DOI: https://doi.org/10.17323/j.jcfr.2073-0438.18.2.2024.82-103
JEL classification: G30

Impact of Board Members' Social Capital on the Resilience of Public Companies to Exogenous Shocks

Dmitry Kirpishchikov ✉
Junior Research Fellow at International Laboratory of Intangible-driven Economy, HSE University, Perm, Russia, DAKirpishchikov@hse.ru, ORCID

Marina Zavertiaeva
Cand. Sci. (Econ.), PhD, Senior Research Fellow at International Laboratory of Intangible-driven Economy, HSE University, Perm, Russia,
moskolkova@hse.ru, ORCID

Abstract

The objective of this study is to estimate the impact of board members' social capital on firms' market-based metrics of resilience to exogenous shocks. The social capital of directors was measured by their professional, political, and international connections. Firms' resilience was evaluated based on their ability to resist and recover from the impact of shocks, as determined by stock market data. The data covers the period from 2007 to 2020 for over 200 Russian companies whose shares were included in the calculation of the Moscow Exchange Broad Market Index. During this period, three exogenous shocks occurred: the global financial crisis of 2008–2009, commodity price shock and sanctions in 2014–2015, and the COVID-19 pandemic in 2020. The system generalized method of moments is used to estimate the effect of directors' connections on the ability to mitigate shocks, while OLS with robust standard errors is used to reveal the influence of directors' connections on firms' ability to recover from shocks. The results indicate that professional connections moderated the negative impact on firms' resistance to shocks and improved recovery speed during the global financial crisis. However, this type of connection reduced stock recovery speed after the COVID-19 crisis. Political and international connections have different effects on market-based metrics of firm resilience. It is possible that shocks of different nature require firms to leverage various forms of social capital from their directors in order to mitigate the negative effects of such shocks.

Keywords: social capital, firm resilience, exogenous shocks, board of directors, directors' connections, network analysis

For citation: Kirpishchikov D., Zavertiaeva M. (2024) Impact of Board Members' Social Capital on the Resilience of Public Companies to Exogenous Shocks. *Journal of Corporate Finance Research.* 18(2): 82-103. https://doi.org/10.17323/j.jcfr.2073- 0438.18.2.2024.82-103

Introduction

Over the past 15 years, Russian financial markets have faced several severe shocks of different natures. In 2008–2009, the subprime mortgage crisis in the USA led to a sharp capital flight from Russia and a decline in oil and commodity prices. In 2014–2015, a commodity price shock occurred, and its negative effects were further amplified by the implementation of sanctions against the Russian economy and companies. In 2020, the COVID-19 pandemic slowed down economic activity, which was reflected in reduced demand for oil and gas, decreased consumer spending, and the disruption of supply chains. In 2022, the Russian economy experienced new sanction packages, the ultimate impact of which will become known in the future. Despite the differences in the nature of these shocks, they all had a negative effect on financial markets and, in particular, on the share prices of companies.

Firms react differently to external shocks, leading to a search for factors that enhance the resilience of corporate market indicators. The concept of resilience can be defined as "the ability of companies to reduce the impact of shocks and recover from them by transforming their structure and means of functioning in the face of long-term pressure, change, and uncertainty" [1]. Research has shown that one of the core factors that can reduce the negative impact of exogenous shocks is corporate governance [2–4], with a significant role played by CEOs [4; 5] and boards of directors [6; 7].

Boards can influence investor expectations during exogenous shocks through several channels. First, they can offer qualified governance, which increases the company's resistance to market turmoil. For example, more independent boards increase the survival probability of firms during crises [8], while more diverse boards may provide better governance, especially during shocks [9]. Additionally, directors can provide essential resources, including valuable knowledge and connections, which are limited during crises. However, existing studies pay little attention to the importance of the resource-providing role of directors during crises, usually focusing only on firm performance [10].

The study of the impact of directors' connections on corporate resilience is particularly relevant for Russian companies. First, the instability of the economic situation in Russia, due to the constant pressure of shocks, leads to high volatility of stock prices, highlighting the need to identify factors that enable companies to withstand and recover from such shocks. Secondly, researchers note that in developing countries, including Russia, the role of top managers' connections is crucial for ensuring access to various resources, such as state support and information, which can affect company performance and investor expectations [11]. Thus, the goal of the current study is to determine the impact of board members' connections on the resilience of Russian traded companies to exogenous shocks.

The empirical part of the study is based on a database of large listed Russian companies included in the Moscow Stock Exchange Broad Market Index (MICEX BMI). The final analyzed sample consists of 1854 firm-year observations between 2007 and 2020. We use two metrics of corporate resilience based on stock prices: the standard deviation of daily stock returns [12; 13] and the speed of stock price recovery to pre-crisis levels [14–16]. Board members' connections are measured based on three types of connections: professional, political, and foreign.

This paper contributes to the literature in three main ways. First, using agency theory, resource dependence theory, and the theory of upper echelons, we argue that firms' market-based resilience to exogenous shocks can be influenced by board members' connections. Second, we propose and empirically test two metrics of market-based firm resilience: one characterizes resistance to shock pressure, and the other measures the speed of recovery. Third, we analyze different crises separately, as they vary in nature. The results confirm that board connections play different roles in firm resilience depending on the crisis. For instance, professional connections enhanced firms' resilience to the market shock of 2008, but their significance decreased during the 2014 crisis and the COVID-19 pandemic. Political and international connections had varying impacts during the crises considered.

Literature Review

Directors' social capital

This research examines the role of the board of directors in a company from the perspective of organizational theories. The most commonly cited theories are agency theory [17; 18] and resource dependence theory [19]. The former focuses on the board's monitoring function, which prevents managers from engaging in opportunistic behavior. The latter emphasizes directors' ability to provide unique resources to a company, such as information and power, which can create a competitive advantage. However, these theories do not directly link the personal characteristics of directors to firm performance. Corporate strategy and actions are proposed through communication and interaction between board members, and this within-group interaction may be influenced by the personal characteristics of the directors.

The upper echelons theory [20] proposes that corporate decisions are based on the cognitive features of decision-makers, which can be observed through different personal characteristics, such as age, experience, education, and others [21]. The influence of directors' personal characteristics on corporate performance [10; 22] and resilience [4; 5] is a highly discussed topic in the literature. One important characteristic that influences corporate performance is social capital [10; 23; 24]. Social capital refers to a director's ability to mobilize resources by using social ties and relations with social structures [25–27]. Based on this definition, empirical studies focus on various directors' connections, such as professional [22; 28], political [29; 30], educational [12], international [31], and others.

A director's social capital comes from connections with social structures. According to the upper echelons theory, these connections are observable characteristics of directors that can influence the decision-making process and firm performance. Following the resource dependence theory, directors' connections are sources of resources that a director can bring to a company. In turn, according to the agency theory, connections can influence a director's incentives to perform duties efficiently (e.g., reduce monitoring efforts) [32; 33]. Therefore, these theories suggest that directors' connections, which form social capital, can affect corporate performance.

