NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

Ilya Prakhov, Maria Bocharova

SOCIO-ECONOMIC PREDICTORS OF STUDENT MOBILITY

BASIC RESEARCH PROGRAM

WORKING PAPERS

SERIES: EDUCATION
WP BRP 34/EDU/2016

Ilya Prakhov[1], *Maria Bocharova*[2]

SOCIO-ECONOMIC PREDICTORS OF STUDENT MOBILITY[3]

This paper analyses the determinants of student mobility under the unified system of admission in Russia and evaluates the barriers which still limit educational mobility. It is argued that even under the Unified State Examination (USE) and the decreased transaction costs of applying to universities, student mobility is directed towards more developed regional educational markets and richer regions, but is still limited due to the financial constraints in the absence of the additional student support. Russia is a unique case, because it consists of regions with a high variation in socio-economic development and has local higher education markets with different levels of competition between universities. This study shows the importance of the institutional characteristics of regions in student mobility.

Keywords: educational mobility, student mobility, university choice, the Unified State Exam

JEL Codes: I21, I23, I24

[1] Research Fellow, International Laboratory for Institutional Analysis of Economic Reforms, Center for Institutional Studies, National Research University Higher School of Economics, Russian Federation. Corresponding Author, ipra@inbox.ru.

[2] Research Assistant, International Laboratory for Institutional Analysis of Economic Reforms, Center for Institutional Studies, National Research University Higher School of Economics, Russian Federation.

[3] The article was prepared within the framework of the Basic Research Program at the National Research University Higher School of Economics (HSE) and supported within the framework of a subsidy by the Russian Academic Excellence Project '5-100'.

Introduction

One of the aims of the recent institutional transformation of admission to higher education in Russia was to decrease transaction costs for application to universities and to simplify student mobility. The introduction of the Unified State Exam (USE) instead of high school exit exams and university-specific entry exams was to widen the opportunities for the university applicants. Prospective students may now apply to 5 different universities without visiting the admission office, simply by sending their certificates with their final USE scores. Before the USE, with each Russian university had its own specific requirements and examination procedure, applicants were forced to attend extra classes with tutors or pre-entry courses within a particular university (Prakhov, 2016). In other words, university entrants who lived closer to the desired higher education institution (HEI), for example, in the same region, had a better chance of successful admission because of the opportunity of attending pre-entry programs offered by the university. With the introduction of the USE, 'local' applicants may not have the benefit of being closer to the desired university they had before, while for applicants from other regions the admission procedure has been simplified. This can contribute to a student migration, and it is reasonable to assume that the applicants will move to regions with universities of a high quality, because they will have higher returns from higher education obtained in better HEIs. However, even under the simplified access to higher education, university applicants can face barriers which can influence their decision to move to another region. For example, in the absence of additional student support such as grants and student loans, individual and regional socio-economic characteristics may play a significant role in such a decision, and university applicants would not be able to take advantage of the opportunities afforded by USE.

This study analyses the factors which drive student choice between moving to another region to study at university or to stay in their home region, under USE. In other words, we estimate the determinants of the probability of a student's decision to move. Using the assumptions of human capital theory and models of university choice (decision-making models), we claim that individual (ability, gender) and family (parental education, income) factors affect such a decision. Moreover, Russia represents an interesting case for the analysis of student mobility, it consists of more than 80 regions with highly differentiated economic conditions and varying regional higher education markets. Institutional characteristics of regions where the applicant graduated from high school, and those of the region where the university is located, can also be the important predictors of educational migration, and in some cases can still restrict the level of mobility despite the unification of admission procedures. In this study we evaluate the determinants of educational migration and focus on

the role of socio-economic characteristics of households and regions in this process, and argue that even under USE, but in the absence of the appropriate mechanisms of student support, educational mobility can be limited.

The paper is organized as follows. First, we place our research in the theoretical context for educational mobility and provide the empirical results of previous studies. Based on those, we state the hypotheses to be tested empirically. Second, we describe the data and empirical methodology of the study. The next part contains the results of the regression analysis, and the final part concludes. We show that along with individual student characteristics (such as USE results which reflect the probability of being admitted to the desired HEI), regional economic and educational characteristics matter. Regional economic development can influence a student's decision to move, as students tend to move to regions with higher salaries, but higher costs of living in the absence of student financial support may restrain mobility. Interregional differences in the development of higher education markets contribute to student mobility for the entire sample (students tend to move to regions with more developed higher education markets) and increase the distance travelled by the applicants when they moved from their 'school' regions to 'university' regions.

Theoretical grounds and empirical results of previous studies

The theoretical approach is based on human capital theory (Becker, 1962) applied to the higher education market, when the applicant compares potential benefits and costs of migration to another region. Mchugh & Morgan (1984) explore the decision of students to migrate through the decision-making strategy of a rational agent who invests into his/her human capital. Moving to another region to study is beneficial if the net benefits from studying and migrating to another location exceed the added costs of migration (Alecke, Burgard, & Mitze, 2013; Mak & Moncur, 2003; Mchugh & Morgan, 1984). The level of average wages, low unemployment rates, and the availability of scholarships are associated with the benefits of migration, and the costs include the cost of living, tuition fees and moving costs. This effect is relevant in the long run: even if the agent returns to their home region after graduation they will receive a greater return on their investment in human capital (Beine, Noël, & Ragot, 2014; Rosenzweig, 2008).

