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Hungary: Skilling up the next generation

An analysis of Hungary's performance in the Program for International Student Assessment

WORLD BANK GROUP
Education Global Practice
Europe and Central Asia Region

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Acknowledgments

This report was prepared by a World Bank team consisting of Christian Bodewig, Lucas Gortazar, Sandor Karacsony, Jeremie Amoroso, and Martin Moreno, under the overall guidance of Mamta Murthi, Country Director, Central Europe and the Baltics, and Cristian Aedo, Education Global Practice Manager. The note benefited from peer review comments from Juan Manuel Moreno. Marc De Francis edited the report.

Abbreviations and Acronyms

ESCS	Economic, Social, and Cultural Status
ECA	Europe and Central Asia
ECE	Early childhood education
EU	European Union
GDP	Gross domestic product
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary least squares
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
RIF	Re-centered influence functions
TIMSS	Trends in International Mathematics and Science Study
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
VET	Vocational education and training

Executive Summary

Executive Summary

Facing the prospects of rapid aging and demographic decline over the coming decades, Hungary needs a highly skilled workforce to help generate the productivity growth that it needs to continue fueling a convergence of its living standards with those of its West European neighbors.

Skilling up Hungary's workforce should start by equipping youth with the right cognitive and social-emotional foundation skills. International research has identified three dimensions of skills that matter for good employment outcomes and economic growth: cognitive skills, such as literacy, numeracy, creative and critical thinking, and problem-solving; social-emotional skills and behavioral traits, such as conscientiousness, grit, and openness to experience; and job- or occupation-specific technical skills, such as the ability to work as an engineer. Cognitive and social-emotional skills formation starts early in a person's life. Good cognitive and social-emotional skills provide a necessary foundation for the subsequent acquisition of technical skills. Put differently, poor literacy and numeracy skills severely undermine a person's ability to benefit from further training and lifelong learning.

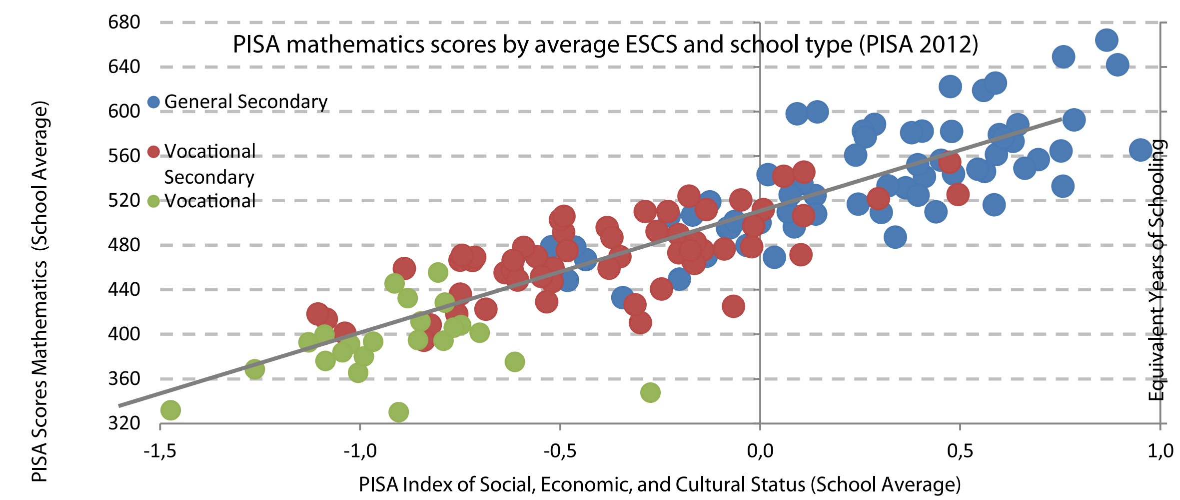
Hungary can do significantly better in preparing its next generation with the right cognitive foundation skills. This report focuses on cognitive skills and examines results for Hungary from the Program for International Student Assessment (PISA), which assesses the mathematics, reading, and science competencies of 15-year-olds. Although Hungary's aggregate scores in these areas are largely on par with OECD averages, its mathematics scores declined between 2009 and 2012. Moreover, Hungary's 15-year-olds perform poorly on problem-solving.