Directors' connections as a factor of firm resilience

Although the literature has analyzed the effect of board members' social capital on firm performance and the impact of corporate governance on firm resilience (or adaptation to crises), the effect of different types of board social capital on firm resilience to various exogenous shocks has not been addressed so far. Previous studies usually highlight the importance of the board of directors during exogenous shocks – unexpected external occurrences such as the 2008–2009 financial crisis and the COVID-19 pandemic. Researchers have shown that board independence was an important factor in overcoming the financial crisis in the US [34], Russia [8], China [35], Spain [36], and other European countries [37]. Board size also influenced firm performance during the crisis in Brazil [38] and Spain [36]. The recent paper by E. Croci et al. (2024) estimates the role of board characteristics in stock price changes around disruptive events such as storms, fires, and cyberattacks [39].

Researchers also examine the influence of boards on firms during crises by addressing the notion of resilience. Corporate resilience can be defined as "a firm's ability to recover from disruptive events" [40] or as "the ability of systems to absorb and recover from shocks while transforming their structures and means for functioning in the face of long-term stresses" [1].

Some studies examine the impact of directors' social capital, created through different types of connections, on firm performance in times of crisis, suggesting that higher performance in turbulent times indicates greater firm resilience. For instance, M. Carpenter and J. Westphal [41] provide evidence that directors' connections impact firm resilience. E. Croci et al. (2024) show that directors' busyness, i.e. high number of professional connections, increases cumulative average returns around shocks and even 12 and 36 months after [39].

Directors' professional connections may increase the board's ability to gather information, improving communication within the board and decision-making processes [42]. R. Carney et al. [43] show the positive effect of professional ties on performance around the 2008–2009 crisis. Although there may be no significant impact on firm performance during stable periods [44], the importance of directors' connections can increase in turbulent times, due to greater access to resources [45]. However, several studies show the negative effect of professional connections on firm performance in turbulent times [35; 46], as a high number of connections, termed "busyness," can lead to a lack of time to efficiently fulfill duties. This may reduce the effectiveness of the directors' management monitoring functions and exacerbate agency problems, resulting in poorer financial performance [47; 48] and reduced resilience. Given the increasing importance of social capital in developing capital markets, we align with the first stream of literature and formulate the first hypothesis as follows:

H1: Directors' professional connections reduce the effects of exogenous shocks on firms' market-based metrics of resilience.

Directors' political connections may help firms gain access to financial and informational support from the government [49]. However, empirical evidence presents mixed results on the impact of political connections on firms. On the one hand, such directors may increase a firm's market value [50]. On the other hand, they may underperform in their monitoring and other responsibilities due to a busy schedule, thereby reducing firm value [51; 52]. A. Panibratov et al. [53] show the importance of political connections for the performance of Russian firms. Such connections may therefore be valuable for resilience, leading to the second hypothesis:

H2: Directors' political connections decrease the effects of exogenous shocks on firms' market-based metrics of resilience.

Directors' international connections may positively impact firm value by providing access to the best corporate governance practices [31] and by exercising an effective supervisory function, particularly in controlling investment activities [54]. This can increase the efficiency of companies and make them more resilient in times of increasing turbulence. Thus, the third hypothesis is:

H3: Directors' international connections reduce the effects of exogenous shocks on firms' market-based metrics of resilience.

Data and Methodology

Data sources

The study uses data on Russian non-financial public joint stock companies whose shares were included in the calculation of the Moscow Exchange Broad Market Index (MICEX BMI). This index includes stocks selected based on capitalization, liquidity, and free-float. The capitalization of these companies represents more than 80% of the total market capitalization of companies traded on the Moscow Exchange, making the sample representative of Russian listed companies. The use of data from Russian companies is justified by the significant role that connections play in doing business [11], forming social capital, and acting as a source of limited resources. Additionally, the presence of multiple shocks affecting the Russian economy highlights the relevance of identifying factors of firm resilience.

The data were collected for the period from 2007 to 2020. Consolidated financial statements (IFRS) were obtained from SPARK-Interfax, information on board members from annual reports, market capitalization data from Refinitiv Eikon, and stock prices from the Moscow Exchange.

This paper analyzes the impact of three exogenous shocks on the resilience of Russian companies: the global financial crisis of 2008–2009, the commodity crisis and sanctions of 2014–2015, and the crisis caused by the COVID-19 pandemic in 2020. Although all three crises resulted in economic downturns that affected Russia's GDP growth rate, they were different in nature. The impact of each crisis on the resilience of Russian companies is analyzed separately using a set of dummy variables.

Measurement of resilience

Taking into account the diverse interpretations of resilience provided by numerous papers on this topic, we explore two aspects of firm resilience: the ability to resist and the ability to recover from disruptive events [1]. Following E. Conz and G. Magnani [55], the former measures a dynamic aspect of resilience, while the latter regards resilience as an attribute that allows the firm to return to a stable equilibrium. We measure these using stock market data.

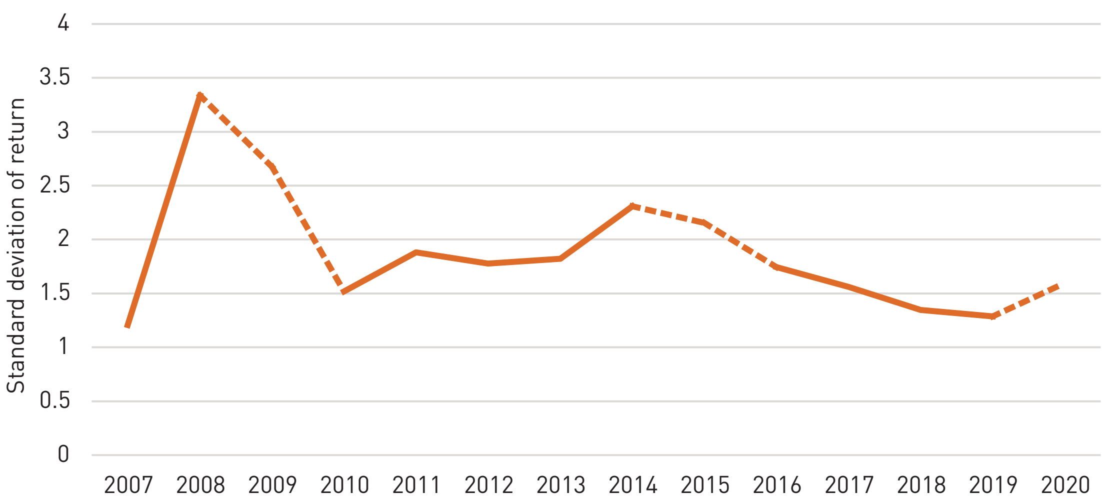
The efficient market hypothesis [56] suggests that stock prices reflect all available information. Therefore, the market reassesses the expected contribution of the board's social capital to the company's recovery from external shocks [57]. If investors anticipate that a company will be significantly affected by a shock – indicating that the firm lacks resilience – they are more likely to sell its shares, leading to a decline in share price and increased volatility.

