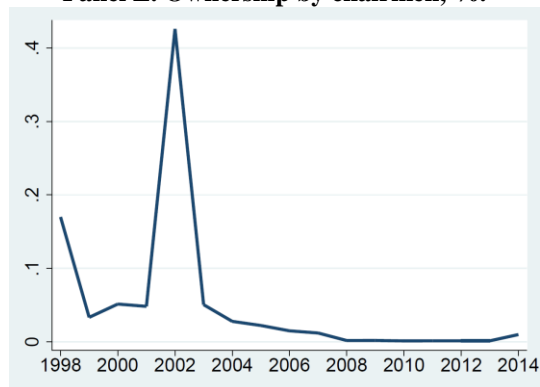
**Panel C. Share of foreign chairmen.**



**Panel D. Average age of chairmen, years.**



**Panel E. Ownership by chairmen, %.**





## Appendix F. Additional estimation results

**Appendix F Table 1. Random-effects regression results, the baseline model.**

	(1)	(2)	(3)	(4)	(5)	(6)
	log(MtB)	log(Q)	ROE	ROE(t+1)	ROA	ROA(t+1)
Board_size	-0.020 (0.068)	-0.041 (0.030)	0.016 (0.011)	0.020 (0.012)	0.017* (0.009)	0.013** (0.005)
Board_size_squared	0.001 (0.003)	0.002 (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001* (0.000)	-0.001** (0.000)
Fraction_inside_dir	0.170 (0.146)	0.031 (0.072)	0.003 (0.030)	-0.036 (0.032)	0.012 (0.022)	-0.013 (0.016)
Fraction_foreign_dir	0.967*** (0.216)	0.367*** (0.125)	0.029 (0.050)	-0.007 (0.053)	0.059 (0.057)	0.018 (0.026)
Fraction_govern_dir	0.227 (0.278)	0.052 (0.140)	0.018 (0.043)	0.024 (0.050)	0.030 (0.029)	-0.007 (0.026)
Fraction_women_dir	0.409** (0.202)	0.159* (0.091)	0.085** (0.037)	0.027 (0.036)	0.047* (0.027)	-0.015 (0.019)
Director_age	-0.012** (0.005)	-0.003 (0.003)	-0.002** (0.001)	-0.001 (0.001)	-0.001** (0.001)	-0.001 (0.001)
Director_age_variance	-0.006 (0.008)	-0.005 (0.004)	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.001)	-0.001* (0.001)
Inside_dir_ownership	0.001 (0.004)	0.001 (0.002)	0.002** (0.001)	0.001 (0.001)	0.001** (0.000)	0.001 (0.000)
Outside_dir_ownership	0.015*** (0.003)	0.005*** (0.002)	0.002** (0.001)	0.002** (0.001)	0.001** (0.000)	0.001** (0.000)
Posts_per_director	0.069*** (0.016)	0.035*** (0.008)	-0.004 (0.004)	-0.008** (0.004)	-0.003 (0.002)	-0.004** (0.002)
Number_managers	0.003 (0.008)	0.003 (0.003)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001* (0.001)
Unitary_CEO	-0.087 (0.084)	-0.021 (0.039)	0.009 (0.017)	-0.006 (0.016)	0.000 (0.012)	0.001 (0.008)
Shareholder1_ownership	0.094 (0.126)	0.090 (0.064)	-0.003 (0.026)	-0.021 (0.030)	0.015 (0.022)	0.007 (0.014)
Shareholder2_ownership	0.492** (0.213)	0.266** (0.106)	-0.038 (0.039)	0.043 (0.045)	-0.026 (0.026)	0.005 (0.023)
Leverage	1.154*** (0.135)	0.690*** (0.065)	-0.170*** (0.029)	-0.006 (0.030)	-0.146*** (0.022)	-0.044*** (0.013)
Dual_class_stock_firm	-0.198*** (0.076)	-0.114*** (0.038)	0.006 (0.015)	0.011 (0.014)	0.006 (0.011)	0.004 (0.008)
Size_of_firm	-0.107*** (0.029)	-0.047*** (0.015)	0.025*** (0.003)	0.010*** (0.003)	0.014*** (0.003)	0.007*** (0.001)
ADR	-0.010 (0.112)	0.074 (0.056)	-0.039** (0.015)	-0.034** (0.016)	-0.028*** (0.010)	-0.017* (0.009)
Liquidity	1.545*** (0.164)	0.586*** (0.056)				
Year dummies	yes	yes	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes	yes	yes
R <sup>2</sup> (overall)	0.4042	0.4171	0.1229	0.1051	0.1631	0.2123
N	2898	2898	3431	3127	3535	3128
Hausman test: p-value	0.0732	0.0191	0.0003	0.0020	0.0015	0.0006

