

# Democratizing Access to Higher Education: The Consequences of the Unified State Exam Reform

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# College Admission Systems

- Many countries use *decentralized college admission policies*: applicants required to take institution-specific entrance exams
  - ▶ In the US, students have to complete college-specific requirements in addition to taking SATs
  - ▶ Other cases: Japan, Finland, Israel, South Korea and Brazil (Avery, Roth, and Lee, 2014; Pekkala Kerr et al., 2015)
- Because of the large application costs, students are prevented from applying to more than a small number of universities
- In contrast, in many countries the application and admission processes are centralized with national exams as the main criterion for admissions
  - ▶ China, Taiwan, Italy, Belgium, Norway, and Germany

# College Admission Systems

- The welfare and sorting effects of university-specific versus national university entrance exams have been investigated from a theoretical perspective (e.g., Chade, Lewis, and Smith, 2014; Che and Koh, 2016; Hafalir et al., 2018)
- But there is little (if any) empirical evidence of the effects on students and parents

# The Unified State Exam

- The unified state exam (USE) consists of a series of standardized tests taken by Russian students toward the end of their last year of high school
- Students can choose which tests to take (14 different subjects are available)
- Exams of Russian language and Math are mandatory requirements for high school graduation

# The Unified State Exam

- Following a major reform implemented in 2009, most university admission decisions have to be based on USE scores
- Each higher education program decides which subject tests will be required and advertises minimum threshold scores
- Only students scoring above the threshold in each of the required subjects may apply to the program
- Applicants are ranked according to their total score (the simple sum of scores in the required tests)
- Final admission decisions are made according to this ranking until either vacancies are filled or the pool of eligible applicants is exhausted

# The Old System

- Prior to the reform, admission procedures in Russian higher education institutions were very heterogeneous
  - ▶ Each university developed its own entrance examinations, administered and graded in-house
  - ▶ Many of these exams were highly idiosyncratic, often involving an extensive oral examination conducted by a special committee
- Obvious disadvantages
  - ▶ Admission exams had to be taken in person, so students from distant locations had to incur the cost of travel to examination venues
  - ▶ Notoriously ample opportunities for corruption and favouritism
- Attending the most prestigious programs in Moscow and St. Petersburg was very difficult

# Unequal Access to Higher Education

- 1 Students from low SES considerably less likely to apply to college and gain a degree relative to high SES
  - ▶ Example from 2006 RLMS: 65% of 25–29 year old individuals reported to have a university qualification if their father also had a university degree, as opposed to only 20% among those whose father had no such qualification
  - ▶ This differential is twice as large as the college gap observed in the U.S. (Carneiro and Heckman, 2002) and comparable to the black–white male college graduation rate differentials in the 1960s!
  - ▶ Borisov and Pissarides (2016) report similarly stark inter-generational coefficients for higher education
- 2 Geographic Origin
  - ▶ Before 2009, less than 20% of the Russian population was born in the ten largest cities, yet this group comprised more than 60% of all university graduates
  - ▶ Only one in ten graduates born in small cities, towns, and rural areas, although they account for about half the population

# The Reform

- The USE was the center piece of a reform meant to upend the system
- Several functions:
  - ① To **reduce the cost of applying** to college for students outside of the main educational centers
    - ★ Students spared from preparing for program-specific entry exams and from repeated examinations
    - ★ Costs materialized in terms both of time and money
  - ② To eliminate the host of illegitimate practices associated with the old system by moving the administration and grading of the exams away from higher education institutions
  - ③ To tighten the screws on high schools



# This Paper

- We investigate whether the USE reform had an effect on student mobility across Russia.
  - ① We contrast mobility for students in their last year of high school with those of children in a similar age range.
    - ★ We find sizeable and statistically significant increases in the probability of leaving the parental home of treated students.
    - ★ Geographic heterogeneity: effect concentrated in small cities and towns.
  - ② The USE reform was not expected to affect the mobility of high school students in Moscow and St. Petersburg.
    - ★ We find comparable effects using this alternative control group.
  - ③ A different measure of mobility (changes in residence location for the purpose of starting university studies)
    - ★ Control for a full set of characteristics related to the higher education institution & field of study.
    - ★ College students 8–12 pp. more likely to come from a location other than the city where their university is based.

# Other Findings

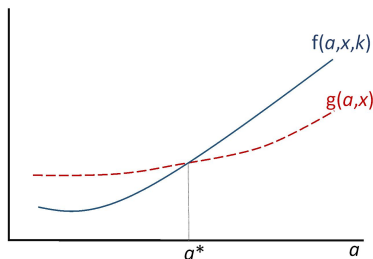
- Mechanisms
  - ▶ Highly educated parents.
  - ▶ Knowledge of the reform/College attendance intentions.
  - ▶ Geographic distance to regional centers.
- Related outcomes: prior investments in human capital acquisition and parental transfers post-migration.
- No effects on parental labor supply or divorce.
- No evidence of unfavorable labor market outcomes among young adults who do not move.

## Related Literature

- College application decisions in the U.S. (likely to be suboptimal, especially among low-income students)
  - ▶ Ellwood and Kane (2000), Bowen, Chingos, and McPherson (2009), Hoxby and Avery (2013), Dillon and Smith (forth.)
- Providing prospective students with salient information (e.g. the range of colleges available) can lead to substantial changes in college application choices
  - ▶ Bettinger, Long, Oreopoulos and Sanbonmatsu (2012), Hoxby and Turner (2013), Pallais (2015), Carrell and Sacerdote (forth.)
  - ▶ Unlike these papers, we study a country-wide reform to the admissions system
- Literature on admission rules: SAT/ACT-based rules vs. high-school grades
  - ▶ A curriculum-based type test is likely to produce more socioeconomic diversity on campus
  - ▶ Geiser and Santelices (2007), Espenshade and Chung (2010)

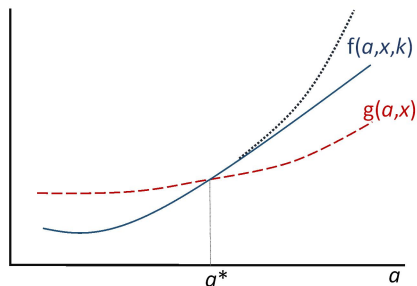
# Conceptual Framework

- Our setup is based on standard models of migration and education (Sjaastad, 1962, Becker, 1964, Mountford, 1997).
- Country composed of two regions: core (elite universities) and periphery.
- Students in the periphery compare net benefits of staying vs. applying to college in the core.
- In an interior solution, there will be a critical level  $a^*$  such that only individuals with higher-than-critical ability levels apply and eventually move away.



# The Effect of the Reform

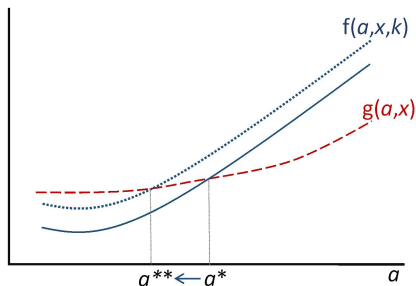
- The reduction in cost will **not** necessarily lead to an increase in migration rates.



- Two important implications: potential heterogeneity of responses and relatively high-ability margin of adjustment

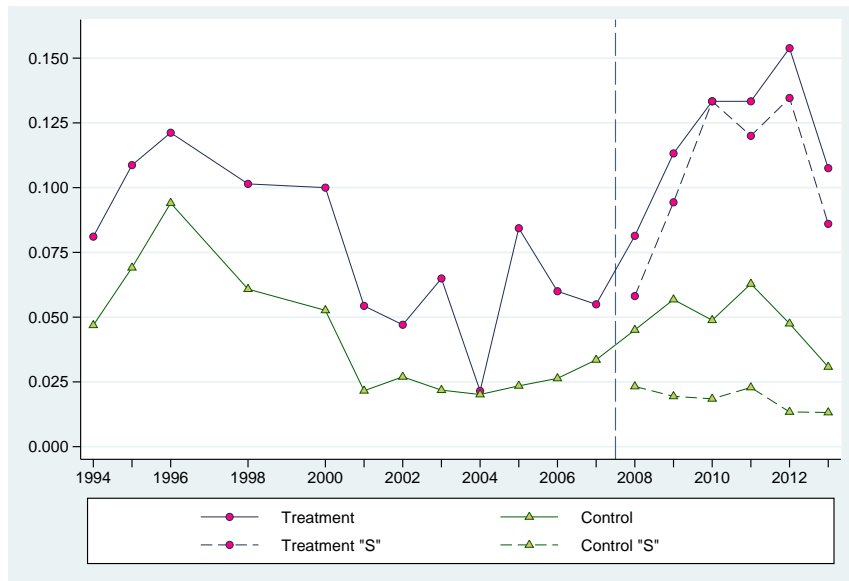
# The Effect of the Reform

- The reduction in cost will **not** necessarily lead to an increase in migration rates.



- Two important implications: potential heterogeneity of responses and relatively high-ability margin of adjustment

# Fraction of Children Leaving the Parental Home



# Effect of the USE Reform on Student Mobility

	Flexible Common Trend			Group-specific Linear Trend			PSM
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
<b>Full Sample</b>							
$\beta$	0.041** (0.018)	0.037** (0.017)	0.042** (0.018)	0.038 (0.028)	0.035 (0.027)	0.022 (0.033)	0.040** (0.018)
$N$	13,710	13,710	13,710	13,710	13,710	13,710	13,709
<b>Moscow &amp; St. Petersburg</b>							
$\beta$	-0.014 (0.023)	-0.020 (0.022)	-0.009 (0.030)	0.071 (0.068)	0.069 (0.065)	0.059 (0.065)	-0.005 (0.022)
$N$	1,373	1,373	1,373	1,373	1,373	1,373	1,369
<b>Other Major Cities</b>							
$\beta$	0.057** (0.022)	0.049** (0.022)	0.039 (0.027)	0.018 (0.031)	0.013 (0.031)	0.015 (0.045)	0.049** (0.023)
$N$	4,015	4,015	4,015	4,015	4,015	4,015	4,013
<b>Small Cities and Towns</b>							
$\beta$	0.119*** (0.041)	0.115*** (0.040)	0.128*** (0.041)	0.163*** (0.053)	0.157*** (0.056)	0.159** (0.065)	0.132*** (0.041)
$N$	3,801	3,801	3,801	3,801	3,801	3,801	3,776
<b>Rural Areas</b>							
$\beta$	-0.002 (0.027)	-0.008 (0.026)	0.012 (0.027)	-0.042 (0.052)	-0.040 (0.051)	-0.070 (0.054)	-0.032 (0.037)
$N$	4,521	4,521	4,521	4,521	4,521	4,521	4,504
Controls	No	Yes	Yes	No	Yes	Yes	
Sibling FE	No	No	Yes	No	No	Yes	

*Note:* The treatment group consists of students in the last year of high school. The control group consists of individuals aged 15–19 who are not in the last year of high school. Robust standard errors clustered at population center level are in parenthesis.



# Sensitivity Checks

	Alternative Control Group		Falsification Test		Duration Model	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Moscow and St. Petersburg	-0.008 (0.038)	0.037 (0.117)	-0.012 (0.032)	-0.032 (0.032)	-0.002 (0.017)	-0.017 (0.025)
<i>N</i>	517	517	930	930	1,143	1,124
Other Major Cities	0.058** (0.024)	0.063 (0.053)	0.004 (0.018)	-0.008 (0.026)	0.038** (0.017)	0.036** (0.015)
<i>N</i>	1,504	1,504	2,616	2,616	4,767	4,727
Small Cities and Towns	0.102** (0.049)	0.104 (0.095)	-0.058 (0.038)	-0.043 (0.034)	0.072** (0.036)	0.070** (0.035)
<i>N</i>	1,690	1,690	2,474	2,474	4,361	4,343
Rural Areas	-0.027 (0.030)	-0.068 (0.043)	0.019 (0.042)	0.059 (0.042)	-0.013 (0.026)	-0.021 (0.026)
<i>N</i>	1,672	1,672	2,781	2,781	5,050	5,037
Wave Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	No	Yes
Sibling FE	No	Yes	No	Yes	No	No

*Note:* Columns (i) and (ii) report estimates when the control group is restricted to vocational and technical school students. Columns (iii) and (iv) report estimates of the effect of a “placebo reform” imposed to occur in 2002 (sample restricted to the period 1994–2007). Columns (v) and (vi) report the marginal effect obtained from a (logit) discrete time duration model.

# Heterogeneous Effects (Small Cities and Towns)

	Level	FE
Female	-0.032 (0.072)	-0.035 (0.082)
Russian ethnicity	0.050 (0.096)	0.049 (0.103)
Born Elsewhere <sup>a</sup>	-0.188*** (0.060)	-0.115 (0.083)
In the top half of the income distribution	-0.040 (0.083)	-0.070 (0.093)
Both parents have university degrees	0.203** (0.094)	0.225 (0.151)
<i>N</i>	3,801	3,801

*Note:* The table shows the estimate on  $d \times I(t \geq s)$  interacted with the variable of interest. Robust standard errors clustered at population center level are in parenthesis.

# Mobility of Students in Their Last Year of High-school

	Equation (2)	Equation (3) Restricted	Equation (3) Full
	(i)	(ii)	(iii)
Regional Centers ( $\widetilde{\beta}_1$ )	0.056* (0.030)	0.034 (0.031)	0.057* (0.030)
Small Cities & Towns ( $\widetilde{\beta}_2$ )	0.158*** (0.049)		0.158*** (0.058)
Rural Areas ( $\widetilde{\beta}_3$ )	0.006 (0.036)		-0.038 (0.041)
Effect of Distance:			
Baseline ( $\pi$ )		0.003 (0.006)	0.006 (0.006)
Common Effect ( $\vartheta$ )		0.020** (0.008)	
Small Cities and Towns ( $\vartheta_2$ )			-0.000 (0.011)
Rural Areas ( $\vartheta_3$ )			0.036* (0.021)
<i>N</i>	1,547	1,547	1,547

*Note:* Students residing in Moscow and St. Petersburg are the control group. Other locations are considered treated. Robust standard errors clustered at population center level are in parenthesis.

# College Attendance Intentions

	Flexible Common Trend			Group-Specific Time Trend		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Moscow and St. Petersburg <i>N</i>	-0.080 (0.182) 276	-0.136 (0.187) 276	0.148 (0.612) 276	0.071 (0.305) 276	0.017 (0.308) 276	0.280 (0.720) 276
Other Major Cities <i>N</i>	-0.023 (0.083) 903	-0.056 (0.076) 903	-0.029 (0.178) 903	-0.048 (0.129) 903	-0.065 (0.121) 903	-0.217 (0.198) 903
Small Cities and Towns <i>N</i>	0.236** (0.105) 863	0.214* (0.112) 863	0.225 (0.164) 863	0.308** (0.126) 863	0.314** (0.136) 863	0.190 (0.235) 863
Rural Areas <i>N</i>	-0.013 (0.063) 968	0.052 (0.067) 968	-0.033 (0.115) 968	-0.008 (0.093) 968	0.024 (0.089) 968	-0.097 (0.174) 968
Controls	No	Yes	Yes	No	Yes	Yes
Sibling FE	No	No	Yes	No	No	Yes

*Note:* The dependent variable is an indicator equal to 1 if the student expects to attend university (available for RLMS rounds 2006–2014). All high-school students are considered treated. Full-time students 14-19 not in high-school or university are used as control group.

# Mobility Prior to College

	Simple DD (i)	Flexible Common Trend (ii)	Group-Specific Time Trend (iii)	PSM (iv)
$\lambda$	0.115*** (0.037)	0.081*** (0.029)	0.114** (0.051)	0.109** (0.033)
$N$	3,610	3,610	3,610	3,595

*Note:* The dependent variable is an indicator equal to 1 if the individual changed their residence location for the purpose of starting university studies. Robust standard errors are in parentheses. Column (i) shows the estimate without time trends and without control variables. Columns (ii) and (iii) include, respectively, a flexible common time trend and group-specific linear time trends, as well as the controls for individual and higher education program characteristics. The estimate in column (iv) is obtained applying PSM on these same characteristics.

# Heterogeneous Effects on Mobility Prior to College

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A. Gender	
$\lambda$ (base = Male)	0.133*** (0.045)
Female	-0.085 (0.058)
B. Ethnicity	
$\lambda$ (base = Non-Russian)	0.203*** (0.0683)
Russian	-0.143* (0.075)
C. Mother's Education	
$\lambda$ (base = No higher education)	0.077** (0.030)
Mother has university degree or more	0.094 (0.138)
D. Father's Education	
$\lambda$ (base = No higher education)	0.082*** (0.030)
Father has university degree or more	0.012 (0.166)

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*Note:* Relevant characteristics interacted with  $D_{it}$ ,  $I(t \geq 2009)$ , and  $D_{it} \times I(t \geq 2009)$ . The dependent variable is an indicator equal to 1 if the individual changed their residence location for the purpose of starting university studies. Robust standard errors are in parentheses. All regressions include a fully flexible common time trend, as well as the control variables.