Researchers employ various market-based indicators to estimate firm performance during crises: abnormal stock returns [34; 58], cumulative returns [37; 40], crash risk [59], Tobin's Q coefficient [60], and corporate risk-taking [12; 13; 61]. In this study, we calculate the metric related to a company's risk-taking – the standard deviation of the company's stock returns for each year – using the following equation:

$$SD\,of\,stock\,returns_{i,t} = \sum_{w=1}^{W}\sqrt{\frac{1}{N-1}\cdot\sum_{d=1}^{N}\left(ret_{i,t,w,d}-\frac{1}{N}\sum_{d=1}^{N}ret_{i,t,w,d}\right)}, \quad (1)$$

where $ret_{i,t,w,d}$ is the rate of return for firm i in year t in week w on day d. N denotes the total number of days in each week, and W represents the total number of weeks (w) in each year (t). We compute the standard deviations of a firm's stock returns for each week and then sum them. Alternatively, researchers also consider the standard deviations of daily, weekly, and monthly stock returns for each year [61], but these measures may smooth the increased volatility during exogenous shocks. Equation (1) allows us to control for this and identify stocks with the highest volatility. We assume that companies with higher standard deviations of returns can be considered less resilient. Figure 1 illustrates that higher values occur during periods of shock, decreasing as the market reassesses the companies' risk.

Figure 1. Dynamics of the average standard deviation of companies' stock returns (the dotted line indicates crisis periods)



The other aspect of resilience that we investigate is the speed with which companies recover. This can be determined by analyzing stock prices and calculating the number of days required to return to pre-crisis levels [14–16]. To define the beginning and end of crises, we track the value of the Moscow Exchange Index (IMOEX, formerly MICEX) and monitor news reports. It is noteworthy that after the Global Financial Crisis (May 19, 2008), the IMOEX did not recover to its pre-crisis level until April 2016. Therefore, we selected the end dates as presented in Table 1, assuming that after these dates, the effects of the crises are either eliminated or minimized. Subsequently, the recovery speed was calculated for each company as the number of days it took for the company's common stock price to return to its pre-crisis level.

Table 1. Dates of crises*

Crisis	Start date	End date
Global financial crisis 2008–2009	19.05.2008	12.04.2011
Commodity price shock and sanctions implementation in 2014–2015	18.02.2014	16.02.2015
COVID-19 pandemic in 2020	20.01.2020	14.12.2020

* The start dates of crises are identified based on the beginning of the decline in IMOEX values. For the 2008–2009 crisis, the end date is determined as the date when the maximum value of the index was observed from the beginning of the crisis until 2014. Similarly, for the 2014–2015 crisis, the end date is considered the maximum value of the index after the signature of the Second Minsk Agreement (February 12, 2015).

Measurement of directors' connections

This paper investigates the social capital of board members formed through different types of connections. Board members establish professional ties through simultaneous service on boards, facilitating the sharing of experience and information. Political ties derive from board members' experience in public administration, while international ties involve connections with foreign companies and institutions [12].

To measure the social capital formed by professional connections, we utilized a social network analysis (SNA) approach, focusing on centrality metrics: degree centrality, betweenness centrality, closeness centrality, and eigenvector centrality [62; 63]. SNA is preferred for measuring professional connections because it captures multiple dimensions such as connection quality and each director's position in the network [64]. Centrality metrics are constructed using graphs where vertices represent board members and edges represent professional connections based on shared board service. Appendix 1 displays the constructed graphs.

- **Degree centrality** quantifies the number of professional ties normalized by the maximum possible number.
- **Betweenness centrality** identifies directors who act as bridges, influencing information flow between other directors [65].
- **Closeness centrality** is calculated as the average length of the shortest paths between directors [65], showing how quickly a director can access information or resources from others in the network.
- **Eigenvector centrality** assesses the degree to which a director's centrality in the network is related to the centrality of their neighbors [66].

The calculation of these variables is described in detail in Appendix 2.

The variables are used separately when testing the impact of professional connections on firm resilience. We do this for several reasons. Firstly, the variables are correlated and so including them simultaneously in the model can lead to the problem of multicollinearity. Secondly, considering them separately allows us to examine the effect of professional ties on firm resilience from different perspectives. However, we can identify the overall effect of professional ties by aggregating the four centrality measures using principal components analysis.

Previous studies have employed diverse methods to identify political connections of board members, including informal ties with politicians formed during education or sports [67]. However, formal ties based on board members' experience in public administration are more commonly used [30; 68]. Information on formal ties is readily available in annual reports and better explains changes in firm performance compared to informal ties [69]. In this study, political ties are measured by board members' experience in public authorities such as the Federation Council, State Duma, Government of the Russian Federation, Supreme Court of the Russian Federation, and regional and municipal authorities.

Board members' international connections are identified based on their birthplace or experience in foreign companies, indicating exposure to international corporate governance practices [31; 53]. Research indicates that a higher proportion of foreign board members in Russian companies positively impacts market value [70], suggesting that international connections can enhance a company's market-based resilience to external shocks.

Control variables that may influence corporate market resilience include firm size, board size, proportion of independent directors, financial leverage, government ownership, and market-to-book ratio [35; 43].

Estimation method and descriptive statistics

The first model investigates how the social capital of directors influences the ability of firms to withstand shocks during crises. The equation is formulated as follows:

$$AS_{it} = \eta_i + \alpha_1 AS_{it-1} + SC_{it-1} \bullet \beta + Crisis_t \bullet \gamma + + SC_{it-1} \bullet Crisis_t \bullet \delta + CV_{it} \bullet \theta + \varepsilon_{it}, \quad (2)$$

where AS_{it} is the ability to resist shocks measured by the standard deviations of stock returns, SC_{it-1} is the social capital vector consisting of directors' professional, political, and international connections, $Crisis_t$ is the vector of crisis dummy variables, CV_{it} is the vector of control variables, η_i is the company fixed effect, and ε_{it} is the model standard error. In this model we focus on the coefficient δ, which indicates the moderating effect of directors' social capital on firm resilience.

We incorporate the past value of the resilience metric as an independent variable into the equation on the basis of two assumptions. First, firm resilience is a dynamic process [56], suggesting that internal resources can accumulate over time, enhancing robustness and adaptability to future shocks. Second, we calculate the resilience metric using company stock prices: stakeholders and investors take all available information into account [55; 57], and so firms' past resilience may be reflected in present-day share prices, affecting current resilience.

The dynamic panel data models are estimated using the system generalized method of moments [71]. This method is chosen to mitigate endogeneity issues commonly encountered in studies examining the impact of corporate governance on firm performance [9; 12]. Lagged values of social capital metrics are included to capture potential delayed effects and further address endogeneity.

Table 2 presents the descriptive statistics of the variables used. All financial variables were winsorized to minimize the influence of outliers. The average board size of 9 aligns with findings from previous research [9; 70; 72]. However, the sample size is reduced due to the use of IFRS consolidated financial statements, which were not published by all companies during the study period.

Table 2. Descriptive statistics of variables

Variable	N	Mean	St. Dev.	Min	Q25	Median	Q75	Max
SD of stock return – ability to resist	1037	1.710	1.465	0.228	0.975	1.293	1.881	18.650
Financial leverage	1037	0.573	0.268	0.161	0.356	0.539	0.752	1.158
Firm size	1037	519 192	1 997 815	17	15 009	74 201	273 624	22 617 267
Logarithm of firm size	1037	11.034	1.884	7.026	9.616	11.215	12.520	13.947
Board size	1037	9.763	2.700	5	7	9	11	23
Share of independent directors	1037	0.217	0.224	0.000	0.000	0.182	0.364	1.000
Market to book value	1037	1.141	0.562	0.432	0.724	0.993	1.389	2.550
ROA	1037	0.187	0.200	0.000	0.000	0.125	0.300	1.200
Government ownership	1037	0.124	0.190	0.000	0.000	0.000	0.200	0.909
Share of directors with political connections	1037	0.008	0.004	0.001	0.006	0.007	0.010	0.031
Share of directors with international connections	1037	0.002	0.003	0.000	0.000	0.001	0.003	0.031
Mean degree centrality	1037	0.079	0.061	0.002	0.008	0.095	0.126	0.223
Mean betweenness centrality	1037	0.055	0.130	0.000	0.000	0.000	0.021	1.000
Mean closeness centrality	1037	0.336	1.690	–1.676	–1.026	–0.055	1.063	8.190
Mean eigenvector centrality	1037	0.057	0.100	–0.160	0.007	0.053	0.118	0.258
PCA professional connections	1037	0.166	0.268	0.000	0.000	0.000	0.340	0.950

Note: see Appendix 2 for a detailed description of variables.

Source: authors' calculations.

The second model estimates the effect of directors' social capital on the speed of firm recovery. The sample is divided into three subsamples corresponding to each exogenous shock. The models are estimated using OLS with White's robust standard errors. The equations for each subsample are specified as follows:

$$RS_{i,2008-2011} = \alpha_0 + SC_{i,2008} \cdot \beta + FIN\_CV_{i,2007} \cdot \theta + NF\_CV_{i,2008} \cdot \gamma + \varepsilon_i; \quad (3)$$

$$RS_{i,2014-2015} = \alpha_0 + SC_{i,2014} \cdot \beta + FIN\_CV_{i,2013} \cdot \theta + NF\_CV_{i,2014} \cdot \gamma + \varepsilon_i; \quad (4)$$

$$RS_{i,2020} = \alpha_0 + SC_{i,2019} \cdot \beta + FIN\_CV_{i,2018} \cdot \theta + NF\_CV_{i,2019} \cdot \gamma + \varepsilon_i, \quad (5)$$

where $RS_{i,2008-2011}$ is the recovery speed after the global financial crisis, $RS_{i,2014-2015}$ is the recovery speed after the commodity price shock and implementation of sanctions, and $RS_{i,2020}$ is the recovery speed after the COVID-19 shock; $SC_{i,t}$ is the vector of lagged values of social capital metrics; $FIN\_CV_{i,t}$ is the vector of control variables: the logarithm of firm size, market-to-book ratio, ROA, and financial leverage; $NF\_CV_{i,t}$ is the vector of non-financial control variables: a dummy variable for government ownership, industry dummy variables controlling for their effects, and board size; and α_0 is the constant.

We examine how firm characteristics at the onset of each shock influence the speed of stock price recovery. By focusing on these periods, we consider the information available to investors from various sources. For instance, during the onset of COVID-19 in January-February 2020, investors did not have access to 2019 annual reports but could gather non-financial information from other reports and official websites.

Table 3 presents descriptive statistics of the recovery speed of companies after each shock. We see that these shocks had different strengths judging from the number of days it took for stock prices to recover. The minimum and maximum values show the heterogeneity in recovery speeds.

Table 3. Descriptive statistics of recovery speed

Crisis	N	Mean	St. Dev.	Min	Q25	Median	Q75	Max
Recovery speed after the global financial crisis in 2008–2009	45	614.2	147.7	66	581	676	706	717
Recovery speed after the commodity price shock and sanctions implementation in 2014–2015	96	153.7	83	3	73.5	165.5	236.5	250
Recovery speed after the COVID-19 shock	127	141.9	82.4	0	67	173	218	227

Note: the recovery speed is calculated as the number of days required for company stock prices to reach their pre-crisis levels (closing price at the crisis starting date, presented in Table 1).

Source: authors' calculations.

Results

Ability to absorb the negative effects of shocks

Tables 4 and 5 includes two panels. Panel A presents the estimated results for degree centrality (columns 1–3), closeness centrality (columns 4-6), and betweenness centrality (columns 7–9) regarding their influence on firms' ability to absorb the negative effects of the considered shocks. Panel B displays the results for eigenvector centrality (columns 1–3) and the aggregated metric of professional connections (columns 4–6), derived from centrality metrics using principal component analysis (PCA).

Table 4. Panel A. Relation between directors' social capital and firms' ability to absorb negative effects of shocks

	SD of stock returns (ability to absorb shocks)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SD of daily stock returns$_{t-1}$	0.365**	0.543**	0.550**	0.369**	0.542**	0.550**	0.367**	0.540**	0.549**
	(0.058)	(0.056)	(0.056)	(0.058)	(0.057)	(0.056)	(0.059)	(0.057)	(0.056)
Share of directors with political connections$_{t-1}$	−0.506**	−0.080	−0.323*	−0.518**	−0.082	−0.316*	−0.507**	−0.100	−0.311*
	(0.176)	(0.154)	(0.176)	(0.176)	(0.154)	(0.179)	(0.176)	(0.153)	(0.178)
Share of directors with international connections$_{t-1}$	−0.795**	−0.401**	−0.528**	−0.780**	−0.415**	−0.551**	−0.800**	−0.418**	−0.559**
	(0.157)	(0.113)	(0.125)	(0.154)	(0.111)	(0.127)	(0.155)	(0.110)	(0.131)
Degree centrality$_{t-1}$	5.584	5.072	6.533						
	(17.438)	(10.173)	(12.074)						
Closeness centrality$_{t-1}$				0.399	−0.133	−0.047			
				(1.024)	(0.777)	(0.800)			

	SD of stock returns (ability to absorb shocks)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Betweenness centrality$_{t-1}$							−9.489	−10.499	−12.258*
							(9.164)	(7.300)	(7.274)
Crisis 2008–2009	0.469*	0.544**	0.545**	0.617**	0.565**	0.572**	0.456*	0.568**	0.574**
	(0.270)	(0.116)	(0.117)	(0.230)	(0.126)	(0.128)	(0.212)	(0.125)	(0.127)
Crisis 2014–2015	0.584**	0.773**	0.514**	0.577**	0.798**	0.510**	0.574**	0.847**	0.507**
	(0.125)	(0.212)	(0.119)	(0.117)	(0.239)	(0.114)	(0.117)	(0.255)	(0.114)
Crisis 2020	0.252**	0.321**	0.459*	0.265**	0.311**	0.249*	0.235**	0.300**	0.199
	(0.091)	(0.075)	(0.206)	(0.101)	(0.081)	(0.150)	(0.091)	(0.076)	(0.127)
Share of directors with political connections$_{t-1}$ • Crisis 2008–2009	1.199**			1.253**			1.135**		
	(0.375)			(0.370)			(0.382)		
Share of directors with political connections$_{t-1}$ • Crisis 2014–2015		−1.321*			−1.311*			−1.151*	
		(0.736)			(0.699)			(0.599)	
Share of directors with political connections$_{t-1}$ • Crisis 2020			0.721*			0.671*			0.629*
			(0.284)			(0.296)			(0.296)
Share of directors with international connections$_{t-1}$• Crisis 2008–2009	1.392**			1.237**			1.301**		
	(0.418)			(0.466)			(0.478)		
Share of directors with international connections$_{t-1}$• Crisis 2014–2015		−0.871*			−0.885*			−0.927*	
		(0.426)			(0.447)			(0.469)	
Share of directors with international connections$_{t-11}$• Crisis 2020			−0.157			−0.085			−0.084
			(0.292)			(0.291)			(0.294)

	SD of stock returns (ability to absorb shocks)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Degree centrality$_{t-11}$• Crisis 2008–2009	–16.283								
	(18.368)								
Degree centrality$_{t-11}$• Crisis 2014–2015		8.207							
		(28.919)							
Degree centrality$_{t-11}$• Crisis 2020			–34.988*						
			(19.631)						
Closeness centrality$_{t-11}$• Crisis 2008–2009				–3.690**					
				(1.185)					
Closeness centrality$_{t-11}$• Crisis 2014–2015					0.440				
					(1.543)				
Closeness centrality$_{t-11}$• Crisis 2020						–1.248			
						(1.641)			
Betweenness centrality$_{t-11}$• Crisis 2008–2009							–58.917*		
							(23.223)		
Betweenness centrality$_{t-11}$• Crisis 2014–2020								–17.586	
								(18.314)	
Betweenness centrality$_{t-11}$• Crisis 2020									–19.930
									(46.123)
Financial leverage	0.403*	0.238	0.250	0.398*	0.236	0.247	0.413*	0.240	0.249
	(0.235)	(0.224)	(0.228)	(0.235)	(0.226)	(0.229)	(0.232)	(0.225)	(0.227)
ROA	0.263	0.084	0.173	0.249	0.087	0.164	0.256	0.077	0.159
	(0.795)	(0.636)	(0.663)	(0.791)	(0.643)	(0.664)	(0.793)	(0.644)	(0.665)

	SD of stock returns (ability to absorb shocks)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Logarithm of board size	0.616**	0.372**	0.388**	0.644**	0.407**	0.422**	0.647**	0.400**	0.423**
	(0.195)	(0.131)	(0.130)	(0.174)	(0.126)	(0.125)	(0.167)	(0.121)	(0.123)
Government ownership	–0.579**	–0.496**	–0.487**	–0.548**	–0.453**	–0.458**	–0.493**	–0.405**	–0.420**
	(0.157)	(0.121)	(0.123)	(0.142)	(0.110)	(0.113)	(0.134)	(0.103)	(0.104)
Logarithm of firm size	–0.056*	–0.037	–0.038	–0.061*	–0.039	–0.039	–0.057*	–0.036	–0.038
	(0.031)	(0.024)	(0.025)	(0.032)	(0.026)	(0.026)	(0.032)	(0.026)	(0.026)
Share of independent directors	–0.316*	–0.230*	–0.250*	–0.308*	–0.211	–0.230*	–0.280*	–0.199	–0.214
	(0.147)	(0.134)	(0.133)	(0.139)	(0.129)	(0.126)	(0.147)	(0.133)	(0.131)
Market-to-book value	0.099	0.102	0.103	0.091	0.095	0.098	0.080	0.089	0.093
	(0.080)	(0.065)	(0.066)	(0.081)	(0.067)	(0.067)	(0.081)	(0.067)	(0.067)
J-test	115.8	116.2	116	115.9	114.5	116.2	115.7	116.4	116.1
AR(2)	–0.39	–0.28	–0.27	–0.38	–0.28	–0.28	–0.39	–0.28	–0.29
Wald test	3091.1**	4858.7**	4815**	3010.8**	4612.5**	4858.7**	2995.1**	4524.9**	4659.3**

Note: *p < 0.1, *p < 0.05, **p < 0.01. See Appendix 2 for variables descriptions and calculations. J-test measures the validity of the instrument. AR(2) checks for the absence of the second-order correlation. Wald test shows the joint significance of the independent variables.

Source: authors' calculations.

Table 5. Panel B. Relation between directors' social capital and firms' ability to absorb negative effects of shocks

	SD of stock returns (ability to absorb shocks)					
	(1)	(2)	(3)	(4)	(5)	(6)
SD of daily stock returns$_{t-1}$	0.372**	0.537**	0.548**	0.370**	0.538**	0.547**
	(0.057)	(0.057)	(0.056)	(0.058)	(0.056)	(0.055)
Share of directors with political connections$_{t-1}$	–0.514**	–0.106	–0.329*	–0.497**	–0.092	–0.320*
	(0.175)	(0.150)	(0.178)	(0.172)	(0.154)	(0.178)
Share of directors with international connections$_{t-1}$	–0.808**	–0.410**	–0.566**	–0.820**	–0.431**	–0.574**
	(0.153)	(0.108)	(0.130)	(0.154)	(0.110)	(0.129)
Eigenvector centrality$_{t-1}$	–0.414*	–0.184	–0.320*			
	(0.249)	(0.184)	(0.180)			