The studies which analyse the determinants of student mobility help us understand potential barriers which may restrict educational mobility. In general, factors that determine the choice of the applicant can be divided into two categories: internal and external. Internal (or individual) factors are directly related to the student: gender, academic performance and social background. The external factors include: the characteristics of the region, universities

and the education system in the region as a whole. The content of these two groups varies from one study to another. First, we provide a detailed analysis of the internal factors.

The first question in studying internal factors is whether there are gender differences in the decision to move. Research suggests that male students accept higher costs and tend to invest in education more, since they are aimed to get higher earnings than women (Pekkarinen, 2012). However, studies show that gender does not have a significant influence on the decision to move. Nevertheless, some research still argues that a small observed effect may be present because of differences in individual preferences, i.e. different perceptions of benefits and costs of higher education (Alecke et al., 2013; Becker et al., 2010).

The most significant individual factor of educational mobility, according to the previous studies, is academic performance. Kyung (1996) found that, on average, mobile students show better academic performance. For this reason, it can be assumed that the applicants' academic abilities influence their decisions to move. For example, Fenske, Scott and James (1974) show that SAT results are positively correlated with the probability of moving. Additionally, researchers found that applicants with higher scores in English, Mathematics, social and natural sciences (according to ACT assessment) are more likely to move and even a considerable distance. In contrast, low-achievers tend to remain in the home region.

Family income is the most important characteristic of social background in terms of educational mobility. Since moving to another region is associated with significant costs (especially financial), it follows that the probability of migration is higher among university applicants from more affluent families (Fenske et al., 1974; Fenske, 1972; Hübner, 2012; Kyung, 1996; Mak & Moncur, 2003). Many factors have a strong influence especially on low-income students. Therefore, income may be one of the main determinants of educational migration. However, research has not reached a consensus on what motivates applicants better: economic or non-economic factors. Nevertheless, there is agreement that the level of family income is a key factor (Alecke et al., 2013; Hübner, 2012).

In addition to the individual factors which stimulate or limit educational migration, there are external determinants of the decision to move. Research shows that the economic climate in the regions of origin and destination is an important predictor of student mobility (Tuckman, 1967; Long, 1977; Fenske, 1972; Mchugh & Morgan, 1984). For example, Long (1977) determines educational migration as a function of a number of economic variables: the unemployment rate and per capita income in the regions of origin and destination. Rich regions are characterized by a high level of immigration and emigration at the same time (Tuckman, 1967; Long, 1977). An explanation for this effect is that the applicants choose a place to get higher education for the purpose of further employment (Long, 1977; Mchugh &

Morgan, 1984). In addition to this, studies on international mobility also highlight the importance of economic factors (Mihi-Ramirez & Kumpikaite, 2014; Rodríguez, Ricardo, & Mesanza, 2011; Thorn & Holm-Nielsen, 2006). These factors may influence the decision of the applicant to move from one region to another as there is strong variation in the socio-economic development of the regions of Russia.

Second, the regional characteristics of educational systems matter. These factors could serve as push- and pull-factors (Alecke et al., 2013; Kyung, 1996; Mak & Moncur, 2003; Mchugh & Morgan, 1984). For example, it was found that the regions with a high number of HEIs tend to have lower levels of migration to other regions. Indeed, there is no need to move somewhere else, since the student has a better choice in his home region (Mak & Moncur, 2003). The disproportion in the number of universities across the regions is also significant. Applicants from rural regions tend to move more frequently than applicants who live in urban areas because of unequal educational choices (Fenske et al., 1974; Fenske, 1972; Mchugh & Morgan, 1984).

As a result, the analysis of external determinants of student mobility shows that applicants are also guided by regional factors: the characteristics of the economic climate and the characteristics of the regional education system. Most of the research on educational mobility deals with the US education system. Russia is different as it represents a country which has many disproportionally developed regions both in the context of socio-economic development and in the context of regional higher education markets. Such macroeconomic and educational differences also may drive educational migration decisions and should be taken into account. By examining the results of empirical studies related to the analysis of educational mobility, we formulate the following hypotheses:

1. Academic achievement (expressed in USE results) has a significant positive impact on the probability of making the decision to move. If applicants have higher scores, they have a wider choice of where to apply, and a better chance of being admitted to the desired university. Hence, it will positively contribute to educational mobility.

2. A higher socio-economic background positively affects the probability of educational migration. The results of the previous studies have found a significant influence of family characteristics such as parental education and family income. We pay particular attention to the latter, as the financial costs of moving are very important in educational decisions.

3. Interregional difference in salaries, and the average salary in the ‘university region’ positively influence the decision to move, as richer regions will attract students

because after the graduation they may stay in the university region and get higher salary than in their home region.

4. Interregional differences in the costs of living in the university region would deter students from educational migration, as they will face a strong financial barrier.

5. The concentration of universities in the 'university' region and the difference in concentration between 'university' and 'school' regions will positively affect educational mobility: students will tend to move from the regions with poorly developed systems of higher education to those better educational opportunities.

Data and methodology of the study

Data

The empirical part of the study is based on data from the Trajectories in Education and Career project, which is a national representative longitudinal study devoted to the investigation of educational trajectories[4].

