CEO EDUCATION IN RUSSIA: FIRST SYSTEMATIC EVIDENCE AND A RESEARCH AGENDA

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We use a novel hand-collected dataset to provide first systematic evidence on CEO education in Russian publicly traded companies over 2009–2020, including its link to other characteristics of CEOs and key attributes of firms. We find that almost all CEOs in Russia have higher education, that PhD degrees are unusually common, while MBA degrees are relatively rare, that CEOs with different levels of education differ among a number of key socio-demographic characteristics and that the appointment of CEOs with various educational levels is systematically related to firm-level attributes, including ownership and governance structure. In particular, PhD CEOs, who are relatively older, are more likely to have prior connections to government and also tend to be chosen by companies with state ownership, while MBA CEOs, who are relatively younger, are more likely to be chosen by companies with foreign ownership. An important implication is that establishing a causal effect of CEO education on firm behavior and performance requires addressing endogeneity problems caused by potential omitted variables at the CEO level and non-random selection of CEOs by different types of firms. The article outlines several areas for future research.
Keywords: CEO characteristics, CEO education, corporate governance, Russia.
JEL: M12, G34.

INTRODUCTION

The role of CEOs (and other top managers) has recently received special attention in analyses of firm behavior and performance. The upper echelons theory [Hambrick, Mason, 1984] views top managers and CEOs in particular as key actors that influence the strategic choices and performance of firms. It suggests that the decisions of CEOs have a large behavioral component and are closely linked to their personal characteristics, such as age, gender, education, experience, and personality traits. Several influential em-

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https://doi.org/10.21638/spbu18.2022.103

pirical studies confirm that CEOs matter for the firm, which is reflected, for example, in different management styles and varying innovation activity (e. g., [Bertrand, Schoar, 2003; Cho et al., 2016]). The importance of CEO personal characteristics is also widely documented (e. g., [Barker, Mueller, 2002; Kaplan, Klebanov, Sorensen, 2012]).

Among various attributes of CEOs, a prominent role is given to their education. From the theoretical viewpoint, the human capital theory [Becker, 1964; Mincer, 1958] regards education as investment that increases individual productivity and generates higher private and social returns. Formal education may also be associated with individual ability, which is typically unobserved: people with higher ability choose to invest more in education compared to people with lower ability. Overall, education appears one of the best indicators of human capital, which is broadly understood to encompass individual knowledge, skills, and life experiences. In reference to top executives, D. Hambrick and P. Mason suggest that both the amount and the type of education are important markers of their knowledge and skill base [Hambrick, Mason, 1984]. Both affect the CEO decision-making process and, ultimately, corporate behavior and performance.

Several strands of literature consider the phenomenon of CEO education from different angles. The most voluminous literature attempts to evaluate the effect of CEO education on various corporate outcomes. The latter are extremely diverse: from risk-taking and R&D spending to financial and non-financial performance of firms. For example, V. Barker III and G. Mueller study the link between CEO education and the firm's R&D spending [Barker, Mueller, 2002], T. King, A. Srivastav and J. Williams relate the level and quality of CEO education to bank financial performance [King, Srivastav, Williams, 2016], H. Farag and C. Mallin assess the impact of CEO demographic characteristics, including education, on corporate risk-taking [Farag, Mallin, 2018], while D. Gounopoulos, G. Loukopoulos and P. Loukopoulos evaluate the effect of CEO education on the level of IPO underpricing in IPO firms [Gounopoulos, Loukopoulos, Loukopoulos, 2021].

The second, and much narrower, strand of literature tries to identify the causes for selecting CEOs with particular characteristics, including their education credentials [Abernethy, Kuang, Qin, 2019]. It is part of the CEO succession literature, which encompasses four primary dimensions: when, how, who, and consequences of CEO change [Cragun, Nyberg, Wright, 2016]. For example, E. Elsaid, B. Benson and D. Worrell study how firm or predecessor characteristics are associated with a board of director's choice of a successor CEO, including her education level [Elsaid, Benson, Worrell, 2016]. B. Martinson relates the level of education of newly hired CEOs to the life-cycle of the firm [Martinson, 2012]. Further, Z. He and D. Hirshleifer investigate, among other issues, whether more innovative firms tend to hire CEOs with PhD degrees [He, Hirshleifer, 2022], while S. Yao analyses which characteristics of CEO successors, including education, are most demanded by firms recovering from financial distress [Yao, 2020].

There is also a relatively small literature analyzing the national career patterns of top managers, including educational attainments, and linking them to national institutional contexts. For example, E. Davoine and C. Ravasi document large differences in the incidence of PhD CEOs in large European countries, ranging from 6–7% in France to 45% in Germany [Davoine, Ravasi, 2013]. Among other findings, these studies suggest that the metrics for the level and quality of CEO education may be highly country-specific and the results for different countries should be compared with some caution.

To date, most analyses of CEO education are based on data from advanced economies, primarily the US, due to its rich, homogeneous, and reliable data [Morresi, 2017]. While US literature suggests a number of regu-

larities, the evidence is far from conclusive.[1] Few such analyses are available for other developed or emerging markets. For example, S. Schmid, F. Altfeld and T. Dauth investigate the incidence and performance effects of the doctoral degrees in the German firms included in the DAX-30 index and find no positive reaction of the stock market on the appointment of CEOs with a doctoral degree [Schmid, Altfeld, Dauth, 2017]. S. Boubaker, E. Clark and S. Mefteh-Wali study the relationship between CEO elite education and firm hedging decisions in French firms and establish a positive and significant relationship between education quality (albeit not quantity) and derivatives use, with a link to corporate performance [Boubaker, Clark, Mefteh-Wali, 2020]. Examining Indian manufacturing firms over 1998–2017, G. Gupta, J. Mahakud and V. Verma find the importance of CEO financial education for the corporate investment decisions [Gupta, Mahakud, Verma, 2021], while M. Zhou, F. Chen and Z. Chen show, using a sample of listed nonfinancial Chinese companies between 2008 and 2017, that enterprises with highly educated CEOs are likely to engage in environmental innovation [Zhou, Chen, Chen, 2021].

The evidence on CEO education in Russian companies, its determinants and effects is particularly scarce. Using cross-sectional data of 100 publicly traded companies in 2016, Y. Ovanesova and E. Zotov find that virtually all CEOs have higher education, that 28% of them have at least two degrees and that 18% of CEOs have MBA degrees [Ovanesova, Zotov, 2017]. Their empirical results suggest no statistically significant effect of CEO education on firms' abnormal returns. E. Prosvirkina and B. Wolfs study the effect of top management team characteristics on the performance of 178 Russian banks and find that the fraction of PhD holders among the top managers is positively related to bank profitability [Prosvirkina, Wolfs, 2021]. L. Ruzhanskaya and A. Sizikov provide some evidence for the 50 largest Russian companies over 2011–2019, reporting in particular no significant effect of CEO education on firm performance (measured by Tobin's *Q*) [Ruzhanskaya, Sizikov, 2020]. In their data, about 20% of the CEOs have MBA degrees and about a quarter have PhD degrees. Overall, the literature on Russian CEOs lacks not only solid empirical evidence regarding the determinants and outcomes of appointing CEOs with different characteristics, including education, but also detailed data on the education of Russian CEOs per se. The information available to date is extremely incomplete and fragmentary.

In this paper we employ a novel hand-collected dataset to address several research questions, namely: (1) to provide first systematic evidence on CEO education in Russian publicly traded companies with a special focus on advanced degrees, MBA and PhD; (2) to investigate whether and how CEOs with advanced degrees differ from other CEOs across key socio-demographic characteristics; and (3) to establish which firm-level factors are associated with hiring CEOs with advanced degrees in Russia. To our best knowledge, our paper is the first to provide such systematic evidence for Russia.

The paper is organized as follows. Section 1 presents a short literature review. Section 2 describes the data and sample. Section 3 presents and discusses the main results of descriptive analysis. Section 4 studies socio-demographic characteristics of CEOs with different levels of education and investigates which firm-level factors are associated with hiring MBA and PhD CEOs. The following section concludes by summarizing the key findings and outlining possible directions for further research.

LITERATURE REVIEW

The theoretical underpinnings of the link between CEO education and company beha-

[1] In particular, a number of studies [Bertrand, Schoar, 2003; Gottesman, Morey, 2010; King, Srivastav, Williams, 2016; Miller, Xu, 2019; He, Hirshleifer, 2022] provide conflicting evidence on the performance effect of CEOs with MBA and PhD degrees in US companies.

vior and performance can be found in three main lines of research. First, the upper echelon theory proposed by D. Hambrick and P. Mason argues that strategic behavior and performance of a firm is influenced by personal characteristics of its top managers as they act in accordance with their values, experience and personality traits [Hambrick, Mason, 1984]. Among these, education is viewed as one of the most important factors signaling not only a manager's knowledge and skill base, but also her values and cognitive preferences. Second, the human capital theory [Becker, 1964] considers education as investment that enhances an individual's human capital and improves her productivity. As a result, firms run by more educated, and therefore more productive, CEOs may have better performance.[2] Third, the signaling theory offers an alternative viewpoint: according to it, education plays a role of a pure signal, without contributing directly to CEO productivity [Spence, 1973]. In particular, in the presence of information asymmetry between the owners of the firm [and/or the board of directors] and the CEO regarding her productive abilities, she may use education to signal her high skills. Nevertheless, both the human capital and signaling theories imply a link between a CEO's formal education and firm behavior and performance.

Three dimensions of education are considered as theoretically relevant: the level, quality and specialization (field of study). Managers with higher levels of formal education are generally assumed to be better able to process information and are more receptive to change than CEOs with lower educational attainment [Gottesman, Morey, 2010]. The same is true for the quality of education: graduates from more prestigious universities may have higher human capital compared to those who graduate from less prestigious schools. The difference is not necessarily due to better education per se, however; it may be driven by higher entrance requirements at more prestigious schools which effectively preselect students with better innate ability [Herrmann, Datta, 2005]. As to the field of study, it has long been assumed that CEOs with technical education use different cognitive models compared to their counterparts with education in humanities and social sciences [Hambrick, Mason, 1984]. As a result, education in science & engineering may create managers that have better understanding of technology and innovation and may be more engaged in R&D.

