How Schoolmates Affect Your Chances of Getting into College:

School Socioeconomic Composition and Inequality in Access to Higher Education

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Abstract

The problem of socioeconomic inequalities in Russian education takes on particular significance in the context of massification and increasingly differential quality of higher education. Relevant research is mostly focused on individual student characteristics and regional aspects as factors for inequality. Less often, researchers' attention is attracted to school factors, such as school socioeconomic composition (SEC) which is considered one of the most powerful school predictors of student achievement. The long-term effect of school composition on students' educational trajectories remains underinvestigated, although higher education is more important for life chances than school achievement.

In the present study, Russian data (the Higher School of Economics' project Trajectories in Education and Careers) is used for the first time to measure the effect of school SEC on educational choices and chances of getting into college. This effect is analyzed successively for key decisions and outcomes at every stage of long-term educational trajectories. Analysis is performed with due regard to the specifics of Russian education and the sorting of students into the academic and hybrid tracks in pursuit for college degrees.

School composition is found to be positively associated with proceeding from middle to high school, obtaining a college degree, and pursuing a Master's degree. The largest influence of school SEC on college enrollment is observed for students who enroll in vocational studies after middle school. The compositional effect is extremely robust and persists even when student achievement and family characteristics are controlled for. Adding school SEC to the model offsets the effect of individual socioeconomic status on the likelihood of going to college, which means that exclusion of SEC from analysis may lead to invalid inferences in educational research. The effects detected cannot be explained by differences in achievement, so it would be reasonable to explore the social mechanisms behind the compositional effect in further research. School desegregation measures suggested on the basis of prior findings may turn out to be hasty and overly drastic in practice for russian context.

Keywords

academic track, school socioeconomic composition (SEC); compositional effect; hybrid track, inequality of educational opportunity; selective colleges.

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Along with school education, higher education has traditionally been regarded as a powerful social elevator, leveler of opportunities, and driver of social mobility [Brown 2018; Esping-Andersen 2015; World Economic Forum 2020]. Higher education gains particular significance in post-industrial societies where, according to the principle of meritocracy, educated and talented individuals are supposed to take advantageous positions in the social structure [Shkaratan 2011], and where cases of upward mobility—when children achieve higher levels of educational attainment than their parents—are perceived as a successful step toward sustained socioeconomic growth and development [Aiyar, Ebeke 2019].

On the one hand, the higher education system does actually cope with its duty of levelling life chances. Over the recent decades, higher education has shifted from being a privilege for a small elite to a mass phenomenon: access to tertiary programs has been growing rapidly around the world, and the number of people with college degrees is constantly growing.[1] By 2012, the gross tertiary enrollment ratio reached 90% in 14 countries [Marginson 2016a]. Higher education becomes a good investment in one's own human capital for almost anyone. In addition to improved skills and knowledge, tertiary schooling also yields economic returns in the form of higher lifetime earnings [Blagg, Blom 2018; Moretti 2004; Psacharopoulos, Patrinos 2018].

On the other hand, there is ample evidence that massification of higher education tends to exacerbate the socioeconomic gap rather than narrow it. In a number of aspects, education systems reproduce the existing social structure, ensuring the transmission of cultural capital and privileges across generations in advantaged families [Bourdieu, Passeron 1977]. Among European and U.S. college graduates, for instance, coming from higher socioeconomic backgrounds is still associated with higher occupational and earning returns [Jacob, Klein 2019; Triventi 2013a].

Why does it happen? According to the *effectively maintained inequality* theory, even if universal access to some level of education is provided, within-level differences will begin to emerge [Lucas 2001]. Tertiary education is highly stratified, advantaged families being able to afford choosing the best educational options for their children in terms of quality and future occupational outcomes [Marginson 2016b; Triventi 2013b]. Selective institutions with the highest levels of academic performance and education quality are mostly attended by students from families with a high socioeconomic status (SES) [Prakhov 2015; Prakhov, Yudkevich 2012; Khavenson, Chirkina 2018; Shishkin 2006; Jerrim, Chmielewski, Parker 2015]. The same students tend to enroll in majors

[1] UNESCO (2020) Towards Universal Access to Higher Education: International Trends. https://globaleducationforum.org/wp-content/uploads/2021/10/DOC-11-Towards-universal-access-to-higher-education-international-trends.pdf

associated with better chances of labor market success [Blagg, Blom 2018; Triventi 2013a; 2013b; Wolniak et al. 2008].

Furthermore, despite the globally increasing participation in higher education, social origin inequalities in access to college are still continuing. Having a college-educated parent and coming from a high-SES family is still associated with better chances of getting into college [Argentin, Triventi 2011; Chesters, Watson 2013]. In the Russian context, the problem of inequality in access to higher education is particularly acute today, compared to previous periods, as the growing stratification of the system creates significant barriers to inclusion [Malinovskiy, Shibanova 2019]. A number of findings show that students from upper-class families are more likely to go to college [Kosyakova et al. 2016; Roshchina 2006; Khavenson, Chirkina 2018; Shishkin 2006; Konstantinovskiy 2012] and perform better in admission tests [Prakhov, Yudkevich 2019], while universal access to higher education basically turns out to be a myth [Bessudnov, Kurakin, Malik 2017]. Remarkably, the effects of social background on getting into college are significant even when prior academic achievement is controlled for [Kosyakova et al. 2016; Khavenson, Chirkina 2019]. Essential regional differences are observed as well, as higher education programs and their quality are distributed unevenly among the federal subjects of Russia, explicitly leading positions being held by a very limited number of regions [Malinovskiy, Shibanova 2020].