Hungary's education system is one of the most inequitable in the European Union (EU). Three findings stand out: First, performance in PISA varies significantly by students' socioeconomic backgrounds – differing by the equivalent of more than three years of schooling between students from the top and bottom quintile, which is significantly more than elsewhere in the EU. Second, performance varies by type of school – general secondary, vocational secondary and vocational schools. Third, 15-year-olds from socioeconomically disadvantaged background are disproportionately represented in vocational schools and vocational secondary schools, where the quality is significantly below that of general secondary schools. While PISA data does not allow for an analysis disaggregated by ethnic background of students, Roma youth are likely to be suffering disproportionately from the inequities in the education system due to their socioeconomic disadvantages.

Figure 1 summarizes the evidence, in a single picture, of how students from different socioeconomic strata are distributed into different educational tracks and achieve widely differing levels of cognitive skills as measured by PISA mathematics scores, with gaps representing the equivalent of multiple years of schooling. While Hungary's mean scores in general secondary schools are on par with the best-performing countries participating in PISA, the scores in Hungarian vocational schools are worse than the aggregate scores in the weakest participating countries in PISA.

More than a quarter of Hungarian 15 year-olds perform at the bottom level in PISA's mathematics test. These students risk leaving school without the minimum literacy and numeracy skills needed to succeed in obtaining a productive job, in subsequent training, and in lifelong learning. This may be one of the explanations for why 15 percent of Hungarian 15- to 24-year-olds are idle and neither in employment, education, or training, a phenomenon that an economy with an aging and shrinking population can ill afford.

Figure 1. Mathematics scores in Hungary's schools vary significantly by school type and their students' socioeconomic background



Source: World Bank Staff estimates using PISA 2012 data. Notes: The 2012 PISA sample for Hungary contained 204 Schools. For the purposes of this chart, basic education schools (49 schools with very few observations each) and schools with less than 12 students in secondary (7 schools) were removed, leaving 149 schools. An increase of 40 points is the equivalent to what an average student learns in a single school year. OECD averages of ESCS index and PISA mathematics score are 0 and 500, respectively. The ESCS school average is calculated by computing the weighted average of student's ESCS at each school.

This significant variance in performance is linked with three contributing causes:

- A large share of children and youth at risk of poverty or social exclusion;
- Significant social stratification of schools hand-in-hand with early ability-based selection into general secondary, vocational secondary and vocational tracks; and
- Insufficient efforts to tackle inequity in learning conditions faced by Hungarian students from an early age.

How can the quality and inclusiveness of Hungary's education system be raised? The dual challenge for Hungary is to ensure that all students acquire basic competencies on the one hand and to promote continued excellence at the top on the other. The examples of other countries such as Poland show that improvements in equity and excellence can go hand in hand, and international research has documented that these two goals, if achieved simultaneously, promote economic growth.

This report lays out a policy agenda consisting of two parallel elements: First, improving socioeconomic conditions for children and youth in general and in school through policies targeted to the poor and disadvantaged such as welfare and employment policies for parents and education support for children. Second, promoting equity and reducing socioeconomic segregation in basic education through inclusive education policies. Hungary has been a leader in the EU in expanding access to early childhood education, including for children from disadvantaged backgrounds. It needs to build on that solid foundation and promote greater equity and quality for all students in the rest of its compulsory education system if it wants to have the kind of well-skilled workforce it needs for continued inclusive economic growth and subsequent convergence in living standards with the economies in Western Europe.

