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**Developing key skills:
What can we learn from various national approaches?**

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Developing key skills: What can we learn from various national approaches?¹

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¹ Opinions expressed in this report are those of the author alone and do not represent the point of view of the European Commission.

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1 Introduction

The importance of human capital for individual success and economic development is widely accepted. There exists compelling evidence that the level of education is associated with better economic outcomes at the individual level such as higher annual earnings and a lower probability to be unemployed (e. g. Mulligan 1999). Moreover, recent studies confirm that human capital, in particular cognitive skills, are a key driver of long-run economic development (Hanushek and Kimko 2000; Hanushek and Woessmann 2008, 2009, 2011a).

The European Union consistently recognized the importance of educating its citizens, often framed as the development of a human capital policy. Within the EU, it is a declared policy objective to endow all citizens with the skills needed to compete in a modern and integrated society. Especially the acquisition of basic skills has been emphasized, since it provides a gateway to all further learning, employment and social inclusion.

Recently, much political attention has been given to improving performances in reading, math and science among the EU Member States. A large number of policies and reform packages often accompanied by large spending programs have been implemented, but progress remains slow and uneven. While some countries managed to increase their performance levels, other countries show only moderate progress. Meanwhile, there exists widespread performance gaps linked to migrant status or socio-economic backgrounds.

Substantial research has gone into understanding the determinants of educational achievement.³ The goal is to identify causal impacts of school factors. That is, to isolate the impacts of factors which can be controlled by policy from other influences on achievement such as family background, individual ability or peers. However, while most nations declare their commitment to education, there still exists a large uncertainty about whether specific education policies indeed promote the development of cognitive

³ The emergence of international achievement tests such as PISA or TIMSS created the possibility to assess and compare cognitive skills across countries and over time. Within the last decades, the ranking of countries based on their results in international student achievement tests has become more and more pronounced.

skills. A wide range of policies has been discussed and implemented around the world, but the evidence on the effectiveness of these policies is mixed.

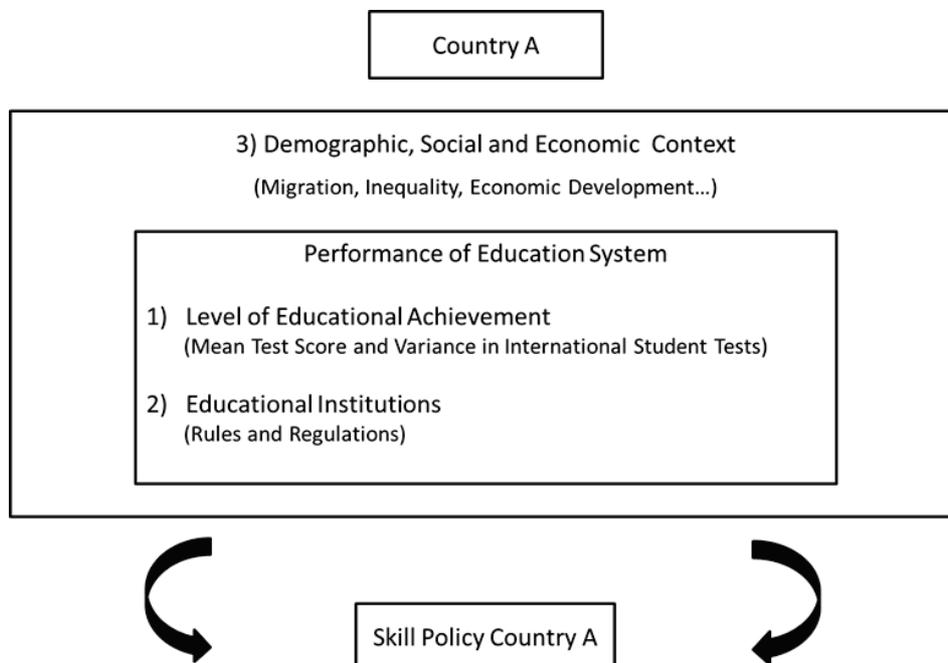
Presumably, the success of every skill policy depends on a country's unique characteristics such as the level of development and the institutional framework. Consequently, a country's individual education policy should recognize such features as important determinants of educational achievement. Hence, the provision of universal or group-based policy recommendations is often not appropriate. Still, this report assists policymakers in two ways: First, it provides a conceptual framework to rethink the development of a country's unique skill policy. Second, the report identifies for each EU Member State concrete education policies while taking into account the country's national peculiarities and characteristics.

Section 2 presents the conceptual framework. Section 3 reviews several skill policies and identifies the most influential institutions. Section 4 describes the performance of the education system of the EU Member States based on the PISA 2009 results. Section 5 brings Sections 3 and 4 together and provides concrete recommendations based on a country's current educational performance level, the existing institutional setting and the social context. Section 6 concludes.

2 Conceptual Framework

Every country has its individual tradition, culture and historical development, institutional setting and demographic, social and economic context. One way to think about inconclusive cross-country policy evidence is the idea that the success of every policy including skill policies interacts with a country's unique framework. Figure 1 presents three dimensions that should be considered to develop an education policy. First, a country can be characterized by the **achievement** of its educational system. Every education system runs through several achievement stages, from poor achievement to ideally excellence. The current stage of an education system can be assessed by the level of educational achievement as approximated by international achievement tests such as PISA or TIMSS. A country's average test score and the variation in test scores are particularly interesting indicators.

Figure 1: Conceptual Framework



Note: Author's own depiction.

Second, the performance of the education system is crucially influenced by the existing **institutional setting**. The institutions of an education system are the rules and regulations that explicitly or implicitly set rewards or penalties for the people involved in the education process. By this, institutional features generate incentives for all actors in the education process, including principals, teachers and students. Existing institutions together with political beliefs affected the education policies and reform packages of the past and in turn the current performance level. Furthermore, different educational institutions are likely to interact with each other. E.g. the introduction of a specific policy might depend on the existence of other rules and regulations. The review of the existing educational setting is therefore crucial for the development of new reform packages.

Moreover, countries vary in their **social and economic context**. Consequently, each education system operates in a different social and political environment. A country's demographic and social context refers e.g. to the prevailing human capital, the share of minorities or migrants and the socio-economic heterogeneity. Given the importance of

the socio-economic background for an individual's educational achievement, it is very likely that the social context in which an education system operates has at least an indirect influence on a country's performance and equity level. An education environment in which student achievement is closely related to an individual's socio-economic background might be especially unequal if the socio-economic heterogeneity is large. Given that students who were born abroad perform on average significantly worse in achievement tests compared to natives, countries with large shares of migrants might be characterized by larger variations in test scores. Moreover, countries with large migrant shares need to recognize the educational integration of children with migration background as crucial because it is the main precondition for integration at the labor market and assimilation in the host country.

The economic context refers to a country's economic development and can be approximated by its GDP per capita. GDP per capita presents a measure of the overall stage of development, since it is positively associated with other country characteristics such as the level of democracy or governance effectiveness. With respect to the development of skill policies, it is plausible that a specific policy might be harmful within a dysfunctional environment, whereas the very same policy might be beneficial in a well-developed setting. But even less extreme, a country's stage of development may enforce or weaken the policy effects.

The next section provides an overview of important education policies and reviews the existing evidence. For five institutional features which are found to be influential for student achievement, it is then discussed if and to what extent these policies may interact with a country's institutional setting, social context or level of development.