The end of middle school (Grade 9) in Russia, when students choose between high school and vocational studies, is a particularly important milestone, as this transition is where inequality of educational opportunity starts. According to the 2019 statistics, only 51% of middle school graduates proceeded to high school, as compared to 68% in 2001 (a downward trend). At the same time, there has been an increase in the percentage of students who leave school after Grade 9 and enroll in vocational programs (around 34%).[2] Very few of them obtain higher education down the road. Most often, withdrawal before high school is observed among low-SES and low-achieving students. For this reason, the educational transition after middle school is considered even more important a factor of inequality than the transition after high school (11th grade), when student composition is less heterogeneous [Bessudnov, Kurakin, Malik 2017].

However, transition to a vocational institution after middle school does not cut off access to higher education, quite the contrary. The hybrid track (middle school—vocational studies—college) has been gaining popularity lately [Alexandrov, Tenisheva, Savelyeva 2015]. The advantage of this pathway toward higher education is that it mitigates the risks associated with high-stakes testing (graduates of vocational

[2] Bondarenko N. V., Gokhberg L. M., Kuznetsova V. I. et al. (2021) *Indikatory obrazovaniya: 2021: statisticheskiy sbornik* [Indicators of Education in the Russian Federation: 2021: Data Book], Moscow: NRU HSE.

track can get into college without passing a Unified State Exam (USE)). According to the latest findings, it is mostly low-performing students from advantaged families who use the hybrid track as a bypass strategy. However, this trajectory is fully accessible to low-SES students as well, so it also contributes to inequality reduction to some extent [Yastrebov, Kosyakova, Kurakin 2018].

In the majority of publications on factors of inequality in access to quality higher education, the primary focus is placed on student/family SES, one of the pivotal factors of educational outcomes in general [Hattie 2009; Sirin 2005]. Less attention is paid to a similar indicator at the level of school: socioeconomic composition (SEC).

For the first time, socioeconomic composition of educational institutions came into focus of sociological research in Coleman's 1966 report [Coleman 1966]. School SEC is understood as student SES characteristics aggregated over the school, i. e. the school's average SES that measures advantage and disadvantage for the entire school composition instead of individual families. In his study, Coleman showed that although school characteristics are less important than individual ones for academic achievement, SEC is the strongest school-level predictor of student performance. A recent study applying more advanced methods to the same data revealed that compositional effect of school on educational outcomes can even be a few times stronger than the student-level effect of family resources [Borman, Dowling 2010].

The strong effect of peer average SES on student achievement has been confirmed by researchers from different countries—Belgium, United States, England, Australia, and others [Opdenakker, Damme 2007; Palardy, Rumberger, Butler 2015; Strand 2010; McConney, Perry 2010; Slik van der, Driessen, De Bot 2006]—and, more importantly, from different academic disciplines [Ewijk van, Sleegers 2010]. A methodology for measuring the so-called compositional effect was developed to assess the independent contribution of school SEC to student achievement.[3] Applied for the first time to a Russian sample, this methodology showed that attending a low-SEC school results in a significant decrease in academic achievement regardless of student ability, family SES, and some other characteristics. If the same child attended a high-SEC school, their educational outcomes would be better irrespective of their baseline skill level [Kersha 2020].

It is no surprise that a factor with such a strong influence on school achievement affects longer educational trajectories as well. However, few studies measuring long-term compositional effects are available even beyond Russia—and this despite the fact that the longer-term consequences of school SEC are more important than near-term effects on achievement as the former have greater implications for students' life [Palardy 2014]. The few available recent studies have doc-

[3] For a review of relevant literature and methodology description, see [Kersha 2021].

umented a positive association between SEC and college enrollment [Palardy 2013] as well as college persistence and completion [Niu, Tienda 2013]. There is also evidence that the relationship between school SEC and college destinations are non-linear [Klugman, Lee 2019].

No similar analysis of long-term compositional effects has been performed in the Russian context. International studies do examine the impact of SEC on enrollment in college programs of different duration, but they provide no information on how SEC affects college enrollment for students in different educational tracks. Does school composition affect early school leavers' chances of getting into college? Is this effect determined by the choice of educational trajectory alone, or does it also apply to students within the same track? Neither is there data on the relationship between school SEC and longer-term educational choices, i. e. participation in graduate and doctoral programs.

This study seeks to answer four research questions:

1. How is school SEC related to choosing the academic track at the end of middle school?
2. How is school SEC related to college enrollment for high school graduates and middle school graduates who transitioned to a vocational institution? Are there track-related differences in this connection?
3. How is school SEC related to college completion? Are there track-related differences?
4. How is school SEC related to pursuing a graduate degree?

Answers to the questions posed above will allow not only documenting the presence or lack of independent SEC effects on participation in higher education but also establishing at which stage and for which category of students the compositional effect is the strongest as well as how and when it emerges—the latter being the focus of most research works in the field today.