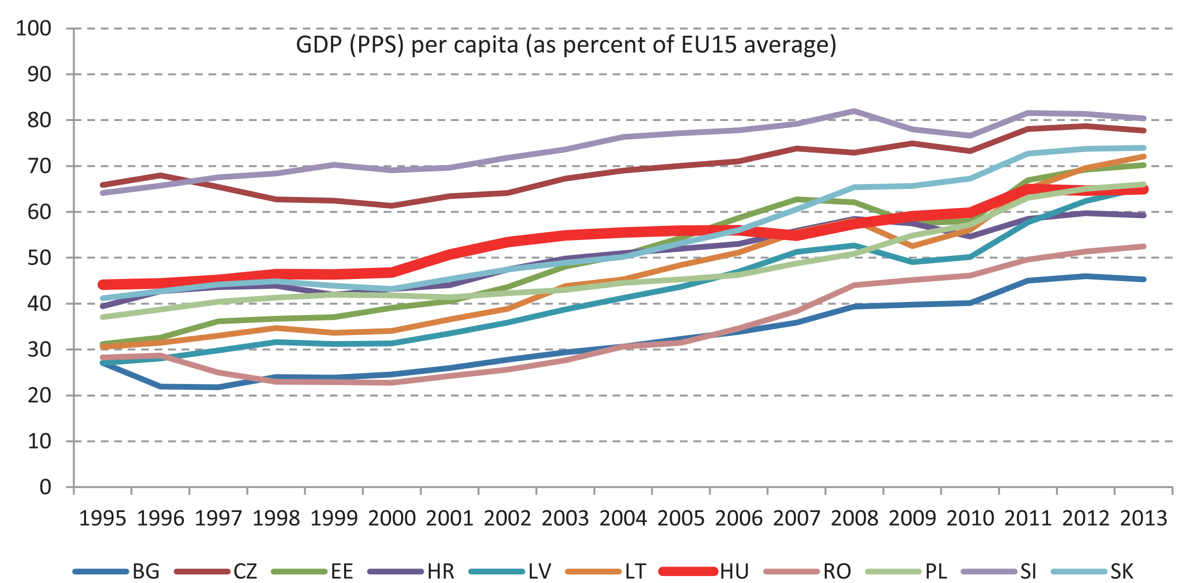
Chapter 1

Why Skills Matter for Hungary

Why skills matter for Hungary

Hungary faces the challenge of achieving convergence in living standards with its Western European neighbors at a time when its population is aging and shrinking. Hungary has seen remarkable income growth over the last two decades but still has a long way to go to catch up with EU15 living standards. In 1995, Hungary's GDP per capita stood at about 45 percent of the EU15 average, and by 2013 it had risen to 65 percent (Figure 2). Hungary will need brisk economic growth over the coming decades if it is to deliver EU15 living standards for its population. However, Hungary's long-term economic growth prospects are put at risk by demographic change: the country is projected to see a decline (by more than 10 percent between 2010 and 2050) and significant aging of its population (Figure 3). With fewer workers and more old-age dependents, labor productivity improvements are key for continued sustained economic growth.

Figure 2. Hungary's income convergence: GDP (PPS) per capita, Hungary and neighboring countries, 1995 – 2013



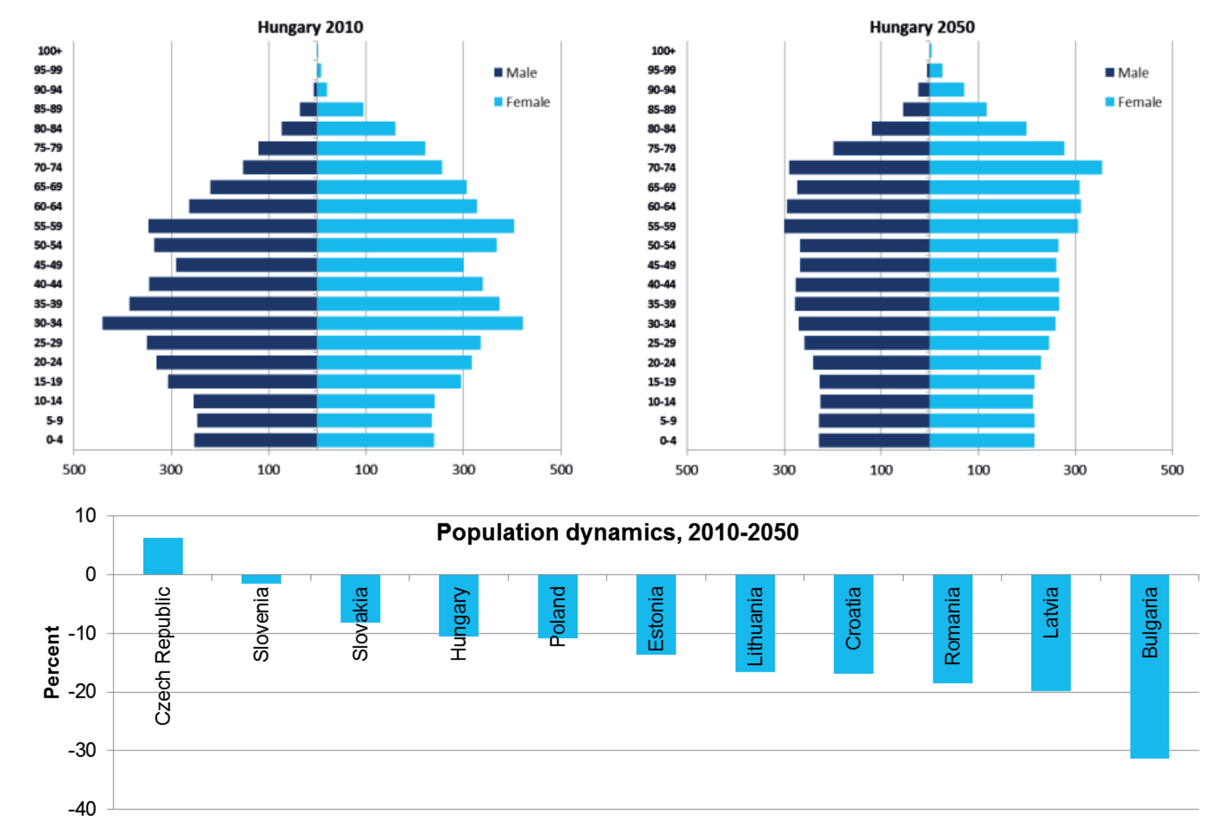
Source: World Bank Staff estimates using Eurostat data

