The Consequences of the Unified State Exam Reform

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LIRT Seminar, December 2015

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, university admission decisions have to be based exclusively on USE scores
  - Minor exceptions: “olympiads” and other specially designed competitions
- 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
  - Different departments or institutes within a university would have very different admission criteria.
- 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

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
  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

The Reform

Table : The Introduction of the USE

Year	Particip. Regions	# of Subjects	# of Takers (any test)	# of Takers (excluding Russian and Math)	# of High School Graduates
2001	5				
2002	16	8	260,999	18,103	1,332,700
2003	47	12	644,178	73,298	1,370,700
2004	65	13	798,031	106,095	1,394,300
2005	78	13	823,912	108,734	1,312,100
2006	78	13	798,215	129,425	1,213,800
2007	82	13	952,888	140,966	1,105,300
2008	84 (all)	13	1,089,513	157,001	959,000

Evidence from Migration Data

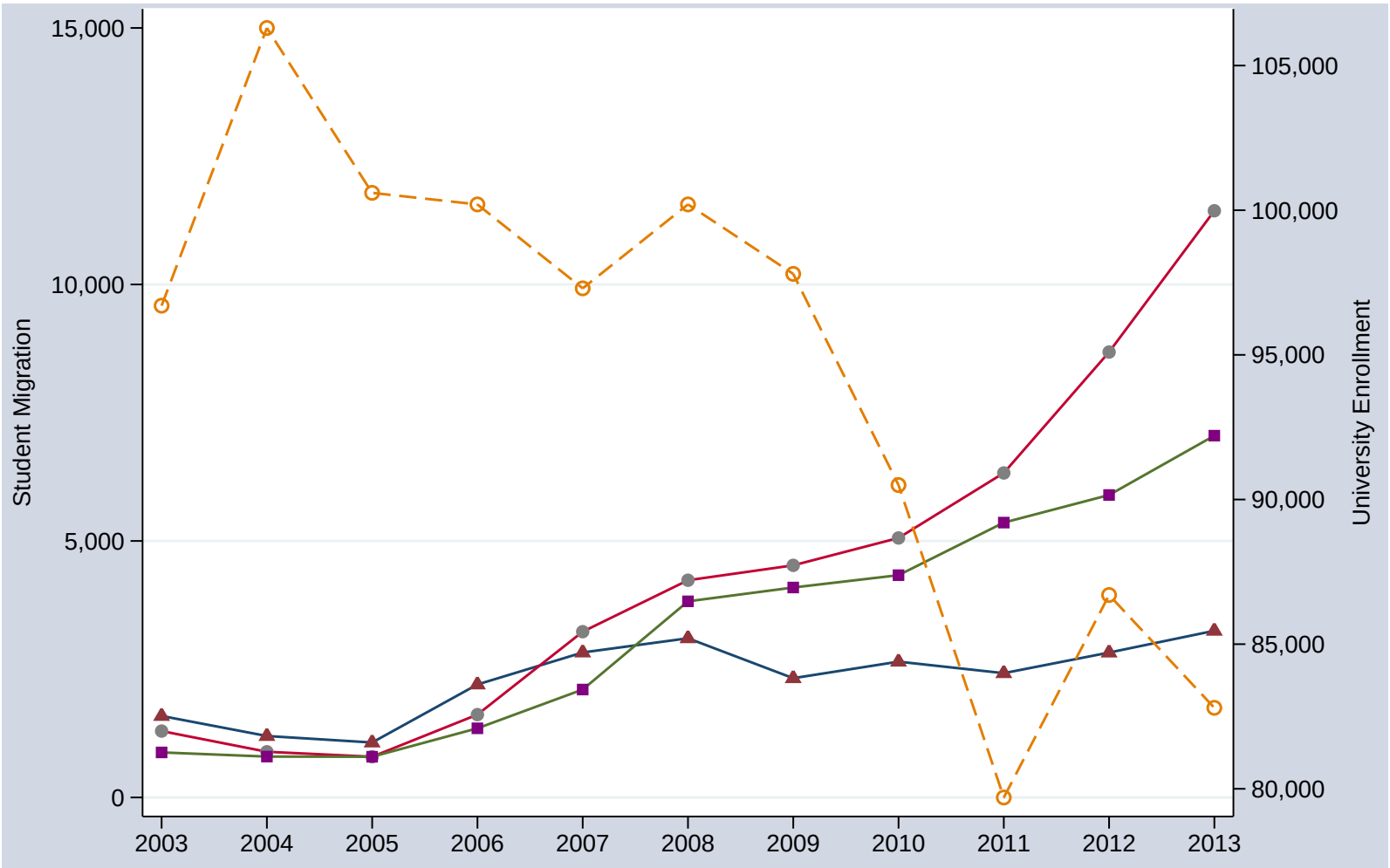
- Limited data on internal migration flows in Russia
  1. Administrative records compiled by the Federal Migration Service (voluntary registrations; aggregates only)
  2. Internal migration for the purpose of studying
  3. Destination cities: Moscow, St. Petersburg, and "Other" (Chelyabinsk, Ekaterinburg, Kazan, Krasnoyarsk, Nizhniy Novgorod, Novosibirsk, Omsk, Perm, Rostov-on-Don, Samara, Saratov, Volgograd, and Voronezh)
- University enrollment figures from the Ministry of Education, based on reports by the institutions themselves

Student Migration and University Enrollment

Figure : Moscow

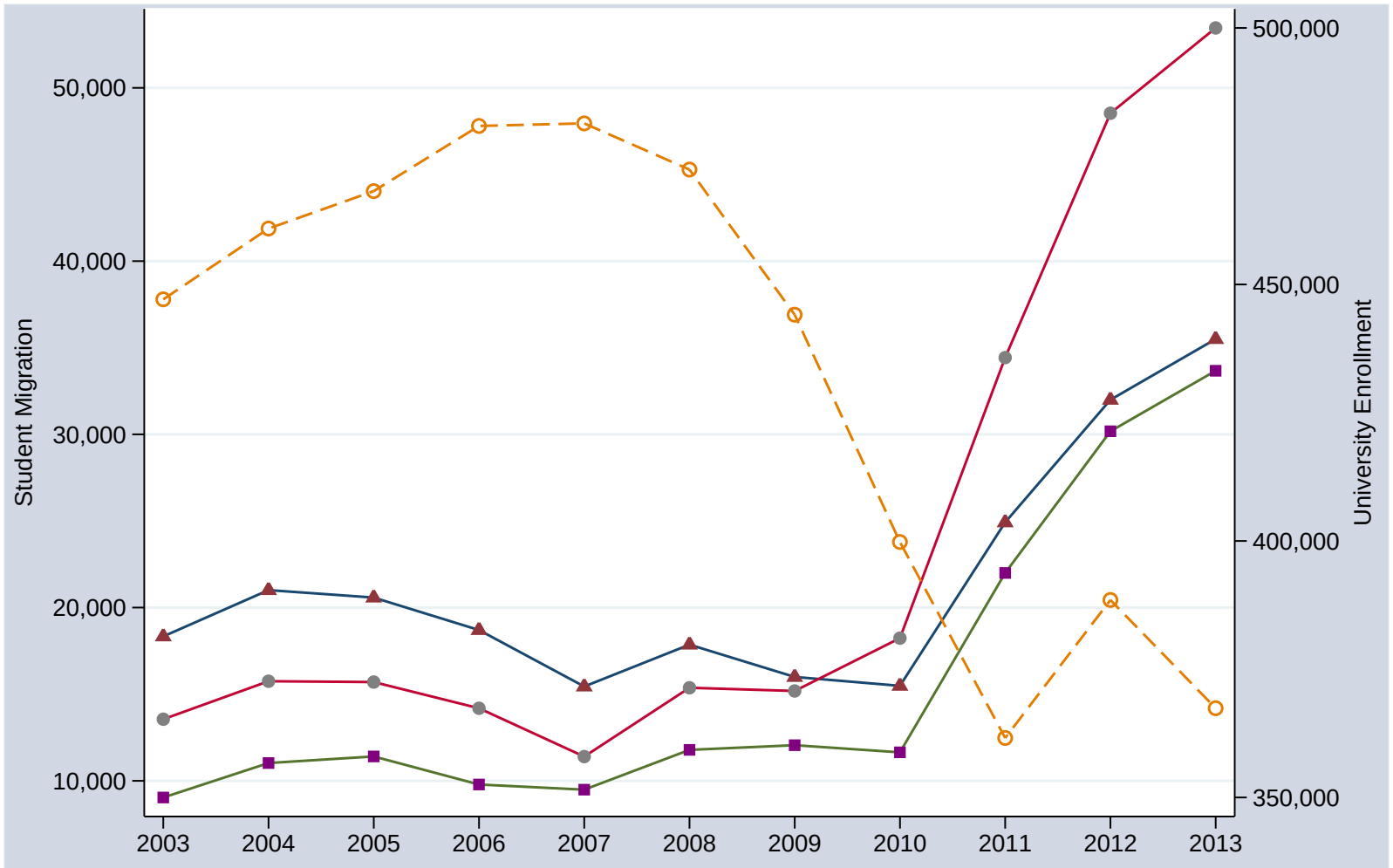
Student Migration and University Enrollment

Figure : Saint Petersburg



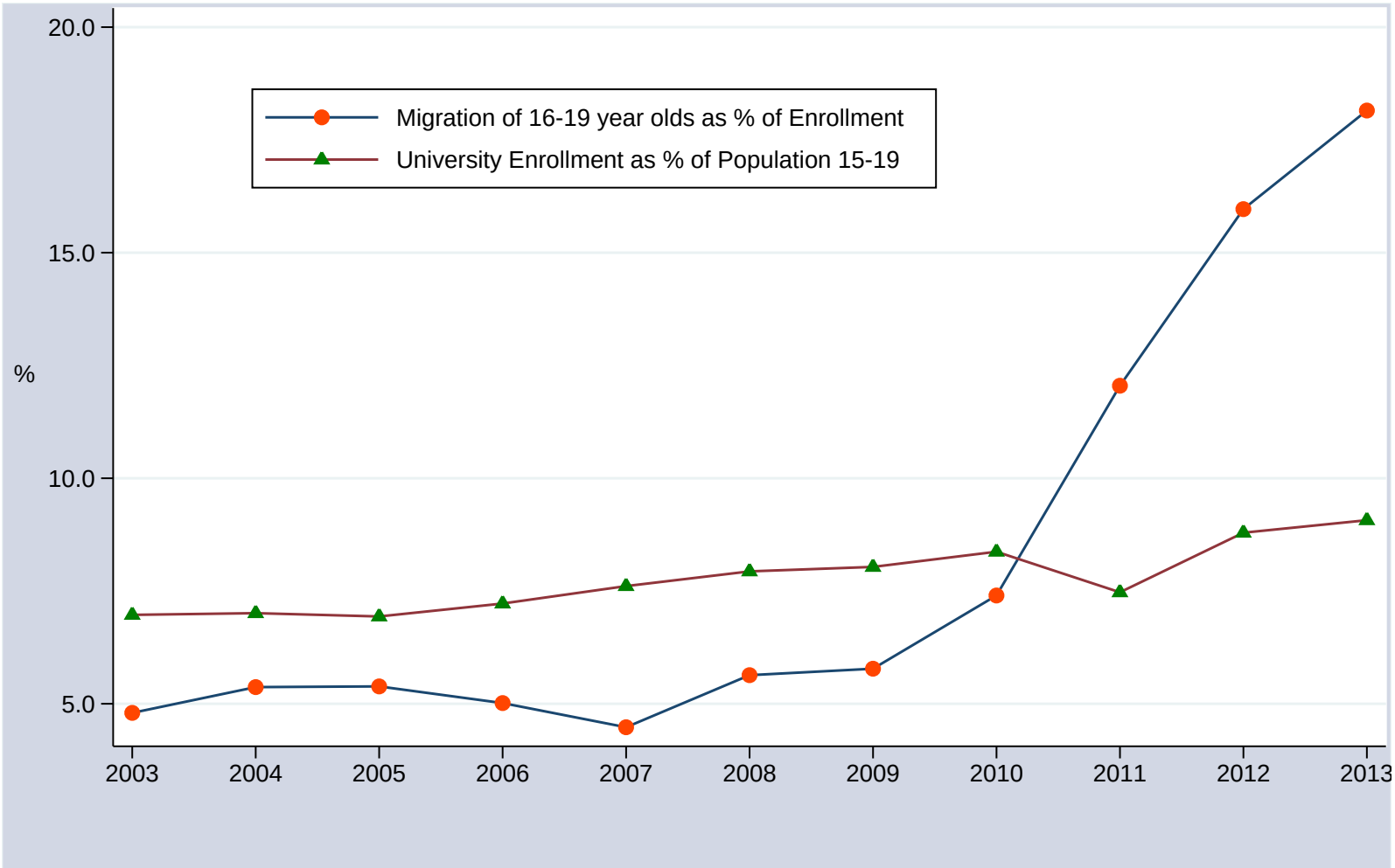
Student Migration and University Enrollment

Figure : Other Major Cities



Student Migration and Enrollment: relative magnitudes

Figure : Migration and Enrollment in 15 large Russian cities

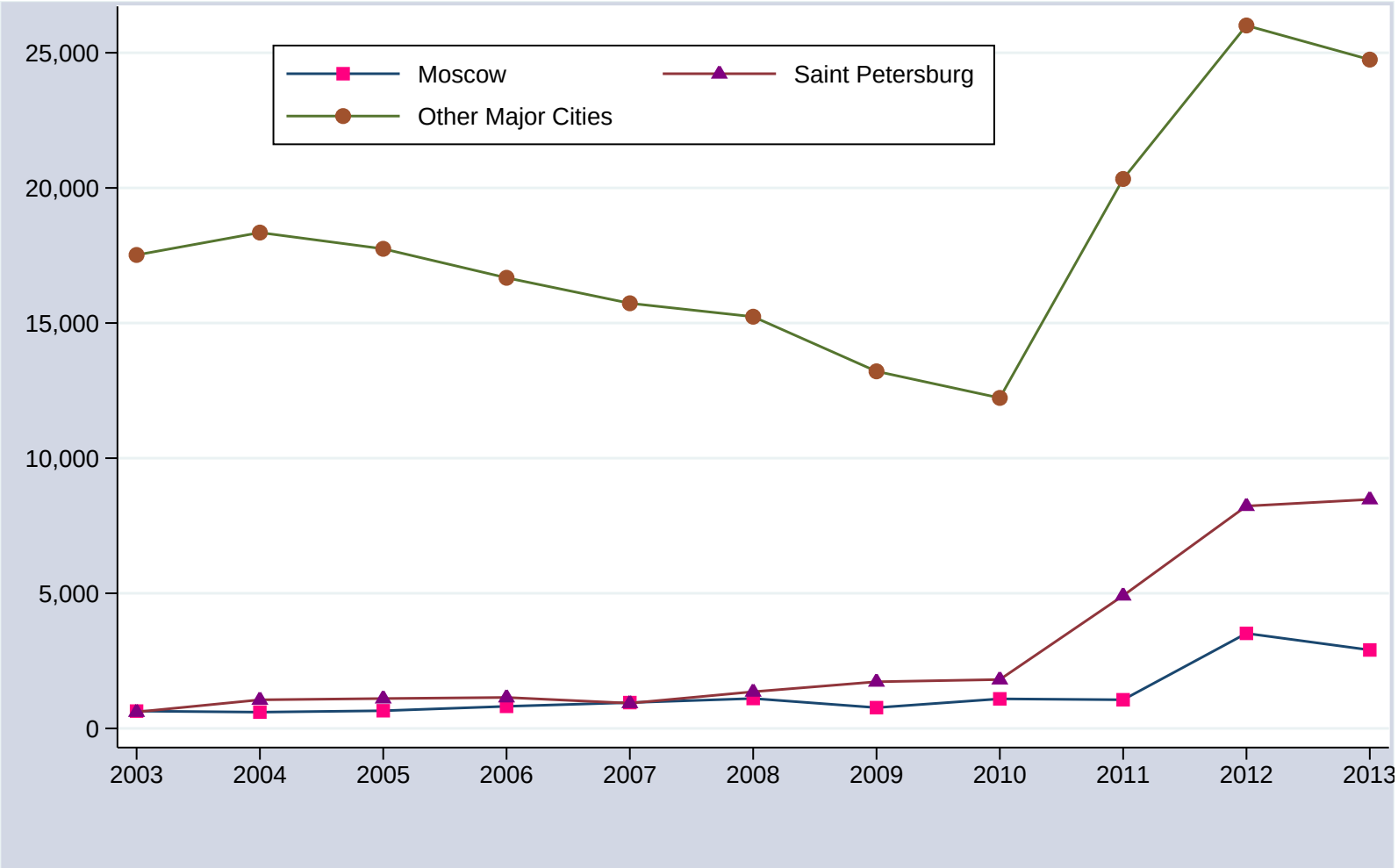


Evidence from Migration Data

- Preliminary evidence is consistent with a story of relative success for the USE (the % of migrant students more than tripled)
- But there are also reasons for caution
  1. The timing is not quite right: in SP migration flows started to increase in 2007–2008; in other locations the increase only starts in 2010
  2. Some first year college students surely belong to the 16–17 year old group but in neither Moscow nor SP did migration flows in this age group increase
  3. There is some evidence that migration flows unrelated to studying were also increasing

Migration for Work

Figure : Internal Migration for the Purpose of Starting a New Job (18–24)



Evidence from Migration Data

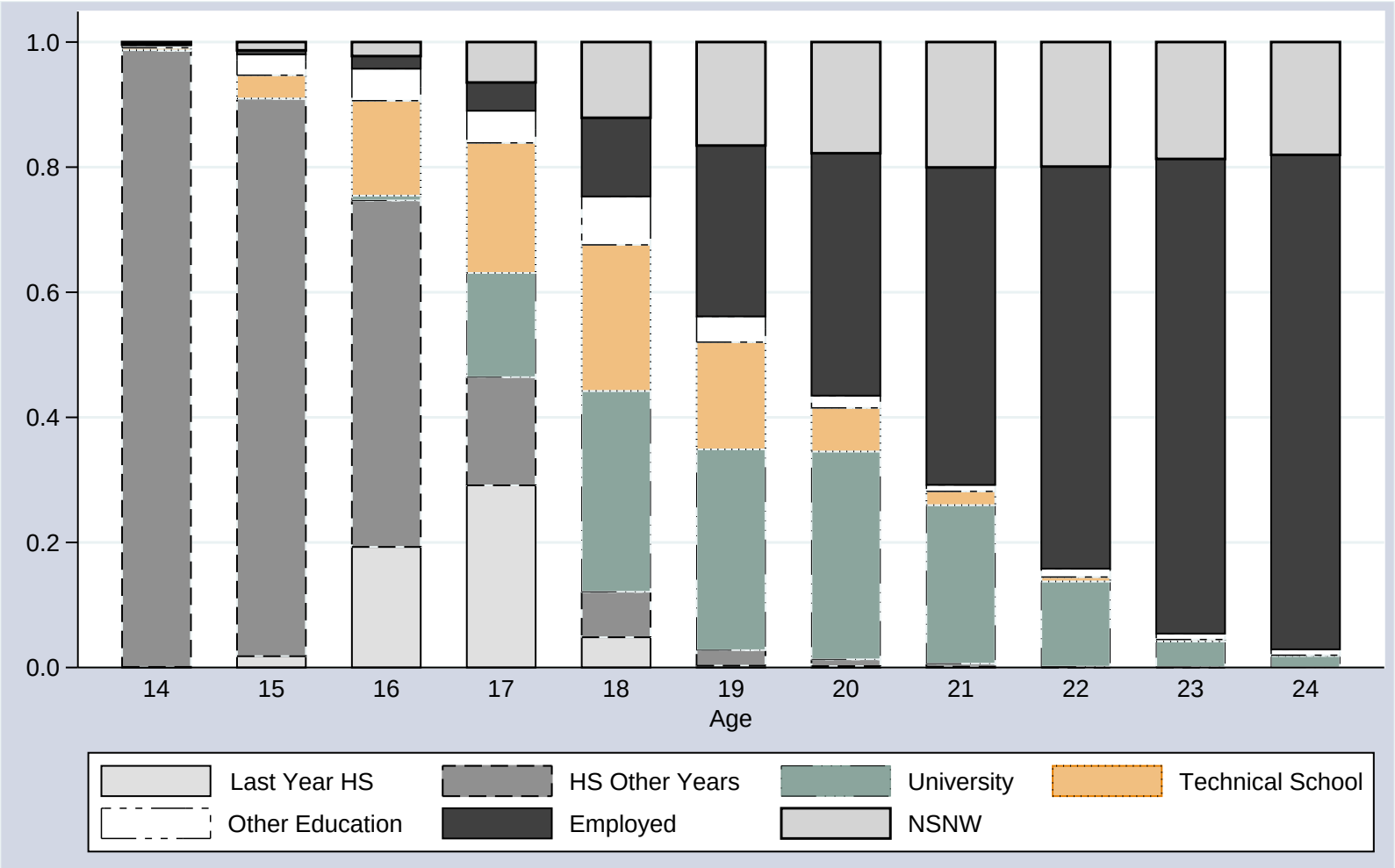
- Unfortunately migration statistics at the point of destination are only available in aggregate form, so it is not possible to further develop the analysis in this way
- We focus instead on the analysis of behavioral changes at the (potential) origin of migration flows

Identification Strategy

- We apply a differences-in-differences approach
  - The treatment group consists of households with a child in the last year of high school
  - Hypothesis: the reduction in the cost of gaining admission to non-local universities made it more likely for children in the treatment group to leave their parent's home within the year after interview
  - Since there may be underlying trends in the probability of moving out and there may be other policy or economic shocks that affect migration decisions, we use control groups to allow us to isolate the impact of the USE reform from other factors
  - A good control group is similar in its characteristics to the the treatment group, making it likely to respond similarly to any underlying trends or shocks, but does not receive treatment

Control Group

Figure : Main Activity of Children Ages 14–24 Living with Parent(s)



Control Group Definition

- We construct three different control groups
  1. Households with a child 15–24 and not treated
  2. Households with a child 15–19 and not treated
  3. Households with a child 15–19 that is in full time education and not treated

Difference in differences

- The DID estimate of the effect of the USE reform on mobility is the difference between the change in the probability of moving out for children in the last year of high school and the corresponding change for children in the control group
- The main identifying assumption is that there are no differences in the unobservable underlying trends in migration rates between the treatment and control groups
- In addition, our identification strategy actively controls for a number of observable factors which might affect migration rates

$$y_{ht} = \alpha_t + \beta_1 treat_{ht} + \beta_2 treat_{ht} \times post_t + \mathbf{X}_{ht}\gamma + \varepsilon_{ht} \quad (1)$$

Difference in differences

- Some of the determinants of the migration rate might differentially affect treatment and control groups yet be unobservable to us
  - As a way to insure against this possibility, we estimate versions of equation (1) that include household level fixed effects
  - The identification of the treatment effect in this case relies on the comparison of moving-out probabilities of siblings within a household
- Because the most prestigious universities in Russia are located in Moscow and Saint Petersburg, we would not expect the introduction of the USE to have affected moving out probabilities in these two cities
  - As a final robustness test, we estimate versions of equation (1) where we interact $treat_{ht}$ and $treat_{ht} \times post_t$ with location indicators
  - We expect all of the effect to come from locations other than Moscow and Saint Petersburg

Data

- Our data come from the Russian Longitudinal Monitoring Survey (RLMS)
  - Household survey based on the first national probability sample drawn in the Russian Federation
  - We use all available rounds of the study: yearly interviews over the period 1994–2014 (minus 1997/9)
  - Follows a dwelling or address and not households or individuals
  - Creating a household panel requires overcoming two challenges
    1. Some households split across rounds
    2. Households sometimes do not participate in the study for a number of rounds and then return

Sample selection

- We only keep households where the reference person lives together with (at least) one child
- If one these children is in the last year of high school, then the household is considered part of the treatment group
- Other households are kept in the sample only if they qualify for membership in the control group

Sample

Table : Treatment and Control Groups Sizes by Year

Year	Control 1	Control 2	Control 3	Treatment
1994	865	565	306	78
1995	843	564	287	60
1996	812	535	307	80
1998	810	550	472	74
2000	806	553	441	90
2001	896	611	486	95
2002	923	630	510	89
2003	940	641	523	84
2004	981	656	517	97
2005	943	618	478	96
2006	1201	741	581	83
2007	1162	680	510	94
2008	1071	596	459	93
2009	1081	590	488	59
2010	1555	809	628	110
2011	1496	755	633	122
2012	1458	784	677	101
2013	1311	740	647	101
2014	1078	600	522	91
Total	20,232	12,218	9,472	1,697

Notes: Number of observations in the treatment and control groups.

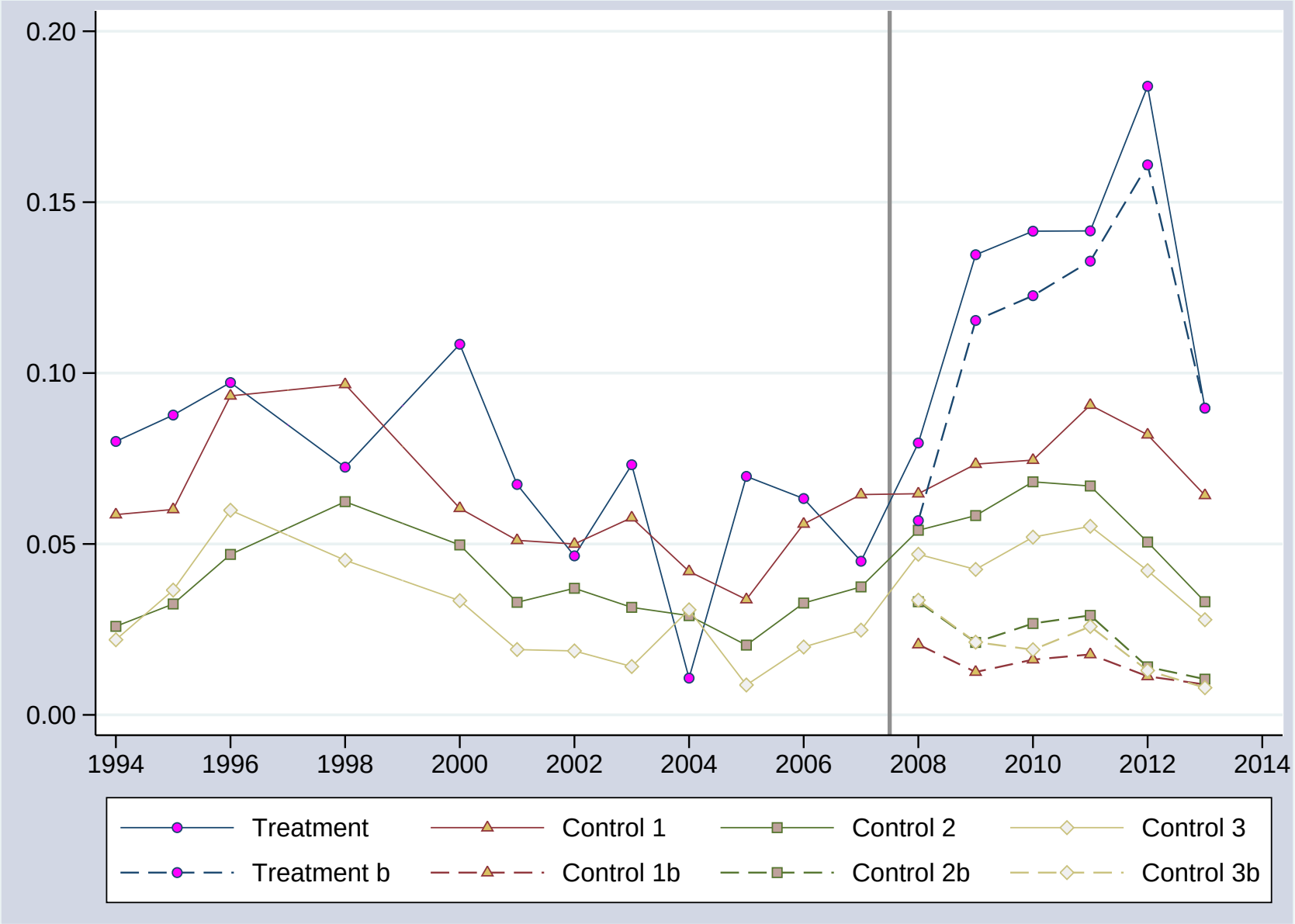
Descriptive Statistics

Variable	Control 1	Control 2	Control 3	Treatment
Household Size	3.80	3.86	3.84	3.96
# Siblings 0-6	0.06	0.09	0.10	0.10
# Siblings 7-14	0.26	0.34	0.33	0.36
# Siblings 15-19	0.07	0.11	0.13	0.20
# Siblings 20-24	0.16	0.19	0.18	0.17
# Siblings 25 and older	0.12	0.06	0.06	0.06
Single Parent	25.5%	22.7%	22.3%	18.5%
# Other Relatives	0.24	0.15	0.12	0.11
# “Grand parents”	0.14	0.14	0.15	0.14
Parents Average Age	46.5	44.2	43.8	44.0
Home Owners	92.1%	90.7%	91.2%	90.0%
Have Dacha	22.6%	20.9%	21.7%	21.1%
Have Extra Apartment	8.5%	8.3%	8.6%	8.1%
Have Car	44.2%	43.2%	45.7%	49.6%
Family Income (Thousands of 2013 rubles)	56.34	53.09	48.52	51.44
One Parent has Univ Degree	30.9%	30.6%	33.0%	37.7%
Both parents have Univ Degree	8.0%	8.3%	9.3%	11.0%
Proportion Female Children	46.8%	47.6%	47.9%	52.8%
Moscow & St.Pete	11.8%	10.7%	10.3%	8.8%
Other Cities	61.8%	61.4%	62.4%	60.1%
Rural Areas	26.4%	28.0%	27.2%	31.1%
Region (excluding Moscow-St.Pete):				
North & North Western	8.1%	8.9%	8.4%	8.0%
Central & Chernozemye	19.3%	18.7%	19.0%	17.5%
Volga	18.1%	18.3%	18.7%	21.1%
North Caucasian	16.1%	15.8%	15.3%	17.1%
Ural	17.1%	17.5%	18.0%	13.8%
Western Siberian	10.6%	10.4%	10.1%	11.9%
East Siberia & Farther	10.6%	10.5%	10.6%	10.7%

Dependent Variable

- We refer to the child based on which the household is kept in the sample as the *reference child*
- The dependent variable is an indicator equal to one if the reference child left the household and moved to a different address by the time of the following interview, and zero if the child remains part of the household or leaves for different reason
- The possible alternative reasons for leaving the household are the formation of a sub-household and death
- We exclude from our estimating sample households that are not interviewed in the subsequent round and for which the we cannot determine the presence of the reference child

Fraction of Reference Children Leaving the Household



Simple DID Estimates

	Before 1 1994–2007	Before 2 2002–2007	After 2008–2013	BA 1 Difference	BA 2 Difference	DID 1	DID 2
Treatment	0.0667	0.0505	0.1298	0.0631	0.0793		
Control 1	0.0594	0.0512	0.0759	0.0165	0.0247	0.0466	0.0546
Control 2	0.0361	0.0315	0.0559	0.0199	0.0245	0.0432	0.0548
Control 3	0.0262	0.0196	0.0448	0.0186	0.0252	0.0445	0.0541

Notes: BA="Before–After"; DID="Differences-in-differences". All BA and DID comparisons are statistically significant at 1%.

- A 99% confidence interval for 'DID 2' is [0.0132,0.0960]

Regression DID Estimates

	Control 1			Control 2			Control 3		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$post$	0.002	0.010	0.117***	0.019	0.030**	0.163***	0.013	0.020	0.135***
	(0.011)	(0.011)	(0.018)	(0.012)	(0.012)	(0.024)	(0.014)	(0.014)	(0.027)
$treat$	0.007	0.009	0.002	0.031***	0.030***	0.023***	0.040***	0.040***	0.031***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)	(0.008)	(0.008)
$treat \times post$	0.047***	0.044**	0.048***	0.043**	0.040**	0.033**	0.045***	0.043**	0.041**
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Household FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	19,095	19,075	19,075	12,224	12,214	12,214	9,800	9,792	9,792
R-squared	0.006	0.019	0.034	0.012	0.025	0.031	0.019	0.029	0.036
Number of HH		4,306			3,366			3,107	

Notes: Robust standard errors clustered at household level in parenthesis.

Results By Location

	Control 1		Control 2		Control 3	
	(1)	(2)	(3)	(4)	(5)	(6)
A. **Rural Areas**						
$post$	0.011	0.135***	0.038**	0.192***	0.030*	0.166***
	(0.014)	(0.021)	(0.015)	(0.028)	(0.017)	(0.031)
$treat$	0.049**	0.035*	0.082***	0.067***	0.094***	0.075***
	(0.022)	(0.021)	(0.021)	(0.021)	(0.021)	(0.020)
$treat \times post$	-0.015	0.005	-0.029	-0.025	-0.027	-0.011
	(0.033)	(0.032)	(0.033)	(0.033)	(0.033)	(0.032)
B. **Moscow & Saint Petersburg**						
$constant$	-0.032***		-0.014		-0.010	
	(0.010)		(0.010)		(0.009)	
$post$	-0.008	-0.040*	-0.014	-0.036	-0.009	-0.015
	(0.014)	(0.020)	(0.015)	(0.027)	(0.015)	(0.032)
$treat$	0.001	0.020	0.015	0.032	0.024	0.033
	(0.023)	(0.023)	(0.022)	(0.022)	(0.022)	(0.021)
$treat \times post$	-0.027	-0.011	-0.030	-0.021	-0.033	-0.012
	(0.033)	(0.039)	(0.033)	(0.036)	(0.033)	(0.035)
C. **Other Cities**						
$constant$	-0.034***		-0.016**		-0.013**	
	(0.006)		(0.006)		(0.006)	
$post$	-0.000	-0.023	-0.011	-0.042**	-0.013	-0.045**
	(0.010)	(0.016)	(0.011)	(0.020)	(0.011)	(0.022)
$treat$	-0.008	-0.016*	0.008	0.001	0.016*	0.010
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
$treat \times post$	0.087***	0.078***	0.086***	0.070***	0.090***	0.073***
	(0.023)	(0.022)	(0.023)	(0.022)	(0.023)	(0.021)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	No	Yes	No	Yes	No	Yes

Treatment-specific Time Trend

	Control 1			Control 2			Control 3		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$trend$	-0.001***	-0.001	0.006***	-0.000	0.001	0.011***	-0.001*	-0.000	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
$post$	0.029***	0.026**	-0.009	0.046***	0.045***	0.012	0.038***	0.036***	-0.003
	(0.011)	(0.011)	(0.012)	(0.013)	(0.013)	(0.016)	(0.013)	(0.013)	(0.016)
$post\times$	0.000	0.000	0.009***	-0.006**	-0.007**	0.001	-0.003	-0.004	0.005
$trend^{\dagger}$	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)
$treat$	0.019	0.018	-0.005	0.051**	0.050**	0.033*	0.054***	0.053***	0.035*
	(0.020)	(0.020)	(0.021)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
$treat\times$	-0.001	-0.001	0.001	-0.002	-0.002	-0.001	-0.002	-0.002	-0.000
$trend$	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$treat\times$	0.067***	0.061**	0.037	0.075***	0.072***	0.042*	0.071***	0.069***	0.044*
$post$	(0.025)	(0.025)	(0.026)	(0.026)	(0.025)	(0.026)	(0.026)	(0.025)	(0.025)
Other Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Household FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	19,095	19,075	19,075	12,224	12,214	12,214	9,800	9,792	9,792
R-squared	0.003	0.017	0.029	0.010	0.023	0.027	0.016	0.027	0.032
Number of HH		4,306			3,366			3,107	

Notes: Robust standard errors clustered at household level in parenthesis. The variable $trend$ is a linear time trend (1994=1). † The "post" period time trend is normalized so that 2009=1.

$$y_{ht} = \delta_0 + \delta_1 t + (\delta_2 + \delta_3 t) treat_{ht} + (\delta_4 + \delta_5 t) post_t + \tau \cdot treat_{ht} \times post_t + \mathbf{X}_{ht}\gamma + \varepsilon_{ht}$$

Summary

- We look at the effect of an important reform in the Russian higher education system
- We find some robust evidence that the reform significantly affected the mobility of students
- No statistically significant heterogeneous effects (female children, income quartiles, single parent, parents with univ degree)
- Huge “to do” list