Consistent with theoretical arguments on the importance of education, there is solid international evidence that CEOs of large and publicly traded firms are well-educated: most have higher education (at least a bachelor's degree).[3] Although this positions CEOs as a rather homogenous group relative to the population at large, there is still considerable variation in CEO education in the level, quality and specialization/field of study — the dimensions that are increasingly found relevant in the empirical literature. For example, T. King, A. Srivastav and J. Williams report that 37.7% of CEOs in publicly listed US banks obtain an MBA degree and 7.3% have a PhD degree [King, Srivastav, Williams, 2016]. More than one-quarter of the undergraduate CEOs and 9.7% of MBA CEOs graduated from the top 20 U.S. institutions, which may be taken as a measure of elitist education. Similarly, S. Boubaker, E. Clark and S. Mefteh-Wali report substantial variation in the level, field and quality of education among CEOs of French non-financial firms. In particular, they show

[2] This theory also acknowledges that formal education may be associated with individual ability, which is typically unobserved: people with higher ability choose to invest more in education compared to people with lower ability. This means that highly educated CEOs may also feature better scores on other elements of human capital, such as motivation and social connections.

[3] For example, 96.6% in the US [King, Srivastav, Williams, 2016], 95.1% in France [Boubaker, Clark, Mefteh-Wali, 2020] and 85.4% in China [Zhou, Chen, Chen, 2021]. However, there are well-known cases of successful CEOs who did not get a college degree, including Bill Gates (Microsoft) and Steve Jobs (Apple).

the dominance of the degrees in Business and Economics (60.4%), followed by the degrees in Engineering (21.6%) and other fields (18.0%), and that 29.4% of CEOs graduated from one of the French elite schools [Boubaker, Clark, Mefteh-Wali, 2020].

The variance is even more substantial in cross-national comparisons. Indeed, there are considerable cross-country differences in the educational background of senior managers, reflecting national institutional context (e. g., [Davoine, Ravasi, 2013]). For example, CEOs with doctoral degrees are relatively unusual in the US and UK, but more common in continental Europe, especially in Germany.[4] In the US context, the quality of CEO education is usually assessed by the presence of MBA degrees or elite education from Ivy League universities, while doctoral degrees are generally deemed more appropriate for an academic career. In contrast, in Germany, where education is much more egalitarian with smaller differences among universities, PhD is often acquired to qualify for a business career [Entrop, Merkel, 2020]. Some erosion of these national patterns is driven by the increased internationalization of business and the appointment of foreign top managers with foreign degrees [Bühlmann, Davoine, Ravasi, 2018]. Finally, the presence of a domestic versus foreign degree is sometimes taken as yet another dimension characterizing CEO education, especially in the context of emerging markets (e.g., [Bai, Tsang, Xia, 2020]).

Coming back to a national context, why do firms choose CEOs with different education credentials and not those with the highest levels? This question is part of a broader issue concerning the selection of CEOs which is studied in the CEO succession literature (e.g., [Cragun, Nyberg, Wright, 2016]). The main premise in this literature is that different types of companies require different skills from the CEOs (e.g., [Bertrand, Schoar, 2003]). For example, CEO international experience may be valuable in highly internationalized firms, i.e., companies-exporters and those with subsidiaries abroad [Magnusson, Bogs, 2006]. M. Abernethy, Y. Kuang and B. Qin suggest that prospector firms (i.e., those adopting a prospector-type strategy) tend to appoint CEOs with high social capital [Abernethy, Kuang, Qin, 2019].[5] Clearly, education is only one of the desirable characteristics and may be systematically related to other attributes of CEOs, some of which may be less desirable. For example, D. Miller and X. Xu show — without claiming causality, though — that the MBA degrees are associated with short-term management behaviors, which may be at odds with shareholder and stakeholder interests [Miller, Xu, 2019]. Moreover, more educated CEOs may be more expensive and therefore unaffordable to some firms. Indeed, A. Falato, D. Li and T. Milbourn find that firms pay a premium to newly appointed CEOs with stronger educational credentials [Falato, Li, Milbourn, 2015]. This explains why many firms opt for CEOs with weaker educational achievements.

The available empirical literature, while providing some evidence that CEO education affects company behavior and performance, is far from conclusive. For example, in relation to MBA degrees, M. Bertrand and A. Schoar report higher returns on assets, of the order of one percent, in companies whose CEOs have MBA degrees compared to companies with non-MBA CEOs [Bertrand, Schoar, 2003]. Similarly, T. King, A. Srivastav and J. Williams find that banks headed by CEOs with higher MBA education scores show better financial performance compared to banks led by non-MBA CEOs (those having an undergraduate degree or a PhD) [King, Srivastav, Williams, 2016]. However, A. Gottesman and M. Morey conclude that CEOs with MBA degrees do not

[4] According to C. Ellersgaard, A. Larsen and M. Munk, almost 50% of CEOs in top 100 German companies had a doctoral degree compared to 10% in France, 8% in Denmark and 6% in the UK [Ellersgaard, Larsen, Munk, 2013].

[5] The increasing importance of soft skills is documented in a recent study [Hansen et al., 2021].

perform better than the rest [Gottesman, Morey, 2010]. D. Miller and X. Xu also cast doubt on the value of MBA degrees by noting that MBA CEOs are associated with the short-term tactics of positive earnings management and the restriction of R&D expenses, which tend to hurt firm market valuations [Miller, Xu, 2019]. As regards PhD degrees, Z. He and D. Hirshleifer show — in contrast to most previous studies — that firms led by PhD CEOs are more innovative and achieve superior long-run operating performance [He, Hirshleifer, 2022]. Given these conflicting findings, it comes as no surprise that CEO education ranks high on the research agenda in the corporate finance and governance literature.

DATA

This paper uses a new and unique database of Russian publicly traded companies constructed by us in the following way. First, we started with the list of companies that were ever traded on the Moscow Exchange between 2009 and 2020. Next, we extracted essential corporate data about these firms from the SKRIN and SPARK databases, which offer one of the most complete and accurate information on Russian companies.[6] Specifically, the data collected characterize the ownership structure of firms, composition of their governance bodies, key financials, etc. Finally and most importantly, we conducted a thorough search of biographies of the companies' CEOs using public sources (corporate annual and quarterly reports, corporate news, specialized and public media sources, etc.). The data assembled include key demographic characteristics of CEOs, such as age, gender, place of birth, and nationality; details of their educational background, including universities attended, fields of study, degrees obtained, and years of graduation. In addition, we coded the data on the affiliation of CEOs with government, their military background and international work experience. We paid particular attention to the identification of CEOs with advanced degrees (MBAs and PhD, the latter include Russian lower and upper doctorate degrees[7] as well as foreign PhDs). To identify CEOs with PhD, we looked not only at CEO biographies, but also searched the database of all dissertations defended in Russia and maintained by the Russian State Library[8] to find all possible matches between CEO names and dissertations' authors. Such a thorough search allows us to clarify the field of study as well as to obtain the titles of dissertations for almost all Russian CEOs with a research degree. All in all, we have collected detailed information on 405 firms and 883 CEOs for the period between 2009 and 2020, resulting in more than 3000 observations (firm-years). Except for a handful of firms with missing values in key variables, our data cover the universe of the Russian publicly traded companies, both financial and non-financial, over 2009–2020.

Figures 1 and 2 provide essential information about the sample. The distribution over time (Figure 1) highlights the gradual exit and delisting of Russian companies over the last decade; the spike in 2011 is due to the merger of the MOEX and the RTS at the end of 2011, which temporarily increased the number of listed firms.

The sectoral distribution (Figure 2) is based on the two-digit industry codes (OKVED in Russian) reported by the companies, with additional cross-checks and corrections by us.[9] Two sectors, manufacturing and power utilities, dominate the sample with

[6] Skrin. URL: https://skrin.ru (accessed: 11.10.2021); Spark. URL: https://spark-interfax.ru (accessed: 11.10.2021).

[7] The Russian titles are "Candidate of science" and "Doctor of science", respectively.

[8] The Russian State Library. URL: https://www.rsl.ru (accessed: 11.10.2021).

[9] In particular, holding companies often report their main industry codes as "wholesale trade" and/or "holding companies management". For example, JSC Gazprom reports the main industry code as "wholesale trade", while it is actually an internationally known oil & gas company; similarly, JSC Polus, which is one of the top gold miners globally, reports the main industry code as "holding companies management".