Making better use of its human capital is at the heart of policies to accelerate Hungary's convergence in living standards. Mitigating the risk to economic growth from population aging and shrinking will require expanding the number of workers; that is, increasing the employment rate at all ages, especially among young and older workers, and encouraging immigration. It also requires enhancing their productivity, raising the skills of the current and future workforce, in addition to other measures such as reforms in product and capital markets.

According to Eurostat labor force survey data, Hungary's employment rate for the 20-64 age group in 2014 was 66.7 percent, below the European Union average. While this marks a significant improvement over previous years, there is room for further increase. More worryingly, a significant number of young Hungarians are struggling with the transition from school to work and are idle. More than 15 percent of the 15-24-year-olds neither in employment, education or training (NEET), and recently the shares of early school leavers has increased as well, according to Eurostat data.

But what about skills? This report places a spotlight on the next generation and asks if Hungary's youth are leaving the compulsory education system with the right set of skills needed for further education and training and for productive employment. It argues that there is considerable scope for Hungary to raise the skills of the next generation and prepare them better for the demands of a growing and changing economy.

Figure 3. Age distribution of Hungary's population, 2010 and 2050 (projected)



Source: World Bank staff estimates using UN Population Prospects. Medium variant.

The importance of cognitive skills

International evidence shows how much the skills of a country's workforce matter for economic growth and shared prosperity. International evidence suggests that the quality of education is one of the most important determinants of long-term economic growth.[1] Recent research (Hanushek and Woessmann, 2007 and 2012), drawing on student assessment surveys from 1960 onward, estimates that an improvement of 50 points in scores in the Organisation for Economic Co-operation and Development (OECD) Program for International Student Assessment (PISA) would imply an increase of 1 percentage point in the annual growth rate of GDP per capita.[2]

Both the share of students achieving basic literacy and the share of top-performing students matter for growth (Hanushek and Woessmann, 2007; OECD, 2010b). A recent OECD (2015) report presents economic returns to

[1] See Sala-i–Martin, Doppelhofer, and Miller (2004).

[2] See Hanushek and Woessmann (2007) and Hanushek (2010). Using these tests as measures of cognitive skills of the population, they show that countries that had better quality of education in the 1960s experienced faster economic growth during the years 1960-2000, controlling for other factors.