	SD of stock returns (ability to absorb shocks)					
	(1)	(2)	(3)	(4)	(5)	(6)
PCA professional connections$_{t-1}$				–0.037	–0.028	–0.029
				(0.030)	(0.020)	(0.021)
Crisis 2008–2009	0.493*	0.577**	0.583**	0.416*	0.586**	0.593**
	(0.192)	(0.125)	(0.127)	(0.199)	(0.122)	(0.124)
Crisis 2014–2015	0.566**	0.871**	0.504**	0.567**	0.819**	0.503**
	(0.116)	(0.262)	(0.113)	(0.119)	(0.253)	(0.116)
Crisis 2020	0.247**	0.313**	0.234*	0.223*	0.295**	0.152
	(0.086)	(0.074)	(0.126)	(0.095)	(0.077)	(0.114)
Share of directors with political connections$_{t-1}$ • Crisis 2008–2009	1.109**			1.151**		
	(0.364)			(0.373)		
Share of directors with political connections$_{t-1}$ • Crisis 2014–2015		–1.095*			–1.194*	
		(0.544)			(0.660)	
Share of directors with political connections$_{t-1}$ • Crisis 2020			0.647*			0.694*
			(0.280)			(0.283)
Share of directors with international connections$_{t-1}$ • Crisis 2008–2009	1.130**			1.250**		
	(0.416)			(0.437)		
Share of directors with international connections$_{t-1}$ • Crisis 2014–2015		–1.017*			–0.932*	
		(0.499)			(0.457)	
Share of directors with international connections$_{t-1}$ • Crisis 2020			–0.147			–0.107
			(0.300)			(0.301)
Eigenvector centrality$_{t-1}$ • Crisis 2008–2009	–1.763*					
	(0.738)					
Eigenvector centrality$_{t-1}$ • Crisis 2014–2015		–1.303*				
		(0.542)				
Eigenvector centrality$_{t-1}$ • Crisis 2020			–0.660			
			(0.520)			

	SD of stock returns (ability to absorb shocks)					
	(1)	(2)	(3)	(4)	(5)	(6)
PCA professional connections$_{t-1}$ • Crisis 2008–2009				–0.072*		
				(0.042)		
PCA professional connections$_{t-1}$ • Crisis 2014–2015					–0.014	
					(0.048)	
PCA professional connections$_{t-1}$ • Crisis 2020						–0.060
						(0.052)
Financial leverage	0.405*	0.246	0.248	0.392*	0.235	0.244
	(0.232)	(0.227)	(0.227)	(0.233)	(0.226)	(0.228)
ROA	0.198	0.044	0.127	0.227	0.065	0.148
	(0.789)	(0.643)	(0.663)	(0.796)	(0.648)	(0.669)
Logarithm of board size	0.688**	0.440**	0.461**	0.676**	0.429**	0.450**
	(0.172)	(0.121)	(0.123)	(0.172)	(0.122)	(0.123)
Government ownership	–0.463**	–0.402**	–0.408**	–0.430**	–0.376**	–0.376**
	(0.137)	(0.105)	(0.109)	(0.137)	(0.106)	(0.110)
Logarithm of firm size	–0.065*	–0.045*	–0.045*	–0.063*	–0.043*	–0.044*
	(0.032)	(0.025)	(0.026)	(0.031)	(0.025)	(0.025)
Share of independent directors	–0.248*	–0.196	–0.198	–0.239*	–0.177	–0.188
	(0.143)	(0.134)	(0.131)	(0.137)	(0.130)	(0.126)
Market-to-book value	0.072	0.085	0.089	0.071	0.081	0.084
	(0.081)	(0.068)	(0.067)	(0.081)	(0.068)	(0.068)
J-test	114.8	115.7	115.6	115.6	116.2	117
AR(2)	–0.4	–0.25	–0.29	–0.4	–0.29	–0.29
Wald test	3243.6**	4605.3**	5025.1**	3160.8**	4654.1**	4998.6**

Note: *p < 0.1, *p < 0.05, **p < 0.01. See Appendix 2 for variables descriptions and calculations. J-test measures the validity of the instrument. AR(2) checks for the absence of the second-order correlation. Wald test shows the joint significance of the independent variables.

Source: authors' calculations.

In this part of the research, we focus on the coefficients of interaction between social capital measures and crisis dummy variables. A negative sign implies that a specific type of director connection mitigates the negative impact of a given shock on the standard deviation of daily stock returns. This indicates an enhanced ability to resist the adverse effects of the shock, thereby reflecting higher resilience from the market's perspective.

Table 5 supports the positive influence of directors' professional connections on firm resilience during the global financial crisis. While the aggregate metric of professional connections is insignificant for the other two periods, some components demonstrate importance. Eigenvector centrality, indicating connections to highly central directors, positively impacted firms' resilience in 2014–2015. Degree centrality, which counts the number of connections, was significant for resilience during the COVID-19 pandemic. Thus, the first hypothesis is supported.

Directors' political connections affect firms' ability to resist shocks differently. These connections had a negative influence during the commodity price shock and sanctions in 2014–2015, implying a positive effect on resilience. However, in the other two periods, the opposite effect was observed. Therefore, the second hypothesis is partially supported for the 2014–2015 crisis, but not for the other two periods.

Similarly, directors' international connections affect firms' resistance in varying ways. During the global financial crisis, these connections increased the standard deviation of firms' returns, thereby reducing resilience. However, in 2014–2015, international connections were beneficial and mitigated the shock's effects. This partly supports the third hypothesis.

Recovery speed from the negative effects of shocks

The second part of the research investigates the influence of directors' social capital on the speed of firms' recovery after shocks. Tables 6 and 7 includes two panels. Panel A presents results for the global financial crisis, and Panel B for the COVID-19 pandemic. Models for the commodity price shock in 2014–2015 were found to be insignificant, therefore results for this period are not reported.

Table 6. Panel A. Relation between directors' social capital and firms' ability to recover from the negative effects of the global financial crisis

	Number of days (recovery speed)				
	(1)	(2)	(3)	(4)	(5)
Share of directors with political connections	−53.788	−21.361	−39.023	−47.935	−38.783
	(49.037)	(45.661)	(59.802)	(44.518)	(51.442)
Share of directors with international connections	−40.943	−23.075	−11.096	−66.453	−35.047
	(48.870)	(37.630)	(41.937)	(45.109)	(41.909)
Degree centrality	−5,324.572*				
	(3,162.320)				
Betweenness centrality		−8,851.719**			
		(2,825.372)			
Closeness centrality			−109.581		
			(118.950)		
Eigenvector centrality				−282.543**	
				(90.263)	
PCA professional connections					−11.586*
					(5.206)
Logarithm of firm size	26.557*	14.973	28.302*	32.314*	24.590*
	(13.261)	(11.894)	(14.064)	(12.914)	(12.955)
Market-to-book value	−29.937*	−37.063*	−30.806*	−32.943*	−31.452*
	(14.939)	(17.480)	(16.226)	(14.419)	(16.255)
ROA	117.851	47.077	24.800	136.436	73.644
	(140.933)	(126.166)	(141.182)	(141.877)	(137.430)

	Number of days (recovery speed)				
	(1)	(2)	(3)	(4)	(5)
Financial leverage	0.560**	0.497**	0.576**	0.595**	0.554**
	(0.088)	(0.078)	(0.096)	(0.088)	(0.087)
Logarithm of board size	–13.669	–39.573	–57.743	–50.748	–35.034
	(83.266)	(60.386)	(73.780)	(65.279)	(67.217)
Industry dummy	Included				
Constant	505.522*	678.491**	550.249*	484.153*	534.240*
	(218.399)	(223.573)	(223.241)	(219.398)	(225.764)
Observations	30	30	30	30	30
R^2	0.849	0.878	0.838	0.870	0.857
Adjusted R^2	0.663	0.728	0.640	0.709	0.680
Residual Std. Error (df = 13)	51.148	46.003	52.913	47.539	49.851
F Statistic (df = 16; 13)	4.572**	5.843**	4.218**	5.420**	4.855**

Note: *p < 0.1, *p < 0.05, **p < 0.01. White's robust standard errors are given in parentheses. The dummy variable for government ownership is excluded as observations for this period are lacking.