The first wave of the survey was carried out among ninth-year students in 2011. At that stage, 3,827 students in 42 Russian regions were interviewed (Bessudnov et al., 2014). The questionnaires included questions not only about current student achievement and expected educational strategies (as after the 9th year, students can choose to continue their education by either entering the 10th grade of the same or another school, or continuing the studies in a vocational educational institution, or entering the labour market) but also included information about the main socio-demographic characteristics of households (for example, family income and parental education).

The next two waves were conducted in autumn 2013 and spring 2014. At that point, the questionnaires included questions about prospective enrolment in HEIs, as at that moment those respondents who were in the 11th year (prospective high school graduates) usually make a choice either to apply for university or enter the labour market, and adjust their strategies according to such a decision.

The last available wave represents a telephone survey in autumn 2014. For the successfully enrolled 1st year university students the information about the results of the USE, their university and its location is available. Based on this data we can see if the student is mobile or not.

The resulting dataset for the empirical analysis included only those students who in 2014 either started or continued their education at university, as the focus of our research is

[4] See project description: https://trec.hse.ru/en.

the study of educational mobility in the context of transition between high school and university. The final sample consists of 1169 observations: students who study full-time (94.6%), part-time (0.9%), or by distance learning (4.0%)[5]. For every observation we have manually added the variables which reflect educational mobility, the socio-economic conditions of 'school' and 'university' regions, and the indices of the development of the regional higher education markets (see below). The descriptive statistics are presented in Table 1.

Table 1. Descriptive statistics

Variable	**N obs.**	**Min.**	**Max.**	**Mean**	**Std. Dev.**
Mobility based on a distance (=1 if mobile)	1166	0	1	0.43	0.49
Interregional mobility (=1 if mobile)	1169	0	1	0.23	0.42
Distance (km)	1166	0	8838	335.68	790.22
Male	1169	0	1	0.43	0.49
The USE score in Russian	1147	12	100	69.24	12.98
The USE score in Mathematics	1147	12	100	51.91	16.34
Mother's education (=1 if higher education)	1104	0	1	0.54	0.50
Father's education (=1 if higher education)	913	0	1	0.48	0.50
Incomplete family (=1 if yes)	1169	0	1	0.23	0.42
Number of kids	1159	1	14	1.54	0.86
Family income (rubles per month)	1072	10000	95000	31856.00	22535.50
Family income per child (rubles per month)	1063	2000	95000	24511.00	20154.55
School specialization (=1 if any)	1152	0	1	0.55	0.50
Average monthly salary in a 'school' region (rubles)	1169	15264	58040.4	25854.00	10167.58
Average monthly salary in a 'university' region (rubles)	1166	14432.8	58040.4	28488.00	12689.84
The cost of living in a 'school' region (rubles per month)	1169	5979	12077	7345.60	1469.37
The cost of living in a 'university' region (rubles per month)	1166	5979	12077	7598.70	1636.49
Herfindahl-Hirshman index (HHI) in a 'school region'	1166	0.02	0.60	0.15	0.12
HHI in a 'university' region	1166	0.02	0.69	0.13	0.11
Interregional difference in salary	1166	-40500	42061.3	2644.00	9350.91
Interregional difference in the cost of living	1166	-5709	5512	253.47	1182.35
Interregional difference in HHI	1166	-0.58	0.54	-0.02	0.09
Migration to the neighboring region (=1 if yes)	1169	0	1	0.11	0.31
Moscow high school graduate (=1 if yes)	1169	0	1	0.11	0.31

Description of variables

Mobility variables

[5] Students which are on distance learning are included in the sample, as they have made an educational choice as well. Moreover, it does not contradict our purpose to study student mobility, as the majority of such kind of students (93.6%) applied to the HEIs in their 'school' regions. Only 3 students were admitted to the universities in other regions.

Mobility based on a distance is a binary variable that equals '1', if the distance between the settlement, in which the respondent graduated from high school and the location of the university where he was admitted is equal to or greater than 100 km. In this case, the individual is considered a mobile student based on distance, and '0' otherwise and the student is considered in the empirical analysis as immobile (by distance). 43% of students are mobile by distance in the sample.

Interregional mobility is a binary variable that takes a value of '1' if the respondent moved to another region in order to study in the university ('university' region). These students are mobile in an interregional context. If the student remains in the 'school' region, then this variable is '0' and such students are considered immobile. This variable more accurately reflects the concept of educational mobility, as it is different from commuting (e.g., everyday migration from the satellite cities in the same agglomeration to the regional centres and back)[6]. 23% of students in the sample changed region after high school. There are 44 'school' regions and 62 'university' regions presented in the sample. The most popular cities which attract first year students from other regions are Moscow (more than 5% of the sample moved to Moscow from other towns) and St. Petersburg (around 4% of the sample moved to this city from other regions). However, there are other cities which attract applicants from other regions, such as Tomsk, Novosibirsk, Yekaterinburg, Rostov-on-Don. Together Moscow and St. Petersburg attracted around 21% mobile students (by distance) and around 40% of those who have changed a region.

Distance is a variable which reflects the geographical distance (in km) between the geographical centres of 'school' and 'university' towns. This variable is obtained with the help of Google Maps and is calculated not only for interregional mobility, but for all mobile students (even if the distance travelled does not exceed 100 km). The mean distance between 'school' and 'university' towns is 336 km with the longest distance travelled 8838 km.