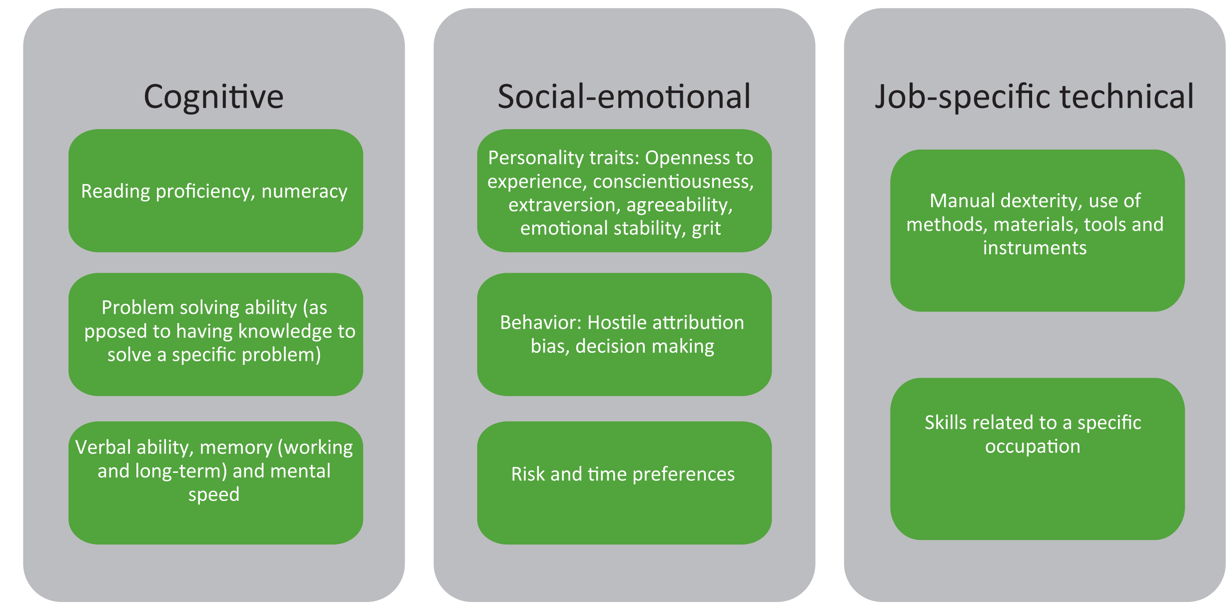
universal basic skills, defined as all students achieving level 1 skills (420 points) in PISA. While low-income countries with lagging education systems stand to gain the most, advanced middle-income and high-income countries can expect a significant boost for long-run economic growth simply from making their education systems deliver better for the weakest students: The report finds that on average, high-income countries could gain a 3.5 percent higher discounted average GDP over the next 80 years if they were to ensure that all students achieved basic skills, defined as level 1 in PISA. As will be presented in this report, a significant and growing share of Hungarian 15-year-olds currently perform below level 1 of PISA. Ensuring universal basic skills in Hungary would add 4.1 percent discounted future GDP.

Ensuring basic cognitive skills for all also helps to make growth inclusive. Beyond aggregate economic growth, education improves the living standards of individuals, since the more educated are able to acquire more and higher-order skills, making them more productive and employable and extending their labor market participation over their lifetime, which in turn leads to higher earnings and better quality of life.[3] Education is an engine of social mobility: Human capital is a key asset in income generation and hence critical to reducing poverty and increasing shared prosperity (Bussolo and Lopez-Calva, 2014).

"Skills" can be differentiated into separate, mutually reinforcing dimensions: cognitive, social-emotional, and technical. Figure 4 presents the differentiation across the different dimensions. *Cognitive* skills include literacy and numeracy, as measured in PISA, and also include competencies like critical thinking and problem-solving. *Social-emotional* skills capture one's ability to interact with others as well as determination and focus on getting a job done. *Technical skills* in turn capture one's ability to perform technical tasks in any occupation, such as work as a plumber or engineer. Measuring the level of educational attainment does not automatically mean measuring actual skills. While many countries in Central and Eastern Europe have seen educational attainment expand since the start of the economic transition, as measured by years of education as well as level of education completed, they have not necessarily seen performance improvements in international student assessments that measure cognitive skills, such as PISA (Sondergaard and Murthi, 2012).

[3] See Hanushek (2013).

Figure 4. Three dimensions of skills



Source: Bodewig and Badiani-Magnusson (2014)

Cognitive skills built in childhood and youth are a necessary foundation for successful acquisition of technical and job-specific skills later in life. The foundations of cognitive (and behavioral) skills are formed early and are the platform upon which later skills are built. Skill formation is cumulative, benefiting from previous investments, and the most sensitive periods for building a particular skill vary across the three dimensions. Technical and job-specific skills – often acquired last, through technical and vocational education and training (TVET), higher education and on-the-job learning – benefit from strong cognitive and behavioral skills acquired earlier in the education system. In other words, the cognitive skills acquired in childhood and youth, such as those measured by PISA, will help workers to continuously update their technical skills during their working lives. This is of particular importance in aging economies such as Hungary's, where workers need to adapt to technological progress during their longer working lives.