The reported results are obtained using the random effects estimator with cluster-robust standard errors (clustering on firms). All regressions include year, regional and industry dummies, which are not reported due to space constraints. Standard errors in parentheses. Asterisks indicate significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Appendix F Table 2. Fixed-effects regression results, specifications with the fraction of new directors.**

	(1)	(2)	(3)	(4)	(5)	(6)
	log(MtB)	log(Q)	ROE	ROE(t+1)	ROA	ROA(t+1)
Board_size	-0.083 (0.097)	-0.069 (0.047)	0.056*** (0.019)	0.071*** (0.024)	0.033** (0.016)	0.029*** (0.009)
Board_size_squared	0.004 (0.004)	0.003 (0.002)	-0.003*** (0.001)	-0.003*** (0.001)	-0.001* (0.001)	-0.001*** (0.000)
Fraction_inside_dir	-0.090 (0.181)	-0.011 (0.089)	-0.028 (0.041)	-0.089* (0.046)	0.005 (0.030)	-0.027 (0.021)
Fraction_foreign_dir	0.702** (0.272)	0.264* (0.155)	0.022 (0.070)	-0.048 (0.078)	0.078 (0.086)	0.012 (0.038)
Fraction_govern_dir	0.254 (0.306)	0.049 (0.157)	-0.000 (0.064)	-0.030 (0.073)	0.007 (0.044)	-0.059* (0.032)
Fraction_women_dir	0.555** (0.220)	0.300*** (0.109)	0.081* (0.045)	0.035 (0.049)	0.057* (0.034)	-0.006 (0.025)
Director_age	-0.003 (0.007)	0.001 (0.003)	-0.001 (0.001)	0.001 (0.001)	-0.000 (0.001)	0.000 (0.001)
Director_age_variance	0.005 (0.009)	-0.004 (0.005)	-0.001 (0.002)	-0.001 (0.002)	-0.000 (0.001)	-0.001 (0.001)
Inside_dir_ownership	-0.001 (0.007)	-0.001 (0.002)	0.003** (0.001)	0.001 (0.001)	0.001** (0.001)	0.001 (0.001)
Outside_dir_ownership	0.017*** (0.004)	0.005*** (0.002)	0.003** (0.001)	0.003*** (0.001)	0.001* (0.001)	0.001** (0.001)
Posts_per_director	0.081*** (0.019)	0.038*** (0.011)	-0.007 (0.005)	-0.008 (0.005)	-0.005* (0.002)	-0.004* (0.002)
Fraction_new_directors	-0.002 (0.077)	0.013 (0.034)	-0.024 (0.017)	0.017 (0.021)	-0.006 (0.012)	0.014* (0.008)
Number_managers	0.001 (0.009)	0.004 (0.004)	0.000 (0.002)	0.002 (0.002)	0.001 (0.001)	0.002* (0.001)
Unitary_CEO	-0.145 (0.106)	-0.032 (0.046)	-0.018 (0.022)	-0.017 (0.020)	-0.009 (0.015)	-0.002 (0.011)
Shareholder1_ownership	0.110 (0.149)	0.081 (0.078)	0.016 (0.031)	-0.002 (0.033)	0.026 (0.026)	0.024 (0.017)
Shareholder2_ownership	0.510** (0.213)	0.345*** (0.124)	-0.080* (0.044)	0.006 (0.055)	-0.037 (0.028)	0.002 (0.028)
Leverage	1.075*** (0.176)	0.640*** (0.095)	-0.319*** (0.044)	-0.017 (0.050)	-0.214*** (0.048)	-0.033 (0.021)
Dual_class_stock_firm	0.453*** (0.162)	0.094 (0.082)	-0.049 (0.030)	-0.122*** (0.031)	-0.051* (0.029)	-0.103*** (0.016)
Size_of_firm	-0.172*** (0.052)	-0.071*** (0.026)	0.031*** (0.006)	0.004 (0.006)	0.013*** (0.004)	0.003 (0.002)
ADR	-0.071 (0.139)	0.071 (0.069)	-0.043** (0.020)	-0.064*** (0.022)	-0.035** (0.014)	-0.026** (0.011)
Liquidity	0.934*** (0.161)	0.453*** (0.069)				
$R^2$	0.412	0.423	0.122	0.072	0.083	0.102
$N$	2483	2483	2887	2576	2924	2577