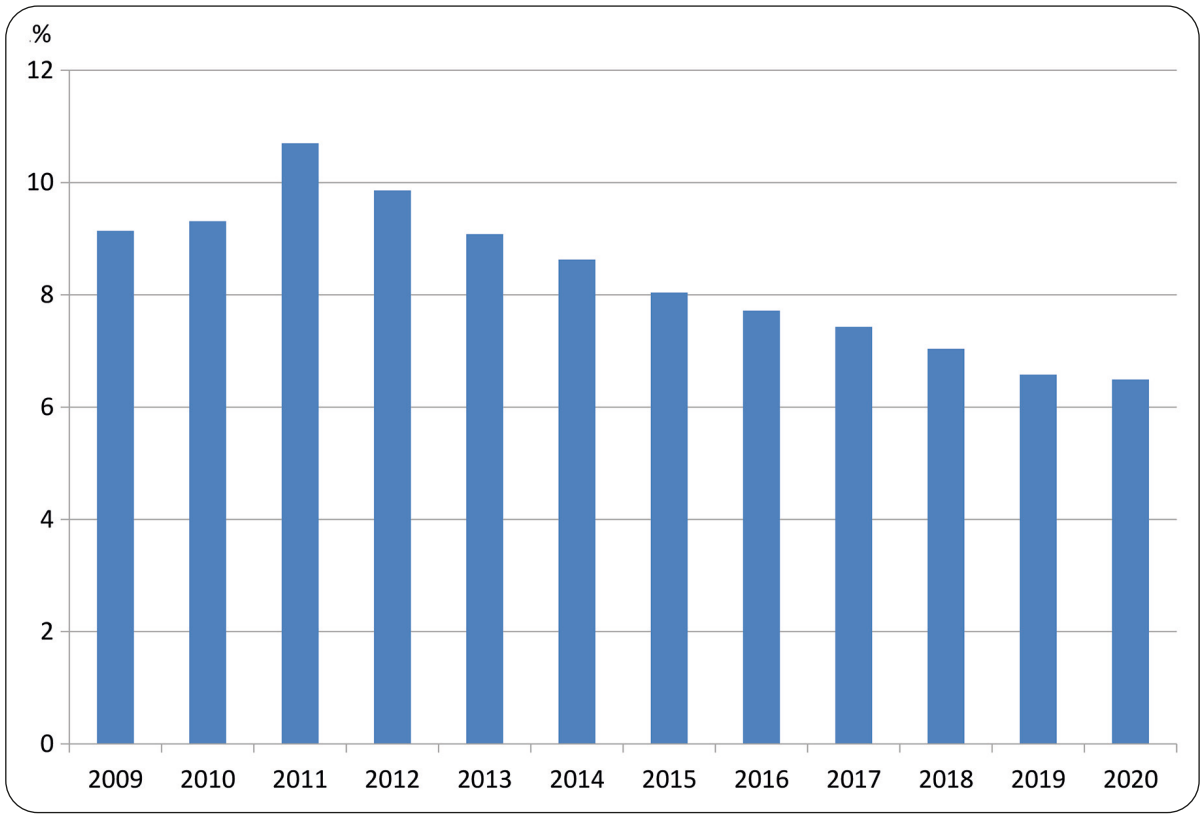

Fig. 1. The distribution of firms over time, 2009–2020

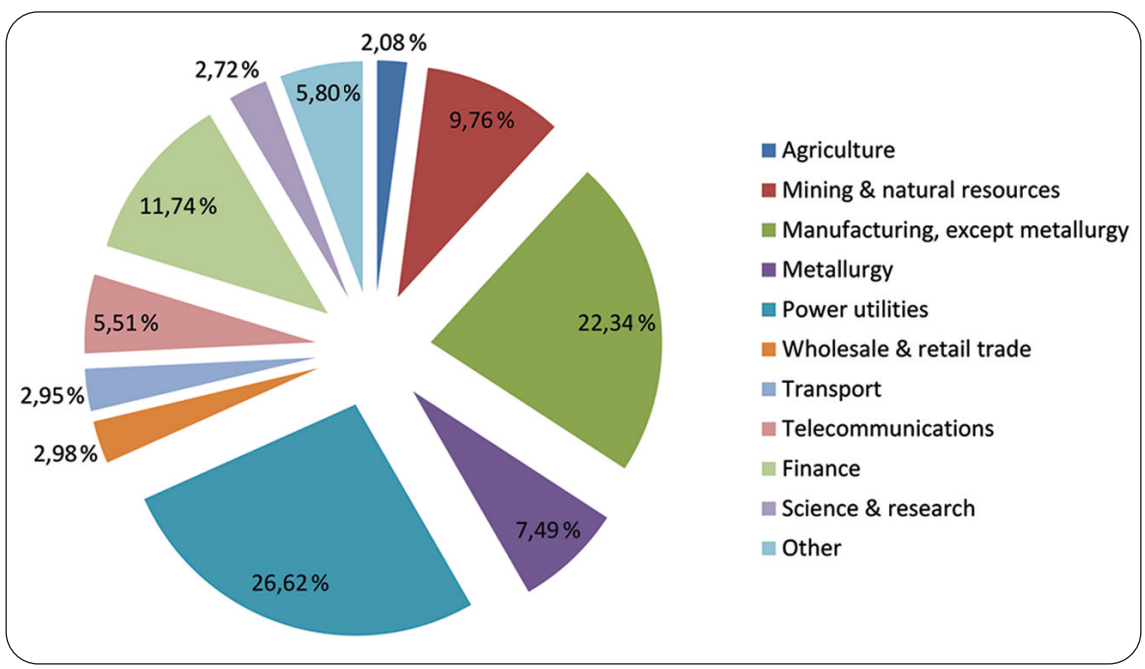

Fig. 2. The distribution of firms by sector

more than 25% of observations in each.[10] The other important sectors, each with nearly 10% of observations are finance and mining & natural resources. Far less important, but still visible in the data, are the sectors of telecommunications, transport, trade, agriculture, and science & research. The data reflect the well-known specifics of the Russian equity market's sectoral composition.

There have been some changes in the sectoral distribution of the publicly traded firms over the study period. Most notably, the share of companies in mining & natural resources as well as in finance increased, while the share of manufacturing companies and power utilities somewhat declined.[11] These changes are, however, modest and cannot fully account for a number of interesting patterns in the evolution of CEO education that are described below.

DESCRIPTIVE ANALYSIS

Our rich data allow us to analyze CEO education from different angles. First, we focus on the highest level of education and the number of degrees earned. Then we look at the fields of study, including at various level of education. Finally, we study the degree awarding universities and the countries where they are based.

Number of degrees

The first interesting fact concerning the education of Russian CEOs is that almost all of them (more than 99%) have higher education (at least a bachelor degree).[12] This is consistent with previous results reported, for example, by Y. Ovanesova and E. Zotov [Ovanesova, Zotov, 2017]. From an international perspective, this seems unusual: in most countries covered in the literature there are at least 5–10% of CEOs who did not get higher education. For example, about 7% of the CEOs in the 2008 Fortune 500 list had less than a bachelor degree [Martelli, Abels, 2010]. The numbers are unusual even on the background of a very high level of tertiary educated in Russia, where "54% of 25–64-year-olds hold a tertiary degree, the second highest after Canada of all OECD and partner countries and 19 percentage points more than the OECD average" [OECD Library, 2016, p. 2].

The reasons for the almost universal incidence of higher education among Russian CEOs should probably be sought in institutional and cultural features of the country, which overemphasize the possession of a formal degree without paying much attention to its quality. As noted by D. Popov and A. Strelnikova, a higher education degree is merely regarded by many as an important social marker, while the amount of real knowledge obtained when a person receives higher education is minimal in comparison with OECD countries [Popov, Strelnikova, 2018]. Given this environment, a higher education diploma is almost a must for a top manager. The relative ease and low cost of acquiring higher education in Russia (or even purchasing a fake diploma, which is not unusual (e. g., [Caplan, 2007])) may further contribute to its spread among the population at large and top managers in particular.

The data also show that multiple degrees are quite common among CEOs of Russian companies (Figure 3). Only about 46.4% of them have just one university degree, while 52.8% have multiple degrees. In particular, two degrees are found for 32.2% of the CEOs, three degrees — for 15.9% of CEOs and four degrees — for 4.5% of CEOs.

Moreover, matching these data with information on the level and field of study reveals that many multiple degrees seem to

[10] Given the large number of metallurgical companies in the sample, we create a separate category for metallurgy, distinguishing it from other manufacturing.

[11] More detailed information is available from the authors on request.

[12] As a rule, they hold the so-called specialist diploma, requiring five years of study at a university. The reason is that the transition to bachelor and master degrees in Russia occurred in 2007 only (although some universities introduced it earlier, at least in some fields of study).

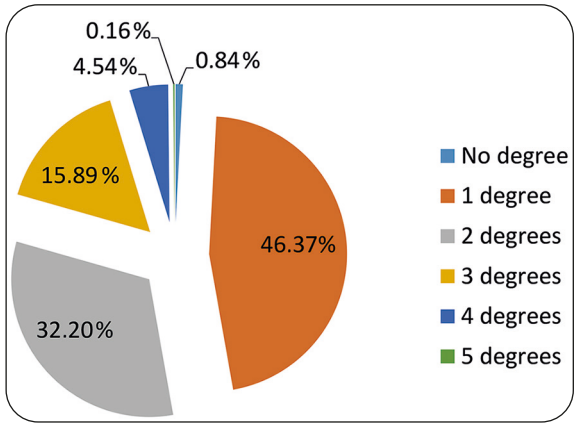

Fig. 3. Number of degrees reported

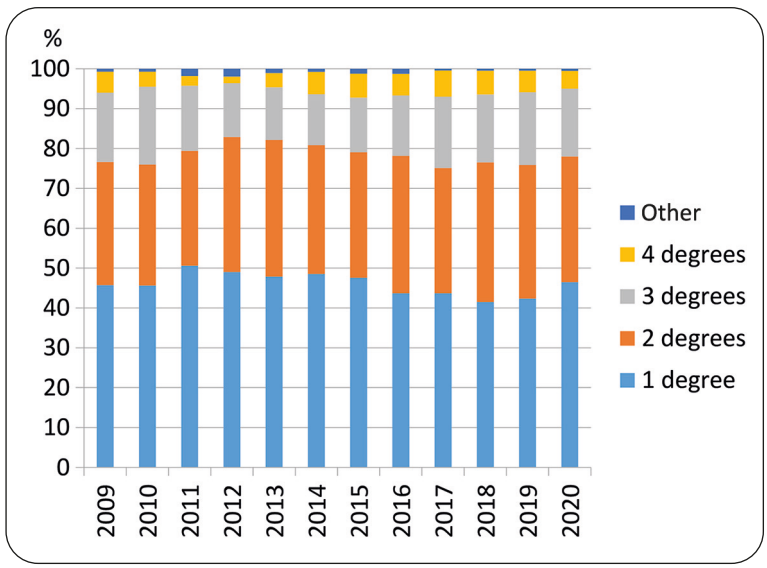

Fig. 4. Dynamics of the number of CEO degrees over time, 2009–2020

be at the same level of education.[13] They are especially common when the first degree is in Engineering & Science and the second one is Business & Economics (in particular, 79.9% of CEOs with the first degree in Engineering & Science acquire a second degree in Business & Economics).

Finally, there is no clear dynamics in the evolution of the number of degrees earned among Russian CEOs. Figure 4 shows some decline in the share of CEOs with three or more degrees over 2009–2014, but it increased again in the subsequent years. Overall, the high incidence of multiple degrees, often at the same level, is an interesting feature of Russian CEOs. While it may be related to the above-mentioned obsession with

[13] A word of caution is due here. We cannot effectively distinguish between bachelor, master and specialist degrees in our data (except for MBA, which is almost always mentioned separately in the sources of data that we use). Therefore, we put these degrees in a single category "higher education", and count MBA degrees separately.

formal degrees and titles, which seems to be embedded in national culture, as well as to the relative ease of obtaining diplomas in Russia, the issue may deserve a special study.

Highest level of education

As to the highest level of education, 64.3 % of the CEOs report a university degree, in most cases a specialist degree corresponding to five years of study and occasionally a bachelor or a master degree (as already mentioned, Russia completed transition from 5-year specialist degrees to bachelor and master degrees in 2007 only, when most of the CEOs included in our analysis completed their formal education), see Figure 5.

