Do Principals Matter? The Case of Close Elections in Moscow

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June 2024

Abstract

Is school management able to improve student outcomes and what frictions prevent them from doing so? In this paper, I exploit the panel data on the peer-graded interviews that each school personnel in Moscow schools has to pass to stay in the position in order to estimate the effect of the school management turnover on student outcomes such as exam grades and winning the regional and national Olympiads in various school subjects. Exploiting the variation caused by the "close elections", i.e. comparing managers who barely passed and barely failed the re-appointment, I demonstrate that quasi-random continuation of the incumbent's term decreases the number of Olympiad winners by 27–29% of the mean for the next 2 years, leads to 3.2 more top scorers next year at the same time increasing the number of worst scorers by 7.4. I show that the competence of the incumbent school personnel is relevant exclusively for the change in the number of Olympiad winners. At the same time, the observed effects are driven by politically connected and loyal to the authoritarian ruling party school personnel. The results allow us to reject the hypothesis of benevolent school management while being consistent with the hypothesis that politically connected school management maximizes the school budget, which can be potentially diverted into personal benefits.

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Introduction

School governance and leadership quality are strongly associated with educational performance (Bloom et al., 2015a). As Leaver et al. (2019) posit, "Strong people management practices may be improving student learning through a combination of teacher selection and incentive effects." At the same time, there is little causal evidence on the effect of principals and school management on school performance. The only notable exceptions are value added model estimation by Munoz and Prem (2024) and exploration of the role of the principal's managerial skills by Di Liberto et al. (2024).

School governance may have a special role in the non-democratic context. Facing the possibility of treason, the leadership in authoritarian countries has to deal with the trade-off between the competence of their subordinates and their loyalty as more competent subordinates can detect the weakness of the dictator and betray (Egorov and Sonin, 2011) or because more competent subordinates they have better outside options (Zakharov, 2016). This trade-off is essential at all the stages of the bureaucratic machine and plays a particular role in education as the educational system to a large extent forms the political views of the younger generation (see e.g. Cantoni et al. (2017) for the analysis of the role of the social sciences curriculum in China).

Investigating how the authoritarian bureaucracy solves this issue is fundamental for understanding the formation of institutional prerequisites for regime transformations. Empirical tests of the loyalty-competence trade-off available so far rely exclusively on the cross-sectional variation (Wagner, 2011) or concentrate on the high-level officials (Bai and Zhou (2019), Buckley and Reuter (2019)). The literature also tends not to focus on the effects this trade-off has on people other than the autocrat and his subordinates. The welfare effects of the competence-loyalty trade-off faced by autocrats are hard to analyze due to the fact that the decisions and the reasoning behind them are rarely observable, let alone contain quasi-random variation.

In this paper, we will concentrate on the specific context of the educational system in authoritarian Moscow to analyze the role that the trade-off between competence and the loyalty of the principal plays in the students' educational results. This will additionally allow me to analyze the influence that the principals and school management may have on the school results which may be relevant for public governance and educational reforms in different contexts. We investigate

whether the arguably exogenous change in school management can boost school results and discuss the potential mechanisms of this change in a centralized yet competitive public school system in an authoritarian country.

We leverage the peer-graded interviews necessary for the reappointment of school personnel in Moscow schools, which are held once every 3 to 5 years. Obtaining more than 50% of the votes from the appointment committee, comprising Department of Education bureaucrats, top school principals, and university professors, is required for the continuation of the incumbent's term. This unique feature of the Moscow school system provides us with a natural context for regression discontinuity (RD) analysis, where close elections generate a quasi-random variation in school management turnover.

We demonstrate that the turnover of school personnel increases the number of Olympiad winners by 27–29% of the mean for the next two years. Additionally, it results in 3.2 fewer top scorers and 7.4 fewer worst scorers in the National State Exam the following year.

To better comprehend the mechanisms driving the effect, we analyze the heterogeneity of the observed effect with respect to two characteristics of the incumbent: competence, as measured by the qualification exam, and loyalty, based on whether the personnel has participated in local elections as a candidate supported by the ruling party in Putin's regime

We demonstrate that competence of the school management matters exclusively for the school Olympiad winners – more competent school management leads to a higher number of Olympiad winners. At the same time, a quasi-random continuation of the politically connected incumbent school management is associated with a higher number of Olympiad winners and higher tails of the exam grade distribution. We suppose that it may be connected with the fact that monetary rewards to the school budget are given for the number of Olympiad winners and top exam scorers while the left tail of the exam grade distribution does not matter for the budget size.

At the same time, we cannot reckon that there is a classic loyalty-competence trade-off involved as loyalty and competence measures are uncorrelated near the threshold used for RDD. Moreover, loyal principals have positive effects for students on the right tail of the abilities distribution while negative effects for those on the left tail, likely due to the financial incentives involved in the decision-making process in schools.

The paper contributes to the existing literature across 3 different dimensions. Firstly, it provides

a piece of evidence concerning the role of principals and, more generally, school management in school achievements and the effect of principal turnover. The large strand of literature has so far concentrated on the descriptive, non-causal evidence (Eberts and Stone (1988), Rangel (2018), Hoxby (2000), Rothstein (2006), Bloom et al. (2015a)) with the very few recent exceptions (Munoz and Prem (2024) and Di Liberto et al. (2024)). What distinguishes this paper from the recent improvements in the field is the fact that this paper digs into the underlying mechanisms of the school management effect and focuses on school management in general rather than solely principals.

Secondly, we contribute to the literature studying the effect of bureaucratic turnover (Akhtari et al. (2022), Miller (2013), Bloom et al. (2015b), Moreira and Pérez (2020)). Contrary to what has been done in the literature, we put special emphasis on the political loyalty frictions in addition to qualifications and the inefficiencies connected with the competence level of the bureaucrats.