# Heterogeneous Effects on Mobility Prior to College

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E. University Location	
$\lambda$ (base = Moscow & St Petersburg)	0.131** (0.055)
Other major cities	-0.062 (0.071)
Small cities and towns	-0.076 (0.076)
F. Field of Study	
$\lambda$ (base = Natural and social sciences)	0.165*** (0.062)
Business, economics, and law	-0.102 (0.075)
Education	-0.323*** (0.125)
Engineering	-0.040 (0.087)
G. University Ranking	
$\lambda$ (base = 31+)	0.079*** (0.030)
In top 30	0.049 (0.091)

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*Note:* Relevant characteristics interacted with  $D_{it}$ ,  $I(t \geq 2009)$ , and  $D_{it} \times I(t \geq 2009)$ . The dependent variable is an indicator equal to 1 if the individual changed their residence location for the purpose of starting university studies. Robust standard errors are in parentheses. All regressions include a fully flexible common time trend, as well as the control variables.

## Other Outcomes (Small Cities and Towns)

	Flexible Common Trend (i)	Group-Specific Time Trends (ii)
A. Monetary transfers to children [mean of dep. var. = 0.302] <sup>a</sup>		
$\phi$	0.150** (0.063)	0.232*** (0.074)
$N$	3,465	3,465
B. Household expenditure share on education [mean of dep. var. = 0.032] <sup>b</sup>		
$\phi$	0.022*** (0.006)	0.0062 (0.0125)
$N$	3,914	3,914
C. Father's monthly hours of work [mean of dep. var. = 140.6] <sup>c</sup>		
$\phi$	-3.1 (9.2)	18.3 (12.4)
$N$	2,771	2,771
D. Father's labor force participation [mean of dep. var. = 0.915] <sup>d</sup>		
$\phi$	-0.021 (0.032)	0.000 (0.052)
$N$	2,771	2,771

*Note:*  $\beta$  is the treatment effect estimate obtained from regressions that include all the control variables.  $N$  is the number of household-wave observations.

<sup>a</sup> 'Monetary transfers to children' takes value 1 if the household makes a transfer to a child outside the household in any of the two RLMS waves following the child's move out of the household, and 0 otherwise.

<sup>b</sup> Share of household expenditures in education over the total household nondurable consumption. The regressions also control for the log of total nondurable expenditures.

<sup>c</sup> Measured as actual total hours worked in all jobs during the month before interview.

<sup>d</sup> Equals 1 if in work, and 0 otherwise.



# Other Outcomes (Small Cities and Towns)

	Flexible Common Trend (i)	Group-Specific Time Trends (ii)
E. Mother's monthly hours of work [mean of dep. var. = 123.] <sup>c</sup>		
$\phi$	1.8 (7.2)	-0.3 (14.6)
$N$	3,708	3,708
F. Mother's labor force participation [mean of dep. var. = 0.873] <sup>d</sup>		
$\phi$	0.003 (0.028)	-0.005 (0.052)
$N$	3,708	3,708
G. Parental divorce [mean of dep. var. = 0.028] <sup>e</sup>		
$\phi$	-0.021 (0.017)	0.005 (0.031)
$N$	2,795	2,795
H. Spillover effects [mean of "work" = 0.371; mean of "study" = 0.512] <sup>f</sup>		
$\phi$ (Work)	0.036 (0.047)	0.035 (0.071)
$\phi$ (Study)	-0.067 (0.057)	-0.065 (0.083)
$N$	3,364	3,364

Note:  $\beta$  is the treatment effect estimate obtained from regressions that include all the the control variables.  $N$  is the number of household-wave observations.

<sup>e</sup> Equals 1 if one of the two parents leaves the household within one year of the interview at time  $t$  in households in which both parents are present at  $t$ , and 0 otherwise.

<sup>f</sup> Each figure is the estimated treatment effect of the USE reform obtained from MNL models. The base category is inactivity. The household sample is restricted to individuals who co-reside with their parents in the following survey round.

# Conclusion

- We look at the effect of an important reform in the Russian higher education system
- We find that the introduction of the USE significantly affected the mobility of students
- This finding is robust to the inclusion of multiple controls, household fixed effects, different definitions of the control group, and different specifications of the estimating equation.
- Similar findings result from using retrospective data
- The reform induced a substantially greater mobility among high school graduates living in small cities and towns
  - ▶ Pent-up demand for college enrolment: small Russian cities and towns do not have elite universities and their high schools are generally of high quality

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