1. Research Methodology

1.1. Sample

Data from the panel study Trajectories in Education and Careers (TrEC)[4], administered by the Higher School of Economics' Institute of Education since 2011, constitutes the empirical basis of the present research. The first round of TrEC was based on a representative sample from the Trends in International Mathematics and Science Study (TIMSS-8), which involved 4,893 eighth-graders from 210 schools across Russia. In 2012, almost all the same students participated in the Programme for International Student Assessment (PISA). Further on, the same school students—and later vocational and college students and graduates—were surveyed every one or two years. As of now, nine rounds

[4] http://trec.hse.ru/

Table 1. **TrEC rounds and sample size in 2011–2020.**

Round	Period	N of respondents
TIMSS8	2011	4,893 (100%)
Round I	2012	3,377 (69%)
PISA	2012	4,399 (90%)
Round II	2013, fall/winter	4,138 (85%)
Round III	2014, spring	4,239 (87%)
Round IV	2015, spring/fall	3,618 (74%)
Round V	2016, spring	3,866 (79%)
Round VI	2017, fall	3,954 (81%)
Round VII	2018, fall	3,793 (78%)
Round VIII	2019, fall	3,732 (76%)
Round IX	2020, summer	3,743 (76%)

Grey color indicates rounds used in the present study.

of the panel study are available, providing data for the period from 2011 through 2020. Data has been collected using survey methods (online survey, telephone survey, interview). Administrative data and data from parent, teacher, and school principal surveys are also available for some of the rounds. The key survey topics are students' participation in education and their educational and career trajectories.

To answer the research questions posed, this study uses data from nine rounds of TrEC that allow tracing how students build and move along their long-term educational trajectories. By the end of the study, 76% of the first-round sample was left (Table 1). Weight coefficients are used to minimize the effects of non-random attrition and keep the data representative [Bessudnov et al. 2014].

1.2. Variables

At the stage of data analysis, four milestones in respondents' educational trajectories were selected as outcome variables: choosing the academic track after middle school, college enrollment, college completion, and pursuing a graduate degree.

Choosing the academic track after middle school. A dichotomous variable is introduced for all the middle school graduates, coded 1 if the student proceeded to high school, and 0 if they chose any other track, i. e. transferred to a vocational school or some other educational institution or withdrew from the education system.

College enrollment. Because Russian school students have two ways of getting into college, college intentions are analyzed depending on the choice made in the previous transitional point. For this purpose,

two different variables are used as dependent in different subsamples. For those who proceeded to high school, the outcome variable is coded 1 if the respondent reported being enrolled in college one year after graduation from high school and 0 if not. Additionally, the probability of attending a selective college (1) vs. a nonselective one (0) is assessed for high school graduates admitted to college. Selective college is understood here as an educational institution with the mean Unified State Exam score of at least 70 among the students admitted in 2013–2014 [Prakhov 2015]. For the subsample of middle school graduates who transitioned to a vocational institution, the outcome variable is coded 1 if the respondent reported being enrolled in college in at least one round of TrEC after 2014 (Rounds IV–IX). College selectivity is not assessed in this case, as information on college status is only available for a small proportion of this respondent category.

College completion. In addition to college enrollment, TrEC data also allows tracing whether the respondents persisted through their selected track and successfully obtained their college degrees. For this purpose, a variable is constructed on the basis of data from the last round (six years after high school or eight years after middle school) to reflect whether the respondent had a college degree (1) or not (0) by then.

Pursuing a graduate degree. The study also looks at whether the respondent was a graduate student between 2017 and 2020. This information is used to construct a variable coded 1 if the respondent was enrolled in a Master's degree program and 0 if not.

The main predictor variable is school SEC, measured as the percentage of students with college-educated mothers (parental education being the strongest predictor of individual SES [Erola, Jalonen, Lehti 2016; Triventi et al. 2016]) in the relevant cohort of a specific school. Based on the distribution of SEC, all the schools in the sample are divided into three equal parts, or tertiles: low-SEC (0–27%), medium-SEC (29–52%), and high-SEC schools (52–100%).

Since a sizeable proportion of students leave school after Grade 9, the socioeconomic composition of those who proceed to high school changes. School leavers are mostly students from low-SES backgrounds, so the average percentage of high-SES peers (those with college-educated mothers) increases from 46% in middle school to 56% in high school. For this reason, two SEC variables are created for students proceeding to high school: SEC (middle school) and SEC (high school).[5] In models using high-school SEC, students who changed school after Grade 9 (about 10%) are excluded from analysis as no information is available on their new school.

The methodology for calculating the compositional effects to measure the independent contribution of school SEC to students' educa-

[5] The indicators are included in different models as being correlated quite highly with each other (0.92).

tional trajectories requires that prior student achievement and family SES are included in the models [Thrupp 1995]. In addition, the models also account for a number of student- and school-level control variables that may be important factors shaping educational trajectories. The final set of predictor variables looks as follows:

- Gender (female = 1, male = 0);
- Family SES (mother has a college degree = 1, mother has no college degree = 0);
- TIMSS-2008 scores (interval scale from 1 to 1,000 points);
- PISA-2012 Reading scores (interval scale from 1 to 1,000 points);
- Basic State Examination (BSE)-2012 scores in Russian and Mathematics (ordinal scale from 2 to 5);
- Unified State Exam (USE)-2014 scores in Mathematics and Russian (interval scale from 1 to 100 points);
- Region of residence (Moscow, Moscow Oblast, Saint Petersburg = 1, other = 0);
- Tuition (government-funded = 1, self-funded = 0);
- School SEC (percentage of students with college-educated mothers in the relevant school cohort);
- Type of school locale (urban = 1, rural = 0);
- School type (regular school = 1, elite school/gymnasium = 0).