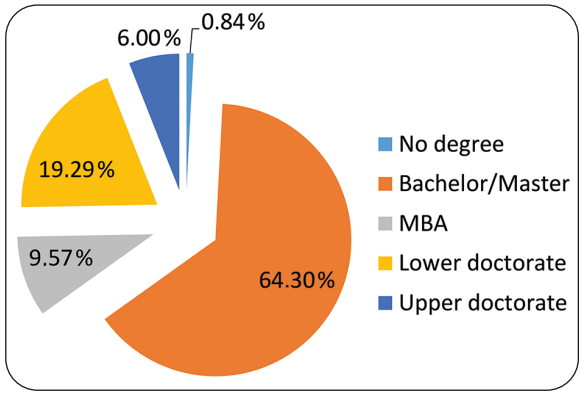

Fig. 5. The distribution of the last degrees

Only 12.2 % of the top managers studied have MBA degrees, for 9.6 % of the CEOs it is the top degree. Interestingly, 19.3 % of CEOs report a lower doctorate and 6.0 % report a higher doctorate degree, implying that 25.3 % of Russian CEOs have research degrees. Thus, doctoral degrees are twice more popular as MBA degrees. Importantly, there is some overlap between doctoral and MBA degrees as 2.5 % of the CEOs have both.[14]

These statistics on advanced degrees (MBA and PhD) are rather unusual in the international context. For example, doctoral degrees are relatively rare in the US and UK, more common in continental Europe, but MBAs dominate almost everywhere, with a notable exception of Germany.[15] For example, J. Martelli and P. Abels studied the CEOs of companies from the 2008 Fortune 500 listing and found out that 39.2 % of the CEOs had an MBA degree and only 5.2 % had a doctorate degree [Martelli, Abels, 2010]. A. Urquhart and H. Zhang identified that 19.9 % of CEOs of publicly listed FTSE 350 firms from 1999 to 2017 had an MBA degree compared to 10.5 % with a doctorate degree [Urquhart, Zhang, 2021]. Interestingly, relatively low shares of MBA degrees among CEOs are found in some other emerging markets. In particular, H. Sun with coauthors report that only 10.6 % of Chinese CEOs had an MBA degree [Sun et al., 2021]. However, these economies usually feature a small share of PhD CEOs (5 % in China according to [Pan, Tang, 2021]), which is very different from what one observes in Russia. Another interesting feature to be mentioned here is the low quality of Russian research degrees, at least in Business & Economics, as assessed by A. Libman and J. Zweynert [Libman, Zweynert, 2014]. As we show below, the majority of doctorates in the sample are earned exactly in this field.

The statistics shown above suggest that Russia may have its unique pattern of CEO education, which is different from the developed and emerging economies covered in the literature. The institutional features of Russia that are responsible for the observable pattern are still to be identified. But one possible and obvious hypothesis concerning the low incidence of MBA de-

[14] This feature has implications for future analysis as different degrees do not represent mutually exclusive alternatives in our dataset.

[15] In the US, almost 43 % of the CEOs hold a MBA degree in non-financial firms [Beber, Fabbri, 2012] and 37.7 % in banks [King, Srivastav, Williams, 2016]. In contrast, E. Semenova notes that CEOs with MBA degrees were almost absent in the 2012 sample of CEOs of top-100 German corporations [Semenova, 2022].

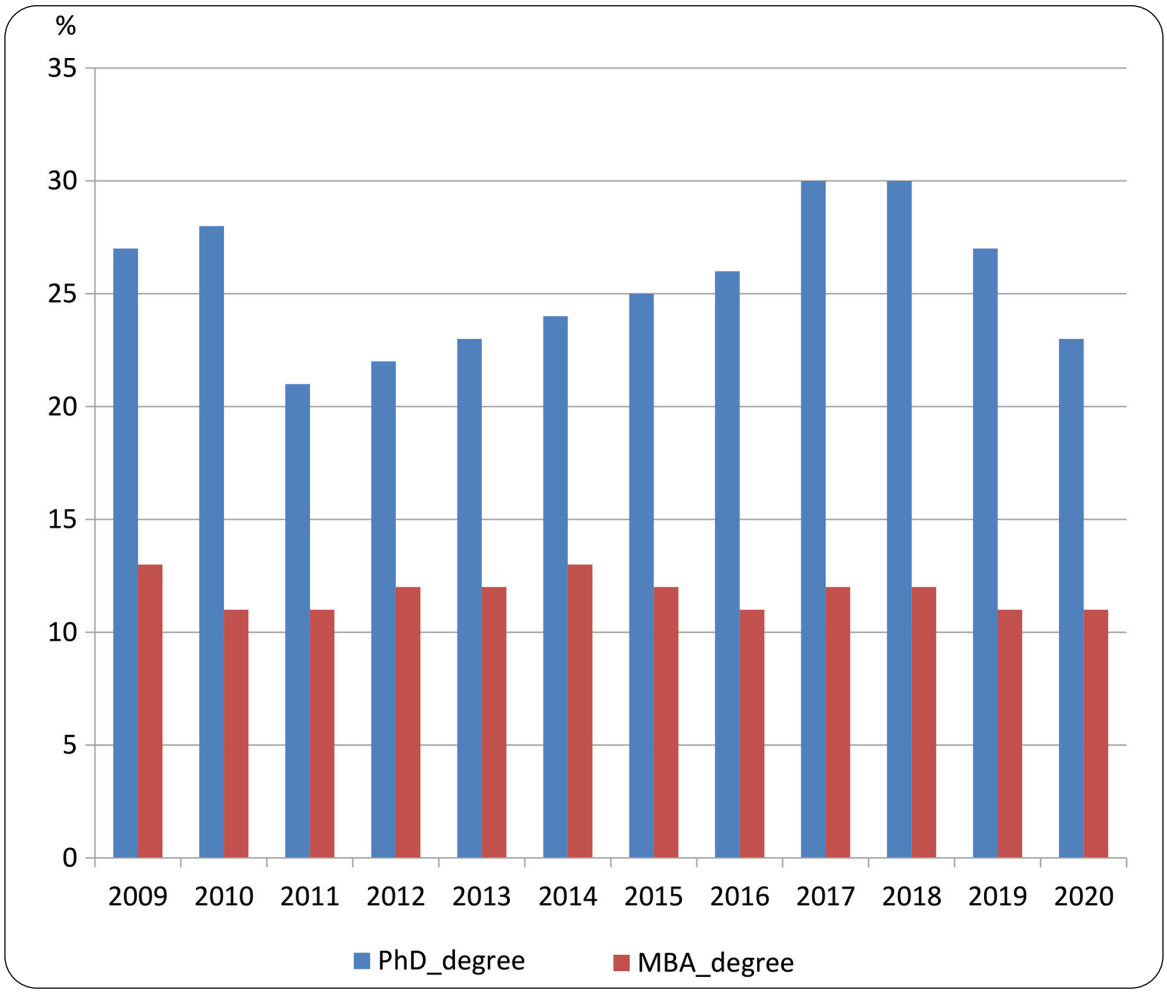

Fig. 6. Doctoral and MBA degrees over 2009–2020, full sample

grees can be discarded immediately using the data at hand. In particular, it may be tempting to link the low popularity of MBA degrees to the late transition to two-tier education in line with the Bologna Process (bachelor and master degrees instead of specialist degrees) as well as the relatively recent launch of MBA programs in Russia. If this hypothesis is true, one would probably expect an increasing share of MBA graduates among Russian CEOs over time. However, the data on the dynamics of various degrees (Figures 6 and 7) do not support this conjecture.

Figure 6 shows the distribution of advanced degrees over time. The percentage of firms with MBA CEOs is relatively stable, at about 12 %. There is some evidence that PhD degrees were less common in 2011–2013 as compared with the earlier and later periods, but this particular pattern may be explained by the expansion of the MOEX due to its merger with the RTS, which added several dozen smaller firms (they usually appoint less educated CEOs, as we will show soon). Interestingly, there is some decline in the percent of PhD CEOs observed in the most recent years, which is impos-

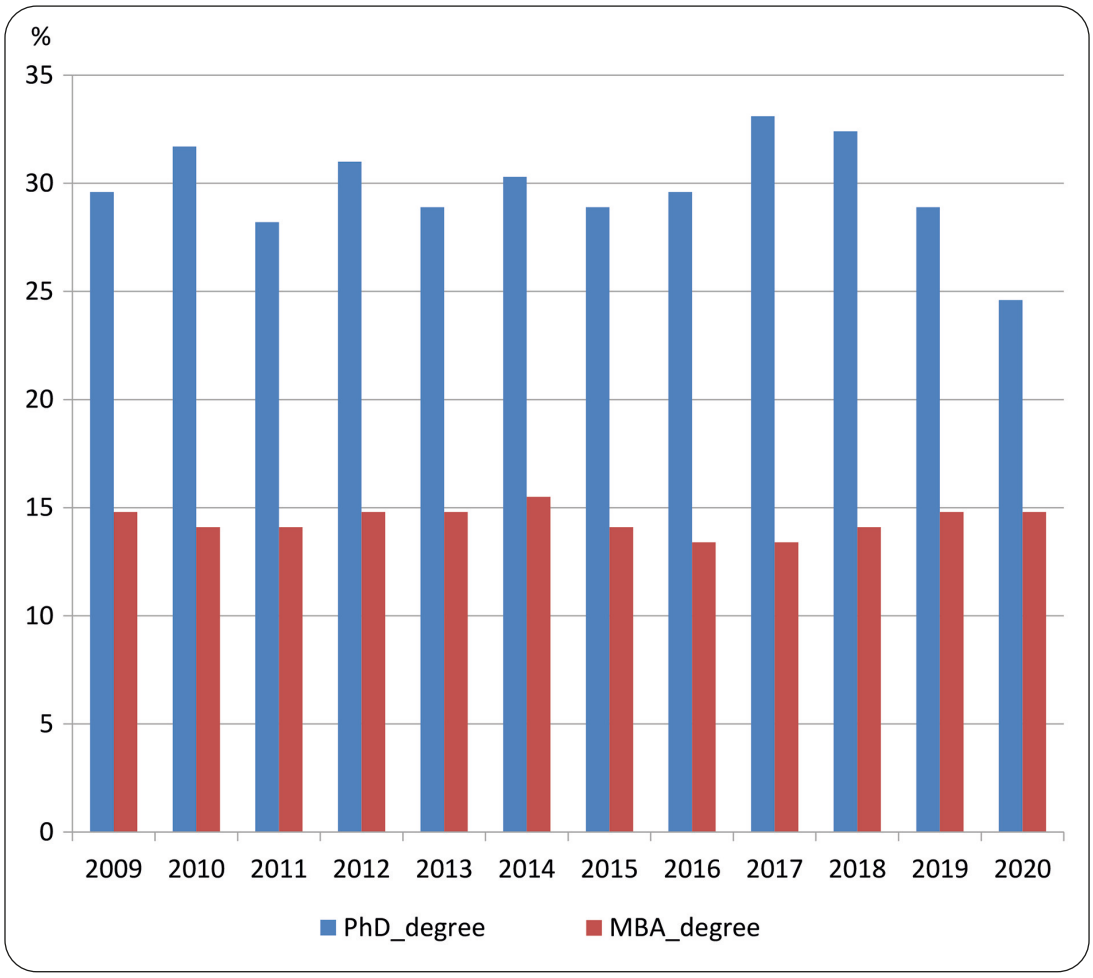

Fig. 7. Doctoral and MBA degrees over 2009–2020 sub-sample of firms observed in all years

sible to explain by the variation in sample composition.