3 Policies to Improve Educational Achievement

Even though the importance of cognitive skills - in contrast to years of schooling - for economic development has been stressed by several studies (Hanushek and Woessmann 2008, 2011a), it could not be resolved which policies promote the acquisition of cognitive skills successfully. Almost every country around the world implemented

packages of education reforms within the last decades, however not all countries show significant improvements in student achievement over time.⁴

3.1 Review of Existing Evidence

This section reviews the available evidence on school policies to improve educational achievement. Substantial research has focused on the determinants of student achievement.⁵ Existing evidence can be broadly categorized into the effects of school resources, teacher quality and institutional structures on student performance.⁶

Research on the effects of resources is the most extensive. Policies on school resources generally involve substantial flows of resources with reductions in class size or increases in teacher salaries being the most common. According to the available evidence however, increases in spending and resources does not necessarily lead to increases in student achievement.⁷

Another strand of literature has stressed the conclusion that teacher quality is enormously important in determining student achievement.⁸ This is based on the fact, that several U.S. studies confirm large differences between teachers in terms of their ability to promote student learning. However, only a small part of the variation in student achievement can be attributed to observable teacher characteristics.⁹ So far, the available evidence on teacher quality does not allow the identification of crucial characteristics and makes it difficult – if not even impossible – to formulate specific policies.

Therefore, a country's institutional setting receives considerable attention. This strand of the literature stresses the idea that a well-functioning education system needs a

⁴ See changes in reading performance since 2000 in Table 2.

⁵ For an overview see e.g. Hanushek and Welch (2006) and Hanushek and Woessmann (2011b).

⁶ For an overview see Hanushek and Woessmann (2010) Section 4.

⁷ See Hanushek (2003) and Woessmann (2007a) and for extensive reviews of the existing evidence on the effects of school resources.

⁸ Teacher quality refers to any combination of unobservable and observable individual characteristics that are likely to be correlated with student achievement such as specialized knowledge, pedagogical know-how or the ability to motivate students.

⁹ See e.g. Hanushek (1971, 1992), Rockoff (2004) and Rivkin, Hanushek and Kain (2005).

supportive institutional structure. Institutions create incentives for the people involved in the education process. Even though opinions on the ideal institutional structure are diverging, there is widespread consensus that better incentives are the key to educational improvement. If actors in the education system are rewarded for producing high achievement and if they are penalized for poor performance, achievement is very likely to increase.

3.2 Heterogeneous Effects of Selected Skill Policies

In the following, five institutional features which are found to be influential for student achievement are outlined. After a brief review of available evidence, it is discussed if and to what extent these policies may interact with a country's institutional setting, social context or level of development.

Accountability:

Even though accountability systems are manifold, all of them generate explicit or implicit incentives to individuals involved in the education process. Standards-based external assessments, e.g. in terms of external exit exams, resolve the problem of incomplete monitoring by providing performance information relative to a national or regional standard. The publication of national league tables reveals a school's relative performance to parents and policymakers and thereby puts pressure on teachers and principals to promote student learning. Moreover, high performance of schools could be tied to rewards, i.e. an increase in funding, whereas low performing schools might be closed. By creating a national standard, external exit exams - in contrast to peer-based-evaluations - might also generate incentives for students to increase their effort.

The rationale for the implementation of an accountability system is the well-known principal-agent problem which applies also to the process of educational production. If parents and policy-makers have difficulties to monitor the activities of schools, teachers and principals may behave in contrast to the interests of their stakeholders. More

effective monitoring as implemented by an accountability system should then result in improved student outcomes.

While the most-developed accountability systems operate within the United States,¹⁰ countries within the EU differ in the extent to which they implemented accountability devices. As an exception, the United Kingdom reports schools' performance since 1988 publicly, while most other countries assess their students with external exit exams.

Evidence from cross-country and cross-regional studies shows that students perform substantially and statistically significantly better in countries or regions that have external exit systems in place (Juerges, Schneider, and Buechel 2005; Bishop 2006; Fuchs and Woessmann 2007; Woessmann 2010). Moreover, the introduction of external monitoring into a school system is likely to affect the impact of other policies by making educators more accountable for their actions. The existing cross-evidence also confirms that there are important interaction effects between institutions such as standardized testing or school autonomy and the accountability introduced by external exit exams (Woessmann 2007b; Woessmann, Luedemann, Schuetz, and West 2009). Evidence suggests that regular standardized testing is beneficial only if external exit exams are in place and that school autonomy is more beneficial in systems with external exit exams.

Both, the theoretical framework and the empirical evidence point into the direction that accountability systems increase student achievement.¹¹ With respect to equity, most accountability devices seem to be neutral (Woessmann, Luedemann, Schuetz, and West 2009).¹² However, external student assessment seems to be beneficial for the integration of migrants within the OECD countries (Schneeweis 2011). Apart from this, the effect of accountability systems seems to be beneficial mostly regardless of a country's other characteristics.

¹⁰ The most notable example of a far-reaching accountability system is the 2001 No Child Left Behind legislation in the United States, which requires states to meet certain standards for student achievement and sanctions low-performing schools.

¹¹ Figlio and Loeb (2011) give some reasons why accountability systems might not necessarily generate higher achievement. Also, Jacob (2005) and Jacob and Levitt (2003) present evidence for strategic behavior and cheating for school-focused accountability systems in the US.

¹² Exceptions are external exit exams and internal teacher monitoring that have slightly larger effects for student with high socioeconomic background. However, both accountability measures have a positive effect even on students with low socio-economic background (Woessmann, Luedemann, Schuetz, and West 2009).

Traditionally, the primary responsibility for educational administration and legislation in Germany rests with the federal states. According to a recent education reform, 9 German states introduced external exit exams between 2002 and 2006. A short-term analysis of the introduction of external exit exams reveals significantly, albeit small effects on student achievement in Math (Luedemann 2011).

Autonomy:

Local autonomy has been a highly discussed policy with opposing movements internationally. While many countries moved toward more decentralization, others introduced more centralized decision-making.

School autonomy or the decentralization of decision-making power can be understood as the delegation of a task by a principal (in this case, the government agency in charge of the school system), who wishes to improve the usage of local knowledge, to agents, namely the schools (Woessmann 2005). The prime argument for decentralization is that local decision-makers have superior knowledge, namely better understanding of the capacity of their schools and the demands that are placed on them by varying student populations. This knowledge in turn permits them to employ resources more efficiently, to improve the productivity of schools, and to meet the varying demands of their local constituents, with positive consequences for student outcomes (e.g. Hoxby 1999; Nechyba 2003). Additionally, by bringing decision-rights closer to the interested local community, decentralization may improve the monitoring of schools by parents and local communities (see Galiani, Gertler, and Schargrodsky 2008). However, in the presence of divergent interests and asymmetric information, the delegation of decision-rights opens scope for opportunistic behavior, with negative consequences for student outcomes (Woessmann 2005). Especially if there is little risk of detection, agents have an incentive to act in their own self-interest.

The opposing movements internationally and conflicting arguments reflect a fundamental tension and stress the idea that the effects of autonomy may well vary with other elements such as a country's level of development or a country's institutional setting. A poorly developed education system may lack the institutional prerequisites for

decentralized decision-making, whereas the very same policy might be beneficial in a well-developed institutional setting that exhibits a stronger decision-making capacity. Further, the effect of autonomy likely interacts with the existence of an accountability system that constrains the possibility for opportunistic behavior. Consequently, there are several reasons why the success of autonomy reforms may depend on a country's national peculiarities and characteristics.

Since the degree of school autonomy most generally does not vary within a country, most empirical evidence is based on the comparison between countries with different levels of decentralized decision-making. Several studies suggest that students tend to perform better in countries with local decision-making in personnel and operational decisions (Woessmann 2003, 2007b; Woessmann, Luedemann, Schuetz and West 2009). However, most studies fail to control for unobserved country heterogeneities.

By introducing a cross-country panel analyses, Hanushek, Link, and Woessmann (2011) control for unobservable time-invariant country characteristics. Their results suggest that autonomy does significantly affect the performance of a country's schools, but that the impact is quite heterogeneous across stages of development. They show that the effect of school autonomy in decision-making on academic content is positive in developed countries, but in fact turns negative in developing countries. A country's level of development is approximated by GDP per capita or student performance and captures such aspects as local capacity, abilities of local decision-makers and governance effectiveness. Therefore, the underlying mechanism is the interaction between a school's right to make decisions and the environment in which a school operates. This suggests that school autonomy needs a well-functioning environment to unfold positive effects, and can even be harmful in a dysfunctional setting. The authors further confirm that the positive effects of autonomy interact with the existence of an accountability system namely external exit exams.

Overall, autonomy reforms seem to be appropriate and successful in well-developed economies (Clark 2009), while countries at a lower development stage could benefit from centralization.

An evaluation of the 1988 Education reform in Britain reveals dramatic gains in student achievement for schools that became autonomous while funded directly by the central government. Performance effects are only partly driven by improved student quality, with the remaining gains presumably coming from changes in teaching quality and staff (Clark 2009).

Competition and School Choice:

Economic theory suggests that freedom of school choice generates competition between schools and should lead to higher overall student achievement. By giving families the right to enroll at any school they wish, higher demand for well-performing schools should create incentives for schools to offer best quality. Even if choice among public schools is limited in many school systems, privately managed schools can provide alternatives for students. The resulting competition among schools should lead to higher achievement.

Opponents often argue that the possibility to choose schools increases educational inequality if only parents with higher socio-economic status take the opportunity or if private schools charge tuition fees (e.g. Brighouse 2000; Ladd 2002). Thus, the distinction between management and funding is crucial: additional choice created by publicly-funded private schools may particular benefit students from disadvantaged backgrounds whose choices are otherwise most constrained. Cross-country evidence even suggests that the dependency on socio-economic background is lower in education systems with a larger share of privately managed schools as long as all schools are publicly funded (Woessmann, Luedemann, Schuetz, and West 2009). Moreover, students in countries with a large share of privately managed schools tend to perform better on average (Woessmann 2007b; Woessmann, Luedemann, Schuetz, and West 2009).

Recent evidence corroborates the conclusion that this is a causal effect induced by the private-sector competition (West and Woessmann 2010). Also, studies on English schools show positive effects on student achievement due to school competition (Bradley and Taylor 2002; Levacic 2004) and several studies conducted in Europe provide evidence on significant positive effects of competition from privately managed

schools on public school performance (Filer and Munich 2003; Björklund, Edin, Freriksson, and Krueger 2004; Sandström and Bergström 2005).¹³

Overall, school choice seems to increase student achievement by forcing schools to compete for students. With respect to educational equity, it is important that all schools are funded publicly and do not charge school fees.

With the event of the “schools to the parents” movement in 1917, parents in the Netherlands were firstly allowed to choose whatever school they wish for their children. Moreover, all education institutions regardless whether they are publicly or privately governed are funded equally as stated in Article 23 of the Education Constitution. The resulting competition is regarded as one determinant of the high student achievement in the Netherlands. (Patrinos 2011)

Early Tracking:

Tracking regimes are characterized by the sorting of students by ability or achievement. Students may be sorted into different classrooms based on achievement within schools as it is typical in the U.S. or Canada. Alternatively, students in some European countries are sorted into different schools that put more emphasis on either vocational or academic contents.¹⁴

Proponents of tracking argue that tracking creates homogenous student populations within classrooms (and schools) which enables teachers to focus more effectively on their specific needs. Here, the distinction between early and later tracking is crucial. While the specialization of skills and competencies through tracking at a later point in time of the educational career may be beneficial, opponents fear that too early tracking increases educational inequality and perpetuates economic disadvantage across generations. This is based on the idea that more educated parents tend to be more interested and successful in placing their children on higher school tracks. Moreover, misclassification of students seems to be more likely at an early tracking age, since some students need more time to fully develop their learning potential. Another line of

¹³ For a more critical review on the effects of competition see Waslander et al. (2010).

¹⁴ See Betts (2011) for a literature overview on tracking.

arguments centers on the idea of peer effects. Separating low-achieving students from their high-achieving peers might harm their educational progress if low-achieving students benefit from the achievement and interaction of or with their peers.

Most studies focus on whether countries that track at an early age have a higher transmission of intergenerational inequality. Evidence from some countries suggests that early track placement is strongly associated with socio-economic status. In absence of variation in tracking policies over time, several studies exploit cross-country variation and account for omitted variables by adopting a difference-in-difference approach with a grade element (Ammermüller 2005; Hanushek and Woessmann 2006; Waldinger 2006). Most of these studies support the hypothesis that family background is stronger related to student outcomes in countries that track students at an early age (Ammermüller 2005; Hanushek and Woessmann 2006). Also studies using other methodological approaches confirm that early tracking increases inequality and suggest that late tracking reduces the impact of socio-economic background (Bauer and Riphahn 2006; Schuetz, Ursprung, and Woessmann 2008; Woessmann 2010). Further, early tracking might be also disadvantageous for the educational integration of migrants. Luedemann and Schwerdt (2012) show that second-generation migrants are less likely to receive a teacher recommendation for a higher school track and that this cannot be attributed to differences in test scores or general intelligence alone. However, Brunello and Checchi (2007) show ambiguous effects of tracking. While they confirm that the influence of parental education on long-term outcomes such as educational attainment and labor market outcomes is larger when countries track at an early age, they also show that the curricula offered at vocational schools may promote further training and adult competencies.

Regarding the effects of tracking on efficiency, Hanushek and Woessmann (2006) find no effects on overall student achievement.¹⁵ This result is also confirmed by Brunello et al. (2012) who account not only for the outcome at school, but for the transition from school to work in a realistic labor market setting.

¹⁵ A recent experimental study conducted in Kenya does not confirm that tracking increases inequality and even shows significant increases in average test scores (Duflo, Dupas, and Kremer 2008). However, this might be due to the very low performance level and development stage of the Kenyan education system.

Based on the existing evidence, early tracking is likely to increase educational inequality.

In the 1970ies, the Finnish two-track school system was replaced by a uniform nine-year comprehensive school. As a result, the selection of students into vocational and academic tracks was shifted from age 11 to age 16 and thereby access to academic secondary education was expanded. Pakkarinen et al. (2009) convincingly show that the reform reduced the effect of fathers' earnings on the sons' earnings significantly and conclude by this that the reform enhanced intergenerational earnings mobility (Pakkarinen et al. 2009).

Early Childhood Education:

Early childhood programs, like kindergardens, day-care centers and pre-schools are aimed at preparing children for primary education and providing an equal starting point for all children. Pre-school programs in the U.S. have been found to be significantly beneficial for educational attainment and earnings for all children. Interestingly, effects are especially large for disadvantaged children (e.g. Currie 2001; Currie and Thomas 1999, Heckman 2008).

This evidence suggests that a country should be more effective in decreasing educational inequality the more children from disadvantaged backgrounds attend pre-primary education. Even though this applies to all countries, it seems to be particular beneficial to increase pre-school attainment in countries with high educational inequity. Especially countries with a high dependency of student achievement on socio-economic background might therefore decrease inequality by increasing the number of children attending early childhood programs.

Further, Figure A1 shows that a country's performance variance is positively correlated with the share of migrants; even though mean performance is not (see Figure A2). The educational integration of children with migration background is crucial, because it is the main precondition for integration on the labor market and assimilation in the host country. Apart from a country's possibility to influence the migrant population through immigration policy, countries seem to differ in their capacity to

integrate migrants (Schneeweis 2011). Especially countries with large share of migrants could therefore benefit from compulsory early childhood education. The attendance of children with migration background in pre-school programs or kindergardens increases their exposure to a country's language and culture which is a crucial precondition for success in school. In line with this, Schneeweis (2011) shows a positive correlation between pre-primary school enrollment and educational integration of children with migration background. Overall, early childhood education is likely to reduce educational inequality, because it is especially effective for students from disadvantaged or migration backgrounds.

As a consequence of the Kindergarten White Paper in 1972, subsidized child care in Norway increased dramatically in the following years. The reform had large positive effects on both children's adult education and labor market outcomes. Most of the effects on education stem from children with low-educated mothers, whereas most of the effects on labor market attachment and earnings relates to girls (Havnes and Mogstad 2011).

4 The Performance of the EU Education Systems

As outlined in Section 2, the performance of the education system can be described by the current achievement level and the existing institutional set-up. One way to approximate a country's **level of educational achievement** is to rank countries according to their mean student achievement in international student assessment tests. In PISA, 15-year-old students are tested in reading, math and science by a broad sample of tasks with differing levels of difficulty. School systems do not only seek to produce high level achievement, but also try to provide equal education opportunities to all students. However, the gap between high- and low-performing students across countries differs considerably. Differences in the **overall variation in student achievement** (measured as the standard deviation) across countries indicate that countries vary in their ability to support different student populations in the same way. A common measure of educational equity in PISA is the average difference in student reading

achievement associated with a one unit increase in the PISA index of economic, social and cultural status which is known as the slope of the socio-economic gradient (PISA 2009, Volume 2, p. 54). The stronger the relationship between socio-economic background and student achievement the less equal a country's educational opportunities are. Figure A3 shows that the overall variance in student achievement and a country's educational equity as measured by the slope of the socio-economic gradient is positively correlated. That is, the stronger the relationship between reading achievement and social background, the greater the test score varies across students within a country. Both, the variance in student test scores and the slope of the socio-economic gradient are taken as indicators for educational equity. However, because of data availability, educational equity is most often proxied by a country's overall variation in student math achievement in the following sections.

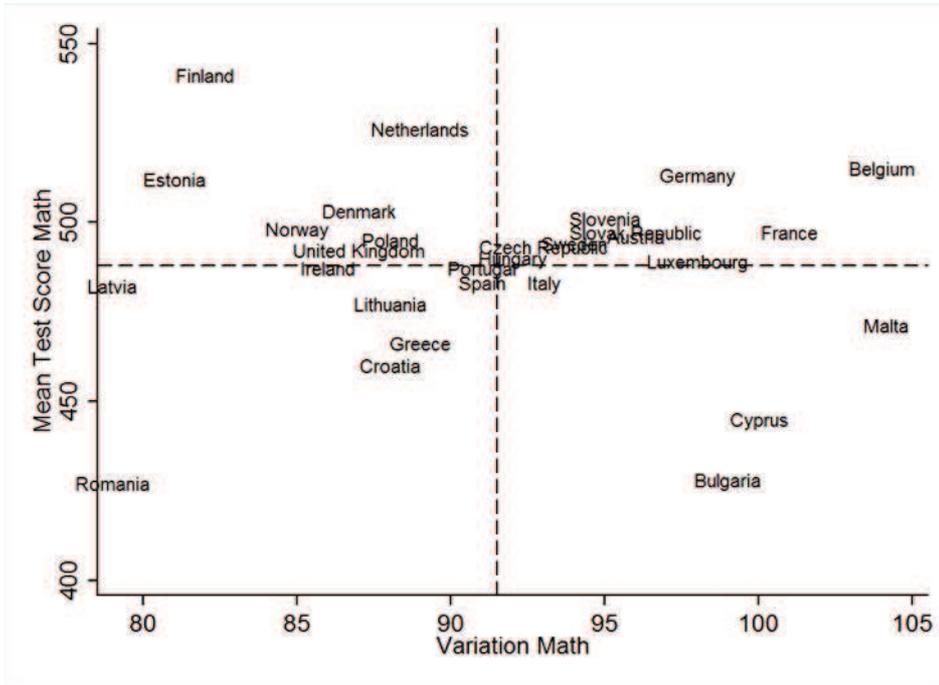
This Section identifies both the **level of student achievement** as well as **educational equity** as important indicators. In the following, information on these two dimensions for the EU Member States is presented. The grouping of countries by level and equity serves as a first indication of the development stage of a country's education system. As outlined in Section 2, the institutional setting and social context are also important determinants. Therefore, Section 4.2 presents country information on the institutional setting, the stage of development and social context.

4.1 Educational Achievement of EU Member States

Figure 2 plots all EU countries according to their mean achievement and overall variation in the math PISA assessment of 2009 (see also Table 2). Malta and Cyprus did not participate in PISA. I follow Hanushek and Woessmann (2010) and use TIMSS data to estimate their achievement scores and test score variations in math.¹⁶ The horizontal and vertical dashed lines indicate the EU means. Among the EU members, the math test scores in PISA 2009 range from 427 to 541 score points with an average mean achievement of 488 score points and a mean variation of 91.5 points in test scores.

¹⁶ For details see Hanushek and Woessmann (2010), Appendix C.

Figure 2: EU Countries according to their Math Performance in PISA 2009



Note: Malta and Cyprus did not participate in PISA. I follow Hanushek and Woessmann (2010) and use TIMSS data to estimate their achievement scores and variations (measured as standard deviations) in math and science. For details see Hanushek and Woessmann (2010), Appendix C.

The upper left square displays all countries with a performance level above the EU mean and a relatively small variance in test scores. The top-performing countries include Finland, the Netherlands, Estonia, Denmark, Norway, Poland and the United Kingdom. These countries manage both, high mean achievement and low differences in test scores across students. The countries displayed in the upper right square of Figure 2 also perform above the EU mean. However, the variation in achievement within the countries varies considerably. Top-performing countries with a relatively large variation are Belgium, Germany, Slovenia, the Slovak Republic, France, Austria, Sweden, Czech Republic, Hungary and Luxembourg. Even though these countries manage a high mean achievement, the gap between high and low performing students is relatively large. Countries in the lower part of Figure 2 perform below the EU mean, most of them with a low variance in achievement levels across students. The lower left square shows Ireland, Portugal, Spain, Latvia, Lithuania, Greece, Croatia and Romania. Italy, Malta, Cyprus and Bulgaria show a relatively low mean achievement with a relatively large variation in achievement levels across students.

4.2 Institutional Setting and Social Context of EU Member States

Table 1 presents information on the existing institutional setting for each of the EU countries. Institutional features such as the existence of accountability systems or the extent of competition between schools are manifold and difficult to measure. In this report, a country's institutional characteristics are approximated by specific indicators taken from the PISA 2009 results volumes.¹⁷ In line with Section 3.1, indicators related to the extent of accountability, school autonomy and school choice as well as information on tracking age and early childhood education are listed in Table 1.

For the upcoming analyses, accountability is approximated by the existence of standards-based external exit exams in an education system. Among the EU member states, external exit exams are a common practice to ensure a national standard and make school's performance more comparable. In Table 1, the existence of external exit exams is coded as a 1, in contrast to a 0. If a country's states differ in their education systems, as e.g. it is the case for Germany, the figure refers to the country mean.

The extent of school autonomy refers to the *index of school responsibility for curriculum and assessment*. PISA 2009 asked school principals to report whether the teachers, the principal, the school's governing board, the regional or local education authorities or the national education authority had considerable responsibility for the curriculum and instructional assessment within the school. This information was combined to create an index of school responsibility for curriculum and assessment, such that the index has an average of zero and a standard deviation of one for OECD countries. Higher values indicate more autonomy for school principals and teachers.

¹⁷ Unfortunately, the most recent data is from 2009 and it is quite likely that at least some countries implemented school reforms that changed their institutional setting within the last years. However, the data still provides the possibility to compare institutional features across countries and serves as an example that has to be updated with more recent data.

Table 1: Existing Institutional Setting

Country	Accountability		Autonomy		Choice		Tracking		Early Childhood Education	
	Standards-based External Exit Exams		Curriculum	Share attending Government-dependent private schools	Initial assignment based on geographical area	Age at first selection	Attendance ISCED 0 (PISA 2009)	Attendance ISCED 0 (EuroStat 2009)		
Austria	0.00		-0.31	10.8	1.00	10.0	85.2	91.3		
Belgium	0.00		-0.17	.	0.00	12.0	93.6	99.3		
Bulgaria	1.00		-0.91	0.0	0.00	13.0	73.8	78.5		
Croatia	1.00		-0.93	0.0	1.00	14-15	52.1	68.8		
Cyprus	0.00		.	.	.	.	.	86.4		
Czech Republic	1.00		0.92	2.9	1.00	11.0	86.6	90		
Denmark	1.00		0.05	17.8	1.00	16.0	69.8	91.9		
Estonia	1.00		0.22	2.3	1.00	15.0	79.7	95.7		
Finland	1.00		-0.15	3.9	1.00	16.0	66.1	71.9		
France	.		.	.	1.00	.	93.1	100		
Germany	0.35		-0.25	4.0	1.00	10.0	84.7	96		
Greece	0.00		-1.25	0.0	1.00	15.0	66.1	70.2 ¹		
Hungary	1.00		0.11	11.5	1.00	11.0	94.5	94.8		
Ireland	1.00		0.01	49.5	1.00	15.0	41.2	73.4		
Italy	1.00		0.20	1.9	1.00	14.0	86.1	98.2		
Latvia	1.00		-0.54	0.5	1.00	16.0	65.7	89.6		
Lithuania	1.00		0.13	0.4	1.00	14-15	50.6	79.6		
Luxembourg	1.00		-0.86	10.9	1.00	13.0	85.0	94.6		
Malta	.		.	.	.	.	.	93.9		
Netherlands	1.00		1.04	64.7	0.00	12.0	94.6	99.5		
Norway	1.00		-0.57	1.4	1.00	16.0	84.3	96.6		
Poland	1.00		0.31	0.6	1.00	16.0	49.9	70.9		

Country	Accountability		Autonomy		Choice		Tracking		Early Childhood Education	
	Standards-based External Exit Exams		Curriculum	Share attending Government-dependent private schools	Initial assignment based on geographical area	Age at first selection	Attendance ISCED 0 (PISA 2009)	Attendance ISCED 0 (EuroStat 2009)		
Portugal	0.00		-0.93	8.8	1.00	15.0	60.2	88.2		
Romania	0.78		-0.36	0.0	.	14.0	87.6	82.3		
Slovak Republic	1.00		0.08	9.0	1.00	11.0	82.8	77.9		
Slovenia	1.00		-0.38	2.7	1.00	14.0	68.4	91.3		
Spain	0.00		-0.48	25.7	1.00	16.0	86.8	99.3		
Sweden	0.00		0.21	10.0	1.00	16.0	66.1	94.7		
United Kingdom	1.00		0.83	0.0	1.00	16.0	66.0	97.3		
EU Average	0.71		-0.15	9.57	0.88	13.9	74.8	89.0		

Note: Except for Cyprus and Malta, all data is taken from PISA 2009 Volume IV Chapter 3, Annex B1. Information on the *existence of standards-based external exit exams* for Cyprus is based on TIMSS 95. Government-dependent private schools refer to government funded and privately managed schools.

¹ For Greece, data refer to 2008.

The extent of competition within an education system has several dimensions such as a parent's right to choose a school for their children, the existing school types as well as school funding. Most often families are assigned to a public school based on geographic location (see Table 1). School choice is then actually restricted since the permission to enroll at another public school may require an application or exemption and is mostly based on the availability of places. Since private schools, especially if they are funded publicly (which leads to lower or no tuition fees), provide alternatives to parents, the percentage of students attending a government-dependent, private school along with the assignment of families to schools based on residency is reported in Table 1.¹⁸ Moreover, the number of students educated privately captures also other means of competition. In Sweden, for example, parents are allowed to spend the money the government allocates to their children's education for whatever school they want, which came along with increased enrollments rates at private institutions.

For tracking the age at which students were selected into different classes or schools is reported. Early childhood education refers to the percentage of students reporting that they have attended pre-primary education (ISCED 0) for more than one year. To additionally capture current pre-primary enrollment rates, data from Eurostat 2009 is reported. Apart from the institutional setting, a country's social and economic context should be considered in developing a human capital policy.

Columns (1) to (4) in Table 2 present information on a country's stage of development in terms of educational achievement and economic development. In particular, the average test score in math, the variation in math tests scores across students, and the change in reading achievement since 2000 as well as GDP per capita is provided. Information on the social context refers to the slope of the socio-economic gradient as a measure of educational equity, the share of migrants and the difference in test scores between native students and students with migration background.

¹⁸ The two measures reported for school choice do not comprehensively capture the extent of competition within a country.

Table 2: Summary Statistics

Country	Performance			Development	Social Context		
	Test Score Math	Variation in Math	Trend		GDP per Capita	Dependency on socio-economic background	Share Migrants	Gap between Natives and Migrants
Austria	496	96	.	36,838.66	48.00	15,23	67
Belgium	515	104	-1	34,661.85	47.00	14.77	68
Bulgaria	428	99	-1	-	51.00	-	-
Croatia	460	88	.	-	32.00	-	18
Cyprus	445	100	.	-	.	-	-
Czech Rep.	493	93	-13	23,994.63	46.00	2.26	17
Denmark	503	87	-2	36,325.64	36.00	8.62	36
Estonia	512	81	.	20,620.01	29.00	8.00	34
Finland	541	82	-11	35,322.19	31.00	2.58	60
France	497	101	-9	32,494.65	51.00	13.14	30
Germany	513	98	13	34,683.25	44.00	17.62	27
Greece	466	89	9	27,792.97	34.00	9.03	57
Hungary	490	92	14	18,763.49	48.00	2.10	-12
Ireland	487	86	-31	44,381.43	39.00	8.28	33
Italy	483	93	-1	31,015.66	32.00	5.55	53
Latvia	482	79	26	-	29.00	-	11
Lithuania	477	88	.	-	33.00	-	23
Luxembourg	489	98	.	82,456.08	40.00	40.16	19
Malta	471	104	.	.	.	.	.
Netherlands	526	89	.	39,593.60	37.00	12.13	14
Norway	498	85	-2	53,671.93	36.00	6.80	33
Poland	495	88	21	16,311.80	39.00	0.03	-
Portugal	487	91	19	22,638.44	30.00	5.48	24
Romania	427	79	-3	-	36.00	-	-
Slovak Rep.	497	96	.	20,269.87	41.00	0.53	-
Slovenia	501	95	.	26,556.57	39.00	7.77	47
Spain	483	91	-12	31,469.10	29.00	9.49	56
Sweden	494	94	-19	36,785.28	43.00	11.73	66
UK	492	87	.	34,956.95	44.00	10.61	23
EU Average	488	92	-0.17	33,744.56	38.67	9.82	35

Notes: Except for Cyprus and Malta, all data is taken from PISA 2009 Volume 1-5, Annex B1. Dependency on socio-economic background is measured as the slope of the socio-economic gradient (PISA 2009, Volume 2, p. 54). Trend refers to the change in reading performance since 2000. Migrants include first and second generation migrants.

5 Concluding Policy Recommendations

Recently, much political attention has been given to improving educational achievement among the EU Member States. Despite the implementation of top-to-bottom reform packages, progress among the EU Member States remains slow and uneven. This report presents a framework that identifies individual country characteristics such as a country's current stage of development and institutional setting as crucial for the success of any skill policy. Consequently, the development of a country's individual education policy should be based on a thorough analysis of a country's current situation, institutional environment and social context. Since the provision of universal or group-based policy recommendations is mostly non-satisfying, this Section presents individual recommendations for each EU Member State. In the following, I relate to each of the presented skill policies a country's stage of development, institutions and social context and derive concrete policy recommendations. Table 3 provides an overview of the policy recommendations for each country.

Accountability:

Accountability systems make educators accountable for their performance and are therefore thought to increase overall student performance. Moreover, accountability systems seem to be neutral with respect to equity. Since this policy aims at the level of student achievement, it is a tool to increase average student achievement in all countries. However, especially countries that perform relatively poor today are likely to raise their achievement level by introducing accountability devices into their school systems. Table 1 reveals that most EU countries already have external exit exams in place. However, almost half of the countries that perform below average have no central examinations. **Cyprus, Greece, Spain and Portugal** are likely to increase student achievement with the implementation of accountability devices such as standards-based external examinations. Also, **Austria, Belgium, Germany and Sweden** could – based on the data available for 2009 – further improve student achievement by making their schools more accountable. As a leading example, **Austria** is going to implement external exit exams, - *Zentralmatura* -, in 2013/2014.

Table 3: Policy Recommendations

Country	External Exit Exams	EEE and AUT	School Autonomy	School Choice	Tracking	Early Childhood Education
Austria	1	1	0	0	1	0
Belgium	1	1	0	0	1	0
Bulgaria	0	0	0	0	1	1
Croatia	0	0	1	1	0	1
Cyprus	1	.	.	.	.	1
Czech Republic	0	0	0	1	1	0
Denmark	0	0	0	0	0	0
Estonia	0	0	0	1	0	0
Finland	0	0	1	1	0	1
France	.	.	.	1	.	0
Germany	1	1	0	1	1	0
Greece	1	1	0	1	0	1
Hungary	0	0	0	0	1	0
Ireland	0	0	0	0	0	1
Italy	0	0	0	1	1	0
Latvia	0	0	1	1	0	1
Lithuania	0	0	0	1	0	1
Luxembourg	0	0	1	0	1	0
Malta	.	.	.	.	.	.
Netherlands	0	0	0	0	0	0
Norway	0	0	1	1	0	0
Poland	0	0	0	1	0	1
Portugal	1	1	0	0	0	1
Romania	0	0	0	0	0	1
Slovak Republic	0	0	0	0	1	1
Slovenia	0	0	1	1	1	0
Spain	1	1	0	0	0	0
Sweden	1	0	0	0	0	0
United Kingdom	0	0	0	1	0	0

Note: This Table presents policy recommendations for each country while accounting for individual country characteristics. A 1 indicates that a country could benefit from implementing the specific institution.

School Autonomy: Decentralization:

Recent work shows that school autonomy is only beneficial in developed countries and can be even harmful in poorly developed economies. Since especially academic-content autonomy has been identified as influential (Hanushek, Link, and Woessmann 2011), I focus in the following on the index of school responsibility for curriculum and assessment as an indicator for school autonomy.

Interestingly, among the top-performers, most countries already have autonomous schools. Denmark, Estonia, the Netherlands, Poland and the United Kingdom already show relatively high indexes for curriculum and assessment autonomy, always in combination with external exit exams. Still, giving more rights to their schools could further improve their achievement.

However, there is a large number of countries which show a relatively high degree of development both in terms of student achievement as well as GDP per capita (see Table 2), but relatively low levels of curriculum autonomy (see Table 1). **Austria, Belgium, Finland, Germany, Luxembourg, Norway and Slovenia** perform above the EU average, have a GDP per capita which is above the crucial treasure that has been identified by Hanushek, Link, and Woessmann (2011), and have relatively low levels of academic content autonomy as measured by the index of school responsibility for curriculum and assessment. Given that autonomy interacts with the existence of an accountability system, in a next step the existing institutional setting of those countries has to be checked. Based on the existence of standards-based external exit exams, **Finland, Luxembourg, Norway and Slovenia** should assign more decision rights to their schools.¹⁹ Assigning more rights to schools could also be a promising policy for **Croatia and Latvia**. Both countries show a promising achievement level with above 460 test scores – Latvia even managed to increase the reading achievement by 26 points since 2000 (see Table 2) – and have accountability systems in terms of external exit exams in place (see Table 1).

¹⁹ Surely, there are other accountability devices than external exit exams such as the publication of school performance or the requirement to meet certain performance levels (see Woessmann, Luedemann, Schuetz, and West 2009). However, a country's procedure should be to check whether schools are held accountable regardless of the specific device before schools are given more autonomy.

Furthermore, **Austria, Belgium and Germany** as well as **Greece, Portugal** and **Spain** that perform only slightly below the EU average could benefit most from a more autonomous system if they would simultaneously implement accountability devices.

School Autonomy: Centralization

Countries at a low stage of educational development, as **Bulgaria, Cyprus** and **Romania** might lack the institutional setting or the ability of decision-makers to ensure effective decisions. Bulgaria and Romania already show low levels of curriculum autonomy; however those countries could decrease their school autonomy regarding other decisions such as resources or personnel.²⁰

Choice:

Competition among schools is likely to increase school quality and thereby student achievement. One way to increase the competition between schools is to give parents the absolute right to select the school they wish for their children. In most countries within the EU, families are allocated to schools by residency (see Table 1). Even though enrollment at other public schools is most often possible, it requires an application process or exemption and is therefore not quite common. Currently, only in Bulgaria and the Netherlands parents have absolute freedom of choice. As mentioned in section 4.2, the existence of privately managed, but publicly funded schools also provides alternatives for parents. With respect to equity, it is important that private schools are publicly funded and do not charge high fees, such that students from all backgrounds have the opportunity to attend those schools. In Austria, Denmark, Hungary, Ireland, Luxembourg, the Netherlands, Portugal, the Slovak Republic, Spain and Sweden relatively large shares of students attend government-dependent, private schools (see Table 1). Based on the extent of freedom of choice and the shares attending private schools, **Croatia, the Czech Republic, Estonia, Finland, France, Germany, Greece, Italy, Latvia, Lithuania, Norway, Poland, Slovenia** and **the United Kingdom** could strengthen competition between schools. More freedom of choice, regardless of how exactly implemented, is likely to increase a country's overall achievement level. E.g. the

²⁰ For Cyprus, there is unfortunately no data available in PISA 2009.

provision of private schools with public funding could stimulate the emergence of independent schools (which should not be allowed to charge extra tuition fees).

Early Tracking:

Concerns regarding early tracking center mostly on the fear that countries that track at an early age have a higher transmission of intergenerational inequality. Most evidence confirms that track placement has much to do with socio-economic background and by this potentially increases inequality. Countries with high inequality across students and an education system that tracks students at an early age could therefore increase equality by rising the tracking age. **Austria, Belgium, Bulgaria, the Czech Republic, Germany, Hungary, Italy, Luxembourg, the Slovak Republic and Slovenia** are classified by relatively high levels of inequality as measured by the slope of socio-economic gradient or the variance in tests cores and show a relatively early tracking age below or equal 14 years (see Table 1 and 2). Those countries could decrease inequality by rising the tracking age.

Early Childhood Education:

Early childhood programs provide an equal starting point for children from heterogeneous backgrounds. Especially countries with a large variation in test scores or a high dependency of education outcomes on individual socio-economic backgrounds could therefore benefit from increasing enrollment rates in early childhood education. Further, countries with large shares of migrant populations could encourage the educational integration of children with migration background by providing early childhood education programs. **Bulgaria, Ireland, Poland, Portugal, Slovenia, Sweden and the United Kingdom** show a high dependency of student achievement on socio-economic backgrounds as measured by the slope of the socio-economic gradient or variation in test scores in PISA 2009. Further, **Austria, Belgium, Denmark, Finland, Greece, Italy, Portugal, Slovenia, Spain and Sweden** show relatively high differences in the test scores between natives and migrants (see Table 2). PISA 2009 provides attendance rates in ISCED 0 on the students tested in PISA 2009 (see PISA 2009 IV Annex B1, Sheet IV.3.18). In other words, this measure refers to pre-primary

attendance rates about 10 years ago, which might explain the overall low attendance rates. However, in the last years, in most countries effort has been made to increase attendance in pre-primary education. Based on current enrollment data, **Bulgaria, Croatia, Cyprus, Finland, Greece, Ireland, Latvia, Lithuania, Poland, Portugal, Romania and the Slovak Republic** show relatively low levels of pre-primary enrolment rates. For those countries, the provision of compulsory and (or) costless pre-primary education could help to increase attendance rates. Especially the attendance of children with migrant or disadvantaged backgrounds could increase a country's educational equality and mobility.

These tentative policy recommendations derive from the general conceptual framework presented in this report, applied to individual countries based on their specific characteristics and contexts. Even though this presents a simplified approach, the conceptual framework has a timeless element and should be aligned – case-by-case – with more recent developments.