1.3. Analysis Strategy

The data is analyzed using Multilevel Logistic Modelling (MLM) [Sommet, Morselli 2017]. This method is chosen for two reasons:—the outcome variables are dichotomous;—the data has two levels because students are grouped into schools. The main purpose of applying MLM is to assess the probability of an event happening as a function of the set of student and school variables.

This study uses a random intercept, fixed slope model in which the probability of an event may vary across schools. Level-1 units are students, and level-2 units are schools. Student variables include gender, family SES, academic achievement, region of residence, and tuition. School variables include SEC, type of school locale, and school type. The general model formula looks as follows:

$$\text{Logit}_{(\text{odds})} = B_{00} + B_{10} \cdot x_{ij} + B_{01} \cdot X_j + u_{0j},$$

where B_{00} is the average log-odds that the outcome variable equals one when all predictor variables are set to zero; B_{10} is the average effect of level-1 variable x_{ij} on the odds ratio; B_{01} is the average effect of level-2 variable X_j on the odds ratio; and u_{0j} is the deviation of level-2 log-odds from the average log-odds.

When it comes to not only defining whether an effect is positive or negative but also measuring its magnitude, interpretation and cross-model comparison of odds ratios in logistic regression can be really challenging [Norton, Dowd 2018], the most preferred alterna-

tive being average marginal effects (AME). In the present study, average marginal effects show how the average probability of an event changes if a particular predictor variable changes by one (or by one standard deviation (SD)) with all the other covariates fixed at their reference levels. Since SEC is the main predictor variable, only the average marginal effect for this variable is presented in the results section. The constructed regression models are used to calculate the predicted probability of specific events after graduation for students from schools with different SEC (from 0 to 100%) and assess the average marginal effects of a change in SEC by one SD (23%).

All the interval variables are standardized before adding them to the models. Descriptive statistics for unstandardized variables are given in the online appendix (Table 11), available here. Where logical discrepancies between different rounds of TrEC are revealed (e.g. the respondent reported having never engaged in higher education but obtained a college degree by the last round), responses are recoded as missing values. All the multilevel logistic models are constructed separately for Mathematics and Russian, with a focus on the former. Indicators of achievement in Russian (BSE, USE) and Reading (PISA-2012) are only used to test the robustness of results because, strictly speaking, PISA-2012 Reading scores cannot be used as direct indicators of prior achievement in Russian. In accordance with the research questions about the effects of school SEC not only on students' trajectories but on their further educational decisions within a track as well, analysis is performed for each subsample independently [Puhani 2000]. A detailed description of regression results for different model specifications and the Stata 16 code are given in the online appendix.

1.4. Limitations

There are a few limitations to the methodology used in this study. First, only data for the cohort of eighth-graders is used to assess school SEC due to the lack of access to information about family SES of all school students. If family SES varies a lot across cohorts within a school, it may affect the accuracy of SEC measurement. It is assumed, however, that there are no major differences among cohorts within schools and, consequently, within regions. Second, despite using panel data, there is no way to directly measure the academic progress and reliably control for prior achievement, as required by the SEC measurement methodology. Available TIMSS, PISA, and State Final Exam (SFE; includes both BSE and USE) scores are obtained with different test instruments. As TIMSS is more similar to SFE, it is used as an indicator of prior achievement when making allowance for SFE in the main phase of analysis. Third, at some stages analysis was impossible to perform for students in the hybrid track due to the small size of this category.

2. Results

2.1. How school SEC is related to choosing the academic track at the end of middle school.

According to TrEC data, 61% of middle school graduates proceeded to high school in 2012. The rest of the students did not choose the ac-

ademic track and either transferred to vocational schools (37%) and other educational institutions (1%) or decided to withdraw from education (2%). At this stage already, educational trajectories differ as a function of SEC (Figure 1). While nearly 80% of ninth-graders proceed to Grade 10 in high-SEC schools, the respective proportion in low-SEC schools is only 47%.

The analysis of factors shaping educational trajectories at this stage confirms previous findings: low-achieving and low-SES students are more likely to withdraw from school after Grade 9 (online appendix, Tables 1–2). Of no less importance is school SEC, even when student characteristics are controlled for. The probability of proceeding to Grade 10 is 47% in schools where no student has a college-educated mother, which is almost twice as low as in schools where mothers of all students have a college degree (83%) (Figure 2). This effect remains virtually unchanged when achievement at the end of middle school is added to the model, which means that high achievement is not the reason why students in high-SEC schools are more likely to choose the academic track.

2.2. How school SEC is related to college enrollment.

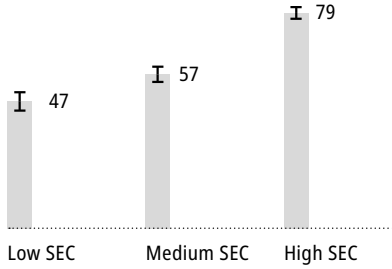
Of those who chose the academic track and proceeded to Grade 10 without changing school-53% of middle school graduates in 2012–82% were admitted to college after graduation. In 2015, one year after admission, 80% of them were still college students, while 12% were enrolled in vocational programs, and 7% were not engaged in any type of education. Of those who entered higher education, 37% were admitted to selective colleges.