In particular, if we take a sub-sample of companies that are observed in all 12 years (55.3 % of the sample with 1704 observations), the share of PhD CEOs fluctuates between 29 % and 33 %, with the peak in 2017, before falling to 25 % in 2020 (Figure 7). The share of MBA degrees varies from 13.4 % and 15.5 % in this sub-sample, the maximum was observed in 2014 and the minimum — in 2016 and 2017. Thus, we witness a declining demand for PhD CEOs in recent years, but no signs of an increased demand for MBA CEOs.

Fields of study

As to the field of study, the first degree earned by Russian CEOs is usually in Engineering & Science (56.9 %) followed by Business & Economics (30.7 %). The second degrees, however, are mostly in Business & Economics (78.4 %). This is also true for the further degrees. As a result, we observe the top degree in Business & Economics for 58.3 % of the observations, while the top degree in Engineering & Science is only found in 32.5 % of the data. This is not that different from what is reported for other countries, for example, by S. Bou-

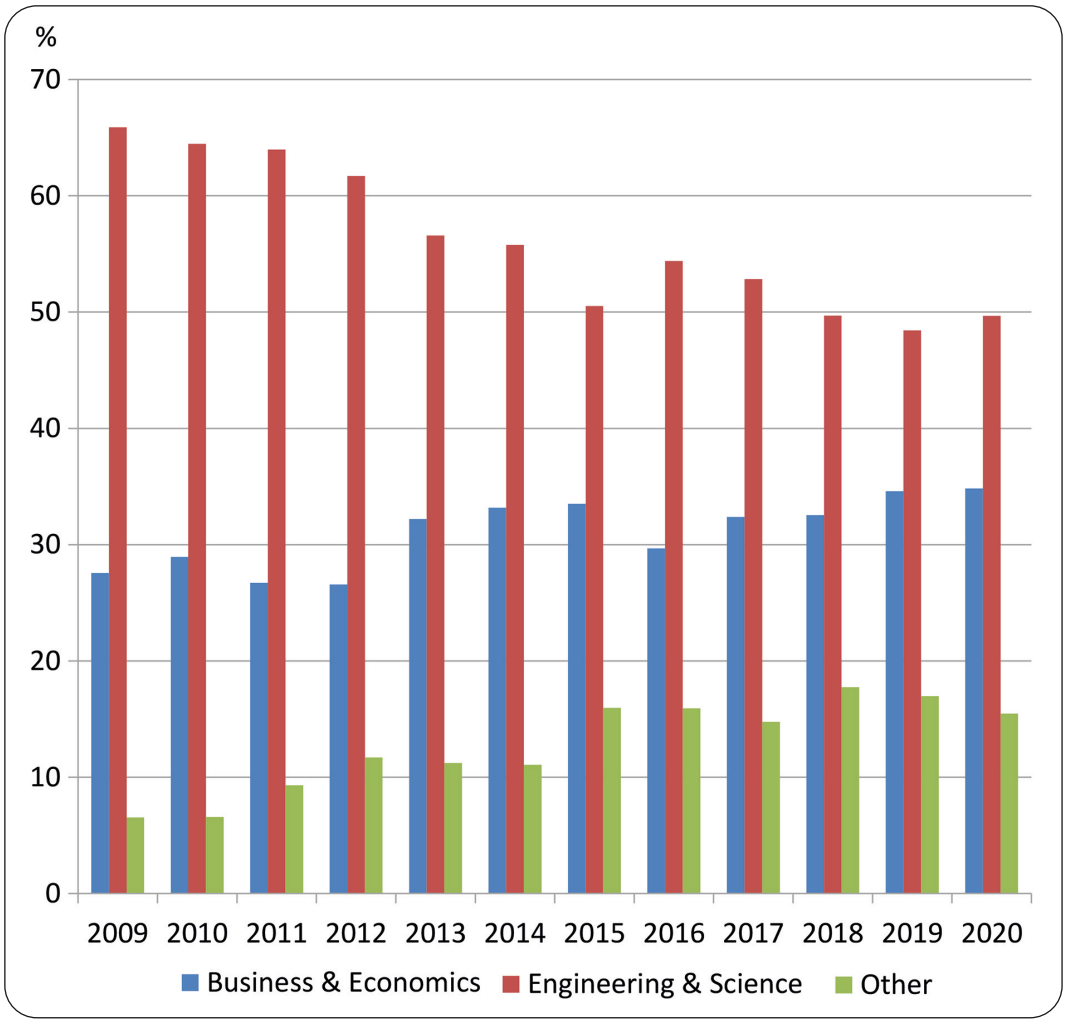

Fig. 8. The field of study of the first degree, 2009–2020

baker, E. Clark and S. Mefteh-Wali for France [Boubaker, Clark, Mefteh-Wali, 2020].

However, Russia shows an interesting evolution of the fields of study over time (see Figures 8 and 9).

In particular, regardless of whether we look at the first degree or the last one, there is a steady decline in the incidence of Engineering & Science, a notable increase in Business & Economics and some increase in other disciplines, primarily Law.

Further, if we specifically look at the research degrees, 55.8 % of the lower doctorates appear to be in Business & Economics, 24.8 % in Engineering & Science and 19.4 % in other fields (Law, History, Medicine, etc.). Among upper doctorates, 63.8 % are in Business & Economics. Those with a lower doctorate in Engineering & Science often obtain an upper doctorate in Business & Economics. The reverse is extremely rare: few CEOs with a lower doctorate in economics obtain an upper doctorate in a technical field.

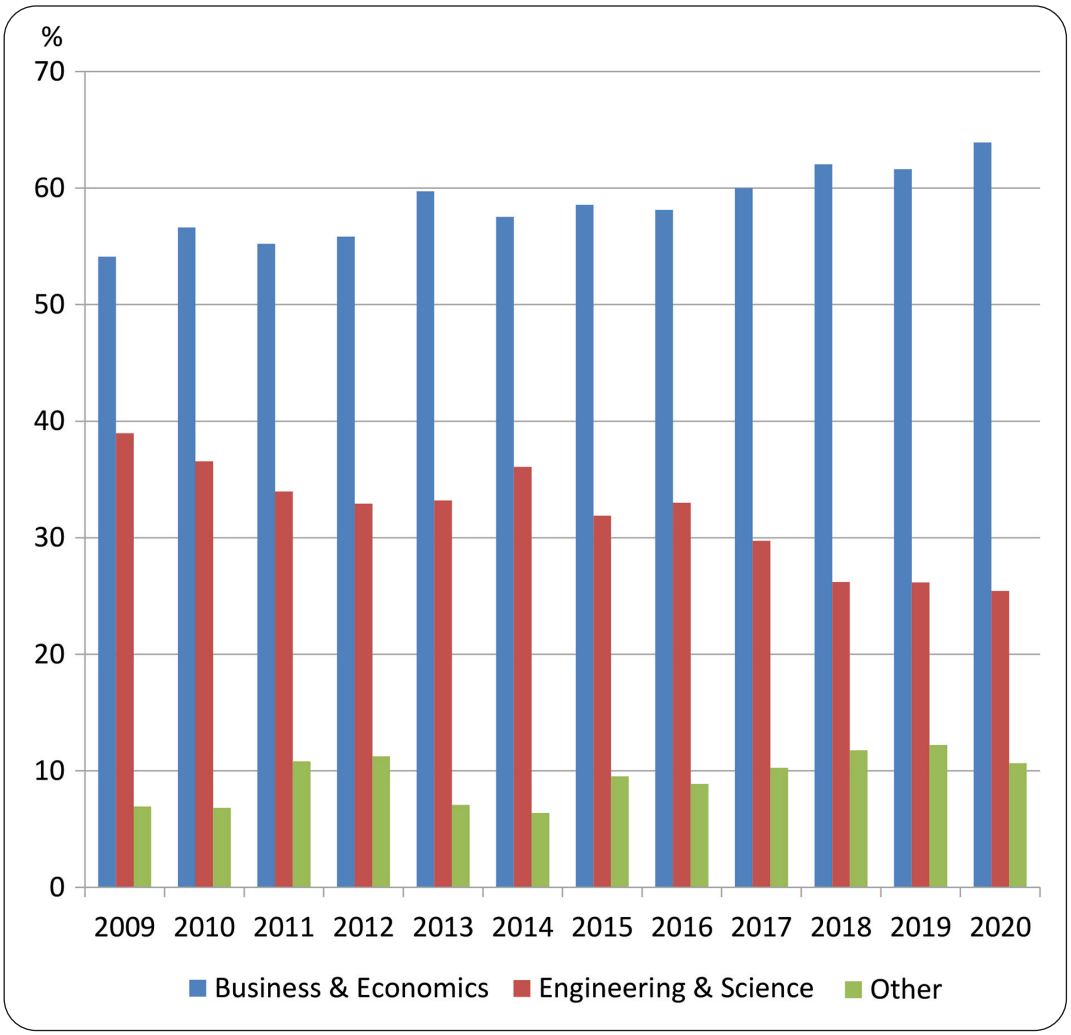

Fig. 9. The field of study of the last degree, 2009–2020

Universities attended

Table 1 below shows 10 most popular universities for the first, second and third university degrees. The table only covers bachelor, master (including MBA) and specialist degrees and does not include PhDs due to the peculiarities of the Russian centralized system of awarding research degrees, where the role of a particular university is not very clear.[16]

The table provides a number of interesting insights. First, universities located in Moscow dominate in the sample. Of ten most commonly chosen universities for undergraduate degrees, seven are based in Moscow. The other three places are occupied by St. Petersburg State University (classical), Ural Federal University (UrFU,

[16] In particular, a dissertation may be written at one university, but defended at a dissertation council of another one; until very recently, a research degree was always awarded by the Ministry of Education and Science following a final check of the dissertation by the Higher Attestation Commission established under the Ministry.

Table 1

Ten most popular universities for the first, second and third university degrees

	1st degree		2nd degree		3rd degree	
Place	**Institution**	**Share**	**Institution**	**Share**	**Institution**	**Share**
1	Moscow State University	6.71	RANEPA	19.08	RANEPA	11.66
2	Ural Federal University	3.55	Financial University (+University of Northumbria)	5.11	Financial University (+University of Northumbria)	10.32
3	St. Petersburg State University	2.88	Stockholm School of Economics	2.21	MIRBIS	6.73
4	South Ural State University	2.38	St. Petersburg State University	2.13	Moscow State University	4.93
5	Financial University	2.06	Plekhanov Russian University of Economics	1.96	State University of Management	2.69
6	MGIMO University	1.99	Ural Federal University	1.79	St. Petersburg State University	2.69
7	Moscow State Technical University (Bauman)	1.7	MGIMO University	1.7	Chicago Universtiy Business School	2.24
8	NUST MISIS	1.63	State University of Management	1.62	Massachusetts Institute of Technology (MIT)	1.79
9	NRU Moscow Aviation Institute	1.53	NRU HSE	1.45	Stockholm School of Economics	1.79
10	NRU Moscow Power Engineering Institute	1.49	South Ural State University	1.45	NRU HSE	0.9
Total 10		25.92		38.50		45.74

Yekaterinburg) and South Ural State University (SUSU, Chelyabinsk). The high position of the UrFU is due to the recent reorganization of this institution (it was reestablished by the merger of the classical university with the technical university located in Yekaterinburg). The contribution of its technical branch (Ural State Technical University) to the high rank in Table 1 appears to be considerably larger than that of the classical branch.