This report focuses on cognitive skills and examines evidence from the PISA assessment of mathematics, reading, and science competencies of Hungarian 15-year-olds. Introduced in 2000 by the Organization for Economic Co-operation and Development (OECD), PISA is a worldwide study of 15-year-old school students' performance in three different disciplines: mathematics, science, and reading. PISA focuses on the competence of students and their ability to tackle real-life problems in those three disciplines, emphasizing skills that are critical for individuals' personal and professional development. Hungary has been participating in all PISA rounds since 2000. A sample question from the mathematics assessment illustrates the applied nature of the PISA tests: "Nick wants to pave the rectangular patio of his new house. The patio has length 5.25 meters and width 3.00 meters. He needs 81 bricks per square meter. Calculate how many bricks Nick needs for the whole patio."[4] In assessing the performance of 15-year-olds, the test largely captures those Hungarian students who are in any one track in upper secondary education and a small share

[4] Additional sample questions can be found at Source: http://pisa-sq.acer.edu.au/

of students who are still in basic education. Given that skills formation is cumulative, the assessment results reflect not just competencies acquired in those schools but competencies acquired even earlier in students' education. PISA's scoring system is standardized so that the mean score for each discipline among OECD countries in year 2000 is 500 points, with a standard deviation of 100 points. According to OECD, a 40 point gain in PISA is equivalent to what students learn in one year of schooling.[5]

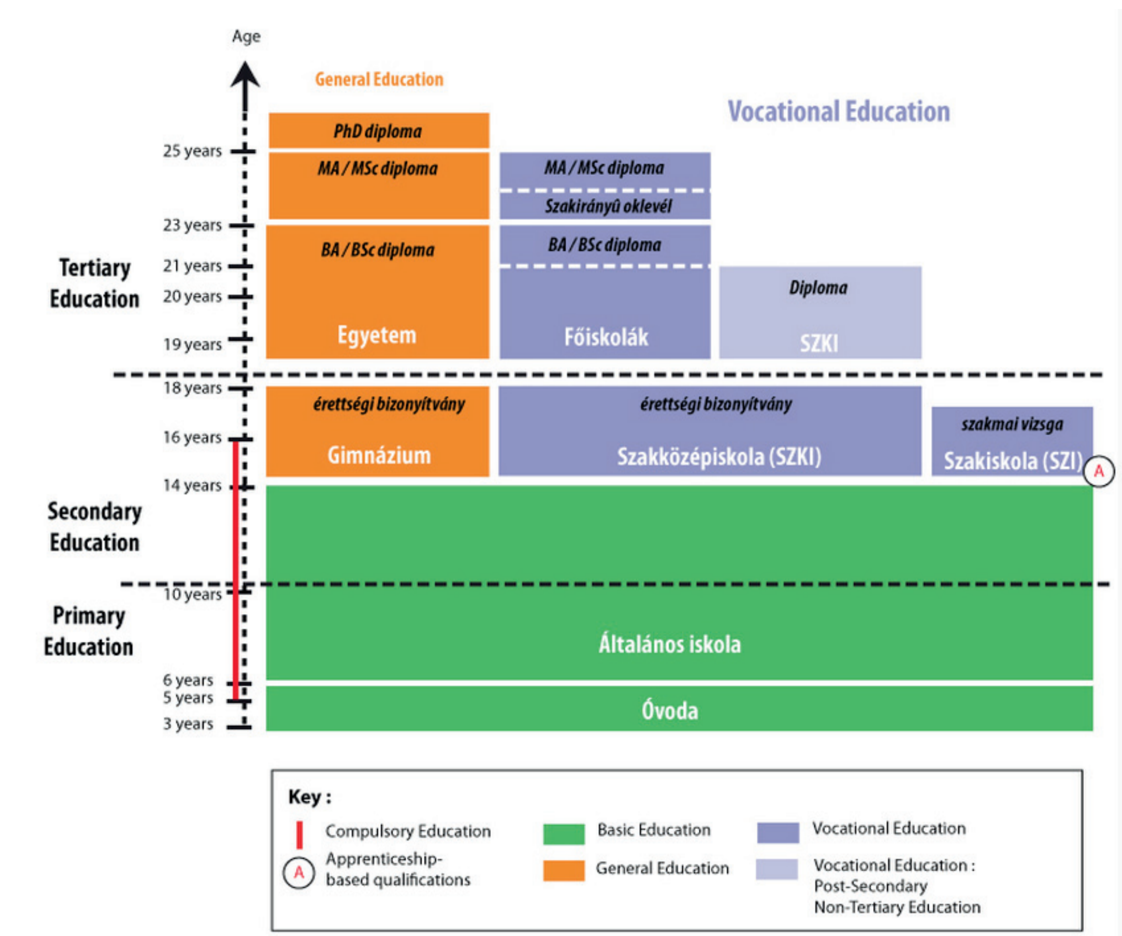
This report is part of a series of World Bank reports that examine PISA data in depth to analyze education systems and provide policy makers with options for evidence-based reforms. Due to its focus on policy, the series aims to address key challenges in several countries, with a focus on improving education quality and equity. This report provides a snapshot of the performance of Hungarian 15-year-olds in PISA both over time and compared with their peers in other countries. In analyzing Hungary's performance in PISA, it analyzes the roles of (i) socioeconomic and family background characteristics; (ii) school types and school segregation; and (iii) learning strategies and teaching practices. It also offers policy recommendations on how Hungary can make its education system more equitable and better prepare the next generation for productive employment.