The overwhelming majority (93%) of high school graduates from high-SEC schools went to college (Figure 3), as compared to only 63% in low-SEC schools, which is significantly lower than even in medium-SEC schools. About half of the graduates from high-SEC schools (49%) and less than 25% of those from low-SEC schools were admitted to selective colleges.

College intentions of high school graduates are associated with their academic achievement (TIMSS Mathematics and USE scores), type of school locale, and school SEC (online appendix, Tables 3–4). For the highest-SEC schools, the probability of high school graduates enrolling in college approaches 100%, which is significantly higher than in the lowest-SEC schools (75%) (Figure 4). Similar effects are observed for SEC measured in middle school, chances of getting into college also being higher for students from high-SEC schools (online appendix, Table 3).

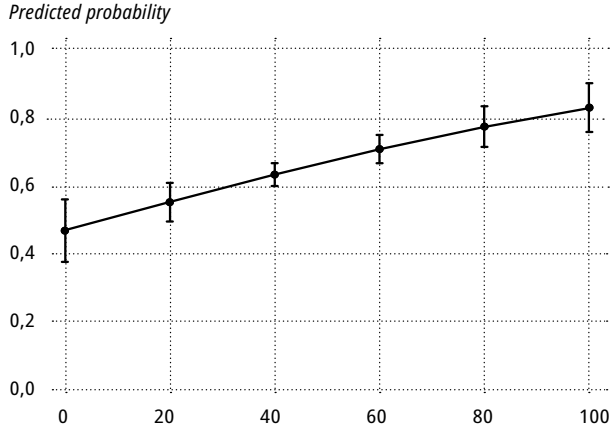
Other factors come into play when assessing the probability of getting into a selective college, not just any college (online appendix, Table 3). Region of residence turns out to be the strongest predictor, chances of attending a selective college being much higher for students living in Moscow, Moscow Oblast, and St. Petersburg (where

Figure 1. **Percentages of middle school graduates proceeding to high school as a function of SEC.**
(Percentage of middle school graduates proceeding to high school)



Here and elsewhere in this article, mean values (CI = 95%) are given in charts.

Figure 2. **Predicted probability of proceeding to high school as a function of school SEC.**



With all the other covariates set at their sample mean values, AME = 9%.

most of such colleges are concentrated) than for those in other cities, towns, or rural areas. With the region of residence controlled for, compositional effects on choosing a selective college are rather weak (Figure 5); and with the test scores in Russian added to the model, the effect of SEC becomes altogether insignificant (online appendix, Table 4).

Of those who transitioned to a vocational institution right after completing middle school-37% of the cohort in 2012–34% reported being enrolled in college in at least one of the TrEC rounds that followed. The hybrid track was most often selected by students from high-SEC schools (53%). Among the respondents from low-SEC schools, only 23% went to college after vocational studies (Figure 6).

By contrast with the academic track, it is not student achievement but school SEC that becomes the decisive factor of college enrollment

Figure 3. **Percentages of high school graduates enrolled in college as a function of school SEC.** (Percentage of high school graduates enrolled in college)

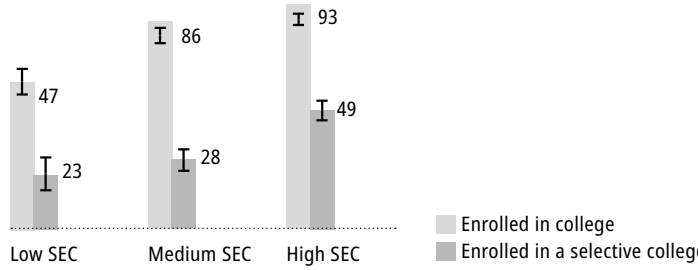
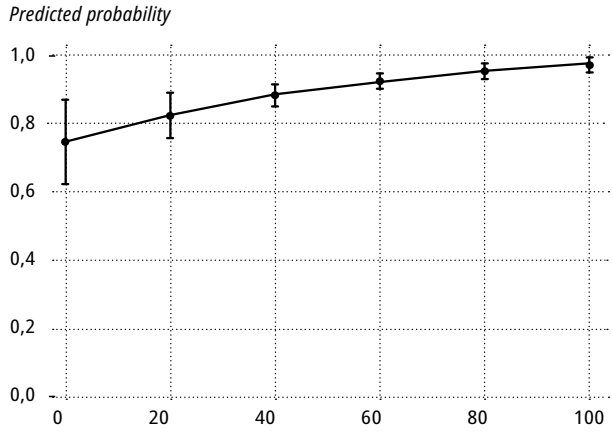


Figure 4. **Predicted probability of college enrollment after high school as a function of school SEC.**



With all the other covariates set at their sample mean values, AME = 5%.

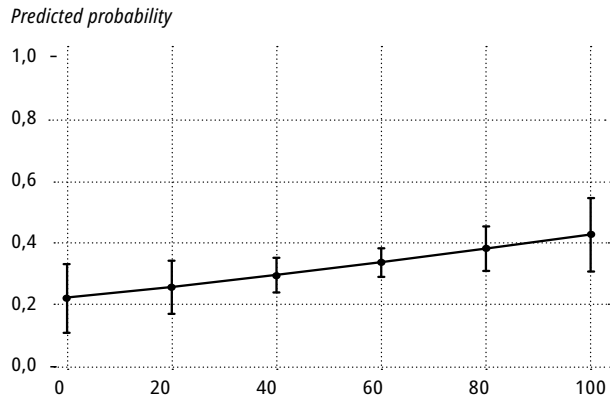
for students in the hybrid track (online appendix, Table 5–6). The probability of getting into college after vocational studies is 85% for the highest-SEC schools and 22% for the lowest-SEC ones (Figure 7).

2.3. How school SEC is related to college completion.

By the last round of TrEC, 44% of the respondents had a college degree. Among the graduates from low-SEC schools, on average 27% had obtained higher education by 2020 (both tracks) (Figure 8), which is more than twice as low as among the graduates from high-SEC schools (66%).

Of the respondents who enrolled in college immediately after graduation from high school, the percentage of college degree holders is very high, ranging from 81 to 86%, as compared to only 27–35% in the hybrid track. In this case, no significant variance in compositional ef-

Figure 5. **Predicted probability of getting into a selective college after high school as a function of SEC.**



With all the other covariates set at their sample mean values, AME = 5%.

Figure 6. **Percentages of middle school graduates transitioning to vocational programs who later enrolled in college.**

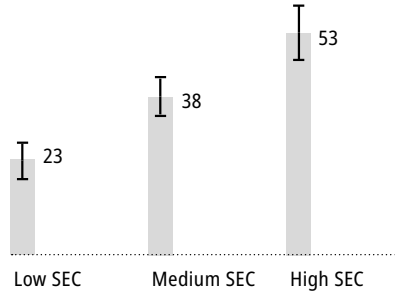
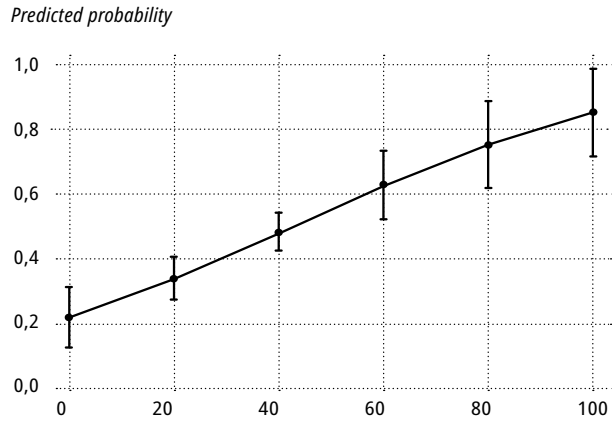
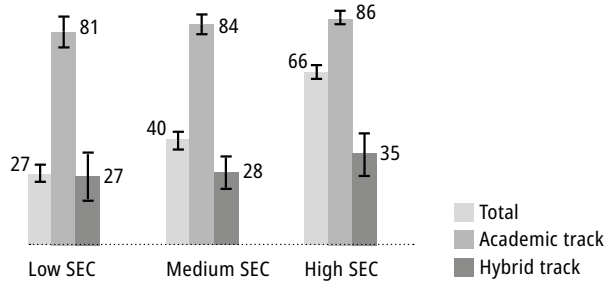


Figure 7. **Predicted probability of college enrollment after vocational studies as a function of SEC.**



With all the other covariates set at their sample mean values, AME = 17%.

Figure 8. **Percentages of college degree holders among school graduates as a function of SEC.** (Percentage of college degree holders)



fect is observed: once the trajectory has been selected, SEC seems to have no influence on student persistence.

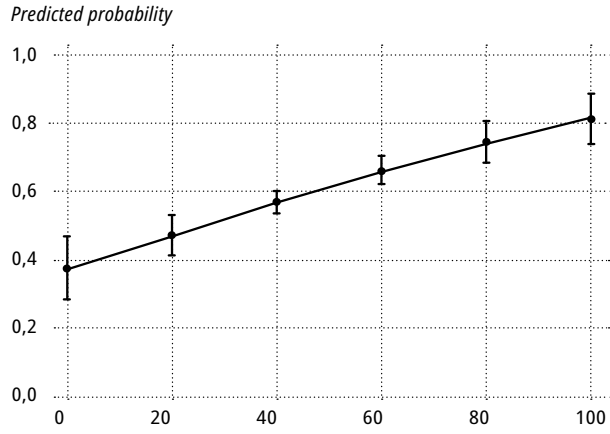
The inferences made are confirmed by the results of regression analysis (online appendix, Tables 7–8). Along with female gender and high level of academic achievement, school SEC contributes to college persistence in the complete sample. The probability of obtaining a college degree is more than twice as high for graduates from schools where all peers have college-educated mothers (81%) than for students from schools where no peer has a college-educated mother (38%) (Figure 9). Nevertheless, when analysis is performed separately for each track, compositional effects become insignificant.

2.4. How school SEC is related to pursuing a graduate degree.

In 2020, 16% of the last-round respondents reported having been a Master's degree student at least once between 2017 and 2020, i. e. they at least enrolled in a graduate program. Among graduates from low-SEC schools, only 6% pursued Master's degrees (Figure 10), as compared to 27% of the graduates from high-SEC schools. The percentage of respondents enrolling in Master's programs is considerably higher among high school graduates with college degrees than among students in the hybrid track. In the latter case, no more than 6% of respondents (graduates from medium-SEC schools) pursue Master's degrees, while in the academic track, the percentage of Master's degree students varies from 21% for graduates from low-SEC schools to 39% for graduates from high-SEC schools.

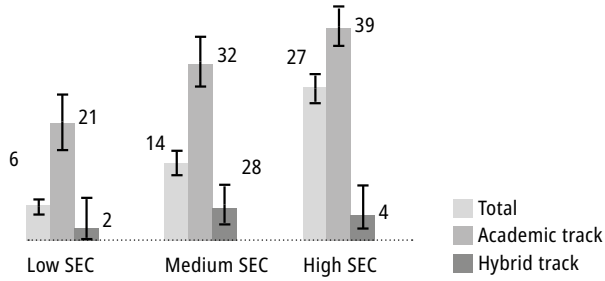
Along with academic achievement, school SEC is a key factor increasing the likelihood of pursuing a Master's degree (online appendix, Tables 9–10). The average probability that a graduate from the lowest-SEC school will enroll in a Master's program is 8%, as compared to 37% for graduates from the highest-SEC school (Figure 11). The compositional effect within the academic track is similar. However, the aver-

Figure 9. **Predicted probability of college completion as a function of school SEC.**



With all the other covariates set at their sample mean values, AME = 11%.

Figure 10. **Percentages of Master's degree students among school graduates as a function of SEC.**
(Percentage of graduate students)



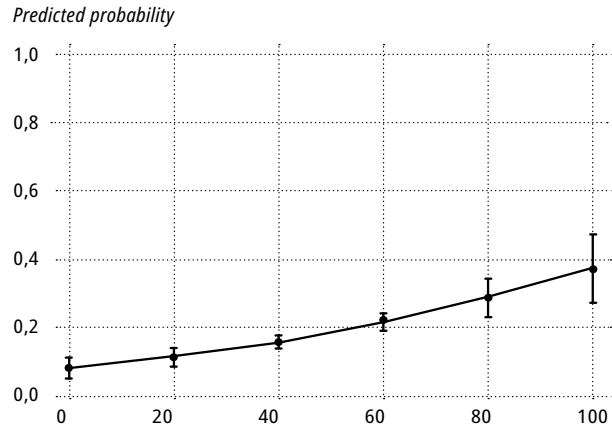
age probability of pursuing a Master's degree is higher for graduates of academic track, ranging from 20 to 46% as a function of school SEC (online appendix, Figure 1).

3. Conclusion and Discussion

Key Findings

- School socioeconomic composition is positively related to proceeding to high school, completing college, and pursuing a Master's degree.
- Compositional effect is explained by a strong relationship between SEC and the choice of educational trajectory in the first place, rather than by within-trajectory variance in student characteristics.

Figure **11. Predicted probability of pursuing a Master's degree as a function of SEC.**



With all the other covariates set at their sample mean values, AME = 6%.

- The strongest effect of SEC on academic intentions is observed for middle school graduates transitioning to vocational education.
- Family SES is not related to college enrollment when school SEC is controlled for.
- The existing effects cannot be explained entirely by differences in student achievement as a function of SEC.

The findings obtained in this study dismiss the widespread belief that school factors are less important than student characteristics for academic achievement and access to higher education—at least when it comes to school composition. Analysis of nine rounds of the Trajectories in Education and Career panel study shows that school socioeconomic composition is significantly related to college-going in Russia, even when individual variables such as student ability and family socioeconomic status are controlled for. School SECdemonstrates a robust effect on long-term educational outcomes across model specifications. In addition, school composition has an influence on college completion (AME=11%) and pursuing a graduate degree (AME=6%). These results are consistent with the findings from other education systems [Klugman, Lee 2019; Niu, Tienda 2013; Palardy 2014], proving that school factors, SEC in particular, not only contribute to student achievement at school but also determine the life chances of students to a large extent.

The key milestones where the compositional effect is the strongest are when students choose a trajectory after Grade 9 (AME=9%) and when they decide whether or not to go to college after obtaining a vocational diploma (AME=15%). Associations between SEC and college enrollment are equally strong when measured for middle and high school students, which means that compositional effect begins

to emerge in middle school at the latest, and factors shaping prospective trajectories are already in play at this stage. After choosing a trajectory, the compositional effects persist but become weaker. That is to say, school composition has a greater impact on trajectory choice than on further stratification of students within a track. No significant relationship is observed between SEC and the selectivity of college attended, the latter being affected most of all by region of residence and student achievement. Such inferences regarding college selectivity are somewhat inconsistent with the findings from another study [Palardy 2014], although an earlier publication found school composition to enhance the prospects for attending a selective college for males only [Alexander, Eckland 1977]. Similar results were obtained on a Russian sample for student SES, which was found to be related to college enrollment in general but not to getting into a selective college [Roshchina 2006]. The lack of a significant relationship between SEC and college selectivity in the present study may be due to the specific procedure of transition from middle to high school in the Russian education system. Since student composition becomes much more homogeneous by the end of high school than it was at the end of middle school, compositional effects on further decision-making become weaker. Within the effectively maintained inequality framework [Lucas 2001], it could be concluded that equality of access to higher education has not been achieved for schools with different composition so far, which is why there may be no essential stratification by education quality observable.