Lastly, we ass to the scarce empirical literature on the trade-off between competence and loyalty in the autocracy. While the theoretical models studying the trade-off are well-established (Egorov and Sonin (2011), Jia et al. (2015)), existing empirical evidence has concentrated exclusively on high-level party members (Bai and Zhou (2019), Buckley and Reuter (2019)). Our paper provides the first empirical test of the loyalty-competence trade-off using "street-level" bureaucrats and demonstrates the implications of the trade-off for society in general.

The rest of the paper is organized as follows. Section 1 introduces the context to the reader focusing on the key features of the educational and political system in Moscow. Section 2 presents the data employed in the paper. Section 3 elucidates empirical strategy. Section 4 demonstrates the results while in Section 5 we discuss potential mechanisms driving the observed effects. Section 6 concludes.

1 Institutional Background

1.1 Educational System in Moscow

Moscow schools. Several hundred schools in Moscow's educational system accommodate over 1.5 million students (Mayor of Moscow Official Website, 2022).[1] Education in Moscow sets a

[1]The exact definition of school is somewhat vague in the Moscow education system. One school can include several buildings located typically within the same districts. Though these buildings officially have the same principal,

standard for other regions and is important on its own as 1 out of 16 pupils in Russia studies in Moscow (Rosstat, 2020, p. 340). The schools in the Russian capital are generally characterized by a higher level of technical equipment, innovation, and diversity of educational services provided compared to the majority of schools in other regions (Mikhaylenko, 2021). Though private schools are more popular in Moscow than in Russia on average, the vast majority of students attend public schools. According to the Russian statistical agency Rosstat, only 2.7% of Moscow students went to private schools in the 2019/20 academic year, which more than triples the country's average of 0.8% but still remains a negligible share (Rosstat, 2020, p. 340).

The governance structure of schools in Moscow presents an intriguing solution to the autocrat's challenge of balancing competence and loyalty. While the elections for the Mayor of Moscow are not free, the city, being the wealthiest region in the country and a showcase for international observers, strives to implement effective governance policies across various aspects of urban life. Most schools in Moscow are public, each led by a principal and administrative staff who controls budget allocation, curriculum development, and overall management. Despite certain legal restrictions and adherence to federal education standards, schools still enjoy considerable flexibility.

School management and Olympiads. Education scholars often emphasize that the leadership of Russian, and in particular Moscow, principals is characterized by a person-oriented approach but lacks complex process organization skills (Kasprzhak and Bysik, 2015). This lack of certain managerial skills is particularly important for the preparation of potential school Olympiad winners. It should be noted that school Olympiads in Russia are organized in each subject (e.g., math, history, physics, Italian, and even P.E.) and serve as the gateway to the top universities in the field. Olympiad tasks are designed by the top universities' scholars and often go beyond the limits of the core curriculum, which is why targeted optional courses with experts are necessary for the systematic success of the school in the school Olympiads (Shatunova and Sedov, 2017).

Competition between schools. Schools engage in a competition, as the Department of Education calculates an official ranking based on key performance indicators (KPIs) that reflect the schools' overall quality. These KPIs include objective measures such as exam results, the number of school

they may have separate administrative staff. The current number of schools is 585, though it varied in the previous years. The lack of data availability does not allow us to distinguish between a school and a school branch.

Olympiad winners, and crime rates among students, thus making it nearly impossible to easily manipulate. One particular feature of the rating is that it is intentionally designed so that it can never punish (deduct scores) for the low educational results of the students (Vasilyeva, 2017). The place in the ranking determines to some extent the budget funds available for schools – more efficient schools benefit from the additional grants available to them. Thus, a school budget depends on the number of students demonstrating a certain level of success (e.g., becoming an Olympiad winner or scoring high on the national exam) but does not depend on the number of students who score low on the national exam.

Administrative staff appointments. The appointment of all administrative staff is controlled by the Department of Education. Every school leader has to pass a peer-graded interview once every 3 or 5 years. Before the interview, each member of the administrative staff has to take a qualification exam which tests their managerial skills, knowledge of educational law, and basic pedagogy. These tests are taken in written form before a computer with proctoring, thus their results can be treated as objective and are used as a measure of personnel's competence. After taking the qualification exam, the candidate has to present before the appointment committee (typically in-person with the exception of Covid times). The interview panel, consisting of 13 to 17 members, primarily comprises principals from other schools, representatives of top pedagogical universities and pedagogical centres, and some bureaucrats from the Department of Education. Committee members ask questions about the achievements of the school and the organization of the regional educational system. Following a 10-15 minute interview, the committee simultaneously electronically votes to approve or reject the appointment of the candidate. There is no devoted time for discussion, and the committee chair does not have any power beyond the organizational responsibilities. If a majority of the jury members vote for this candidate, this candidate is appointed. Note that this system does not feature competition between alternative candidates. Potential candidates for the appointment are typically suggested by the current administrative staff of the school, though the Department of Education may influence the set of potential candidates as well. Every such interview is streamed on the Department of Education website, and copies used to be uploaded on YouTube as well. The key reason behind the reform that introduced such appointments in 2013 was to increase the transparency and efficiency of the educational system in Moscow.

1.2 Political System in Moscow

Political Regime in Putin's Russia. For the last two decades, Russia has grown into a full-scale authoritarian regime that imposes significant restrictions on civil liberties and consistently violates human rights. Electoral fraud in the elections is common, though it is sometimes mitigated by the presence of independent electoral observers (Enikolopov et al., 2013). A recent Freedom House (2023) report describes Russia in the following way:

> *"With subservient courts and security forces, a controlled media environment, and a legislature consisting of a ruling party and pliable opposition factions, the Kremlin manipulates elections and suppresses genuine opposition. Rampant corruption facilitates shifting links among state officials and organized crime groups"*

Ruling party and schools. Yedinaya Rossiya [United Russia] is the largest political party in Putin's Russia, serving a role somewhat similar to the dominant parties in other countries such as the Institutional Revolutionary Party in Mexico. At the same time, Isaacs and Whitmore (2014) notes that United Russia has less power in the redistribution of resources compared to classical dominant-party systems but instead has a more powerful ideological role by "promoting a discourse concerning the centrality [of Vladimir Putin] to the stability and prosperity of the nation". The party holds the majority of seats in the lower chamber of the Russian Parliament – Gosudarstvennaya Duma [State Duma] – as well as the regional parliaments and openly supports Vladimir Putin. A large share of the success of the ruling party can be attributed to years-long propaganda, but the necessity for electoral fraud to guarantee the winning of the ruling party has remained since the 2011 parliamentary elections when United Russia faced a significant decrease in popularity. The authoritarian government exploited the fact that voting stations are located predominantly in schools and turned schoolteachers and administrators into the cogs of the electoral fraud machine. As Forrat (2018) argues, teachers and school management interact with the population on a daily basis and are highly trusted by the local communities while being inevitably connected to the state administrative system. This made some school principals and personnel local and sometimes regional deputies nominated by the ruling party and organizers of electoral fraud.

Moscow electoral system specifics. The 2011 parliamentary elections and large-scale electoral fraud led to mass protests across Russia, but the heart of the political activity was concentrated in Moscow. The protests gained so much strength and momentum that even some Kremlin satellites cautiously spoke in favor of the protesters demanding free and honest elections. The Moscow government decided that it would gain more from making concessions to the protesters, and in 2013 Putin's key opponent, Alexey Navalny, was allowed to participate in the Moscow mayoral elections, leading to the incumbent scoring just above the 50% threshold. It is particularly fascinating that the law at that time set local deputies' support as a requirement for the candidate nomination, and the incumbent mayor Sergey Sobyanin personally asked United Russia members to let Navalny run a campaign. In addition to that, the head of the key opposition radio station *Ekho Moskvy* [The Echo of Moscow] was appointed as the head of the observing committee for all the subsequent elections held in Moscow before the 2022 Russian invasion of Ukraine. While some elements of electoral fraud and greater restrictions on electoral rights were still in place, in many cases the extent of manipulation in the voting polls was negligible. This made the Moscow government rely more on school and hospital personnel as local United Russia deputies due to the trust they received from the local communities. Note that becoming a local deputy does not interfere with staying in the position of a school principal.

2 Data

In order to gather the data, we rely on several key sources. First, we collect school-level data listing all the school Olympiad winners and exam results from the Open Data Portal run by the Moscow government. We augmented this data with the manually collected data on the peer-graded school interview appointments that were made available on the YouTube channel of the Moscow Department of Education. Additionally, to better understand the role that the political connectedness of the school personnel plays in the effect of their turnover, we manually collected the data on all the school personnel who participated in the 2017 Moscow local elections as candidates nominated by the ruling party.

School-level data. Data on school-level outcomes, such as the number of Olympiad winners and exam results is obtained through the official Moscow Open Data portal using API.[2] The data on Olympiad winners contains 120,923 distinct observations, where each observation refers to a prize winner of the Olympiads. These students belong to 1,919 educational institutions, 1,254 of which are included in the data on reappointments. The data on school Olympiads covers all the Olympiad winners from the 2012/13 academic year to 2022/23. Tables A1, A2, and A3 present the distribution of the Olympiad winners over the academic year when they received the prize, the grade they are in, and the academic subject of the Olympiad. Note that the mean number of Olympiad winners per school during one academic year is 8.7, while the median is 0. Therefore, we will often drop the observations from the schools with the highest number of Olympiad winners to avoid the effect being driven by outliers. These schools are typically characterized by an advanced curriculum and more professional and experienced schoolteachers, many of whom work in the top universities.

The data on exam results comes from the same source as the school Olympiad data. Exam results concern the National State Exam, which became a requirement for high school graduation in 2009. This data covers the period from the 2016/17 academic year to the 2022/23 academic year. Each student has to pass exams in Russian language and basic math. The former is graded on a 100-point scale and is used for admissions, while the latter is graded on a 5-point scale and serves only as a graduation prerequisite. In addition to these, students choose several exams in other subjects such as advanced math, physics, social sciences, and English that are needed for university admissions. Each of these exams is graded on a 100-point scale, and universities set 3 to 4 required subjects depending on the field. All other factors, such as volunteering or school essays, have a minor impact as they can only boost the student's result by 10 points out of 300 or 400. For each of the 803 schools present in the data, we know the number of students who scored at least 220 points out of 300 in the national exam and the number of students who scored below 160. We will subsequently refer to these students as *top* and *worst scorers*, respectively. Unfortunately, data on average exam results is available only on school websites without any centralized publication. One should keep in mind that schools are rewarded in terms of budget for top scorers, but there is no penalty for the number of worst scorers. On average, the school has 32.9 top and 62.7 worst scorers.

[2]Please note that the website may be unavailable without VPN.

Reappointments Data. To facilitate the transparency of the education system in Moscow, after the reform of 2013, all the reappointments of school personnel have been publicly broadcasted.[3] Before the end of 2020, all the interviews were additionally published on the YouTube channel of the Moscow Department of Education. The data were collected using the YouTube API. The title of the YouTube video contains the vote share in the reappointment, the personnel's name and position, and the date of the peer-graded interview. In addition to that, competence scores were manually collected for all the interviews in which the vote share is between 35 and 65% of votes. This allows us to obtain data on 4,956 interviews, for 978 of which we also collect the competence scores.

Elections Data. To analyze the heterogeneity of the effect of school management turnover with respect to the political loyalty of the personnel, we collected local elections data available on the website of the Moscow Electoral Commission. We listed all the 1,490 candidates nominated by the ruling party, United Russia, i.e., the party that openly supports Vladimir Putin. We define school personnel to be *loyal* if their full name appears in the ruling party candidates list. The data were collected manually as the Moscow Electoral Commission sets up numerous barriers to obtain the data automatically to avoid the emergence of articles analyzing recent electoral fraud.

3 Identification Strategy

Econometric strategy. We use a regression discontinuity (RD) design intuitively comparing the schools where the school management barely passed the threshold with the ones where the school management got 1-2 votes less than it is necessary for being reappointed. The idea of using the so-called close election goes back to Lee et al. (2004). As the committee votes simultaneously and without internal discussion, this is likely to generate an exogenous variation in the probability of the change in the school's administrative staff. More precisely, our key econometric specification will require estimation of the following equation:

$$Y_{i,t+k} = \beta Win_{it} + f(VoteShare_{it}) + \alpha_i + \alpha_t + \varepsilon_{i,t+k} \tag{1}$$

[3] More than 6,000 videos are available on the Moscow Education Department YouTube channel, and even more can be parsed from the official Moscow Education Department website.

In this specification, $Y_{i,t+k}$ is the outcome k years after the appointment interview, Win_{it} is a dummy that equals 1 for the schools where the personnel was reelected, $f(VoteShare_{it})$ is a polynomial in the share of votes, potentially different on two sides of the threshold, α_i and α_t are school and time fixed effects.[4] Outcomes will be the number of Olympiad winners, top and worst scorers along with the ratio of top to worst scorers.

Identifying assumption. The identifying assumption requires that, absent the turnover, the outcomes would be the same for the schools just below and above the threshold. It does not require balanced characteristics on the two sides of the threshold but instead assumes the continuity of the potential outcome without treatment near the threshold.

Suggestive evidence in favor of identifying assumption. We provide 3 pieces of evidence in favor of the identifying assumption. Though it is inherently untestable, these results make us more likely to believe in the identifying assumption. First, we check that the density of the running variable (share of votes) is continuous near the threshold using the McCrary test introduced by McCrary (2008). The test does not show any evidence of manipulation near the threshold as depicted in Figure 1. Intuitively, it is supported by the fact that voting is simultaneous and electronic without any special time for discussion, which hinders any kind of collusion. Second, we show that the available covariates (namely, loyalty and competence) are continuous near the threshold. Table 1 takes loyalty and competence as dependent variables in specification similar to (1) and demonstrates that covariates are continuous near the threshold as the RD coefficient is statistically insignificant. Lastly, we run the placebo regressions setting $k = -1$ in specification (1), i.e. taking the outcomes 1 year before the reappointment. Tables 2, 3, 4, and 5 demonstrate that we observe no effect 1 year before the reappointment which suggests that schools just below and just above the threshold are similar on average.

[4] Whether we can control for α_i depends on the quality of the data. If we manage to find many observations for one school, it is possible but otherwise, we instead will have to control for the pre-treatment characteristics of the schools.

Effect Heterogeneity. To better understand the mechanism driving the observed effects, we will estimate the following specification:

$$Y_{i,t+k} = \beta Win_{it} + \beta_{trait} Win_{it} \times Trait_{it} + \gamma Trait_{it} + f(VoteShare_{it}) + \alpha_t + \varepsilon_{i,t+k} \quad (2)$$

Here $Y_{i,t+k}$ is an outcome k periods after the appointment, Win_{it} is a dummy that equals 1 for the schools where the personnel was reelected, $Trait_{it}$ is a measure of loyalty or competence based on the principal's connection to the ruling party and qualification exam respectively, $f(VoteShare_{it})$ is a polynomial in the share of votes, potentially different on two sides of the threshold, and α_t are time fixed effects Coefficient β_{trait} will tell us whether the observed effect of the turnover is stronger for more competent or more loyal school personnel.

4 Results

Effect of the school management turnover. Tables 6, 7, 8, and 9 present the results of the estimation of specification (1) for different outcome variables. These results demonstrate that a quasi-random turnover of the school personnel leads to 2.4-2.6 more Olympiad winners in the 2 years following the turnover, which constitutes 27-29% of the mean value. Additionally, we observe that the school management turnover positively affects the students at the very right tail of the abilities distribution, i.e., the most talented ones. It is important to note that, unlike exam preparation, courses preparing students for the Olympiads require significant knowledge of the educational system and available opportunities from the school management.

That said, the effect of the school management turnover on the exam results is more ambiguous. We find that school management turnover decreases the number of top exam scorers by 3.2 in the following year, though the effect seems to dissipate 2 years later. At the same time, following a turnover, we observe a significant decrease in the number of the worst scorers – 7.4 fewer worst scorers in the next year and 2.7 fewer worst scorers 2 years after. The regression that uses the ratio of top to worst scorers as the outcome variable reveals that the positive effect for the left tail of the abilities distribution is somewhat stronger 1 year after the turnover. Therefore, school management turnover seems to shrink the tails of the exam grades distribution, which negatively affects the

students with potentially great exam scores but is beneficial for the students struggling with the exams.

The results are different from what has been shown in the recent literature, e.g. Munoz and Prem (2024), as we demonstrate that school management turnover per se affects student-level outcomes. This implies that "principals matter," i.e. school management has a capacity to influence student-level outcomes, which implies that more should be done to understand which characteristics of school management are particularly important for students' success. Thus, we will delve into the mechanism underlying the observed effect of school management turnover.

5 Mechanisms

Potential mechanisms. The fact that the change in school management affects student-level outcomes may hint at one of two things – either one of them lacks some managerial skills necessary for ensuring student success or the team intentionally chooses to facilitate the development of one group of students, sacrificing others. Particularly important features of the Moscow educational system that will help us better understand the mechanism are connected with its competitive and political aspects. First, the school Olympiad system requires a level of knowledge well above the standard curriculum, and preparation for it often requires relying on external sources such as university professors or ex-Olympiad winners. Second, the school budget system is organized competitively. Schools that produce more top scorers and Olympiad winners get monetary rewards, while the number of worst scorers is orthogonal to the amount of the school budget. Therefore, a principal exclusively maximizing the school budget would prefer to devote limited resources to students with the potential to score high, diverting resources from students with lower abilities.

To better understand the mechanisms behind the observed effects of school management turnover, we will estimate equation (2) analyzing the heterogeneity with respect to our measures of the school personnel's competence (based on the qualification exam taken before the peer-graded interview) and political loyalty to the authoritarian regime (based on whether or not the personnel participated in the 2017 elections as a candidate nominated by the ruling party United Russia).

Competence channel. Tables 10, 11, 12, and 13 demonstrate the heterogeneity of the effect of the school management turnover concerning the competence of the incumbent school management. The Tables are obtained by estimating equation (2) taking competence as a trait in the regression equation. We observe that a 1 standard deviation decrease in the competence of the incumbent school management is associated with 1.3-1.4 more Olympiad winners following school management turnover for the next 2 years. Therefore, school management turnover is more beneficial for potential Olympiad winners when the incumbent school management is incompetent. At the same time, we do not observe any significant differences between the roles of more and less competent school management for exam results. This may indicate that managerial skills and competence matter more for the skill-intensive Olympiad preparation, whereas exam results do not heavily depend on school management competence.

Loyalty channel. Tables 14, 15, 16, and 17 demonstrate the heterogeneity in the effect of school management turnover concerning the political connectedness of school management. The interaction coefficient shows how different the turnover effect is depending on whether the incumbent school personnel has a strong connection to the ruling party in authoritarian Russia. In this specification, being loyal means participating in the 2017 local elections as a candidate nominated by the ruling party, United Russia. The Tables are obtained by estimating equation (2) taking loyalty as a trait in the regression equation. We observe that loyalty of the quasi-randomly remaining incumbent principal is associated with a 47-56% higher increase in the number of Olympiad winners and 4.9 more top scorers in 2 years, along with about 4.9-9.6 more worst scorers annually in the next two years. These results align with the idea that more politically connected principals have more opportunities to divert the school budget into their own pockets. At the same time, the observed results clearly show that politically connected principals are not benevolent student welfare maximizers, which manifests in the increase in the number of worst scorers.

Is there a loyalty-competence trade-off? The mechanism analysis may contribute to our understanding of the loyalty-competence trade-off. Specifically, we do not observe any correlation between competence and loyalty in the truncated sample with vote shares between 35 and 65% of votes. The political connectedness of the incumbent school personnel turns out to be a double-

edged sword: beneficial for students with higher levels of abilities but detrimental to students with lower levels of abilities. Likely, this is connected with the financial incentives that prompt school management, with easier access to the school budget, to concentrate exclusively on the students on the right tail of the abilities distribution.

6 Conclusion

In this paper, we have shown that school management turnover affects student-level outcomes by exploiting the peer-graded interview appointments of the school administrative staff in Moscow. To do so, we leveraged the fact that reappointment requires more than 50% of votes, which generated a quasi-random variation in the reappointments, allowing us to apply the regression discontinuity design based on the close elections idea.

School management turnover is shown to lead to an increase in the number of Olympiad winners as well as a reduction in the tails of the exam grades distribution, decreasing both the number of top and worst scorers. Thus, we cannot exactly say whether the turnover is beneficial for students though the results suggest that it is beneficial for students with a relatively high level of abilities while being disadvantageous for those on the left tail of the abilities distribution.

Analyzing the mechanisms behind the observed effect, we focused on competence and loyalty channels. Specifically, we found that the turnover of a less competent incumbent principal leads to a higher increase in the number of Olympiad winners but is not associated with the effect on exam results. This is likely due to the fact that Olympiad preparation requires higher-than-average managerial skills and deliberate effort from the school management to be well-organized.

We also demonstrate that quasi-random continuation of the politically connected incumbent's term is associated with a higher number of Olympiad winners and top scorers but, at the same time, an increase in the number of the worst scorers. We believe that this is connected to the fact that Olympiad winners and top exam scorers increase the school budget, which can be potentially diverted into the principals' pockets, while the worst scorers have no effect on the school budget.

We do not find clear evidence supporting the existence of the loyalty-competence trade-off. There is no correlation between loyalty and competence measures near the threshold. Furthermore, the political loyalty of the school management is detrimental to low-ability students while

advantageous for high-ability ones.

The paper sheds light on promising areas for future research. It demonstrates the ambiguity of the loyalty-competence trade-off for the lower levels of the administrative hierarchy. Additionally, it shows that there is a potential for future research exploring the role that school management plays in student- and teacher-level outcomes to better understand whether observed effects and mechanisms are driven by context-specific features or are more generalizable.