Table 7. Panel B. Relation between directors' social capital and firms' ability to recover from the negative effects of COVID-19

	Number of days (recovery speed)				
	(1)	(2)	(3)	(4)	(5)
Share of directors with political connections	33.240	29.882	30.455	30.759	30.211
	(39.375)	(39.770)	(39.335)	(39.516)	(39.714)
Share of directors with international connections	106.383**	98.976**	89.209*	95.807**	99.992**
	(37.104)	(37.584)	(34.636)	(34.783)	(36.668)
Degree centrality	5549.354*				
	(3063.073)				
Betweenness centrality		3208.731			
		(4897.073)			
Closeness centrality			–67.230		
			(217.939)		
Eigenvector centrality				72.325	
				(63.861)	
PCA professional connections					7.383
					(7.168)

	Number of days (recovery speed)				
	(1)	(2)	(3)	(4)	(5)
Logarithm of firm size	–4.284	–3.666	–1.306	–1.894	–3.521
	(6.821)	(7.493)	(6.849)	(6.708)	(6.798)
Market-to-book value	10.853	11.929	11.848	11.583	11.697
	(18.494)	(18.322)	(18.514)	(18.265)	(18.363)
ROA	–79.168	–101.182	–112.013	–87.524	–92.392
	(103.857)	(104.707)	(106.969)	(103.087)	(103.419)
Financial leverage	–29.359	–33.943	–37.894	–33.381	–32.450
	(33.918)	(34.108)	(34.847)	(34.203)	(33.922)
Government ownership (dummy)	19.964	22.989	28.931	23.777	21.512
	(16.802)	(17.999)	(18.396)	(17.035)	(17.817)
Logarithm of board size	28.405	61.059*	64.584*	45.591	46.914
	(34.073)	(31.513)	(33.103)	(37.403)	(35.332)
Industry dummy	Included				
Constant	505.522*	678.491**	550.249*	484.153*	534.240*
	(218.399)	(223.573)	(223.241)	(219.398)	(225.764)
Observations	97	97	97	97	97
R^2	0.324	0.307	0.305	0.313	0.312
Adjusted R^2	0.123	0.101	0.099	0.109	0.107
Residual Std. Error (df = 74)	73.926	74.851	74.962	74.546	74.607
F Statistic (df = 22; 74)	1.614*	1.492	1.477	1.532*	1.524*

Note: *p < 0.1, *p < 0.05, **p < 0.01. White's robust standard errors are given in parentheses.

The positive coefficients indicate a longer period required for stock prices to return to pre-crisis levels, suggesting a slower recovery and thus lower resilience of firms from the market's perspective. Panel A of Table 6 demonstrates the positive impact of directors' professional connections on the recovery period. This suggests that directors with greater professional connections can expedite the recovery speed of stock prices. However, similar results are not observed for the other periods.

Panel B of Table 7 presents the results for the COVID-19 period. It shows that directors with international connections prolong the recovery period. Conversely, there is no robust evidence for professional connections, yet we do find a negative impact of degree centrality on stock price recovery. These findings do not support the third hypothesis and only partially support the first one, specifically in relation to the 2008–2009 crisis.

Discussion of results

We find mixed evidence regarding the influence of directors' social capital on firms' resilience to exogenous shocks. Further empirical research should investigate the mechanisms underlying these effects. One possible explanation for these results is that different shocks vary in nature and have distinct mechanisms of influence on firms. As a result, directors' social capital may be beneficial in some periods yet not impactful or even detrimental in others.

During the global financial crisis, which initially impacted banks and subsequently other industries [73], directors' professional connections, indicating access to information and resources, enhanced firms' market-based resilience. However, international and political connections did not show similar effects. It is plausible that companies with such board compositions may not have had sufficient time to adapt their strategies, or investors may not have perceived these connections as valuable at the time.

The commodity price shock, along with sanctions against Russian banks and companies, and the subsequent slowdown in economic growth and investment activity in 2014–2015 [74], saw directors' social capital mitigate the shock's negative impact on firms' resilience. Social capital likely enabled firms to identify new opportunities for development and explore alternative resource pathways.

During the 2020 crisis, initially triggered by non-economic factors such as declining global economic growth rates affecting export prices [75] coupled with lockdown measures reducing household consumption and real income [76], investors may have perceived boards with a high proportion of politically connected directors as less effective in managing the crisis. Government priorities focused more on financing social policies than supporting corporate efficiency. Additionally, directors with international connections, often appointed in companies within global value chains disrupted by restrictions [77], may have experienced difficulties in helping their firms to recover from the shock.

Conclusion

In this study, we employed resource dependency theory and agency theory to explore how board members' social capital, comprising professional, political, and international connections, influences firm resilience to exogenous shocks in terms of market performance. Market-based resilience was initially measured using the sum of daily standard deviations of stock returns, revealing that directors' professional connections mitigated the negative impact of crises studied. Meanwhile, international and political ties lessened the effects of the 2014–2015 crisis yet exacerbated impacts during the COVID-19 pandemic.

Examining resilience through the speed of stock price recovery post-shock, the study demonstrated the positive effects of professional ties during the global financial crisis, no significant effects during the 2014–2015 crisis, and a negative impact of directors' international connections during the COVID-19 crisis on recovery speed.

The implications of our findings are both theoretical and practical. Our results can be used to design boards that are more resilient to exogenous shocks. By distinguishing between different types of director connections and crises, we gain a detailed understanding of the potential consequences of hiring directors with high social capital of a particular type. Moreover, we suggest that board diversity in terms of connections can serve as a form of insurance, enabling firms to handle various types of shocks. Since the nature of future shocks is unknown, including directors with diverse types of connections can enhance firms' resilience.

The government can use the developed resilience metrics to monitor firms' recovery during crises and to develop targeted stimulus programs. Investors may benefit from paying closer attention to the connections of a board of directors when selecting companies during economic turbulence. Researchers can utilize the developed system of social capital and resilience metrics in studies of firms' responses to exogenous changes and the role of board connections in firm performance.

Our research can be extended in several directions. While we focus solely on market-based metrics of resilience, future studies could explore other indicators, such as book-based performance metrics, or develop more complex metrics, such as those measuring the acceleration of recovery. Differences in firms' responses to various types of shocks may prompt further research on the characteristics of crises and the specific types of linkages needed for recovery. Additionally, expanding the sample to include all Russian listed firms could enhance accuracy, given that centrality metrics are highly sensitive to the chosen sample.