The reported results are obtained using the fixed effects estimator with cluster-robust standard errors (clustering on firms). All regressions include year dummies, which are not reported due to space constraints. Standard errors in parentheses. Asterisks indicate significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Appendix F Table 3. GMM-SYS dynamic panel data regressions results.**

	(1)	(2)	(3)	(4)
	log(MtB)	log(Q)	ROE	ROA
Lagged_dependent_var	0.445*** (0.037)	0.502*** (0.037)	0.305*** (0.049)	0.442*** (0.038)
Board_size	-0.050 (0.094)	-0.028 (0.046)	0.031 (0.020)	0.013 (0.011)
Board_size_squared	0.003 (0.004)	0.001 (0.002)	-0.002* (0.001)	-0.001 (0.001)
Fraction_inside_dir	0.256 (0.182)	0.203** (0.086)	0.037 (0.047)	-0.001 (0.025)
Fraction_foreign_dir	0.975*** (0.251)	0.340*** (0.130)	-0.023 (0.063)	0.011 (0.031)
Fraction_govern_dir	0.862** (0.387)	0.315 (0.214)	0.074 (0.062)	0.049 (0.038)
Fraction_women_dir	0.319 (0.290)	0.056 (0.128)	0.100 (0.062)	0.042 (0.026)
Director_age	0.005 (0.007)	0.003 (0.004)	-0.002 (0.002)	-0.000 (0.001)
Director_age_variance	-0.021* (0.012)	-0.020*** (0.006)	-0.003 (0.003)	-0.001 (0.001)
Inside_dir_ownership	0.003 (0.006)	-0.000 (0.003)	0.001 (0.001)	0.000 (0.001)
Outside_dir_ownership	0.004 (0.006)	0.000 (0.002)	0.002 (0.001)	0.001 (0.001)
Posts_per_director	0.109*** (0.023)	0.047*** (0.011)	-0.018*** (0.006)	-0.012*** (0.002)
Number_managers	-0.004 (0.006)	-0.001 (0.003)	-0.001 (0.001)	-0.000 (0.001)
Unitary_CEO	0.044 (0.061)	-0.013 (0.029)	0.014 (0.013)	0.007 (0.006)
Shareholder1_ownership	-0.202* (0.118)	-0.065 (0.058)	-0.045* (0.027)	-0.039*** (0.012)
Shareholder2_ownership	0.020 (0.181)	0.003 (0.090)	-0.035 (0.042)	-0.028 (0.022)
Leverage	0.899*** (0.101)	0.385*** (0.048)	-0.118*** (0.024)	-0.085*** (0.010)
Dual_class_stock_firm	-0.060 (0.051)	-0.034 (0.023)	0.017 (0.011)	0.008 (0.005)
Size_of_firm	-0.045** (0.020)	-0.022** (0.009)	0.021*** (0.003)	0.012*** (0.002)
ADR	0.078 (0.078)	0.077** (0.036)	0.001 (0.014)	-0.003 (0.008)
Liquidity	0.680*** (0.158)	0.350*** (0.061)		
year dummies	yes	yes	yes	yes
AB test for AR(2), p-value	0.785	0.092	0.164	0.014
Hansen test, p-value	1.000	1.000	1.000	1.000
N	2392	2391	2901	2908

The reported results are obtained using the two-step system GMM estimator for dynamic panel data (DPD) with second and third lags of endogenous regressors playing the role of instruments. All regressions include year dummies, which are not reported due to space constraints. Robust standard errors are in parentheses. Asterisks indicate significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .