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Family Background and School Choice in Cities of Russia and Estonia: Selective Agenda of the Soviet Past and Present

Kaire Põder*, Triin Lauri, Valeria Ivaniushina & Daniel Alexandrov

Abstract

In this article, we demonstrate the size of family background effects in various regions of Russia and Estonia, concentrating on urban and rural differences, addressing the idea that the family background effect is moderated by school level admission policies. Having common path-dependent educational institutions from the communist period, the countries differ in both the extensiveness of the welfare state and system level school choice policies. However, we see many commonalities in both systems, especially at the urban school level. The family background effect is defined as the dependence of student achievement on family background characteristics, such as parental education, income and social status. In operationalising family background, the number of books at home and parental education are used as proxies, and its effect is measured as a percentage of the individual level PISA 2012 score. We contribute to the literature by studying school choice, its key characteristics and moderating effects by school level admission policy in an urban environment.

Keywords: PISA data, school choice, admission policy, education policy, Estonia, Russia.

Introduction

We are motivated by the fact that there is increasing evidence that both our post-communist case countries – Russia and Estonia – have grown increasingly unequal over the last decades, while social intergenerational mobility has decreased (Kosyakova, 2016; Helemäe, 2011; Saar, 2010; Strenze, 2006; Gerber & Hout, 2004). One explanation is that due to technological innovation and globalisation, modern economies benefit the better skilled and educated, increasing income gaps while hindering intergenerational income elasticity. However, there is also a theory that the increasingly selective modern educational policy agenda creates more inequality of opportunity by allowing family background effects to work through multiple channels, i.e., the ability to choose, human capital, and class/peer composition (in the case of early tracking and ability grouping). In our paper, we control for the latter theoretical arguments, meaning that our theoretical and empirical grounds rest on school choice literature.

The most hotly disputed debates in educational policy in the last twenty years have undoubtedly been those centred on the autonomy or decentralisation of decision-making power, accountability, tracking and parental choice (Wössmann et al., 2009). The main rationale behind these modernising initiatives is that they have the ability to compel traditional education systems to improve through competitive pressures. This improvement is often defined, at least in empirical works, as efficiency and measured as performance through either national or international standardised tests (Wössmann et al., 2009; Betts & Roemer, 2007). However, school choice and related initiatives are also issues that split educational researchers; opponents argue that efficiency comes at the price of equity, apparent in the increase of the effect of socio-economic background in educational outcomes within choice-

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tolerant systems. Many cases, such as those seen in Germany (Riedel et al., 2009), in various US cities (Cullen et al., 2000), England (West, 2006; West & Ylönen, 2010; Burgess & Briggs, 2010), and even increasingly in Finland (Poikolainen, 2012; Seppänen, 2003; Kalalahti et al., 2014), demonstrate that choice tends to gather children from better socio-economic backgrounds into certain schools, creating not only positive peer effects, but also negative externalities for the rest of the children. Therefore, the question of the effect of school choice on educational efficiency and equity continues to be at the heart of empirical studies on school choice.

Thus, we are interested in efficiency and equity trade-offs in different settings, namely rural and urban school systems in Russia and Estonia. Specifically, we ask whether family background effects (FBE) differ by rural and urban region in Estonia and Russia. FBEs are generally defined as the dependency of students' educational outcomes on parents' backgrounds, i.e., education, wealth, social status and the like. We use a unidimensional measure for family background, justified by our estimation technique. Moreover, motivated by the mixed results from school choice literature and path-dependent institutional frames of both post-Soviet countries, we are interested in how much the rural-urban difference in FBEs is explained by school level admission policy and the kind of admission policies (also termed 'school choice policy') moderating FBEs.

The school choice policy dimension in our paper allows the addition of empirical evidence from post-Soviet education systems to the literature on school choice. As indicated, the key paradigmatic shift has been toward the competitive stance in education, which among other instruments also promotes selectivity and tracking. In post-communist education systems, tracking and admission by academic records or testing have been implicitly (or in some cases more explicitly) used for some decades. Historically, these policies were initiated by the national drive for more specialisation and, moreover, for academic excellence in natural sciences. The long tradition of selectivity is now supported by the OECD policy platform, which makes these two countries interesting testing platforms for demonstrating the effect of ability grouping in school systems where it has been exercised for a long time.

Our estimation technique is as follows. First, we measure the mean sizes of the FBEs within different school districts (urban and rural) in Russia and Estonia. We have chosen these countries because of common system level similarities inherited from the Soviet era, resting on a comprehensive system with some selectivity created by specialised schools. We give the narrative of the emergence of selectivity and school choice in the late 1970s in the Soviet Union and highlight major changes during the last decades. We explore some peculiarities of our case countries' school choice policies, allowing us to distinguish between the more explicit selectivity path in Russia and the implicit and more arbitrary one in Estonia, which influence the implemented school level admission policies. Our main concern is to see whether these school level admission policies affect FBE, as well as what kind of institutional practices are prevalent and whether they moderate FBEs. We are driven by the assumption that balanced school choice policy is not only dependent on system (country) level policy, but on school level institutional execution of the admission policy. In other words, the principles or theoretical model underlying policy decisions at national level rarely, if ever, translate into policy practice in a direct or pristine form (Ball, 1998, p. 126). These practices are rather the function of complex relationships between ideas that take place between and within different levels of actors – at state, municipal and school levels.

We use a comparative micro-econometric study based on disaggregated data. We have four levels of research units: individual, school, region (urban or rural) and country. At all levels, we use data from the 2012 Program for International Student Assessment (PISA). At an individual level, we show what percentage of standardised educational performance scores correlates to family background (FB) features. We use a range of single or multidimensional features to study these effects. Finally, we use books at home and parental education as proxies to operationalise FB. For the econometric technique, we use country and region fixed effects with school clustered robust standard errors.

Our article is constructed as follows. Following the introduction, the second section outlines the tracking and school choice policy literature motivating our research strategy and, thus, synthesises mostly empirical results from interdisciplinary standpoints. Section three describes the common history of the educational systems of our cases, Russia and Estonia, and gives case specifics for model specification and interpretation of the results. Then we describe our data and provide regression results. Finally, in the fifth section, we provide conclusions and discuss limitations and policy implications.

Premises from school choice literature

One of the distinguishing concepts between the various initiatives of school choice policies is whether the policy aims 1) to improve the 'market' environment by levelling access to both publicly and privately operated schools by publicly funding private schools; or 2) to create a market within the public system. The latter, often also called a quasi-market (Le Grand, 2007), indicating that by abolishing assignment to residential schools the opportunity for parents to choose creates a market-like situation, where parents are on the demand side and schools are on the supply side. The empirical attempts in the literature to measure the efficiency of these various school choice initiatives include a list of key explanatory institutional aspects for the analysis: share of private ownership and funding of the school, school autonomy and accountability mechanisms (Wössmann et al. 2009; Wise, 2015). The equity concern adds the aspect of tracking, i.e. tracking is, among others, one of the key dimensions of school choice policies, which determines whether a policy is equity enhancing or not (Lauri & Põder, 2013).

In countries where private schooling has a long tradition, school choice initiatives have had strong equity concerns (Gorard et al., 2003). In others, policy developments in education and more specifically school choice were usually triggered by the wave of education decentralisation as part of a bigger movement in New Public Management (NPM) in the late 1980s and early 1990s. In this context, the problem of school choice points to the reforms that gave parents the right to influence decisions concerning the allocation of pupils to public sector schools. This development is usually driven by a market based ideology that assumes increased competition will generate the incentives that will improve schools' and children's achievement (Le Grand, 2007). Since the 1990s many OECD countries have increased the extent of choice, and nowadays initial geographical assignment is frequently accompanied by more flexible choice options in most OECD countries (OECD, 2011). Therefore, there is no clear evidence from the literature for the claim that private providers improve the achievement of schools. However, recent research has shown that public operation has a negative effect, but public funding of private or denominational schools has a positive effect on student achievement (Wössmann et al., 2009).

Autonomy has been argued to be the institutional aspect of school choice that enables school responsiveness (Wise, 2015). However, school autonomy alone does not necessarily imply better educational outcomes, but rather together with accountability (Wise, 2015; Lauri & Põder, 2013). Thus, serving as a complement to autonomy, accountability might support school choice by improving parental access to information on school options as well as applying additional pressure on schools to perform better and thereby increase competition. However, tightened pressure and public listings of test results may have devastating results in terms of educational equity, as schools have incentives to select students, leading to a phenomenon often approached as tracking.

According to Brunello and Checchi (2007, p. 784), school systems are characterised by tracking when pupils are allocated, at some stage of their career between primary and tertiary school, to different tracks, which usually differ by the curriculum offered as well as in the average cognitive talent of enrolled students. There are explicitly tracking based systems (such as Germany, for instance)

and others in which tracking takes place within a comprehensive system. In the former, tracking takes the form of well-defined separate segments in the education process, typically specialising in general and vocational education. In the latter, the selection process is usually less overt (see for instance Nikolai and West (2013) on tracking systems in Germany and United Kingdom). Insofar as allocation to tracks is non-random, school tracking introduces selection into the schooling process, which may take several forms, ranging from self-selection to admission based on a test or on teachers' recommendations. In most cases, selection is affected, directly or indirectly, by family background, i.e., tracking enforces the role of parental privilege and, therefore, is detrimental to educational equity (Brunello & Checchi, 2007). This may occur for several reasons, including peer effects (more talented or motivated students are gathered together), teacher sorting (teachers prefer to teach more motivated students), and differences in curricula or in resource endowment (p. 782).

The main argument for tracking is that homogeneous classrooms permit a focused curriculum and appropriately paced instruction that leads to maximum learning by all students (Hanushek & Wössmann, 2006). However, the arguments for and against tracking become more complicated once possible peer effects are taken into account, because the precise nature of any interaction then becomes a key element in considering tracking, and there is considerable uncertainty about the impact of tracking on both the level and distribution of schooling outcomes (Hanushek & Wössmann, 2006).

In some countries with a single-track education system, like Estonia and Russia, admission policy mostly affects school beginners (primary school level), but there are also countries, either single- or multi-track states, where choice starts from lower secondary schools (the so-called Year 11 tests in England or the selection of track after Grade 4 in Germany). According to many empirical works on tracking (Hanushek & Wössmann, 2006; Brunello & Checchi 2007), the earlier the tracking takes place, the more harmful in terms of educational equity it is. The educational reforms of the last thirty years have been shaping the educational landscape of European countries and the distinctions between explicit and implicit tracking are not so clear-cut. From one side, more autonomous schools and open enrolment systems have reduced the school systems' dependency on geographical assignment in comprehensive and/or one-track systems. From the other side, there have been several attempts to reform multitrack systems to increase the integration between tracks (Edelstein & Nikolai, 2013).

Despite the wider institutional contexts – more explicit or implicit tracking – there are different choice schemes such as changing catchment areas, establishing criteria for schools to select their children, or making criteria more flexible. Our focus is on the admission criteria and policies of schools to see whether there is an empirical case that, independently of system level tracking policies, socioeconomically advantaged families can better realise their choice opportunities (see also Exley, 2013; West, 2006; West et al., 2011).

Our empirical analysis is based on the assumption that early tracking is harmful (Braga et al., 2013; Hanushek & Wössmann, 2006) and to mitigate the detrimental effect of parental decision-making, centrally steered admission policies (choice policies) are advisable (Cobb & Glass, 2009; Musset, 2012). A centrally steered choice policy or so-called controlled choice emphasises the central criteria and equity enhancement, whereas in cases where schools have considerable autonomy in designing admission criteria and allow academic record or ability test-based intakes, problems with educational equity grow. The importance of central criteria (proximity, siblings, the preference of disadvantaged groups, etc.) in school admission policies in the area is related to the avoidance of cream-skimming (Le Grand, 2007; Musset 2012). The problem of cream-skimming is not only prevalent in pro-choice countries. There is evidence (Hirsch, 2002; Seppänen, 2003; Põder et al., 2013) that in the case of regulated choice and/or catchment-based assignment, there are some open enrolment schools that are over-subscribed and highly selective. However, school choice is largely an urban phenomenon, as in rural areas there is often no more than one school nearby and educational decision-making by families has no such effect on school allocation, thereby justifying our division between urban and rural schools.

We proceed by describing the emergence of choice agendas and selectivity, in our case the selection of countries, and determine the key dimensions of school choice policies in these countries – the share of private providers, autonomy, accountability and tracking – influencing the selectivity of their admission policies.

Emergence of choice agendas in post-Soviet schools

In the USSR, the education system was unified, centralised, state controlled and efficient – literacy levels in the Soviet Union were among the highest in the world. In principle, in the post-WWII period, the soviet school system was uniform and schools offered exactly the same curriculum, approved by the Ministry of Education. In reality, though, school quality differed, and these differences in school quality mainly depended on teachers' availability and qualifications. There were better schools with highly qualified staff in the central areas of metropolitan cities and understaffed schools in rural or industrial areas.

In the 1960s, the differentiation of schools was formally recognised, and a new category was introduced – so-called 'specialised schools' with enhanced curricula in modern languages or in physics and mathematics. In 1962, four boarding schools focusing on physics and mathematics education were opened in Moscow, St. Petersburg, Kiev and Novosibirsk. There were other schools in major cities with specialisations in one particular language (English, French, German, and in some cases Spanish and other languages) or in mathematics and natural sciences.

The emergence of 'specialised schools' with enhanced curricula in modern languages was due to the demand of Soviet elites (party elite and professionals) for language education for their children. Schools with enhanced curricula in math and physics were all organised by academic elites, their existence justified by considerations of national security and the need for R&D in the Cold War. They were established only in major cities, and their numbers grew gradually, but even after twenty-five years of growth, by the end of the 1980s they accounted for only 14% of specialised enhanced curriculum schools in Moscow, even less in St. Petersburg, and far less around the rest of the USSR, including Estonia. Language schools were formally open for admission to all children, but in reality were mainly attended by the children of party and bureaucratic elites and those of highly educated professionals. Maths/physics schools admitted children based on ability testing or based on the results of 'Math Olympiads'.

Selective agenda since the 90s: Russia

At the time of Perestroika (1985-1991), education was at the forefront of changes. Everybody wanted better schools, the ideas of democratic education were very appealing on all levels of the society, and the rhetoric of democratic schools vs. totalitarian schools was important in the wide opposition to the Soviet legacy and in the global transformation of social, economic, and political life in the Soviet Union.

In 1988, the All-Union Congress of School Workers demanded wide reforms, mainly liberation and diversification of the state-controlled standardised system. In 1991, the Decree on Education allowed for the legal differentiation of schools. One of the principles of the new reform was the pluralism of education, the existence of alternative schools and curricula. Important principles of the educational reform were announced, including the abolition of the state monopoly and decentralised governance, allowing for private schools, the autonomy of schools and the right of teachers to choose their own pedagogical style, educational technology, textbooks and teaching aids, and, last yet most relevant for this particular article, the right of students to choose schools and profiles of education (Dneprov, 2006, pp. 58-60).

The changes came quickly: in 1985-86 in Moscow, 86% schools were offering the standard curriculum (in other cities even more), while only 14% were specialised, mainly in languages. Yet by 1993-94, in Moscow only 17% of schools claimed to offer the standard curriculum, while others claimed some specialisation: 18% old-type specialised schools (focused on languages and humanities), 2% gymnasiums, and 63% schools that announced new diverse curricula (Cherednichenko, 2000).

Private schools are very rare in Russia. In 2010, private schools comprised only 1.5% of all schools (about 750 private schools out of a total of about 48,800 schools; see also Table 2), but students in private schools represented about 0.4% of the total student population, as private schools are usually small (Nikolaev and Chugunov, 2012). Private schools are mostly concentrated in major cities, where there are many more families willing and able to pay for private school education. In St. Petersburg, there are 19 private schools (out of 770 schools in the city).

Thus, as opposed to general education schools with a standard curriculum, there are schools with intensive learning programs ('specialised schools' with enhanced curricula for one or several school subjects), lyceums and gymnasiums. The last two types of schools have enhanced curricula either in applied and natural sciences (lyceums) or in languages and humanities and social sciences (gymnasiums). Statistics for the whole country are as follows: 2% lyceums, 3% gymnasiums, 15% specialised enhanced curriculum schools (NORRIC, 2005; Nikolaev and Chugunov, 2012). In St. Petersburg, the share of enhanced curriculum schools is larger: 8.5% lyceums, 10.4% gymnasiums, and 19% specialised schools. In total, enhanced curriculum schools comprise approximately 38% of St. Petersburg city schools.[1] However, ability testing for entrance is prohibited, making comparisons with other multi-tier systems difficult.

The Unified State Examination (USE) enacted in 2008 became mandatory for all students graduating high school and intensified the policy of external accountability. USE is widely used for comparing school quality; in St. Petersburg, schools are obliged to make USE results public. The difference between the USE results by school type is pronounced: in the 1st USE quartile, there are schools with the standard curriculum, while in the 4th quartile, there are gymnasiums, lyceums and specialised schools (2nd and 3rd quartiles comprise all school types).

In contemporary Russia, parents have the right to apply to any school they prefer; there is no obligation to go to the nearest school. School admission tests for primary school entrance (at the age of 7) are forbidden by law, and admission to school is on a first-come-first-served basis. If there are more applications than places in the school, there are preferences for some categories of students. The rules regarding which categories have preferences constantly change. For example, until 2005 there were no preferences for families living in the vicinity of the school, but later, preference was given to those who live in the proximity of a school (within 500 meters), with siblings in the school, who attended a kindergarten attached to the school, who attended preparatory courses at the school, with disabilities, who have a parent in the military, etc.

Most students stay in the same school from 1st class to graduation. This means that parental choice implemented at the entrance in primary school shapes the educational chances of a child for years, so the school choice policy of Russia can be considered as one based on early tracking and, therefore, harmful in terms of educational inequality (Braga et al., 2013; Hanushek & Wössmann, 2006). In terms of the other key dimensions, school choice policy in Russia can be characterised as pro-choice, i.e., the parental discretion to choose the school for their child is enabled and the choice takes mainly place within the public system, which nevertheless has become diverse in terms of different tiers. At the same time, admission tests are prohibited. In addition, school autonomy in terms of admission and curricula is moderately high and accountability is based on standardised testing and comparisons.

1 Komitet po Obrazovaniju Pravitelstva Sankt-Peterburga, see http://k-obr.spb.ru.

Selective agenda since 90s: Estonia

Since Gorbachev's perestroika in the mid-1980s, several attempts were made to establish a renewed Estonian system of education. This period can be characterised as the era of heated debates and brainstorming concerning educational principles and foundations (Kull & Trasberg, 2006). However, no explicit turn toward selectivity or choice can be distinguished. Rather, there was an inevitable transfer period when many educational institutions originating from the Soviet system (such as the general education curriculum, school legislation, etc.) were formally still in force while at the same time Western educational ideas were pouring in. The success of policy learning attempts varied. According to Toots (2009), some attempts failed (implementation of strategic planning, comprehensive legislation reform), some succeeded without revision (national exams), and some were altered during the reform process (curriculum). Despite the Finnish experience – which was the main source of policy learning (ibid.) – the influence of international organisations and neoliberal thoughts took hold. However, the share of private schools is still modest (see also Table 2).

Thus, despite the lack of a decisive turn toward school choice, the 'inherited' system became more diverse. This selectivity emerged within the official comprehensive schooling system and was the result of the increased autonomy of municipalities and schools in designing their own admission policies. Schools have substantial autonomy over the design of admission procedures in the case of oversubscription. Starting from 1993, there have simultaneously been inter- and intra-district school practices in place. In inter-district schools, parents received the right to apply to a school outside of the catchment area. Thus, the specialist character of some schools has been maintained by reinforcing historically specialised schools by granting them inter-district selective admission. These schools are located mainly in urban areas (see descriptive statistics in Table 2). This distinction between inter- and intra-district schools follows the pattern of over- and under-demanded schools, which creates the opportunity to select students. So, even if there is neither official tracking nor ability grouping in the Estonian single-track school system, the selection is usually justified by a specialisation track.

The divide between schools with historically strong reputations (selective schools hereinafter) and local (regular) schools has been enforced for decades. This split by reputational capital takes place within the public sector, and there are no private institutions among these selective schools. For example, eight out of 56 schools in the capital city of Tallinn apply entrance exams for school beginners. Images of the 'good' and 'less good' schools are enforced by the so-called league tables. These league tables report listings of the schools by average national final examination results. Selective public schools triumph there in the top positions. While recent legal changes have tried to increase the importance of school proximity and siblings in school assignment, they have not changed the admission policies of oversubscribed schools, leaving the admission policy of elementary schools a decentralised issue.

The decentralised admission policy is applied by the selective schools without explicit procedures. All these schools use entrance tests for school starters (7 years old) and children are pre-trained in prep schools, where children are basically drilled for tests. Põder and Lauri (2014) showed that approximately 70% of the children who have started their schooling in one of the schools in the capital city during 2008-2011 participated in at least one of the prep schools. Furthermore, spaces in selective prep schools are limited, distributed by competition on a first-come-first-served basis.

However, the situation is rather different in rural areas, where for most families there is only one school in the area (see also Table 2 on schools' competition) and schools are in trouble with their budgets, as the enrolment of rural schools has fallen dramatically (Põder et al., 2014). There is also concern from a governmental level, as one of the conclusions from the latest PISA survey is that a considerable statistical difference exists between schools in rural and city areas. This concern has partly driven the secondary school reform initiated recently, which aims to increase the government's responsibility in upper secondary education. However, another statistical difference and educational

gap – the difference between selective and non-selective schools, also distinguishable according to latest PISA (see for instance Lindemann (2015)) – has not received considerable attention by the government.

In general, the school choice policy in Estonia can be described as one of implicit or hidden choice, where the official educational agenda favours comprehensive, neighbourhood schooling, but includes public schools that are highly selective. As these schools test, among others, school beginners at 6 to 7 years of age, this system may be considered to be an early tracking system. The private share of schooling is moderate. Schools have considerable autonomy in terms of content and admission, and the external accountability mechanisms are visible and emphasised by the so-called league tables.

Analysis

Stemming from empirical and theoretical literature, our empirical strategy is the following. First, we describe our data and reveal the gap between urban and rural school level admission and tracking practices and outcomes in both countries. Second, we reveal our background characteristic estimation strategy (empirical data) and argue the pros and cons of estimation techniques based on various SES proxies such as parental education or occupational status, home possessions such as books or educational resources in general, or some other factor variables composed by the PISA team, i.e., family wealth, parental occupational status or socio-economic status. However, being familiar with the complex nature of FB, we started from the PISA data by operationalising the family background. Multidimensional measures of FB are preferred by many authors who empirically show (De Graaf et al., 2000; Jaeger & Holm 2007) or theoretically argue (Bourdieu, 1984; Ball et al. 1995; Sullivan, 2001; 2007) that educational paths and trajectories of students are largely determined by cultural capital at home. Still, in addition to our data-driven approach to FB we have some support from literature, which argues that using books as a proxy grasps the multidimensional nature of the FB well. It has been argued (see Schütz et al., 2008; Evans et al., 2010; Põder et al., 2016) that books are a preferred indicator for showing the impact of various family inputs, such as family contributions to education, cultural capital of families, and their preferences in education, especially in inter-country research. Moreover, similarly to the concept of cultural capital in sociological education literature, Fuchs and Wössmann (2007) show that books at home are the only and most significant predictor of student performance that combines these various impacts from educational, income-based and social background information. As a limiting factor, it may be argued that books lose their relevance in use due to increased usage of the internet and digital devices. We agree that this might influence the number and importance of books at home; however, for our analytical purposes, books are not an instrument for explaining educational proficiency, but rather books still integrate a multidimensional measure of cultural capital into a one-dimensional proxy. Thus, our estimation strategy is to use 'number of books at home' as a proxy for FB as far as it is a statistically significant measure, meaning as far as it is supported by empirics.

Descriptive statistics

The PISA dataset allows the use of various measures for estimating the individual level of educational efficiency – proficiency in mathematics, reading or science. We use the PISA standardised reading scores as our dependent variables, and the actual score values can be seen in Appendix 1. Our independent variables originate from the student and school questionnaires and, thus, we distinguish school and individual (student) level variables (Table 1). Most of our data is categorical or index-based. We also use many dummies as controls. We concentrate on FBE, so many individual level variables are treated as controls and their effect sizes are not reported in the analysis. At the school level, we

Table 1: Descriptive statistics of the dataset

Variable		No. of observ-ations	Mean	Std. dev.	Min	Max
Dependent variable						
s_read	(standardised PISA reading score)	10010	0.0000	1.0000	-4.36981	2.989491
Family background characteristics						
books	(number of books at home)	9873	3.374861	1.373208	1	6
escs	(index of economic, social and cultural status)	9910	.0301231	.7783789	−4.04	3.69
fisced	(educational level of father)	9008	1.877664	.8831589	0	3
hedres	(home educational resources)	9916	.3457412	.8888281	−3.93	1.12
hisced	(educational level of higher educated parent)	9847	2.194272	.8364874	0	3
hisei	(highest occupational status of parents)	9654	52.20757	21.0699	11.01	88.96
wealth	(index of family wealth)	9936	−.4608202	.8276806	−3.94	3.02
homepos	(index of home posessions)	9939	−.0622548	.8486095	−4.44	4.01
misced	(educational level of mother)	9796	2.018477	.8950922	0	3
pared	(parental years of schooling)	9847	14.01351	1.724152	6	16
Personal control variables						
gender	(male=1)	10010	.4982018	.5000217	0	1
age_at_isced1	(age of starting school)	9827	6.758421	.5170107	4	9
lang_athome	(home language, native=1)	9852	.9282379	.2581067	0	1
immig	(immigrant status=1)	9802	.096919	.2958625	0	1
testlang	(test language same as state official language)	9995	.9006503	.2991459	0	1
School level variables						
sc_owner	(school ownership, private=1)	10321	.0194749	.1381935	0	1
sc_pubfin	(% of public financing at school)	9617	96.78823	8.683825	35	100
sc_feefin	(% of financing by private fees)	9489	1.300885	6.837257	0	61.1
sc_location	(school location: village, small town, town, city, big city)	10010	2.993806	1.244174	1	5
sc_competition	(school competition, competing to how many schools)	10010	1.414186	.7975626	0	2
sc_assessment	(external assessment of the schools)	9965	.7930758	.4051211	0	1
sc_achievment	(school achievement results posted publicly)	9914	.5921929	.4914518	0	1
sc_achiev_~d	(school track students by achievement)	10010	.8922078	.3101333	0	1
sc_parenta~e	(school with parental involvment in administration (voice))	9976	.9218123	.6859137	0	2
sc_admission	(school using academic record in admission)	9995	.9018509	.8096078	0	2
schsize	(school size=number of students at school)	9816	636.5139	358.696	5	3242

Note: for country specific descriptive statistics see Appendix 2
Source: authors' compilation

Table 2: Execution of school level policies in two countries

	Russian		Estonian	
	Urban	Rural	Urban	Rural
% of students in private schools	1%	0%	3%*	4%*
% of total budget financed by general tax revenues	94%	98,8	95,60%	98%
% of total budget financed by fees	3,00%	0,05%	2,21%	0,56%
% of students studing is schools which compete …				
at least with one school	89%	69%	93%	77%
with two or more schools	72%	46%	93%	50%
% of students in schools with national assessment	94%*	93%*	60%	66%
% of students in schools with publicly posted achievement data	85%	73%	54%	30%
% of students in schools which track by achievement	100%	99%	77%	79%
% of students in schools where parents have a lot of voice	31%	12%	19%	17%
% of students in schools which use academic record in admission***	28%	6%	56%	34%
Average school size (min-max)	868 (163-3242)	484 (15-1293)	721(67-1448)	532(5-1518)
Average PISA reading score**	499	453	530	512

* No statistically significant difference between urban and rural schools in one country
**There is 99% significant results that rural and urban PISA reading scores are different (–24 points) independently from the country, but there is also 48 points 99% significant results that countries differ.
*** From school questionere Q28 — *How often is the following factor considered when students are admitted to your school: student record of academic performance (including placement test)?*

Source: authors' compilation

focus on various practices and policies related to school choice literature, such as revenue sources (financing), accountability (assessment, league tables, parental involvement), competition between schools and admission practices.

We pay attention to school level policy variables (Table 2) and their variability between two countries and the rural-urban dichotomy to indicate differences in school level practices. We make discrete cuts in the categorical school questionnaire indicator of the community size where the school is located in 100 000 habitants. So in our analysis, urban indicates community sizes bigger than 100 000 inhabitants.

Looking at Table 2, we see that in both cases the share of private schools and private money in financing school is marginal, as was already indicated in Section 3. There are also similarities in school competition and school sizes. However, in Russian schools, external steering, including league tables, is much more common, while in Estonia there is more admission based on merit (achievement). This is prohibited in Russia.

Our conclusion is that on the school level, Russian and Estonian schools are different — there is more external control and more explicit tracking in Russia, whereas there is more academic record (aptitude tests) based intake and competition between schools in Estonia.

Figure 1 illustrates the effect of admission policy in highlighting that schools' opportunity to admit by academic record comes together with higher scores, i.e., cream-skimming. Technically, there is a statistical difference between Estonia's rural and urban mean scores at the 95% level (policy sometimes). There is a difference between Estonia's rural and urban mean scores only at the 90% level (policy never), and in other cases differences are statistically significant at the 99% level. The latter indicates that in Russia the difference between rural and urban scores is stronger, independently of the type of school level admission policy, whereas in all cases the differences in urban and rural scores seem to be driven by or at least correlated with admission policy (i.e., admission by academic record).

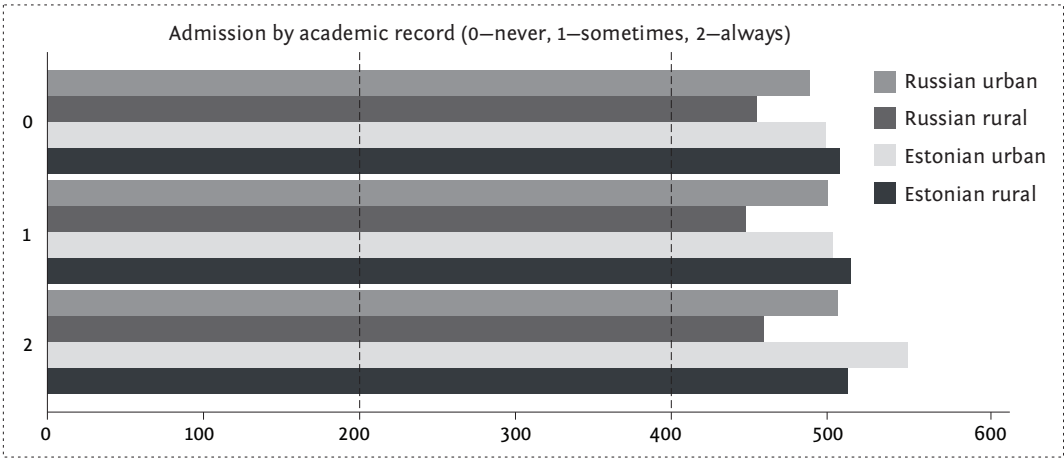

Figure 1: School level admission policy and PISA reading scores by areas
Source: School level admission policy operationalised according to school principal questionnaires in PISA 2012

Thus, we hypothesise that school admission policy partially explains the score, but not only — it works also through group selection and grouping (cream-skimming) and not so much through explicit tracking or management of the school.

Empirical strategy

Our estimation strategy is inspired by the education production function approach that has been dominant in literature since the release of the Coleman report in the 1960s, summarised by Hanushek (1979). The data and case specificities allow us to look separately at four country specific regions: (a) urban regions in Russia, (b) rural regions in Russia, (c) urban regions in Estonia, and (d) rural regions in Estonia. In the statistical model (Equation 1), country-region is specified by j.

$$T_{isj} = \alpha + \beta_j B_{isj} + \gamma_j (B_{isj} \cdot P_{sj}) + \sum_{j=1}^{3} \delta_j D_j + \sum_{j=1}^{3} \varepsilon_j (B_{isj} \cdot D_j) + \theta_j P_{sj} + \sum_{i=1}^{N} \vartheta_j I_{isj} + \sum_{s=1}^{n} \mu_j S_{sj} + \epsilon_{isj} \quad (1)$$

Where i indicates individual at the school s from the region j. We explain the average country-region FBE indicated by β_j and moderated by school admission policy (P_{sj}) effect indicated by γ_j. To estimated country-region fixed effects, we have region dummies D_j. The interaction effect ($B_{isj} \cdot D_j$) is measured by ε_j and itdepicts the effect of the random slopes (how FBE differs by countries and regions). We also add the vector of individual level control variables I_{isj} such as immigrant background, gender, age of schooling, language at home, attitudes toward teachers, etc.; and school level control variables S_sj such as ownership, financing principles, community profile, etc. The estimation technique is OLS with clustering unit school. Thus, the interpretation of regression results is the following: we measure country-region specific FBE ($\beta_{estonia\_rural} + \varepsilon_j$) and the impact of the school choice policies γ_j to FBE.

By operationalising the empirical model, we face the following challenges: how family background works out as a single dimensional measure (for a theoretical discussion see Checchi (2006)) and how it could differ by countries (cultural background); which school level policies operate independently from system level context. We treat these questions as empirical ones, meaning that we run estimations with all possible variations available in the dataset.

In Table 3, we run 10 different specifications of the model based on different operationalisations of family background (FB) to see whether we can rule out some measures of the latter. Original abbreviations from the dataset have the following meanings (see also Appendix 3 for descriptive

statistics and mean values of the FB variables). First, hisced, misced, and fisced indicate highest educational categories by the International Standard Classification of Education respectively for highest in the family, mother and father. Second, pared measures hisced and is converted into the number of years of schooling. Thus, the first three measures are categorical, but pared is continuous. Second, books are also a conventional measure indicating the number of books at home in categories – from 0-10 to more than 500 (see also Table 1). All the rest of the indicators (hedres, hisei, homepos, wealth, escs) are indices composed by the OECD research team by principal component analysis. The final index indicating socioeconomic status of the parents (escs) is the broadest and is derived from these three indices: the highest occupational status of parents (hisei), pared, and home possessions (homepos), which comprises all items on the indices of wealth and hedres, as well as books. Similarly, the wealth index is based on the students' responses on whether they had the following at home: a room of their own, a connection to the internet, a dishwasher, a DVD player, and three other country-specific items; also included were their responses on the number of cellular phones, televisions, computers, cars and rooms with a bath or shower. The hedres indicator shows the existence of educational resources at home, including a desk and a quiet place to study, a computer that students can use for schoolwork, educational software, books to help with students' schoolwork, technical reference books and a dictionary. Most of the indices (excluding hisei) are composed so that each variable has an OECD mean of zero and a standard deviation of one, meaning that variables are standardised, which allows their better interpretation in Table 3.

In general, we see that single-dimensional measures (such as books or hisced) perform relatively well compared with many indices. For the purpose of our empirical strategy, we thus prefer the operationalisation of family background by single-dimensional (categorical) measures instead of indices, because it allows for better interpretation of interactions. All our current estimations assume

Table 3: Operationalisation of family background. Regressions: country fixed effects with school robust standard errors

	hisced	misced	fisced	pared	hedres	books	hisei	homepos	wealth	escs
FBE (linear	0.237***	0.221***	0.194***	0.0988***	0.165***	0.201***	0.0127***	0.172***	0.0313	0.349***
effect)	(0.0173)	(0.0157)	(0.0168)	(0.00763)	(0.0126)	(0.00974)	(0.000621)	(0.0165)	(1.83)	(18.61)
russian_	0.430***	0.426***	0.435***	0.443***	0.465***	0.416***	0.404***	0.445***	0.491***	0.376***
urban	(0.0729)	(0.0725)	(0.0737)	(0.0738)	(0.0756)	(0.0709)	(0.0664)	(0.0740)	(6.33)	(5.59)
estonian_	0.290***	0.297***	0.341***	0.306***	0.364***	0.293***	0.250***	0.336***	0.377***	0.235**
urban	(0.0756)	(0.0755)	(0.0770)	(0.0773)	(0.0803)	(0.0717)	(0.0725)	(0.0792)	(4.59)	(3.26)
gender	-0.488***	-0.489***	-0.483***	-0.488***	-0.488***	-0.453***	-0.488***	-0.498***	-0.491***	-0.502***
	(0.0206)	(0.0208)	(0.0211)	(0.0208)	(0.0213)	(0.0201)	(0.0204)	(0.0212)	(-22.75)	(-24.78)
age_at	-0.218***	-0.215***	-0.217***	-0.221***	-0.228***	-0.204***	-0.195***	-0.226***	-0.235***	-0.198***
_isced1	(0.0268)	(0.0265)	(0.0268)	(0.0270)	(0.0267)	(0.0261)	(0.0252)	(0.0270)	(-8.36)	(-7.77)
lang_	0.483***	0.474***	0.505***	0.480***	0.458***	0.427***	0.452***	0.459***	0.495***	0.435***
athome	(0.0624)	(0.0619)	(0.0640)	(0.0619)	(0.0586)	(0.0604)	(0.0638)	(0.0628)	(7.77)	(7.05)
immig	-0.175***	-0.167***	-0.184***	-0.175***	-0.160***	-0.173***	-0.147***	-0.175***	-0.172***	-0.168***
	(0.0336)	(0.0335)	(0.0345)	(0.0336)	(0.0327)	(0.0328)	(0 .0311)	(0.0330)	(-5.09)	(-5.31)
testlang	0.627***	0.630***	0.640***	0.612***	0.617***	0.533***	0.510***	0.577***	0.612***	0.524***
	(0.0704)	(0.0700)	(0.0687)	(0.0712)	(0.0733)	(0.0672)	(0.0667)	(0.0724)	(8.18)	(7.90)
N	9522	9473	8722	9522	9577	9536	9325	9581	9580	9562
R^2	0.2019	0.2018	0.1944	0.1948	0.1877	0.2423	0.2359	0.1867	0.1672	0.2360

Notes: dependent variable is standardised PISA 2012 reading score, school robust standard errors in parentheses, * p<0.05, ** p<0.01, *** p<0.001

Source: authors' compilation

the linearity of the dependent variables, but in Appendix 4 we have also included nonlinear effects, showing that only books (more than 500 books) will overrule the assumption of linearity, and thus we have recoded our data: *1—0...25 books, 2—26...100 books, 3—101...200 books, 4—more than 200 books*.

Results

First, we run regressions without school policy moderating effects. The estimation technique makes no distinction between the rural areas in the two countries, and thus dummies for the rural areas in both countries are included. Effects sizes can be interpreted in percentages, because of the standardisation of reading scores (it means that in both countries mean score is subtracted from each individual score and divided by standard deviation). In Table 4 from the second column we see that in urban Russia, background effects (indicated by hisced) are approximately 20% higher than in Estonia (and in rural Russia).

Thus, we indicate total effects by summing up the following coefficients: for Russian urban 0.43 (0.211+0.215) and for Estonian urban 0.31 (0.203+0.098). Of course, the latter results indicate just empirical regularities from the measurement exercise, and the results suggest that in an urban context, system or school level practices affect individual abilities differently from the rural context. We hypothesise that due to differences in system level explicit choice policy (selection by aptitude test), there are some inherent school level practices that moderate or intensify these effects in urban settings. However, due to the fixed effect estimation strategy we are unable to disentangle system level effects.

In Table 5, we report the regression results (visualisation of the results can be seen in Appendix 5), testing the effect of school level admission policy to the size of FBE. The only statistically significant effect we were able to find was related to the school level admission policy — admission based on academic record. We find that it intensifies the family background effect. Admission based on academic record is mainly an urban phenomenon, but it is clear from the regression results that this explains only a part of the 'urban phenomenon' — the difference between urban and rural FBEs. Thus,

Table 4: Family background effects in rural and urban regions in Russia and Estonia. Regression 3: different FBE by urban regions

	Family background	
	books	hisced
FBE (linear effect)	0.203***	0.211***
	(0.0124)	(0.0192)
FBE_russian_urban	0.0355	0.215***
	(0.0276)	(0.0532)
FBE_estonian_urban	0.0984***	-0.0393
	(0.0276)	(0.0440)
russian_urban	0.304**	-0.113
	(0.111)	(0.146)
estonian_urban	-0.0636	0.387***
	(0.111)	(0.105)
N	9536	9522
R^2	0.246	0.205

Notes: Country fixed effect regression, dependent variable is standardised PISA 2012 reading score, school robust standard errors in parentheses. Control variables: gender, age at ISCED1, language at home, immigrant status, test language. * p<0.05, ** p<0.01, *** p<0.001

Source: authors' compilation

Table 5: School level admission policy and family background effect. Regression 4: Intensifying effect of academic record based admission

	Family background	
	books	hisced
FBE (linear effect)	0.166***	0.162***
	(0.0161)	(0.0261)
FBE_russian_urban	0.0304	0.215***
	(0.0267)	(0.0534)
FBE_estonian_urban	0.0651*	-0.0709
	(0.0273)	(0.0436)
FBE_school_admission_policy	0.0467***	0.0540*
	(0.0135)	(0.0218)
School admission policy	-0.0925	-0.0594
	(0.0520)	(0.0468)
russian_urban	0.294**	-0.147
	(0.107)	(0.146)
estonian_urban	0.0138	0.427***
	(0.0996)	(0.107)
N	9521	9507
R^2	0.250	0.208

Notes: Country fixed effect regression, dependent variable is standardised PISA 2012 reading score, school robust standard errors in parentheses. Control variables: gender, age at ISCED1, language at home, immigrant status, test language. * p<0.05, ** p<0.01, *** p<0.001

Source: authors' compilation

there is still some urban-rural mechanism that, independently from school-level admission policy, runs the FBEs.

In general, we explain approximately 5% of the total urban effect by including admission policy variable. It is also worth mentioning that such a policy has no statistically significant effect on the student PISA scores, and this contradicts one of the arguments made for tracking (Braga et al., 2013).

Conclusions

The paper aimed to reveal the potential effects of an increasingly selective educational agenda on educational inequality. The latter was operationalised as the family background effect, while the proxy for the selectivity of educational systems is the schools' tendency to admit students by academic record. The latter was considered one of the characteristics that has an effect on educational inequality independent of country-level school choice policy characteristics.

Although geographical assignment (catchment area or zone-based) is still the main approach in assigning children to schools, there is a major trend, involving different tracking systems and post-Soviet countries, to give parents choices beyond their local neighbourhood school. Furthermore, it is not a new phenomenon in countries such as Estonia and Russia. Our narrow focus is on admission based on ability tests or previous academic records, either at the primary level or the lower secondary level of the school, while in Russia selecting students for primary school is prohibited. Because choice is mainly an urban phenomenon, we separated urban and rural school districts and measured SES-based effects on educational outcomes in both countries – Russia and Estonia. Moreover, we asked whether a bigger urban family background effect is explainable by admission policies applied at the school level.

We see that the family background effect is detectable in all various specifications of our empirical model with various single- and multidimensional operationalisations of family background. This indicates that family characteristics have a strong explanatory power in explaining inequality of educational returns in our case countries. Thus, we determine that the dependency of students' results on parental characteristics is present in both case countries, Russia and Estonia, while urban schools generate less social mobility, as family background effects are higher. In addition to the empirical evidence that the urban family background effect is bigger than the rural one, we reveal that the Russian urban family background effect overshadows the Estonian urban effect size significantly (see Figure 2). However, effects work through different channels, thus weakening the argument. This means that in Russia, the effect works through the highest educational category of the family member and in Estonia through books at home. The interpretation of this empirical fact remains open. We may speculate based on theoretical literature that in post-Soviet Estonia books are proxies of the cultural capital of the family, which is not necessarily the case in Russia. What the exact mechanisms behind this phenomenon are remains hidden, but our results confirm that other family background proxies such as composite indices of home possessions or socioeconomic status, excluding wealth, also remain significant. However, the interpretation of effect sizes related to these indices is complex due to the nature of the principal component nature of indices.

Moreover, it has to be stressed that in a comparative European context both countries perform relatively well, and family background effects are small. Estonia does well even when compared to Scandinavian flagships of educational equity (Põder et al. 2016).

Mostly we focused on the explanations of why the family background effect is much higher in urban areas. Our partial explanation is related to school admission policies. Schools that admit students by academic record also create higher family background effects, while this school level admission policy is an urban phenomenon that partly explains the urban-rural gap. In general, our results showed that school level admission policy has an intensifying effect on family background independently of the country. Moreover, independently of the country, the intensifying effect of admission policy by academic record is the same.

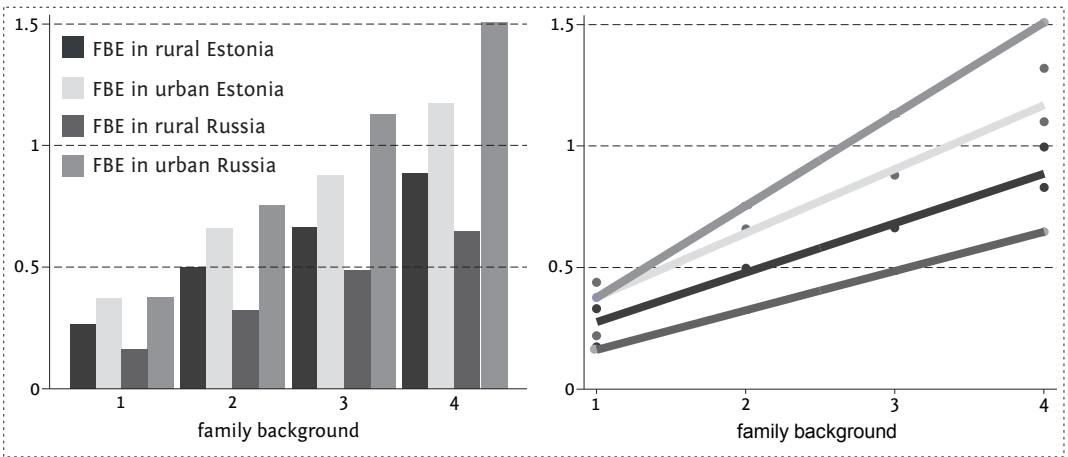

Figure 2: Family background effects are measured by standardised PISA reading scores (mean=0, std. dev=1), country fixed effects

Note: Family background categories for Estonia: 1=0-25 books, 2=26-100 books, 3=101-200 books, 4=more than 200 books. Family background categories for Russia: 1 = ISCED 1, 2; 2=ISCED 3, 4; 3=ISCED 5b, 4 = ISCED 5a, 6.

Source: authors' compilation

In the interpretation of our results, we want to draw attention to certain limitations originating from the data and estimation strategy. Namely, the single-dimensional measure of family background (instead of the multidimensional nature of socioeconomic status) will not allow for the monitoring of whether admission policy has any effect on alternative features of socioeconomic background (controls in our analysis), e.g., immigration status, home language or similar. In addition, we showed that in Russia at the system level there is more external control, making this more similar to controlled choice policy, which according to the literature shows better results in terms of educational inequality. However, the empirical analyses revealed that Russia has a relatively high family background effect in urban areas compared to rural ones. One potential explanation behind this is the magnitude of selectivity in urban settings – in Russia the share of specialised character schools is almost 30% of all schools, while in Estonia the share of oversubscribed schools is barely 10%. And even though admission to this group of schools is highly competitive and selective (see Põder and Lauri 2013), this does not cause too much harm in terms of average educational inequality. In addition, we have not verified whether any system level policy has an effect on equity; instead, we indicated that, independently of country level school choice policies, admission by academic record has a segregating effect in terms of increasing the family background effect.

To put our empirical results in the context of school choice literature, we have shown that similarly to the theoretical and empirical arguments, school choice is mainly an urban phenomenon, as schools in urban areas report having more competitive pressure and urban schools have higher family background effects. This pattern also works in the post-Soviet realm, as our case countries revealed. However, it turned out that the country level characteristics of school choice policy do not necessarily have the ability to predict the educational outcome in terms of the family background effect.

The main contribution of our analysis is at least three-fold. First, it illuminates school choice trajectories in countries of different regions to emphasise the path-dependent character of school systems. Thus, it gives new narrative to the literature. Second, there is a gap in empirical research in post-Soviet education reforms and paths, to which our research contributes. Third, our research emphasises that school choice and its related educational outcomes are complex – different governance layers interact and cannot easily be disentangled by normative policy design.

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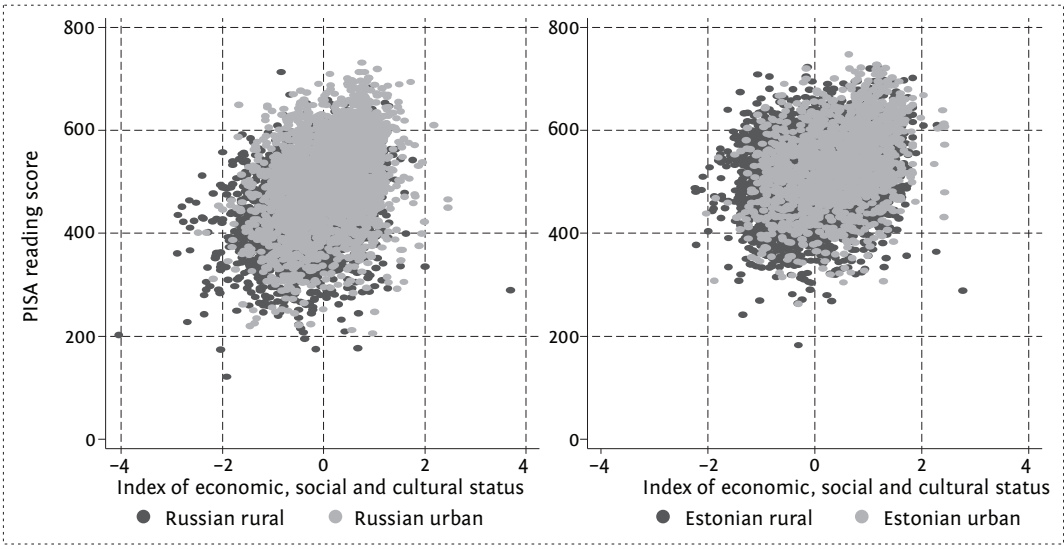
Appendix 1: PISA reading scores (actual values) and socio-economic status of parents



Note: Index of economic, social and cultural status has mean zero (OECD average) and standard deviation of one

Appendix 2: Descriptive statistics by countries

Variable	No. of observations	Mean	Std. dev.	Min	Max	No. of observations	Mean	Std. dev.	Min	Max
	Russia					**Estonia**				
Dependent variable:										
s_read	5231	0	1	-4.088714	2.942344	4779	-3.97e-10	1	-4.36981	2.989491
Family background characteristics:										
books	5166	3.257453	1.359317	1	6	4707	3.503718	1.376962	1	6
escs	5183	-.07672	.7426457	-4.04	3.69	4727	.1472731	.7995942	-2.24	2.76
fisced	4647	2.157091	.7658954	0	3	4361	1.579913	.9023924	0	3
hedres	5179	.3916258	.8851936	-3.93	1.12	4737	.2955753	.8901752	-2.92	1.12
hisced	5168	2.415054	.6787876	0	3	4679	1.950417	.9222091	0	3
hisei	5018	52.87418	21.17519	11.01	88.96	4636	51.48602	20.93372	11.56	88.96
wealth	5196	-.7193437	.7545473	-3.94	3.02	4740	-.1774262	.8114424	-3.2	2.94
homepos	5198	-.2290246	.8089018	-4.44	4.01	4741	.1205906	.8535294	-2.98	3.83
misced	5142	2.243485	.7663356	0	3	4654	1.769875	.9591413	0	3
pared	5168	13.94601	1.487184	8	15	4679	14.08805	1.950199	6	16
Personal control variables:										
gender	5231	.5002868	.5000477	0	1	4779	.4959196	.5000357	0	1
age_at_isc~1	5158	6.653548	.5573369	4	9	4669	6.874277	.4403591	5	8
lang_athome	5170	.9143133	.2799279	0	1	4682	.9436138	.2306905	0	1
immig	5128	.1109594	.3141125	0	1	4674	.0815148	.2736533	0	1
testlang	5231	1	0	1	1	4764	.7915617	.4062344	0	1
School level variables:										
sc_owner	5231	.0055439	.0742576	0	1	4779	.0359908	.1862867	0	1
sc_pubfin	5198	96.40525	9.397155	35	100	4419	97.23873	7.738116	40	100
sc_feefin	5070	1.501045	7.458903	0	61.1	4419	1.071238	6.038483	0	60
sc_location	5231	3.267826	1.307997	1	5	4779	2.693869	1.094445	1	4
sc_competi~n	5231	1.375454	.8113215	0	2	4779	1.456581	.780108	0	2
sc_assessm~l	5196	.9326405	.2506677	0	1	4769	.6410149	.4797531	0	1
sc_achiev_~b	5135	.7912366	.4064645	0	1	4779	.3783218	.4850192	0	1
sc_achiev_~d	5231	.9950296	.0703321	0	1	4779	.779661	.4145186	0	1
sc_parenta~e	5197	1.022128	.6445208	0	2	4779	.8127223	.7124713	0	2
sc_admissi~d	5218	.6607896	.7508985	0	2	4777	1.165166	.7892021	0	2
schsize	5037	678.5599	423.4904	15	3242	4779	592.1979	267.2895	5	1518

Note: the explanations of the variables are given in Table 1.

Appendix 3: Operationalisation of family background: multiple possibilities to operationalise SES

	Russian		Estonian	
	Urban	Rural	Urban	Rural
% of students with books at home				
0-10	7	12	6	10
11-25	17	24	12	14
26-100	33	35	27	34
101-200	18	16	22	20
201-500	16	10	22	15
more than 500	10	5	11	8
ESCS (average)	0.1	–0.26	0,39	0.03
% of students with father ISCED 5A-6	46	24	33	17
% of students with mother ISCED 5A-6	52	32	45	26
Highest parental education (years)	14.2	13.7	14.6	13.9
Home educational resources (HEDRES)	0.48	0.3	0.37	0.26
Home posessions (HOMEPOS)	–0.06	–0.39	0.27	0.05
Family wealth (WEALTH)	–0.59	–0.85	–0.1	–0.21
Highest parental occupational status (HISEI)	56.3	49,3	57.1	48.9
Immigrants (% of students)	11.5	10.7	10.3	7.1

Note: There are statsitically significant (in 99% level) differences by countries but most cases there is even bigger statistically significant differences by rural-urban dimention

Appendix 4: Non-linearity of family background

	Family background		
	hisced	escs	books
isced 3, 4	0.289***		
	(0.0824)		
isced 5B	0.322***		
	(0.0830)		
isced 5A, 6	0.712***		
	(0.0849)		
FB (escs)		0.349***	
		(18.56)	
FB (escs) squared		-0.00210	
		(-0.14)	
11-25 books			0.200***
			(5.38)
26-100 books			0.456***
			(12.69)
101-200 books			0.644***
			(15.32)
201-500 books			0.912***
			(19.84)
more than 500 books			0.897***
			(15.18)
russian_urban	0.410***	0.376***	0.414***
	(0.0714)	(5.59)	(5.88)
estonian_urban	0.294***	0.235**	0.291***
	(0.0753)	(3.26)	(4.07)
gender	-0.489***	-0.502***	-0.452***
	(0.0205)	(-24.78)	(-22.43)
age_at _isced1	-0.215***	-0.198***	-0.203***
	(0.0266)	(-7.77)	(-7.76)
lang_athome	0.487***	0.435***	0.420***
	(0.0637)	(7.04)	(7.03)
immig	-0.172***	-0.168***	-0.172***
	(0.0337)	(-5.31)	(-5.28)
testlang	0.647***	0.524***	0.531***
	(0.0707)	(7.91)	(7.90)
N	9522	9562	9536
R^2	0.2080	0.2360	0.2453

Notes: dependent variable is standardised PISA 2012 reading score, school robust standard errors in parentheses, *p<0.05, **p<0.01, ***p<0.001

Appendix 5: Effect sizes and admission policy