Unexpectedly enough, family SES was found to be unrelated to educational trajectory choice and college completion, when controlling for school SEC. This finding essentially contradicts the inferences made in most of the Russian publications on access to higher education, which report a relationship between family SES and college enrollment [Bessudnov, Kurakin, Malik 2017; Kosyakova et al. 2016; Prakhov 2015; Roshchina 2006; Khavenson, Chirkina 2019; Shishkin 2006]. However, those studies do not make allowance for school SEC. When using multilevel models and adding the school SEC variable, the relationship between family SES and college enrollment is not observed in most cases except transition to high school. On average, where the SEC measurement methodology is applied, SEC can explain close to 25% of variance in academic achievement beyond that accounted for by individual student characteristics [Borman, Dowling 2010]. Consequently, exclusion of such a powerful school factor affecting students' educational outcomes may lead to invalid inferences in educational research.

In particular, while the combination of low academic achievement and high family SES was found to be the strongest predictor of accessing college via vocational education in previous literature [Yastrebov, Kosyakova, Kurakin 2018], the present study reveals the decisive effect of school composition. The effect of SEC on the odds of getting into college after obtaining a vocational diploma is the strongest of all the

effects analyzed (AME=15%); meanwhile, the effect of family SES becomes insignificant once the SEC variable is added to the model. It is also important that in this study, college enrollment in the hybrid track was assessed over a few years, which allowed considering delayed decisions to go to college made during vocational studies or after completing them. Given these model parameters, compositional effect of a specific school can be expected to persist even after graduation and affect the future lives of graduates. However, further research is needed to test this hypothesis.

Conclusions drawn from the findings of this study may seem quite disappointing at the first glance. The phenomenon of school socioeconomic composition looks like a society in miniature, the so-called *sui generis* reality. It manifests the fundamental attributes of Durkheim's "social facts", constituting the sum of all the individual students but having a character of its own and imposing its own independent influence on everyone within it, whether they want it or not [Durkheim 1982]. It becomes hard to refrain from drawing analogies between deciding to go to college and making the most important decision of ending one's life: both choices turn out to be strongly determined by social factors in the first place [Durkheim 1952]. Just as altruistic suicide, enrollment in college may well be the result of caring about the interests of others, e. g. family, friends, or peers. This way, not only school achievement but also further educational trajectories and, hence, future lives of children depend on who their classmates or schoolmates are. As if it was not enough that some of the biggest life decisions are made on the grounds that are far beyond individual effort, responsibility, and often even perception—it also remains unknown how exactly this largely decisive effect emerges.

Even when student achievement at the end of high school is controlled for, the compositional effect is still there, which means that it is unlikely to emerge from cross-school variance in academic performance. The few attempts to find mediators of the relationship between SEC and educational outcomes undertaken by international researchers provide no general idea about the effect and at first glance complicate things. In particular, possible sources of compositional effect may include students' sense of futility [Agirdag, van Houtte, van Avermaet 2012], school practices [Boonen et al. 2014; Palardy 2014], peer influences [Palardy 2013], and teachers' beliefs [Agirdag 2018]. All these factors make their small contribution to the effect but provide no comprehensive understanding of how the relationship between SEC and educational outcomes is formed. It also remains unclear how the described mediators correlate with one another, which are stronger than others, and whether they are the same within long-term effects on educational trajectories. All of this is yet to be discovered.

In the context of Russian education, school socioeconomic composition and its effects are nowhere near the research frontier, let alone the political agenda. Meanwhile, parental definitions of a "good

school" are based, among other things, on perceived school composition: according to the 2020 Monitoring of Education Markets and Organizations (MEMO)[6] (household survey), over 40% of parents consider peer group quality at school to be a factor of academic success. In addition, available research findings basically demonstrate that school composition may foster the reproduction of social inequality in Russia just as in other countries—and this one is hard to ignore. However, it is also rather hard to give any practical advice without understanding the nature of compositional effect. This is not a problem that can be solved using the established methods of school and student support, e. g. by increasing schools' resources, hiring more teachers, providing opportunities for teachers' professional and career development, etc. Because social effects are much more difficult to control than teaching practices or material resources, their mitigation should also employ subtler mechanisms.

Anyway, forewarned is forearmed. A search for effective problem-solving strategies should be preceded by an in-depth analysis of the existing international practices. The simplest—and, in fact, the only available—method of reducing the negative manifestations of compositional effect is to introduce desegregation and student selection practices. No idea how SEC works? No problem—it can be simply eliminated by selecting a more advantaged population of students into a school. This policy is implemented through a number of reforms that regulate school admissions [Söderström, Uusitalo 2010] and introduce student transfers, e. g. based on voucher scholarship programs [Shakeel, Anderson, Wolf 2021]. However, such measures seem to be overly drastic and hardly applicable in the Russian context. First, geographical specifics should not be discounted: when there is only one school within a few kilometers, student transfers may be a challenge. Second, the effects of mixed-SEC schools on educational outcomes differ as a function of student SES. While attending a high- or medium-SEC school will be a growth opportunity for low-SES students, the effects will be strongly negative for high-SES students [Belfi, Haelermans, Fraine]. Inequality will be undoubtedly reduced by this approach, but should it be done at the expense of advantaged students' outcomes? Apparently, it would be wise to continue research before taking any radical measures. By unpacking the mechanisms behind short- and long-term compositional effects, we will be able to develop targeted initiatives to mitigate their negative consequences without acting hastily.

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[6] https://memo.hse.ru

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