We use the assumptions of the combined models of university choice when including different sets of factors which influence the decision. We group these determinants by level: individual (including family and school factors), educational (the characteristics of regional higher education markets), and regional (socio-economic differences in average income and minimum wages in 'school' and 'university' regions).

[6] It should be noted that in the present study Moscow and Moscow oblast' as the same region (although legally they are different entities of Russia). St. Petersburg and surrounding Leningrad oblast' are also considered as a single region. This is due to the highly developed public transportation infrastructure, which allows students from these regions to make daily trips from home to university and back (i.e., despite the fact that formally their high schools and universities are located in different regions, time spent on travel can be comparable to that, which is spent by the students from Moscow and St. Petersburg cities).

Individual characteristics

For the individual characteristics we consider gender, average USE scores in Russian and Mathematics, parental education, family status (complete or incomplete family), number of children, family income, and high school specialization.

43% of students in the sample are male. The *average USE score in Russian* (national language, the obligatory exam) is 69%, for *Mathematics* (the second obligatory exam) the average score is 52%. Around 54% of students have *mothers* who have a higher education diploma, and in 48% observed cases *fathers* have higher education. 23% of students comes from an *incomplete family*, i.e. he lives only with one parent. On average, a family has 1–2 children. The *average monthly income* of the household is about 31,000 rubles, which is approximately 1,025 U.S. dollars. Around 55% of students have graduated from high schools with a specialization (for example, Mathematics or foreign languages).

Socio-economic regional characteristics

For the factors which reflect the socio-economic situation in the regions we use *average monthly salaries* both in 'school' and 'university' regions in 2013[7] and *the cost of living* in each region[8]. These variables represent the attractiveness of living in a certain region: monthly salary expresses the potential benefits of the residence there, while the cost of living is the subsistence level of living there. We have also calculated the differences in monthly salaries between 'university' and 'school' regions, and the differences in the cost of living. These variables reflect the gains in the average salaries and the cost of living associated with the move. In other words, these factors represent the relative benefits and costs associated with the move.

Regional characteristics of higher education markets

The indicators of regional development of the local higher education markets are based on the Herfindahl-Hirschman index (*HHI*), which was calculated both for 'school' and 'university' regions (see Leshukov et al., 2015):

$$HHI_j = \sum_k \left(\frac{x_{jk}}{X_j} \right)^2 ,$$

where x_{jk} is a number of students in university *k* located in the region *j*; and X_j is the total number of university students in the region *j*.

[7] According to the data of the Federal State Statistics Service: http://www.gks.ru/free_doc/new_site/population/bednost/tabl/1-2-6.htm.
[8] See http://www.gks.ru/free_doc/new_site/population/bednost/tabl/2-01.htm.

This index reflects the development of the regional higher education market and the level of competition for the applicants between local universities. In other words, this is a measure of the choice available for the applicant. The HHI can take values from 0 to 1, where '0' is the highest possible level of competition (the widest choice of universities in the region), and '1' reflects the lowest level of competition and a highly limited choice of HEI in the region (i.e. there is only one university in the region).

As for the indicators of socio-economic development of regions, for the HHI we calculated the interregional difference between 'school' and 'university' region. The negative sign of the difference means that the student moved to a region with a better level of competition between regional universities and a wider choice of opportunities. The relative indicators have been calculated as the student is inclined to assess the difference between the corresponding indicators.

We deliberately did not use absolute indicators of the regional higher education markets, such as the number of universities or a number of students admitted for each region as these may reflect the demographic conditions, but not the variety of educational choice and the level of competition for the university applicants. HHI takes these factors into account and reflects the level of the regional development of the higher education system.

Comparative analysis of subsamples

Before the evaluation of the regression models we compare non-mobile and mobile students in the context of mobility based on a distance and interregional mobility. Descriptive statistics on the subsamples are presented in Table 2.

Table 2. Descriptive comparison of subsamples: mobile and non-mobile students

Subsample / Variables	**Mobility based on a distance**		**Interregional mobility**	
	Non-mobile	**Mobile**	**Non-mobile**	**Mobile**
Male	**0.41** (0.49)	**0.45** (0.50)	**0.42** (0.49)	**0.46** (0.50)
The USE score in Russian	**67.66** (12.85)	**71.33** (12.90)	**68.11** (12.77)	**72.94** (12.97)
The USE score in Mathematics	**49.34** (15.95)	**55.23** (16.25)	**50.58** (16.14)	**56.23** (16.26)
Mother's education (=1 if higher education)	**0.52** (0.50)	**0.56** (0.50)	**0.52** (0.50)	**0.60** (0.49)
Father's education (=1 if higher education)	0.49 (0.50)	0.47 (0.50)	**0.47** (0.50)	**0.51** (0.50)
Incomplete family (=1 if yes)	**0.24** (0.43)	**0.21** (0.41)	**0.23** (0.42)	**0.21** (0.41)
Number of kids	**1.56** (0.99)	**1.53** (0.66)	1.55 (0.92)	1.54 (0.64)
Family income (rubles per month)	32475.25 (22468.97)	30885.53 (22420.47)	31753.33 (22165.12)	32204.08 (23786.95)