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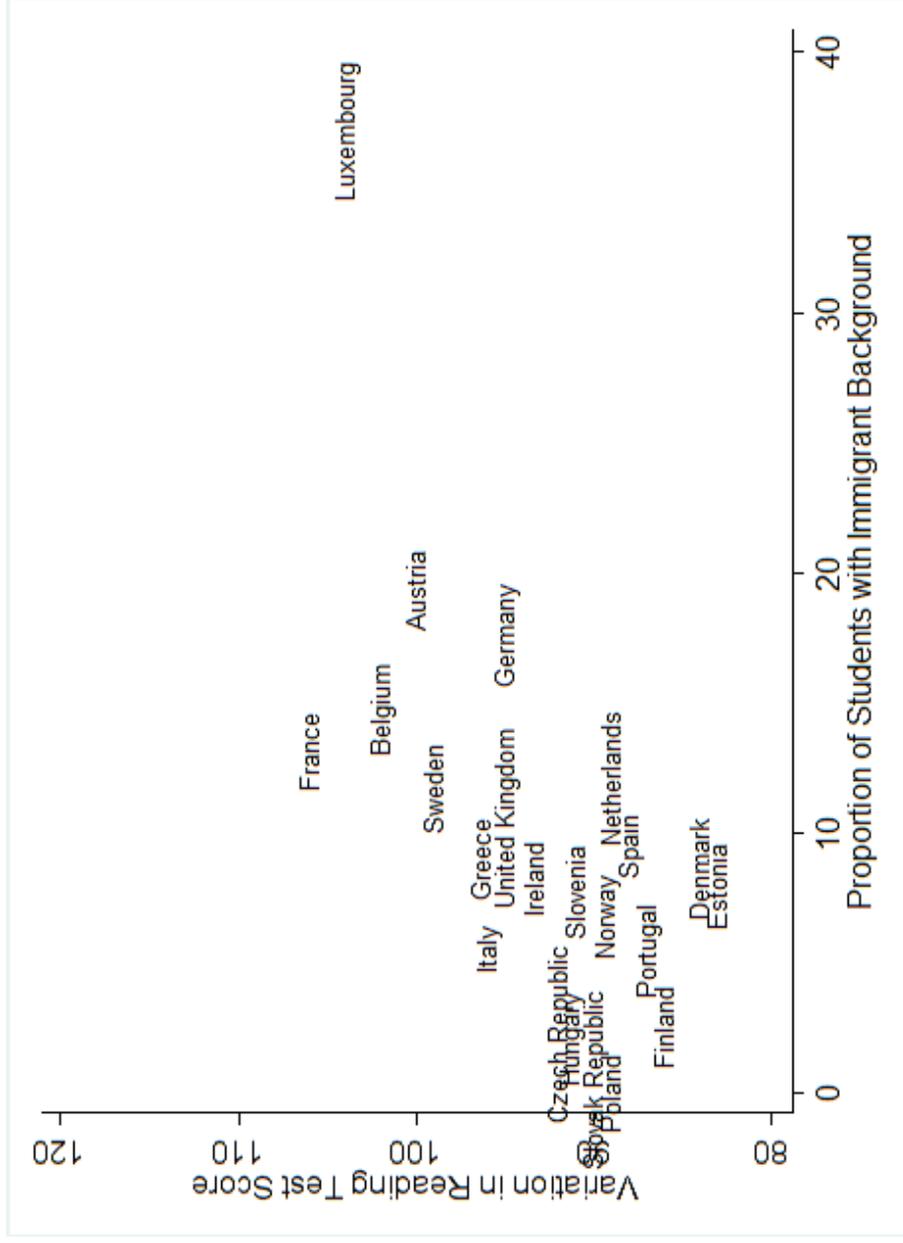
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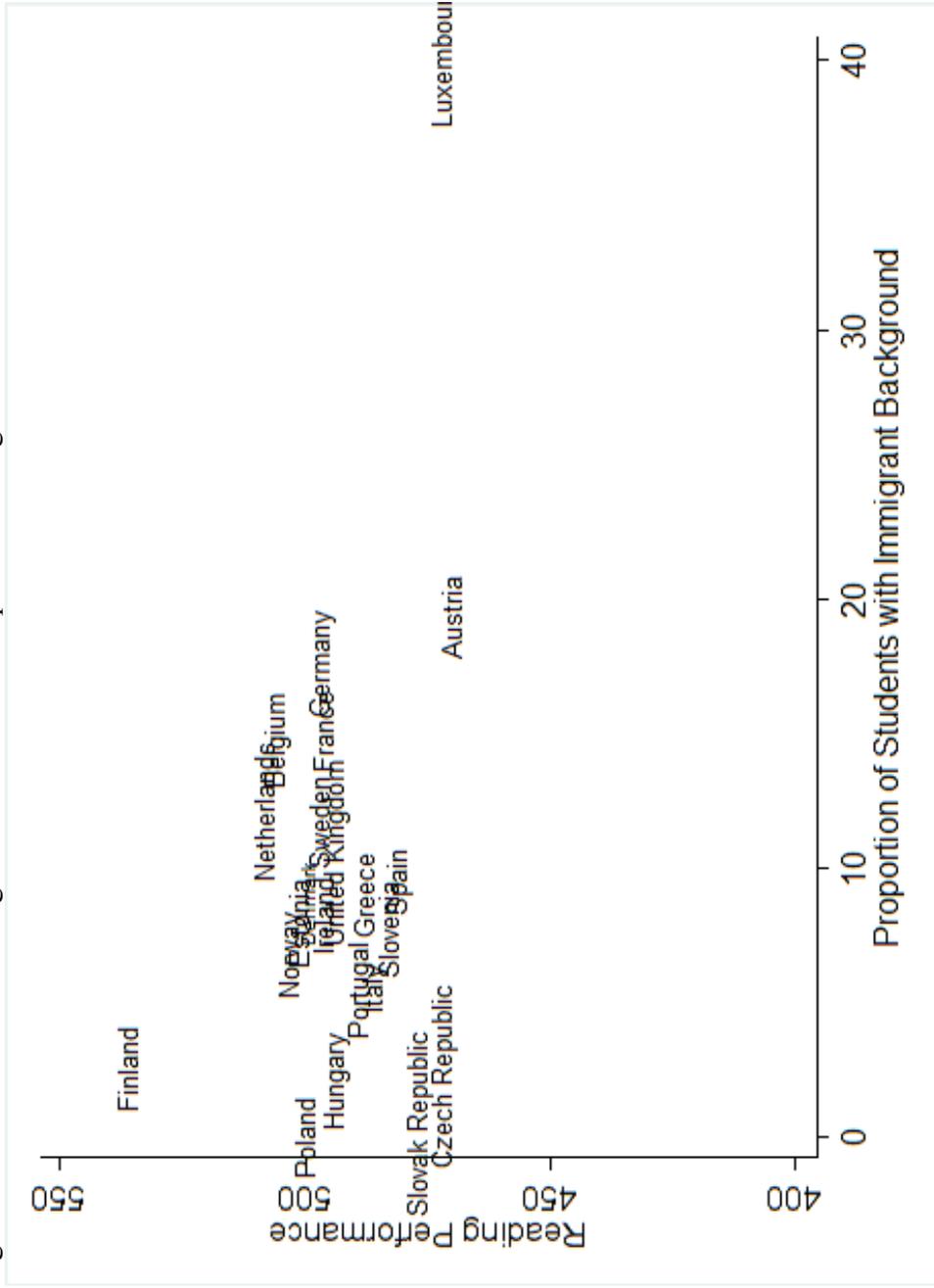
Appendix

Figure A1: Correlation Standard Deviation in Reading Test Score and Proportion of Migrants