Most of these universities belong to top-schools. In particular, if one considers the list of top-10 universities in the RA-100 ranking over 2012–2021, six out of 10 universities from Table 1 can be found there.[17] Three others (Financial University, NUST MISIS and NRU Moscow Aviation Institute), while never being among

[17] RAEX Rating Review. URL: https://raex-rr.com/education/universities/rating_of_universities_of_russia (accessed: 11.10. 2021).

the top-ten, have relatively high ranks nevertheless. The only exception here is the SUSU, whose highest rank was 39 in 2013, when it entered the sample. Since then it declined to 61 by 2021 in the Expert ranking. Nevertheless, the SUSU was given a status of National Research University in 2010 and included in the Project 5–100, aimed to enhance the competitiveness of Russia's leading universities.

The list of top-10 universities for the second degree is quite different, five of the institutions are new, that is, not in the list of top-10 universities awarding the first degree. There is a new absolute leader — the RANEPA — which, as shown below, is also the leader in MBA education. The second place is taken by the Financial University (together with the University of Northumbria, with which it has a double degree program) and the third one by the Russian branch of the Stockholm School of Economics. Interestingly, among the most popular institutions for the third degree, we see two foreign schools: the Chicago University Business School and the MIT.

Overall, we observe an increasing concentration of degree awarding institutions with the number of degrees earned. The sum of shares of the top three most popular universities amounts to 13.1% for the first degree, 26.4% for the second and 28.7% for the third degree. The shares of the top ten universities are 25.9, 38.5 and 45.7%, respectively (Table 1).

As regards MBA degrees, the market seems to be quite concentrated with the following institutions dominating in the sample: the RANEPA with 16.2%, the Financial University/the University of Northumbria with 11.1%, the Stockholm School of Economics with 6.5%, the Chicago University School of Business with 6.0%, and the MIRBIS with 4.3%. These data clearly show that Russian classic and polytechnic universities are left far behind in the market for business education.

Countries

In terms of the country of the awarding institutions, most degrees come from Russia. If one pools all the degrees together, without differentiating across their levels, then 93.6% of the degrees are obtained in Russia. Russian degrees are especially common among the first university degrees (96.9%). The percent of Russian degrees declines to 86.4% among the second degrees and 63.4% among the third degrees. Most of the foreign degrees are awarded by the institutions in the United Kingdom, the United States and France, 33.2%, 20.4%, 8.2%, respectively.[18] Among all CEOs, only 9.7% have an international degree. There is no clear time pattern in the dynamics of appointment of CEOs with foreign degrees: the data show that the share of such CEOs fluctuates between 8% and 11% over the period covered in our study.

A CLOSER LOOK AT CEOS WITH ADVANCED DEGREES

Advanced degrees and other characteristics of CEOs

In addition to CEO education, recent literature on management and corporate governance emphasizes the potential importance of a wide range of other attributes of CEOs, including age, gender, experience, personality traits, and government connections. For example, age and gender are shown to be relevant for corporate risk-taking (e. g., [Faccio, Marchica, Mura, 2016; Chowdhury, Fink, 2017]). The role of government and political connections is documented by C.-H. Hung and others, who find that former government experiences of banks' CEOs are associated with higher return on assets, lower default risk, and lower credit risk [Hung et al., 2017].

[18] These include degrees from double-degree programs such as those offered by the Financial University and the University of Northumbria. They are counted once as foreign degrees.

Finally, according to E. Benmelech and C. Frydman, military CEOs are associated with conservative corporate policies and ethical behavior [Benmelech, Frydman, 2015]. Given the importance of these additional characteristics of CEOs, there arises a natural question as to what extent they are related to CEO education and advanced degrees in particular? If they are, then disentangling the effect of a particular attribute, including education per se, becomes a rather difficult empirical task.

In what follows we try to shed some light on this issue using the data at hand. Specifically, we consider all personal characteristics available in the dataset, namely CEO age, gender, foreign nationality, ownership stake and tenure in the firm as well as government, military and international experience (see the upper part of Table 2 for the list of variables and their descriptive statistics).

According to the data, the average age of CEOs of publicly traded companies in Russia is 48 years, more than 95% of CEOs are males, and less than 2% are foreign. The average tenure of CEOs is less than 3 years and the average ownership stake is approximately 2.5%. About 10% of CEOs have previous experience in government, 11% possess international experience, and 6.3% have military experience.

Our data show considerable differences between CEOs with and without advanced degrees across several of the attributes mentioned (Table 3). The table distinguishes between CEOs without any advanced degree (no MBA or PhD), CEOs with an MBA degree and CEOs with a PhD degree (both lower and upper doctorates). In addition, a separate category is created for those CEOs who earned both MBA and PhD degrees. We compare MBA and PhD CEOs to those who have no advanced degrees using a means/proportion comparison test and report the corresponding p-values.

The data show, for example, that MBA CEOs are considerably younger than CEOs without any advanced degree, while PhD CEOs are somewhat older; the differences in age are statistically significant at the 0.1% level. PhD and MBA degrees are more common among male CEOs. There is a difference in tenure: PhD and MBA CEOs appear to serve longer in their firms compared to non-degree CEOs (of course, we cannot draw any causal conclusions from this fact; it deserves a special analysis).[19] Interestingly, despite their longer tenures, CEOs with PhD degrees have considerably smaller ownership stakes in the firms they run, compared with no-degree CEOs and MBA CEOs. They also feature considerably higher propensity of being related to government, while MBA CEOs are more likely to possess international work experience.

All in all, the data show that the level of education is systematically related to a number of observable characteristics of CEOs, some of which may be important determinants of firm behavior and performance, as suggested by the existing literature. Attempts to estimate the role of CEO education should take these attributes into account, at least as control variables added in robustness checks. Given the strong correlations of CEO education with a number of observables, one can hypothesize a potentially important role of unobservables, too. Clearly, controlling for their effects is a tremendously difficult task. For example, the usual approach with CEO fixed-effects (e. g., [Bertrand, Schoar, 2003]) is unlikely to be productive as CEO education has very little variation over time and will essentially be subsumed by these fixed effects so that no effect of education can be estimated.

Advanced degrees and company characteristics

The extant literature also suggests that CEOs with different levels of education may be non-randomly allocated across firms. Con-

[19] Older age and longer tenures of PhD CEOs are also reported by Z. He and D. Hirshleifer for the US [He, Hirshleifer, 2022].

Table 2

Descriptive statistics of key variables

Variable	Definition	Mean	SD	Min	Max
		CEO attribute			
PhD degree	Dummy for a PhD degree (Candidate or Doctor of Science)	0.253	0.435	0	1
MBA degree	Dummy for an MBA degree	0.122	0.328	0	1
CEO age	CEO age, years	48.294	8.727	26	80
CEO gender	Dummy for CEO gender, 1=male, 0=female	0.955	0.207	0	1
CEO foreign	Dummy for CEOs of foreign nationality	0.016	0.126	0	1
CEO ownership	CEO ownership stake, %	2.498	9.710	0	100
CEO tenure	CEO tenure, years	2.986	3.465	0	22
CEO government	Dummy for CEO experience in government	0.096	0.294	0	1
CEO intern exper	Dummy for CEO international experience	0.111	0.314	0	1
CEO military exper	Dummy for CEO military experience	0.063	0.243	0	1
		Company attribute			
Firm size	Firm size measured by log assets	23.513	2.710	13.274	31.215
Firm age	Firm age, years	15.596	7.091	0	30
Gov ownership (direct)	Direct ownership by the state, %	3.226	13.216	0	92.311
Gov ownership (indirect)	Indirect ownership by the state (via state-controlled companies), %	16.390	28.946	0	100
Foreign ownership	Foreign ownership, %	17.583	28.918	0	100
Dual class stock firm	Dummy for dual-class stock firms	0.276	0.447	0	1
Board size	Number of directors on the board	8.509	2.443	0	22
Two-tier board	Dummy for two-tier boards (the firm has a management board)	0.456	0.498	0	1
Firm cross-listed	Dummy for cross-listing abroad	0.177	0.381	0	1
Firm traded	Dummy for being traded in quarter IV of a given year on the MOEX/RTS	0.855	0.352	0	1

Table 3

Means of the demographic characteristics by degree

Variable	No_degree	PhD	MBA	PhD+MBA
CEO age	48.29	50.03***	43.93***	44.56***
CEO gender	0.94	0.98***	0.98**	1,00*
CEO foreign	0.02	0.00***	0.04*	0.01
CEO ownership	2.71	1.65**	2.68	0.55
CEO tenure	2.69	3.74***	3.08*	3.34
CEO government	0.06	0.21***	0.02**	0,00*
CEO intern exper	0.11	0.07**	0.18**	0.11
CEO military exper	0.06	0.07	0.09*	0.04
Number of obs.	2009	780	377	82

Note: asterisks denote significance levels for means/proportion comparison test (against the base "No_degree") with * — $p<0.05$, ** — $p<0.01$, *** — $p<0.001$.

ceptually, firm size, age, industry affiliation, etc. may affect the choice of successor CEOs [Cragun, Nyberg, Wright, 2016]. Empirically, A. Urquhart and H. Zhang report, for example, higher incidence of PhD CEOs among firms in the health care, oil and gas and telecommunications industries and lower incidence in the utilities, consumer services and financial sector in their analysis of the publicly listed FTSE 350 firms [Urquhart, Zhang, 2021]. In what follows, we try to identify firm-level correlates of CEO education using Russian data.

The distribution of advanced degrees by industry is shown in Figure 10. It turns out that CEOs with PhD degrees are most common in the mining & natural resources, transport, finance, power utilities and metallurgy/metal works. This is quite different from the picture provided by A. Urquhart and H. Zhang [Urquhart, Zhang, 2021]. Moreover, the industry distribution that we observe in Russia is hardly consistent with the hypothesis advanced by Z. He and D. Hirshleifer that PhD CEOs are more likely to be chosen by firms with strong innovative opportunities [He, Hirshleifer, 2022]. Specifically, it is quite unlikely that power utilities and metallurgical companies constitute a cluster of research-intensive firms where "CEO exploratory mindset" may be particularly valuable.