Acknowledgments

This work is an output of a research project implemented as part of the Basic Research Program at the National Research University Higher School of Economics (HSE University).

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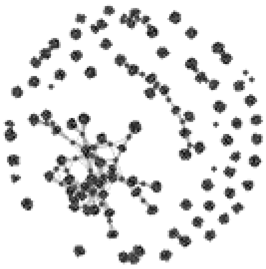
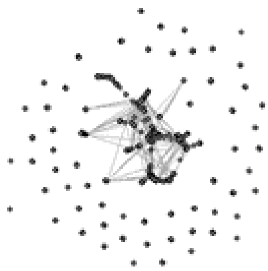
Appendix 1

Graphs show the connections between board members, with N being the number of unique directors in a given year, nodes representing directors, and edges representing professional connections (directors serving on one board).

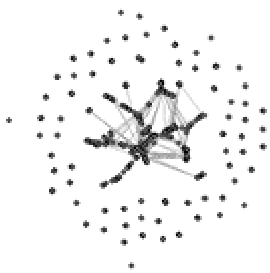
2007, N = 845



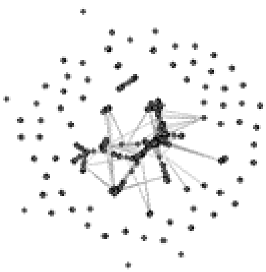
2008, N = 1133



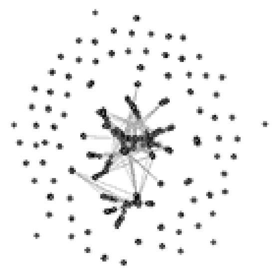
2009, N = 1426



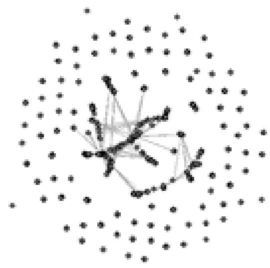
2010, N = 1458



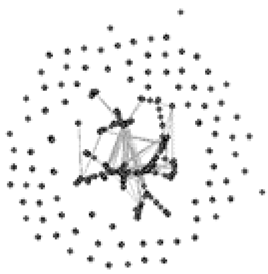
2011, N = 1512



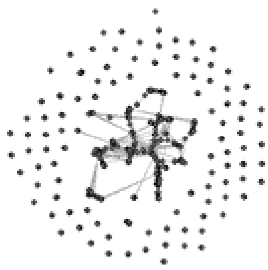
2012, N = 1626



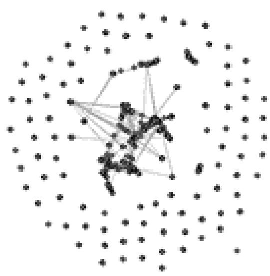
2013, N = 1680



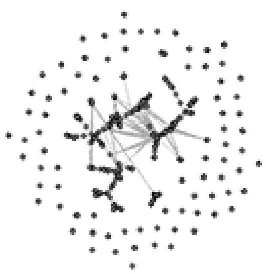
2014, N = 1693



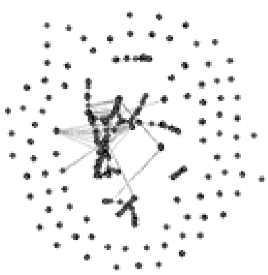
2015, N = 1653



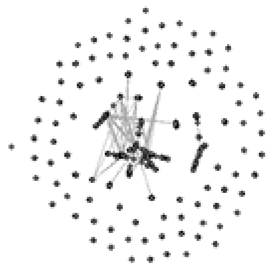
2016, N = 1652



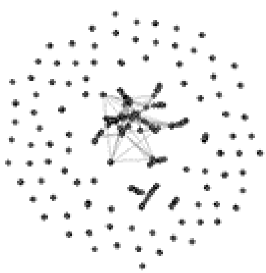
2017, N = 1613



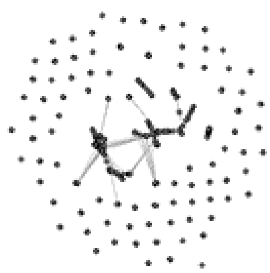
2018, N = 1525



2019, N = 1540



2020, N = 1458



Source: authors' calculations.

Appendix 2.

Explanatory variables used in the study

Explanatory variable	Definition and calculation	Expected influence on resilience
Degree centrality	The number of ties that a given director has, normalized by the maximum possible number of connections: $Degree\_Centrality = \frac{\sum_{i \neq j}^{n} b_{ij}}{n-1}$, where $b_{ij} = 1$ if director *i* is connected with a director *j*, and n is the number of directors in the network.	+
Closeness centrality	The average length of the shortest paths between a node and all other nodes in the network [65]: $Closeness = \frac{1}{\sum_{i \neq j}^{n} dist(b_i, b_j)}$, where $\frac{1}{dist(b_i, b_j)} = 0$ if directors *i* and *j* are not connected, $dist(b_i, b_j)$ is the distance between directors *i* and *j*, and n is the number of directors in the network.	+
Betweenness centrality	The degree to which the same node reduces the path distance between all pairs of other nodes [65]: $Betweenness_i = \frac{\sum_{j<k} g_{jk(ni)} / g_{jk}}{(g-1)(g-2)}$, where $g_{jk(ni)}$ is the number of geodesics in which director *j* communicates with director *k* through director *i*, g_{jk} is the number of geodesics in which director *j* communicates with director *k*, and *g* is the number of directors in the board network.	+
Eigenvector centrality	The extent to which a node's network centrality is related to that of its neighbors [66]: $Eigenvector\_Centrality = \frac{1}{\lambda} \sum_{j=1} b_{ij} E_j$, where b_{ij} is an adjacency matrix that takes a value of 1 if directors *i* and *j* are on the same board and 0 otherwise, λ is the largest eigenvalue, and E_j is the eigenvalue of director *j*'s centrality.	+
PCA professional connections	A variable used to aggregate indicators of professional connections, obtained by applying Principal Component Analysis (PCA) to degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality. The first component accounts for about 75% of the variation in the variable.	+
Political connections	Share of directors with a political background	+

Explanatory variable	Definition and calculation	Expected influence on resilience
Foreign connections	Share of directors who were born outside of Russia (USSR) or have work experience in foreign companies	+
Financial leverage	Total debt to total assets	
Market-to-book value	Market value of equity plus book value of debt divided by book value of total assets	
ROA	EBIT to average total assets	
Firm size	Natural logarithm of total assets	
Board size	Natural logarithm of the number of board members	
Government ownership	Share of equity held by the government	
Dummy government ownership	Dummy for government ownership	

Note: The table describes the explanatory variables, their calculation and the expected signs.

Contribution of the authors: the authors contributed equally to this article.
The authors declare no conflicts of interests.
The article **was submitted on** 06.03.2024; **approved after reviewing on** 08.04.2024; **accepted for publication on** 30.04.2024.