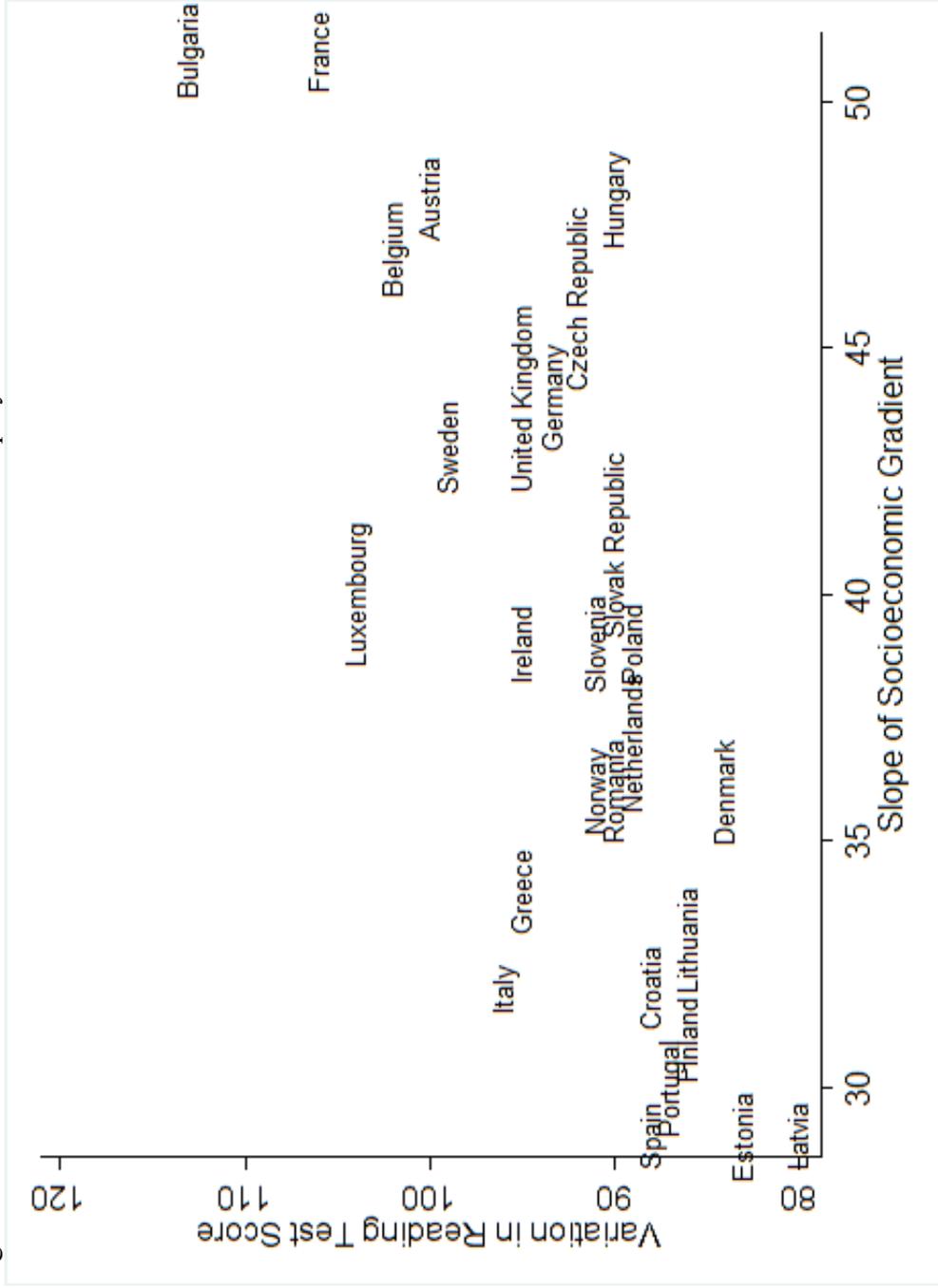
Note: This Figure shows a positive association between overall variation (standard deviation) in reading performance and the proportion of 15-year-olds with an immigrant background.

Figure A2: Correlation Reading Performance and Proportion of Migrants



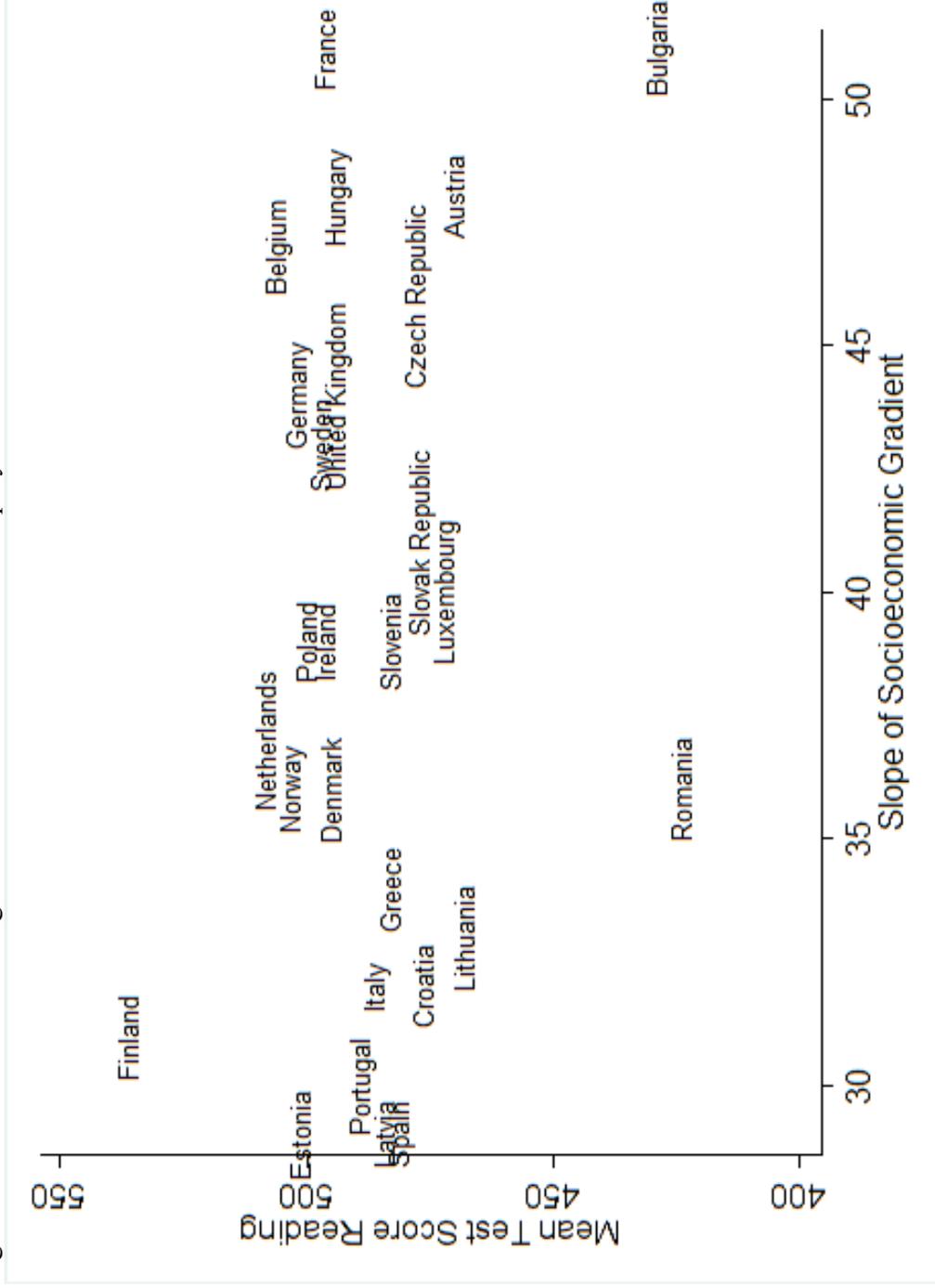
Note: This Figure shows the association between reading performance and the proportion of 15-year-olds with an immigrant background.

Figure A3: Correlation between different Measures of Educational Equity



Note: This Figure shows a positive association between overall variation (standard deviation) in reading performance and the slope of the socio-economic gradient which measures the steepness of the average relationship between reading performance and socio-economic background.

Figure A4: Correlation Reading Performance and Educational Equity



Note: This Figure shows the association between reading performance and the slope of the socio-economic gradient.

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