In contrast to PhDs, MBA degrees are most common in the wholesale & retail trade, manufacturing, science & research as well as in the "other" sector. They are relatively uncommon in agriculture, transportation and finance. There are only three sectors where the percent of MBA CEOs is higher than the percent of PhD CEOs: the wholesale & retail trade, agriculture and the "other" group. For comparison, in the US, MBA degrees are relatively more common in the wholesale & retail trade, chemicals, healthcare, telecoms and consumer non-durables and less common in utilities, business equipment, finance as well as manufacturing [Bhagat, Bolton, Subramanian, 2010]. Overall, there seems to be more similarity between Russia and the US in the sectoral distribution of MBA CEOs compared to PhD CEOs.

Table 4 provides essential information on how CEO education is related to other firm-level characteristics available in our dataset.

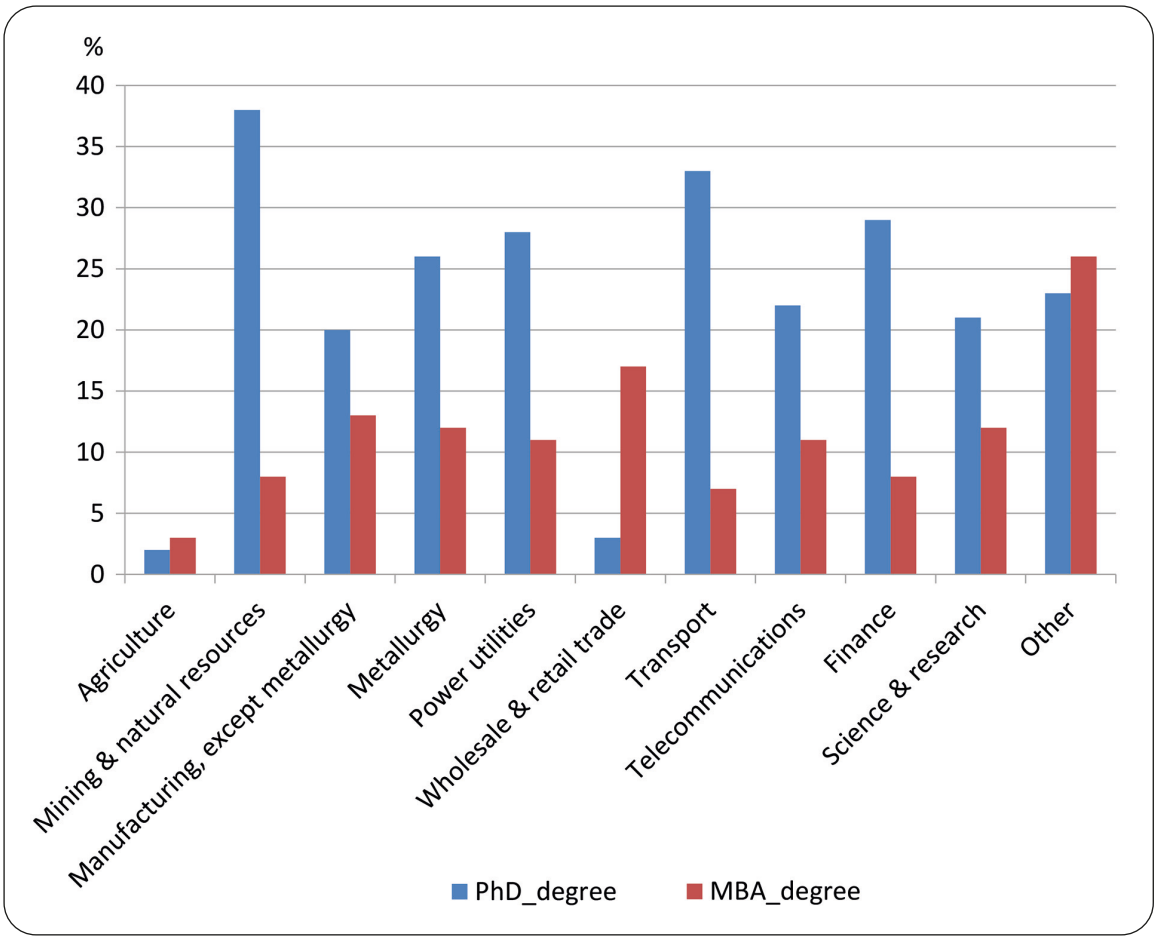

Fig. 10. Distribution of PhD and MBA degrees by industry

These are firm size and age, direct and indirect government ownership, foreign ownership, dual class stock structure, board size, two-tier board structure, the issue of ADRs and being traded on the Russian market (Table 2). According to the data, firms with MBA or PhD CEOs are, on average, several times larger in terms of assets than firms that choose CEOs without advanced degrees. CEOs with PhD are more frequently found in companies with government ownership, both direct and indirect. For example, the combined government stake (direct plus indirect government ownership) amounts to 31 % in companies that appoint PhD CEOs, is less than 20 % in companies with MBA CEOs and close to 15 % in other companies. In contrast, MBA CEOs are more likely to be chosen by companies with foreign ownership.

Companies that appoint PhD CEOs tend to have larger boards, especially compared to companies with CEOs having no advanced degrees. CEOs with advanced degrees tend to work for companies with two-tier boards, those actively traded on the Russian stock market and issuing ADRs. These patterns, however, may be related to firm size as larger firms are more likely to be traded both nationally and internationally, and have more complex governance structures (large or two-tier boards in particular).

Table 4

Advanced degrees and key characteristics of firms

Variable	No_degree	PhD	MBA	PhD+MBA
Firm size	23.00	24.65***	24.07***	24.25***
Firm age	15.27	16.14**	16.02	14.68***
Gov ownership (direct)	1.49	7.46***	4.41***	6.31
Gov ownership (indirect)	13.99	23.23***	14.99	16.2
Foreign ownership	17.14	16.36	22.82***	19.21*
Dual class stock firm	0.29	0.24**	0.25	0.17**
Board size	8.04	9.51***	8.96***	8.76***
Two-tier board	0.37	0.65***	0.56**	0.65*
Firm cross-listed	0.12	0.30***	0.23**	0.20
Firm traded	0.83	0.90***	0.93***	0.89
Number of obs.	2009	780	377	82

Note: asterisks denote significance levels for means/proportion comparison test (against the base "No_degree") with * — $p<0.05$, ** — $p<0.01$, *** — $p<0.001$.

Again, what we see from the above descriptive analysis is a number of strong firm-level correlates of the appointment of CEOs with advanced degrees. Since many of them are related to each other, one needs a multivariate analysis to identify their roles in CEO selection process. Similarly to the case with CEO characteristics, there is concern about the role of unobserved variables at the firm level. However, here the usual strategies such as the fixed-effects estimation may be more successful compared to the case of CEO attributes. Indeed, firm-level fixed effects are not necessarily strongly correlated with CEO education, at least to the extent that the data feature considerable turnover of CEOs.

Which firms want CEOs with advanced degrees? A multivariate analysis

In this section we extend the descriptive analysis of firm-level covariates of the appointment of MBA and PhD CEOs in an attempt to identify the factors that drive the demand for such executives. Given the partial overlap between PhD CEOs and MBA CEOs, implying that the alternatives are not mutually exclusive, we cannot use a multinomial model and therefore opt for two binary models — one for PhD CEOs and the other one for MBA CEOs. Given the panel nature of our data, we use a random-effects probit analysis, which allows us to partially account for unobserved heterogeneity across firms.[20]

The empirical framework resembles that of C. Mio, M. Fasan and A. Ros, where CEO characteristics, such as gender, age, educational background, are the dependent variables and the list of regressors includes firm-

[20] The model assumes that unobserved heterogeneity is uncorrelated with the included regressors. Random effects logit, which relies on the same assumption, shows similar results. Fixed-effects logit, which allows for correlation between unobserved effects and the regressors, does not converge with our data. And the fixed-effects probit is known to be inconsistent.

level characteristics, such as return on equity and industry dummies [Mio, Fasan, Ros, 2017].[21] Since the above-mentioned study focused on the effect of the Great Recession on the demand for CEOs with different attributes, the key regressor was a measure of the crisis impact, while many firm-level variables were omitted. Here, we take the research degrees dummies as the dependent variables and focus on the firm characteristics from Table 4 (to which we add industry and time dummies) as explanatory variables. Due to the panel nature of the data resulting in non-independence of the error terms corresponding to the same firm in different time periods, we compute cluster robust standard errors with clustering on firms.

The results are shown in Table 5 separately for PhD degrees (Model 1) and MBA degrees (Model 2). Marginal effects rather than the regression coefficients are reported. The key findings are as follows. First, ownership plays an important role in CEO selection process. State ownership, either direct or indirect, is associated with higher probability of having a CEO with a doctoral degree. Quantitatively, an increase in the percent of direct ownership by government increases the probability of choosing a PhD CEO by 0.3%, while a similar increase in indirect government ownership raises this probability by 0.2%. In other words, a hypothetical company with 100% government ownership has 30% greater probability of having a PhD CEO compared to a privately owned firm. In contrast, MBA CEOs are more likely to be appointed by companies with foreign ownership: a company with 100% foreign ownership has 10% greater probability of choosing an MBA CEO.

Second, the multivariate framework also confirms the importance of governance structure of firms. For example, more complex firms with two-tier boards are more likely to appoint MBA CEOs. Companies whose shares are actively traded on the stock exchange are also more likely to appoint such executives.

Third, industry patterns are also remarkable. In particular, industry dummies are jointly statistically significant at the 1% level. The appointment of a PhD CEO is more likely in the mining & natural resources sector and less likely in the wholesale & retail trade and agriculture. In contrast, MBA CEOs are less likely to be chosen by firms in the mining & natural resources, metallurgy and transportation sectors as well as in finance.

Of all these results, the findings for ownership are perhaps most remarkable: companies with state participation tend to hire PhD CEOs who, as we know from the previous section, are relatively older and have connections to government, while companies with foreign ownership are more likely to appoint MBA CEOs, who are relatively younger and have international work experience.

Overall, our analysis suggests that CEO education is closely related to other characteristics of CEOs as well as to the characteristics of firms they run. For that reason, attempts to establish a causal effect of CEO education on firm performance cannot be successful without including, at least in robustness checks, an extensive list of controls at the CEO and firm level.