Subsample / Variables	Mobility based on a distance		Interregional mobility	
	Non-mobile	**Mobile**	**Non-mobile**	**Mobile**
Family income per child (rubles per month)	**25128.45** (20568.62)	**23469.52** (19262.90)	**24569.92** (20288.17)	**24312.93** (19741.43)
School specialization (rubles per month)	0.56 (0.50)	0.52 (0.50)	**0.54** (0.50)	**0.57** (0.50)
Average monthly salary in a 'school' region (rubles)	27015.82 (11318.85)	24278.21 (8155.97)	26580.66 (10667.73)	23457.39 (7860.95)
Average monthly salary in a 'university' region (rubles)	28345.07 (13083.50)	28633.41 (12129.34)	27614.79 (12185.10)	31398.36 (13876.42)
The cost of living in a 'school' region (rubles per month)	7444.87 (1512.43)	7203.52 (1391.91)	7385.75 (1477.62)	7213.09 (1436.53)
The cost of living in a 'university' region (rubles per month)	7594.33 (1680.97)	7592.14 (1566.63)	7503.00 (1617.83)	7917.99 (1660.74)
Herfindahl-Hirshman index (HHI) in 'school region'	0.14 (0.12)	0.16 (0.11)	0.14 (0.11)	0.18 (0.13)
HHI in a 'university' region	0.14 (0.12)	0.12 (0.09)	0.14 (0.11)	0.11 (0.11)
Interregional difference in salary	**1327.40** (5536.21)	**4385.82** (12585.01)	**1034.13** (4909.27)	**8012.15** (16184.13)
Interregional difference in the cost of living	**148.82** (633.12)	**390.56** (1645.06)	**117.25** (561.42)	**707.70** (2180.35)
Interregional difference in HHI	**0.00** (0.01)	**-0.04** (0.13)	**0.00** (0.00)	**-0.07** (0.18)
Distance (km)	**16.34** (27.59)	**764.03** (1068.56)	**90.20** (236.10)	**1142.50** (1283.98)
Migration to the neighboring region (=1 if yes)	0.01 (0.08)	0.24 (0.43)	0.00 (0.00)	**0.46** (0.50)
Moscow high school graduate (=1 if yes)	0.18 (0.39)	0.00 (0.06)	0.14 (0.35)	0.00 (0.06)

Means are reported. Standard deviations in parentheses.

According to the descriptive statistics, we may conclude that mobile students have higher USE scores in Russian and Mathematics, their mothers are more educated, and they tend to move to regions with higher salaries, and costs of living, and to those with more developed higher education markets. Moreover, males are more mobile than females. This gives reason to evaluate the regression models and to include the relevant variables as explanatory ones.

Regression models

We estimate the models of binary choice (logistic regressions), where the dependent variable reflects the mobility of the students (based on distance and interregional mobility), while the independent variables include individual characteristics of university applicants, as well as institutional determinants which reflect socio-economic and educational status of regions (according to the models of university choice). We evaluate the following models:

$$\Pr(\textit{Mobility based on a distance}_i = 1) = f(X_i; E_i; R_i),$$
$$\Pr(\textit{Interregional mobility}_i = 1) = g(X_i; E_i; R_i), \text{ where}$$

$\Pr(\cdot)$ is the probability of the corresponding type of educational mobility (either mobility based on a distance or interregional mobility);

X_i is a vector of individual characteristics (including family and school factors);

E_i is a vector of socio-economic regional characteristics;

R_i is a vector of the characteristics of the regional higher education markets.

We run several regression models for the entire sample (models 1–4), and for the following subsamples: only for high achievers, i.e. those who scored more than 79 points on the USE in Russian (models 5–8)[9], and for the sample excluding students who graduated from high schools in the Moscow region (models 9–12).

Additionally, we estimate the linear regression model of a distance between the 'school' and 'university' towns. Since the research on educational mobility pays special attention to the distance travelled, and Russia is a large country in terms of a distance between towns, it is interesting to examine what factors have an impact on the distance. To do this, we estimate the following model (models 13–14):

$$\text{Distance}_i = \alpha + \beta X_i + \gamma E_i + \delta R_i + \varepsilon_i, \text{ where}$$

Distance_i is the distance (in km) travelled by the student i;

X_i, E_i, R_i are the sets of explanatory variables, as in the previous case;

$\alpha, \beta, \gamma, \delta$ are the regression coefficients;

ε_i is the error term.

Results of regression analysis

The results of regression analysis are presented in Table 3. The coefficients for the models 1–12 reflect the marginal effects from mean, which is the percentage change in the probability of educational mobility caused by the corresponding change in the variable. For the whole sample male students are more mobile than female students. This could be explained by the fact that parents are more worried about the girls do not want their daughters to leave them.

[9] We used this cutoff because 79-80 points are a borderline for the most selective Russian universities. Hence, we consider students who have got more than 79 points as high-achievers.

Moreover, it confirms the idea that male students may be more ambitious about their future income and wellbeing (Pekkarinen, 2012).

High school achievement expressed in USE results in Russian positively affects student mobility, which corresponds to the results of previous studies. High achievers are more mobile, but even they, having the widest opportunity, face barriers which limit migration (see models 5–8). Cultural capital (expressed in the level of mother's education) can be a predictor of educational mobility for high achievers. This means, that students with high USE scores but with less parental education are less mobile, so they do not fully use the opportunities given them by USE.

Family income is a significant factor in student mobility only in 3 specifications, but the sample consists of various regions, and in this case the more interesting factors are those which are attributed to the overall regional economic development. Average salary in the 'school' region has a negative effect on mobility: if the home region is characterized by higher salaries, this motivates students to stay. Average salary in the 'university' region has the opposite effect: regions with higher salaries attract new students. Interregional differences in salary also positively influence the decision to move.

Higher the cost of living in the 'school' region contributes to educational mobility, as there can be regions with lower costs of living. Interregional differences in the costs of living have a negative effect: students do not move to regions with higher costs of living. This means that income still plays an important role in decisions about moving in order to study at university, which is crucial in the absence of additional financial student support. These empirical findings fully correspond to the assumptions of the human capital theory—that students are attracted by regions with higher salaries, but are concerned about the costs of living there. These results are stable for all model specifications and subsamples.

For HHI the results are ambiguous. Interregional differences in this index are significant only for the entire sample, so in general students move to the regions with a higher level of competition between universities and a wider choice of HEI. For high achievers and for the subsample which excludes Moscow students, regional higher education development is not that important.

Table 3. The results of regression analysis

Model	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Dependent variable / **Independent variables**	**Mobility based on a distance**		**Interregional mobility**		**Mobility based on a distance**		**Interregional mobility**	
Male	0.081**	0.081**	0.055*	0.055*	0.168**	0.149*	0.044	0.045
	(0.035)	(0.035)	(0.029)	(0.029)	(0.083)	(0.080)	(0.084)	(0.082)
The USE result in Russian	0.006***	0.006***	0.004***	0.004***				
	(0.001)	(0.001)	(0.001)	(0.001)				
Mother's education	0.032	0.031	0.034	0.035	0.146*	0.113	0.182***	0.154**
	(0.034)	(0.034)	(0.027)	(0.028)	(0.082)	(0.079)	(0.073)	(0.073)
Incomplete family	-0.057	-0.065*	-0.042	-0.046	-0.138	-0.147	-0.110	-0.106
	(0.039)	(0.03875)	(0.030)	(0.031)	(0.096)	(0.093)	(0.084)	(0.086)
Family income / 1000	-0.001	-0.002***	-0.000001	-0.001	-0.003	-0.005***	-0.0003	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
School specialization (=1 if any)	-0.037	-0.432	0.014	0.008	-0.032	-0.059	0.070	0.045
	(0.034)	(0.033)	(0.027)	(0.028)	(0.078)	(0.075)	(0.073)	(0.074)
Average monthly salary in a 'school' region	-0.00002***		-0.00003***		-0.00005***		-0.00005***	
	(0.000)		(0.000)		(0.000)		(0.000)	
Average monthly salary in a 'university' region	0.00001**		0.00002***		0.00003**		0.00003***	
	(0.000)		(0.000)		(0.000)		(0.000)	
The cost of living in a 'school' region	0.0001***		0.0001***		0.0002**		0.0002**	
	(0.000)		(0.000)		(0.000)		(0.000)	
The cost of living in a 'university' region	-0.00006		-0.00008***		-0.0001		-0.0001	
	(0.000)		(0.000)		(0.000)		(0.000)	
HHI in a 'school' region	0.412		0.228		0.626		0.119	
	(0.303)		(0.214)		(0.762)		(0.660)	
HHI in a 'university' region	-0.714**		-0.174		-0.163		0.335	
	(0.334)		(0.251)		(0.784)		(0.703)	
Interregional difference in salary		0.00002***		0.00002***		0.00003**		0.00003**
		(0.000)		(0.000)		(0.000)		(0.000)
Interregional difference in the cost of living		-0.0001**		-0.0001***		-0.0002*		-0.0001**
		(0.000)		(0.000)		(0.000)		(0.000)
Interregional difference in HHI		-0.565*		-0.357*		-0.583		-0.269
		(0.296)		(0.222)		(0.758)		(0.702)
Pseudo R^2	0.062	0.052	0.161	0.136	0.146	0.102	0.243	0.198
Number of observations	**999**	**999**	**1002**	**1002**	**215**	**215**	**215**	**215**
Sample	**All observations**				**High achievers**			

Standard errors in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 3 (continued).

Model	**9**	**10**	**11**	**12**	**13**	**14**
Dependent variable / Independent variables	**Mobility based on a distance**		**Interregional mobility**		**Distance**	
Male	0.071* (0.039)	0.084** (0.038)	0.048 (0.035)	0.053 (0.035)	119.929*** (39.846)	125.600*** (40.532)
The USE result in Russian	0.006*** (0.002)	0.007*** (0.002)	0.005*** (0.001)	0.005*** (0.001)	5.500*** (1.552)	5.521*** (1.564)
Mother's education	0.036 (0.037)	0.028 (0.037)	0.025 (0.033)	0.026 (0.033)		
Incomplete family	-0.018 (0.044)	-0.030 (0.043)	-0.031 (0.038)	-0.031 (0.038)		
Family income / 1000	-0.002** (0.000)	-0.0002 (0.000)	0.0004 (0.000)	0.001 (0.000)		
School specialization (=1 if any)	-0.081** (0.037)	-0.057 (0.036)	-0.008 (0.033)	-0.006 (0.032)		
Average monthly salary in a 'school' region	-0.00002** (0.000)		-0.00004*** (0.000)		-0.137*** (0.007)	
Average monthly salary in a 'university' region	0.00003*** (0.000)		0.00004*** (0.000)		0.112*** (0.007)	
The cost of living in a 'school' region	0.00009** (0.000)		0.0005*** (0.000)		1.049*** (0.046)	
The cost of living in a 'university' region	-0.00005 (0.000)		-0.0001*** (0.000)		-0.842*** (0.049)	
HHI in a 'school' region	-0.526 (0.343)		-0.454 (0.287)		-1668.979*** (265.790)	
HHI in a 'university' region	-0.082 (0.360)		0.389 (0.308)		1121.642*** (319.111)	
Interregional difference in salary		0.00003*** (0.000)		0.00004*** (0.000)		0.128*** (0.006)
Interregional difference in the cost of living		-0.0001*** (0.000)		-0.0001*** (0.000)		-0.972*** (0.045)
Interregional difference in HHI		0.280 (0.317)		0.445 (0.276)		1653.359*** (264.802)
Pseudo R^2	0.121	0.086	0.198	0.192	0.334	0.309
Number of observations	**905**	**905**	**907**	**907**	**1141**	**1141**
Sample	**Moscow school graduates excluded**				**All observations**	

Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For Models 13 and 14 R^2 is reported.

For all other aspects, the results for the subsample which does not contain Moscow school graduates are the same as for the entire sample with all observations. For the Models 1–12 hypotheses 1, 3, and 4 are fully confirmed, and hypotheses 2 and 5 are partially confirmed.

The results for the factors which explain the distance travelled (Models 13–14) are the following: male students travel longer distances than female students; USE results in Russian are a strong predictor of distance. For the regional economic conditions the results are similar as in the Models 1–12: students move to the regions with higher salaries and lower costs of living. HHI are significant for distance: the distance is greater if the student moves to the region with higher level of competition between universities. In this case all the hypotheses are confirmed.

Discussion

In this study we show that in Russia, as in other countries, there are individual, regional and educational factors, which influence the level of educational mobility. First, this means that financial aspects matter even under the unified admission process, and decreased transaction costs for university entry. The second result is the significant influence of regional educational characteristics: the unequal distribution and development of HEIs across regions is a driver of student mobility.

We have revealed a positive relationship between the results of USE and the applicant's probability of moving (hypothesis 1 is confirmed). In this case, the simplification of the admission process contributes to educational mobility, but even high achievers face some cultural, and more importantly, financial barriers, which can prevent educational migration. We find mother’s education level has a strong influence on the decision to move only for high-achievers. The level of cultural capital can contribute to student mobility for applicants who have the widest choice of where to apply. For family income there are ambiguous results, but because of the interregional differences the income, the effect may be expressed through macroeconomic indicators of regional economic development (hypothesis 2 is partially confirmed).

The characteristics of regional economic development have a strong influence on the mobility of applicants, i.e., individuals tend to evaluate not only the quality of education, but also the economy of the ‘university’ region. Therefore there is a strong significant positive impact of the average salary in the ‘university’ region on the probability of moving to the applicant, which may be a signal that applicants are seeking to stay in a more economically

advanced region after university graduation. In other words, they may compare costs and benefits of staying in the home region or moving to the new place (hypotheses 3 and 4 are confirmed).

The significance of financial factors, such as income, minimum wage and living standards highlights the importance of student support. However, the mechanisms of student aid in Russia are ill-developed. Despite the opportunity of studying with no tuition fees (which are covered by the government), other forms of student support (such as grants covering living expenses or student loans) are not widespread. We argue that the simplification of the admission system is not enough in the absence of such mechanisms.

The regional differences in characteristics of higher education markets raise questions about the equality of educational opportunity (hypothesis 5). There are regions which are characterized by more universities and, consequently, wider opportunities of university choice (Moscow, St. Petersburg); however, there are regions with few local HEIs. Together with the importance of the financial aspects, the regional differentiation of the higher education market creates unequal conditions for applicants from different regions. Thus, USE only partially solves the problem of equality of accessibility of higher education.

If the implementation of the new mechanisms of student support is costly to the state, it can invest in the development of the regional educational markets. As a result, the development of regional educational markets and the quality of education in local universities, can contribute to increased human capital in the region leading to economic growth in the future.

References

1. Alecke, B., Burgard, C., & Mitze, T. (2013). *The Effect of Tuition Fees on Student Enrollment and Location Choice : Interregional Migration, Border Effects and Gender Differences*. Ruhr Economic Paper, No. 404. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2221351
2. Becker, G. S. (1962). Investment in Human Capital : A Theoretical Analysis. *Journal of Political Economy*, *70*(5), 9–49. URL: http://www.jstor.org/stable/1829103
3. Becker, G. S., Hubbard, W. H. J., Murphy, K. M., Journal, S., Fall, N., Becker, G. S., & Murphy, K. M. (2010). Explaining the Worldwide Boom in Higher Education of Women Explaining the Worldwide Boom in Higher Education of Women. *Journal of Human Capital*, *4*(3), 203–241. doi: 10.1086/657914
4. Beine, M., Noël, R., & Ragot, L. (2014). Determinants of the International Mobility of Students. *Economics of Education Review*, *41*, 40–54. doi:

10.1016/j.econedurev.2014.03.003

5. Bessudnov A. R., Kurakin D. Ju., Malik V. M., & Janbarisova D. M. (2014). *The bulletin of the Russian longitudinal panel study of Trajectories in Education and Career. National panel: first wave (2011–2012)*, National Research University Higher School of Economics, Institute for Education, 117 (in Russian). URL: https://publications.hse.ru/preprints/145923569
6. Brezis, E. S., & Soueri, A. (2013). Mobility of Students and Quality of Higher Education: An Empirical Analysis of the 'Unified Brain Drain' model. *Working Papers, Bar-Ilan University, Department of Economics*, (No. 2013-11). URL: https://ideas.repec.org/p/biu/wpaper/2013-11.html
7. Chronister, J. L., & Martin, E. D. (1975). *Nonresident Student Enrollment in State Institutions of Higher Education: An Overview*. Virginia Univ., Charlottesville. Center for the Study of Higher Education. URL: http://eric.ed.gov/?id=ED107183
8. Etzioni, A. (1974). Interstate Integration of Students. *The Educational Forum*, *38*(2), 223–224. doi: 10.1080/00131727409338271
9. Fenske, R. H. (1972). *College Student Migration*. American Coll. Testing Program, Iowa City, IA. Research and Development Div. URL: http://eric.ed.gov/?id=ED079396
10. Fenske, R. H., Scott, C. S., & James, C. F. (1974). Recent Trends in Studies of Student Migration. *The Journal of Higher Education*, *45*(1), 61–74. doi: 10.2307/1980649
11. Galotti, K. M., & Mark, M. C. (1994). How do High School Students Structure an Important Life Decision? A Short-term Longitudinal Study of the College Decision-Making Process. *Research in Higher Education*, 35(5), 589-607. doi: 10.1007/BF02497089
12. Hübner, M. (2012). Do Tuition Fees Affect Enrollment Behavior? Evidence from a 'Natural Experiment' in Germany. *Economics of Education Review*, *31*(6), 949–960. http://doi.org/10.1016/j.econedurev.2012.06.006
13. Imbens, G., & Wooldridge, J. (2007). Difference-in-differences Estimation. *National Bureau of Economics Research Working Paper*
14. Kyung, W. (1996). In-Migration of College Students to the State of New York. *The Journal of Higher Education*, *67*(3), 349–358. doi: 10.2307/2943848
15. Leshukov, O., Platonova, O., & Semyonov, D. (2015). Does Competition Matter? Efficiency of Regional Higher Education Systems and Competition: Case of Russia. National Research University Higher School of Economics, *HSE Working papers*, No WP BRP 29/EDU/2015. URL:

https://www.hse.ru/pubs/share/direct/document/164812315

16. Long, J. F. (1977). Prospects for a Composite Demographic-Economic Model of Migration Forsubnational Projections. *Report of the Conference on Economic and demographic methods for Projecting Populations*, 153–169. Washington, DC: American Statistical Association. URL: http://www.popline.org/node/634049
17. Mak, J., & Moncur, J. E. T. (2003). Interstate Migration of College Freshmen. *Annals of Regional Science*, *37*(4), 603–612. doi: 10.1007/s00168-003-0130-4
18. Mchugh, R., & Morgan, J. N. (1984). The Determinants of Interstate Student Migration: A Place-to-Place Analysis. *Economics of Education Review*, *3*(4), 269–278. doi: 10.1016/0272-7757(84)90045-1
19. Mihi-Ramirez, A., & Kumpikaite, V. (2014). Economics Reason of Migration from Point of View of Students. *Procedia - Social and Behavioral Sciences*, *109*, 522–526. doi: 10.1016/j.sbspro.2013.12.500
20. Pekkarinen, T. (2012). Gender Differences in Education. *Nordic Economic Policy Review*, 1, 165–196.
21. Rodríguez, C., Ricardo, G., & Mesanza, B. (2011). The Determinants of International Student Mobility Flows : An Empirical Study on the Erasmus programme. *Higher Education*, *62*(4), 413–430. doi: 10.1007/s10734-010-9396-5
22. Rosenzweig, M. R. (2008). *Annual World Bank Conference on Development Economics 2008, Regional*. (P. Boris & J. Yifu Lin, Eds.), *Higher Education and International Migration in Asia: Brain Circulation*. The World Bank. doi: 10.1596/978-0-8213-7123-7
23. Thorn, K., & Holm-Nielsen, L. B. (2006). *International Mobility of Researchers and Scientists Policy Options for Turning a Drain into a Gain* (No. 2006/83). URL: http://siteresources.worldbank.org/INTLACREGTOPEDUCATION/Resources/UNUInternationalMobilityOfResearchersAndScientists.pdf
24. Tuckman, H. (1967). Determinants of College Student Migration. *Southern Economic Journal*, *33*(4), 577–581. doi: 10.1016/0176-2680(93)90013-K
25. Vakulenko E., Mkrtchyan N., & Furmanov K. (2011). Modeling Registered Migration Flows between Regions of the Russian Federation. *Applied Econometrics*, *21*(1), 35–55 (in Russian). URL: https://ideas.repec.org/a/ris/apltrx/0011.html

Ilya Prakhov
National Research University Higher School of Economics (Moscow, Russia). International Laboratory for Institutional Analysis of Economic Reforms, Center for Institutional Studies. Research Fellow
E-mail: ipra@inbox.ru

Maria Bocharova
National Research University Higher School of Economics (Moscow, Russia). International Laboratory for Institutional Analysis of Economic Reforms, Center for Institutional Studies. Research Assistant
E-mail: mbocharova@hse.ru