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Figures and Tables

Suggestive Evidence in Favor of Econometric Strategy

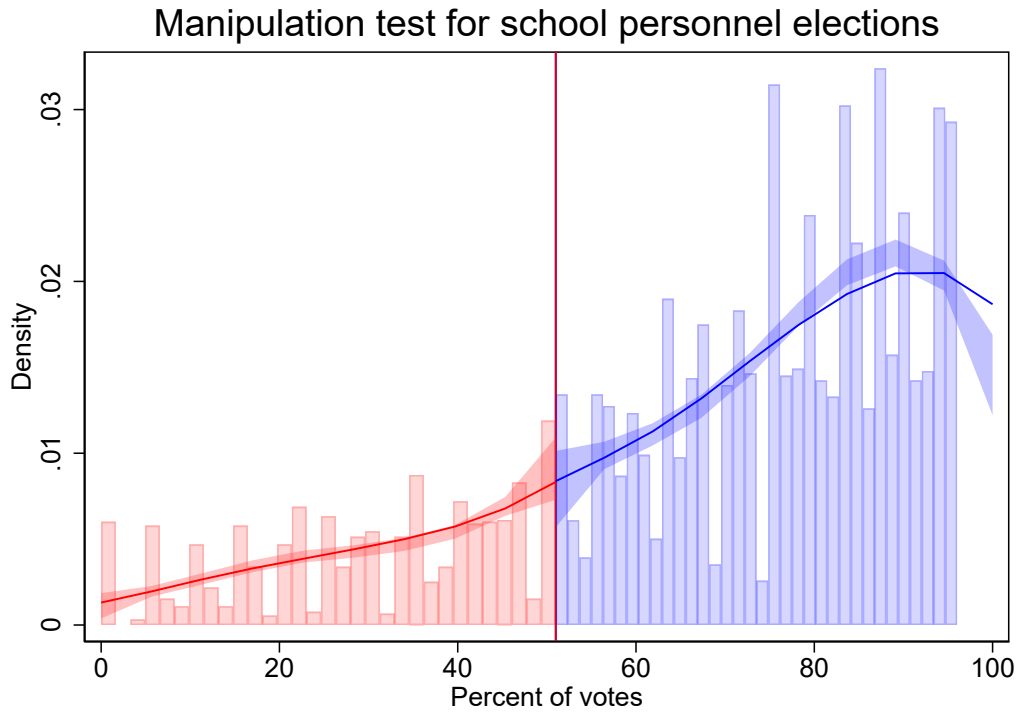

Figure 1: McCrary test for vote share

Table 1: Continuity of competence near the RDD threshold

	Loyalty	Competence				
	(1)	(2)	(3)	(4)	(5)	(6)
RD Coefficient	-0.035	-0.016	-0.018	0.031	0.584	0.732
	(0.029)	(0.030)	(0.018)	(0.414)	(1.197)	(1.167)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	4956	4956	4956	978	978	978

Note. The dependent variable is the standardized competence score. *Loyal* is a dummy that equals 1 if the personnel participated in the municipal elections as a candidate from the ruling party. *Competence* (standardized) is a score in the test about school management practices taken by the personnel before the elections. To improve interpretability, it is standardized. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. Standard errors are clustered by academic year in columns (1)–(3) and by school in columns (4)–(6). $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Placebo Tests for the Main Effect

Table 2: Placebo RD estimate of the effect of school management on olympiad winners

	1 year after		
	(1)	(2)	(3)
RD Coefficient	1.456	1.551	1.202
	(2.745)	(3.499)	(3.523)
Polynomial degree	1	2	2
Year FE	No	No	Yes
Obs	4532	4532	4532

Note. The dependent variable is the number of regional and national olympiad winners at school 1 year before the school management interview. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. To avoid the effects to be driven by outliers, we exclude top 5 schools with the highest number of olympiad winners. Standard errors are clustered by school. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 3: Placebo RD estimate of the effect of school management on top exam scorers

	1 year before		
	(1)	(2)	(3)
RD Coefficient	-0.161	-0.218	-0.009
	(1.051)	(1.263)	(1.235)
Polynomial degree	1	2	2
Year FE	No	No	Yes
Obs	3721	3721	3721

Note. The dependent variable is the number of high schoolers with a great exam score at school 1 year before the school management interview. In all the regressions we control for the previous value of the dependent variable. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. Standard errors are clustered bu school. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 4: Placebo RD estimate of the effect of school management on worst exam scorers

	1 year before		
	(1)	(2)	(3)
RD Coefficient	1.220	1.178	1.403
	(1.812)	(2.113)	(2.044)
Polynomial degree	1	2	2
Year FE	No	No	Yes
Obs	3721	3721	3721

Note. The dependent variable is the number of high schoolers with a great exam score at school 1 year before the school management interview. In all the regressions we control for the previous value of the dependent variable. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. Standard errors are clustered by school. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 5: Placebo RD estimate of the effect of school management on the ratio of top to worst exam scorers

	1 year before		
	(1)	(2)	(3)
RD Coefficient	-0.004	-0.002	-0.001
	(0.011)	(0.013)	(0.013)
Polynomial degree	1	2	2
Year FE	No	No	Yes
Obs	3710	3710	3710

Note. The dependent variable is the ratio of top exam scorers to worst exam scorers at school 1 year before the school management interview. In all the regressions we control for the previous value of the dependent variable. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. Standard errors are heteroskedasticity-robust nearest neighbor variance estimator with minimum number of neighbors set at 3. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Main Results

Table 6: RD estimate of the effect of school management on olympiad winners

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
RD Coefficient	-4.017*	-5.258*	-2.583***	-4.208*	-4.703*	-2.404**
	(2.299)	(2.903)	(0.795)	(2.291)	(2.663)	(1.127)
Polynomial degree	1	2	2	1	2	2
Year and School FE	No	No	Yes	No	No	Yes
Obs	4532	4532	4532	4532	4532	4532

Note. The dependent variable is the number of regional and national olympiad winners at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). In all the regressions we control for the previous value of the dependent variable. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. To avoid the effects to be driven by outliers, we exclude top 5 schools with the highest number of olympiad winners. Standard errors are clustered by school. $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

Table 7: RD estimate of the effect of school management on top exam scorers

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
RD Coefficient	2.665**	3.347**	3.258***	2.683*	2.207	1.484
	(1.350)	(1.591)	(0.970)	(1.451)	(1.878)	(1.077)
Polynomial degree	1	2	2	1	2	2
Year and School FE	No	No	Yes	No	No	Yes
Obs	3993	3993	3993	3935	3935	3935

Note. The dependent variable is the number of high schoolers with a great exam score at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). In all the regressions we control for the previous value of the dependent variable. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. Standard errors are heteroskedasticity-robust nearest neighbor variance estimator with minimum number of neighbors set at 3. $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

Table 8: RD estimate of the effect of school management on worst exam scorers

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
RD Coefficient	4.452**	5.529**	7.419***	3.030	2.553	2.703*
	(2.048)	(2.244)	(1.547)	(2.213)	(3.105)	(1.582)
Polynomial degree	1	2	2	1	2	2
Year and School FE	No	No	Yes	No	No	Yes
Obs	3993	3993	3993	3935	3935	3935

Note. The dependent variable is the number of high schoolers with a bad exam score at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). In all the regressions we control for the previous value of the dependent variable. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. Standard errors are heteroskedasticity-robust nearest neighbor variance estimator with minimum number of neighbors set at 3. $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

Table 9: RD estimate of the effect of school management on the ratio of top to worst exam scorers

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
RD Coefficient	0.002	0.004	-0.018**	0.007	0.004	-0.008
	(0.011)	(0.016)	(0.009)	(0.013)	(0.017)	(0.008)
Polynomial degree	1	2	2	1	2	2
Year and School FE	No	No	Yes	No	No	Yes
Obs	3982	3982	3982	3925	3925	3925

Note. The dependent variable is the ratio of top exam scorers to worst exam scorers at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). In all the regressions we control for the previous value of the dependent variable. The bandwidth is chosen by the MSE-optimal bandwidth selector for the RD treatment effect estimator. Standard errors are heteroskedasticity-robust nearest neighbor variance estimator with minimum number of neighbors set at 3. $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

Competence Channel

Table 10: Heterogeneous effect of school management on olympiad winners with respect to competence

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
Win	-2.913	-4.620	13.883	8.453	-50.471	-35.206
	(7.752)	(105.387)	(102.056)	(16.264)	(141.884)	(130.774)
Competence	-0.399	-0.437	-0.275	-0.857*	-1.006*	-0.776
	(0.424)	(0.418)	(0.450)	(0.431)	(0.489)	(0.537)
Win × Competence	1.412**	1.454**	1.368**	1.269*	1.426**	1.311*
	(0.561)	(0.536)	(0.521)	(0.665)	(0.587)	(0.624)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	919	919	917	919	919	917

Note. The dependent variable is the number of regional and national olympiad winners at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). *Win* is a dummy variable that equals 1 for the school personnel that successfully passed the elections. *Competence* (standardized) is a score in the test about school management practices taken by the personnel before the elections. To improve interpretability, it is standardized. In all the regressions we control for the previous value of the dependent variable. To avoid the effects to be driven by outliers, we exclude top 5 schools with the highest number of olympiad winners. The bandwidth is from 35 to 65 percent of votes in the school personnel's elections. Standard errors are clustered by academic year. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 11: Heterogeneous effect of school management on top exam scorers with respect to competence

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
Win	-10.124	-5.900	37.817	-4.308	-49.858	-7.365
	(7.257)	(109.965)	(82.503)	(5.281)	(73.172)	(62.291)
Competence	-0.406	-0.355	-0.683	-0.950	-0.966	-1.219
	(0.494)	(0.522)	(0.498)	(0.811)	(0.785)	(0.669)
Win $\times$ Competence	1.069	1.009	0.970	1.136	1.144	1.061
	(0.947)	(0.961)	(0.917)	(1.461)	(1.423)	(1.373)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	796	796	796	783	783	783

Note. The dependent variable is the number of high schoolers with a great exam score at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). *Win* is a dummy variable that equals 1 for the school personnel that successfully passed the elections. *Competence* (standardized) is a score in the test about school management practices taken by the personnel before the elections. To improve interpretability, it is standardized. In all the regressions we control for the previous value of the dependent variable. The bandwidth is from 35 to 65 percent of votes in the school personnel's elections. Standard errors are clustered by academic year. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 12: Heterogeneous effect of school management on worst exam scorers with respect to competence

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
Win	-12.319	-14.889	51.120	-3.789	-64.584	4.132
	(10.411)	(185.242)	(158.418)	(4.222)	(205.022)	(186.144)
Competence	-0.971	-0.920	-1.443	-1.303	-1.292	-1.776
	(0.857)	(0.897)	(0.691)	(1.358)	(1.349)	(1.077)
Win × Competence	2.380	2.317	2.328	1.898	1.871	1.844
	(1.636)	(1.692)	(1.638)	(2.085)	(2.076)	(2.031)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	796	796	796	783	783	783

Note. The dependent variable is the number of high schoolers with a bad exam score at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). *Win* is a dummy variable that equals 1 for the school personnel that successfully passed the elections. *Competence* (standardized) is a score in the test about school management practices taken by the personnel before the elections. To improve interpretability, it is standardized. In all the regressions we control for the previous value of the dependent variable. The bandwidth is from 35 to 65 percent of votes in the school personnel's elections. Standard errors are clustered by academic year. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 13: Heterogeneous effect of school management on the ratio of top to worst exam scorers

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
Win	-0.113	-0.210	-0.074	-0.069	-1.147*	-1.146
	(0.055)	(1.266)	(1.300)	(0.035)	(0.533)	(0.544)
Competence	0.000	0.001	-0.000	-0.008**	-0.009**	-0.009**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Win × Competence	0.001	0.000	-0.000	0.006	0.006	0.006
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	796	796	796	783	783	783

Note. The dependent variable is the ratio of top exam scorers to worst exam scorers at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). *Win* is a dummy variable that equals 1 for the school personnel that successfully passed the elections. *Competence* (standardized) is a score in the test about school management practices taken by the personnel before the elections. To improve interpretability, it is standardized. In all the regressions we control for the previous value of the dependent variable. The bandwidth is from 35 to 65 percent of votes in the school personnel's elections. Standard errors are clustered by academic year. $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

Loyalty Channel

Table 14: Heterogeneous effect of school management on olympiad winners with respect to political loyalty

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
Win	1.969	12.178	7.330	0.365	6.128	3.569
	(3.018)	(6.505)	(6.046)	(3.458)	(11.278)	(7.669)
Loyal	-1.099	-0.956	-2.873**	-1.361	-1.425	-3.342***
	(1.131)	(1.221)	(0.928)	(1.247)	(1.451)	(0.405)
Win × Loyal	3.018	2.876	4.114*	3.910	3.976	4.983***
	(2.468)	(2.609)	(1.782)	(2.486)	(2.687)	(1.406)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	4532	4532	4532	4532	4532	4532

Note. The dependent variable is the number of regional and national olympiad winners at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). *Win* is a dummy variable that equals 1 for the school personnel that successfully passed the elections. *Loyal* is a dummy that equals 1 if the personnel participated in the municipal elections as a candidate from the ruling party. In all the regressions we control for the previous value of the dependent variable. To avoid the effects to be driven by outliers, we exclude top 5 schools with the highest number of olympiad winners. Standard errors are clustered by academic year. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 15: Heterogeneous effect of school management on top exam scorers with respect to political loyalty

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
Win	-2.849	9.600	5.478	-2.470	8.421	4.174
	(1.479)	(10.156)	(9.410)	(1.562)	(9.831)	(9.089)
Loyal	-1.714	-1.433	-1.299	-4.901**	-4.840*	-4.701**
	(1.157)	(1.154)	(1.166)	(1.671)	(1.796)	(1.583)
Win × Loyal	2.267	1.962	2.442	4.515*	4.429*	4.896*
	(1.572)	(1.653)	(1.655)	(1.945)	(2.073)	(2.037)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	3993	3993	3993	3935	3935	3935

Note. The dependent variable is the number of high schoolers with a great exam score at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). *Win* is a dummy variable that equals 1 for the school personnel that successfully passed the elections. *Loyal* is a dummy that equals 1 if the personnel participated in the municipal elections as a candidate from the ruling party. In all the regressions we control for the previous value of the dependent variable. Standard errors are clustered by academic year. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 16: Heterogeneous effect of school management on worst exam scorers with respect to political loyalty

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
Win	-4.098*	19.298	12.555	-4.259*	19.525	12.842
	(1.557)	(14.769)	(15.026)	(1.904)	(13.826)	(14.249)
Loyal	-8.485***	-8.215***	-8.517**	-4.659**	-4.648**	-5.314**
	(1.717)	(1.768)	(1.858)	(1.650)	(1.580)	(1.488)
Win × Loyal	8.978**	8.660**	9.659**	3.841	3.775	4.913*
	(2.363)	(2.542)	(2.595)	(2.340)	(2.316)	(2.131)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	3993	3993	3993	3935	3935	3935

Note. The dependent variable is the number of high schoolers with a bad exam score at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). *Win* is a dummy variable that equals 1 for the school personnel that successfully passed the elections. *Loyal* is a dummy that equals 1 if the personnel participated in the municipal elections aas a candidate from the ruling party. In all the regressions we control for the previous value of the dependent variable. Standard errors are clustered by academic year. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 17: Heterogeneous effect of school management on the ratio of top to worst exam scorers

	1 year after			2 years after		
	(1)	(2)	(3)	(4)	(5)	(6)
Win	-0.028**	-0.002	-0.010	-0.011	-0.046	-0.050
	(0.009)	(0.059)	(0.057)	(0.010)	(0.065)	(0.063)
Loyal	0.023*	0.023*	0.025**	-0.043	-0.043	-0.038
	(0.010)	(0.009)	(0.009)	(0.023)	(0.023)	(0.023)
Win × Loyal	-0.030	-0.030	-0.030	0.034	0.034	0.032
	(0.015)	(0.015)	(0.015)	(0.023)	(0.023)	(0.025)
Polynomial degree	1	2	2	1	2	2
Year FE	No	No	Yes	No	No	Yes
Obs	3982	3982	3982	3925	3925	3925

Note. The dependent variable is the ratio of top exam scorers to worst exam scorers at school 1 year after the school management interview in columns (1)–(3) and 2 years after in columns (4)–(6). *Win* is a dummy variable that equals 1 for the school personnel that successfully passed the elections. *Loyal* is a dummy that equals 1 if the personnel participated in the municipal elections aas a candidate from the ruling party. In all the regressions we control for the previous value of the dependent variable. Standard errors are clustered by academic year. $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

Additional Figures and Tables

Descriptive Statistics on School Olympiad Winners

Table A1: Frequency of school Olympiad winners by academic year

	Obs	Percent
2012/2013	5397	4.46
2013/2014	6869	5.68
2014/2015	8920	7.38
2015/2016	9952	8.23
2016/2017	10485	8.67
2017/2018	11236	9.29
2018/2019	13265	10.97
2019/2020	8030	6.64
2020/2021	14924	12.34
2021/2022	15716	13.00
2022/2023	16129	13.34
Total	120923	100.00

Table A2: Frequency of school Olympiad winners by the grade of studies

	Obs	Percent
1	139	0.11
2	132	0.11
3	221	0.18
4	379	0.31
5	4212	3.48
6	5937	4.91
7	6160	5.09
8	8053	6.66
9	27773	22.97
10	31155	25.76
11	36735	30.38
12	27	0.02
Total	120923	100.00

Table A3: Frequency of school Olympiad winners by school subject

	Obs	Percent
Astronomy	1616	1.33
Biology	7531	6.23
Budget literacy	124	0.10
Genetics	85	0.07
Geography	4177	3.45
Art	5788	4.79
Foreign language (English)	5221	4.32
Foreign language (Spanish)	1069	0.88
Foreign language (Italian)	515	0.43
Foreign language (Chinese)	441	0.36
Foreign language (German)	1249	1.04
Foreign language (French)	1695	1.40
IT	44661	3.69
Applied IT	130	0.11
World Culture	3401	2.82
History	6829	5.65
Art History	145	0.12
STEM Olympiad	277	0.23
Latin	59	0.05
Linguistics	271	0.22
Literature	6521	5.39
Maths	11556	9.56
Social Sciences	8204	6.78
Life Safety	4335	3.58
Law	4990	4.13
Pre-professional Olympiad	680	0.56
Robotics	1090	0.90
Russian	5765	4.77
Technology	3685	3.05
Physics	7762	6.42
PE	2042	1.69
Philology	3749	3.10
Financial literacy	391	0.32
Functional literacy	13	0.01
Chemistry	6609	5.47
Ecology	3745	3.10
Economics	4416	3.65
Entrepreneurship	281	0.23
Total	120923	100.00

Determinants of the Vote Share in the Interviews

Table A4: Determinants of the vote share in the peer-graded interview for school personnel

	(1)	(2)	(3)	(4)
Competence (standardized)	0.082		0.081	0.116
	(0.086)		(0.085)	(0.095)
Loyal		11.714***		-1.066
		(2.328)		(2.665)
Loyal × Competence (standardized)				-2.178
				(2.022)
Obs	978	4956	978	978

Note. The dependent variable is the share of votes obtained during peer-graded interview. *Loyal* is a dummy that equals 1 if the personnel participated in the municipal elections aas a candidate from the ruling party. *Competence* (standardized) is a score in the test about school management practices taken by the personnel before the elections. To improve interpretability, it is standardized. Standard errors are clustered by academic year. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.