CONCLUSION

Education is an important attribute of chief executive officers as suggested by theoretical literature. The level, quality and specialization (field of study) of the CEO can influence the strategic choices of firms and, ultimately, their performance. The links between CEO education and firm behavior and performance have been established in many empirical studies. However, most analyses of CEO education are based on data from advanced economies, primarily the US, due to its rich, homogeneous, and reliable data. The evidence on CEO education in Russian companies, its deter-

[21] A similar approach was used by Z. He and D. Hirshleifer, but their focus was on innovative activity and operating performance of firms [He, Hirshleifer, 2022].

Table 5

Random-effects probit: Probability of having a CEO with a PhD or an MBA, average marginal effects

Variable	Model 1	Model 2
	PhD	MBA
Firm size	0.012** (2.47)	0.009** (2.04)
Firm age	−0.000 (−0.07)	0.001 (0.85)
Gov ownership (direct)	0.003** (2.39)	0.000 (0.32)
Gov ownership (indirect)	0.002*** (2.91)	−0.000 (−0.54)
Foreign ownership	0.000 (0.55)	0.001* (1.87)
Dual class stock firm	−0.035 (−0.98)	−0.001 (−0.03)
Board size	0.008 (1.23)	0.005 (1.20)
Two-tier board	0.023 (0.70)	0.043** (2.05)
Firm cross-listed	0.049 (0.95)	0.006 (0.18)
Firm traded	−0.026 (−1.00)	0.026 (1.69)
Agriculture	−0.145** (−2.50)	−0.077 (−1.33)
Mining & natural resources	0.126* (1.81)	−0.080*** (−2.66)
Metallurgy	0.049 (0.76)	−0.076** (−2.31)
Power utilities	0.044 (0.90)	−0.011 (−0.34)
Wholesale & retail trade	−0.164*** (−3.30)	0.012 (0.17)
Transport	0.030 (0.23)	−0.088*** (−2.68)
Telecommunications	0.059 (0.91)	−0.003 (−0.07)
Finance	0.057 (1.09)	−0.072** (−2.24)
Science & research	0.006 (0.06)	−0.065 (−1.21)
Other	0.035 (0.43)	0.055 (0.84)
Number of obs.	3084	3084

Notes: manufacturing is the base industry category; t-statistics are in parentheses; * — $p<0.10$, ** — $p<0.05$, *** — $p<0.01$.

minants and effects is particularly scarce and this article attempts to fill this gap in the literature.

We employ a novel hand-collected dataset to shed light on the education of CEOs in publicly traded companies in Russia over 2009–2020. We first document that almost all CEOs in our sample (99%) have higher education. Moreover, the majority of them have multiple degrees, either at different

levels or at the same level but in different fields. We also find a very high — by international standards — incidence of research degrees among CEOs of Russian companies, exceeding 25%. These are primarily Russian degrees, most commonly, Russian lower doctorates, predominantly in the field of Business & Economics. The share of CEOs with MBA degrees is, however, small by international standards, about 12% only. There is little evidence that either the number of degrees or the incidence of MBA degrees change over time. However, there is some indication that CEOs with PhD degrees are becoming less common in Russian companies in the most recent years.

The fields of study chosen by Russian CEOs are quite diverse, with degrees in Business & Economics and Engineering & Science dominating. The first degree is usually in Engineering & Science. The second degree is, however, more likely to be in Business & Economics, regardless of the field of the first degree. Interestingly, the incidence of Business & Economics degrees increases steadily over time, while that of technical degrees goes down. This is true for the first degree as well as the last (highest) degree.

We also provide first evidence concerning the degree-awarding universities. While about 450 universities award the first degree with the share of top-three institutions being just 13%, the market becomes much more concentrated for subsequent degrees. The same is true for MBA education — there is a clear national leader, the RANEPA, which awards up to a fifth of MBA degrees to top managers of Russian companies. Russian classic and polytechnic universities are left far behind in the market for business education.

Looking more closely at the advanced degrees (MBA and PhD), we find that some observable socio-demographic characteristics of CEOs are related to their education. In particular, we find that CEOs with PhD degrees have longer tenures, fewer international experience and considerably smaller ownership stakes in the firms they run, compared with both no-advanced-degree CEOs and MBA CEOs. Moreover, PhD executives are older than executives without any advanced degree, while MBA degree holders are considerably younger. Finally, PhD CEOs feature considerably higher propensity of being affiliated with government (via prior work in government-related bodies).

The data show important differences between Russian firms that appoint CEOs without advanced degrees, those with MBA degrees and those with PhDs. In particular, CEOs with doctoral degrees are more likely to be appointed in companies with government ownership (both direct and indirect) as well as those belonging to the extraction and raw materials sector. In contrast, CEOs with MBA degrees are chosen by companies with foreign ownership, those having a more complex governance structure with two-tier boards and those actively traded on the stock exchange. They are also less likely to be appointed by companies operating in the mining & natural resources sectors. However, both PhD CEOs and MBA CEOs are more likely to be appointed by larger firms than CEOs without any advanced degree.

The ownership effects are perhaps the most intriguing here and suggest that public sector firms may use different hiring and promotion criteria, those emphasizing formal degrees and titles, compared to private sector firms in Russia. Overall, there seems to be a link between a CEO's research degree and her public sector experience (e. g., previous work in government and/or current employment in a firm with government ownership).

More generally, our analysis suggests that identifying the effect of any particular characteristic of CEO, not necessarily education, on firm behavior and performance is tremendously difficult because of the numerus confounding factors, let alone concerns about selection issues. While firm-level factors, many of which are time-invariant, can generally be controlled by firm fixed-effects, such a strategy is difficult or impossible to use for CEO-level factors.

One probably has to proceed with an extensive list of control variables, at the levels of both CEOs and their firms, and employ a battery of specifications with various combinations of controls. Still, there is a good chance that the results from such analyses could be biased due to various unobservable characteristics.

A number of directions for future research can be outlined based on our findings. First, the descriptive analysis seems to indicate a peculiar national model of education and education of top managers in particular. The high incidence of higher education and, more specifically, research degrees is certainly a feature of the Russian model that requires additional attention from scholars. Other pieces of evidence can help draw a more detailed picture here. For example, A. Smolentseva finds for the late 1990s and early 2000s that new PhDs were more likely to take jobs in business, government, and industry rather than pursue an academic career [Smolentseva, 2007]. Similarly, various sources report the obsession with formal degrees and titles in government and public sector, which is manifested, for example, by the high incidence of research degrees among Russian governors and members of parliament.[22] On this background it is hardly a surprise that CEOs with prior government connections and/or executives in companies with government ownership tend to have research degrees.

Another interesting area of research concerns the determinants of appointment of CEOs with different educational backgrounds. While our detailed descriptive analysis identified a number of factors potentially relevant for the choice of CEOs with different levels of education, a more careful examination of an extended list of firm-level characteristics, such as the firm's prior performance, risk, innovation activity, ownership and governance structure, the level of education of the departing CEO may be worthwhile. For example, is it indeed the case that more innovative firms prefer successor CEOs with a research degree? Or is the level and type of education of a successor CEO related to those of a departing CEO?

The consequences of CEO education for firm performance, innovation, risk, CSR and other outcomes is another area for future research. A particularly interesting issue, driven by the Russian experience, is the effect of fake degrees on firm behavior and performance. Such an analysis could nicely complement the work by A. Abalkina and A. Libman on Russian governors, who find that regions headed by governors with plagiarized PhDs tend to underperform relative to the others [Abalkina, Libman, 2020]. Indeed, there are known cases of deprivation of CEOs of academic degrees due to confirmed charges of plagiarism.[23] But does a CEO's fake research degree have implications for the firm and if so, which ones?

Finally, we would like to reiterate that in all such future studies there is a clear need to base empirical analysis on representative samples of companies, and not on a list of firms selected using unclear and imprecise criteria that cannot be reproduced. More attention — compared to what has been done before, at least in analyses of Russian data — should be paid to the problem of endogeneity, including its manifestations in the form of omitted variables and nonrandom selection.

[22] According to Yu. Krigan and coauthors, 174 out of 448 members of parliament, or 39 %, have a research degree [Krigan et al., 2021]; A. Abalkina and A. Libman show that about one-half of the governors of Russian regions have a research degree [Abalkina, Libman, 2020].

[23] For example, according to the Dissernet database (URL: https://www.dissernet.org (accessed: 11.10.2021)), the PhD degree of V. Adamov, the former CEO of JSC Hals-Development, was revoked in July 2021 by the Higher Attestation Commission and the Ministry of Education and Science. (URL: https://www.dissernet.org/expertise/adamovve2011.htm (accessed: 11.10.2021)). This database also lists several other CEOs whose dissertations apparently contain elements of plagiarism.

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Initial Submission: April 13, 2022
Final Version Accepted: May 16, 2022

Образование генеральных директоров в России: первые систематические сведения и направления дальнейших исследований

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На основе уникального собранного вручную массива данных в статье представлены первые систематические сведения об образовании генеральных директоров в российских публичных компаниях за 2009–2020 гг., включая его связь с другими атрибутами генеральных директоров и ключевыми характеристиками фирм. Показано, что почти все генеральные директора в России имеют высшее образование: ученые степени достаточно широко распространены, а степени MBA встречаются относительно редко; руководители с разным уровнем образования различаются по ряду основных социально-демографических атрибутов; образование руководителей систематически связано с характеристиками фирм, включая структуру собственности и управления. В частности, генеральные директора с ученой степенью в целом старше остальных, чаще имеют опыт работы в структурах государственного управления и нередко получают назначения в компаниях с государственным участием, в то время как генеральные ди-

ректора со степенью MBA в среднем моложе и относительно часто отбираются компаниями с иностранным участием. Из проведенного анализа следует, что при оценке влияния образования генеральных директоров на поведение и результаты деятельности компаний необходимо учитывать проблему эндогенности, связанную с возможным пропуском существенных факторов на уровне генеральных директоров и их неслучайным отбором различными типами фирм. В статье обозначено несколько направлений дальнейших исследований по рассматриваемой проблеме.

Ключевые слова: характеристики генеральных директоров, образование генеральных директоров, корпоративное управление, Россия.

For citation: Muravyev A., Zakharova A. 2022. CEO education in Russia: First systematic evidence and a research agenda. *Russian Management Journal* **20** (1): 52–80. https://doi.org/10.21638/spbu18.2022.103

Для цитирования: Muravyev A., Zakharova A. 2022. CEO education in Russia: First systematic evidence and a research agenda. *Российский журнал менеджмента* **20** (1): 52–80. https://doi.org/10.21638/spbu18.2022.103

Статья поступила в редакцию
13 апреля 2022 г.

Принята к публикации
16 мая 2022 г.