Hungary's education system

Hungary's education system is aligned with the skills formation process, by emphasizing early childhood education and by focusing on cognitive skills-oriented learning content in the beginning of the education system. The compulsory education system starts with kindergarten (ISCED 0). Hungary has a wide network of kindergartens, low associated costs (there are no tuition fees, and children pay only for meals and extracurricular activities; meals are free for disadvantaged children), and conditional cash transfers for families with multiple disadvantages who enroll their children in preschool before the age of four and maintain stable attendance during the school year.6, 7 Since 2008, local governments have been required to offer free kindergarten placements to children from families with multiple disadvantages from the age of three. Preschool attendance has been compulsory for children by age five, and since 2014 preschool education is compulsory from the age of three (this rule enters into force in the 2015–16 school year due to capacity constraints). These policies mark a strong commitment to invest in skills formation at an early age. The results are impressive, with 95 percent of students participating in PISA 2012 reporting that they had participated in two or more years of preschool. Primary and lower secondary education (ISCED 1 and 2) is organized as a single-structure system in eight-grade basic schools (typically for pupils ages 6 to 14, covering grades one through eight).

[5] PISA 2009 Technical Report (OECD 2012).
[6] Disadvantaged children are those who are eligible for the regular child protection allowance (rendszeres gyermekvédelmi támogatás); that is, those who come from families with income below 130 percent of the lowest pension benefit; single-parent families; and families with disabled children.
[7] At least six hours per day spent in kindergarten and a share of absences below 25 percent.

Figure 5. The structure of Hungary's education system



Source: ONISEP

As elsewhere in Europe, in Hungary the education system introduces selection into different educational tracks at the start of upper secondary education. Upper secondary education (ISCED 3, typically for pupils ages 14 to 18, usually covering grades 9 through 12) is provided in three parallel tracks: general secondary schools (Gimnázium), vocational secondary schools (Szakközépiskola), and vocational schools (Szakiskola). General secondary schools provide general education and prepare for the secondary school leaving examination, the prerequisite for admission to higher education. Secondary vocational schools provide general and pre-vocational education, prepare for the secondary school leaving examination and offer vocational post-secondary non-tertiary programs. Vocational schools provide general, pre-vocational and vocational education, and may also provide remedial lower secondary general education for those who have not accomplished basic school. Figure 5 depicts the structure of the system.8

Hungary's public investment in education (4.7 percent of GDP) is lower than the OECD average (5.3 percent of GDP for public education and 6.1 percent for total public and private spending). The investment in the sector seems to have declined since the beginning of the economic crisis in 2008 (Table 1). The government expenditure per student

[8] Higher education programs are offered by public or private universities and colleges and follow the three-cycle Bologna degree structure (bachelor's degree, master's degree, doctoral degree) except for undivided long programs (10-12 semesters) in some disciplines, including medicine and law. Adult education and training includes part-time general education programs at all ISCED levels, vocational education, and a wide range of non-formal courses.

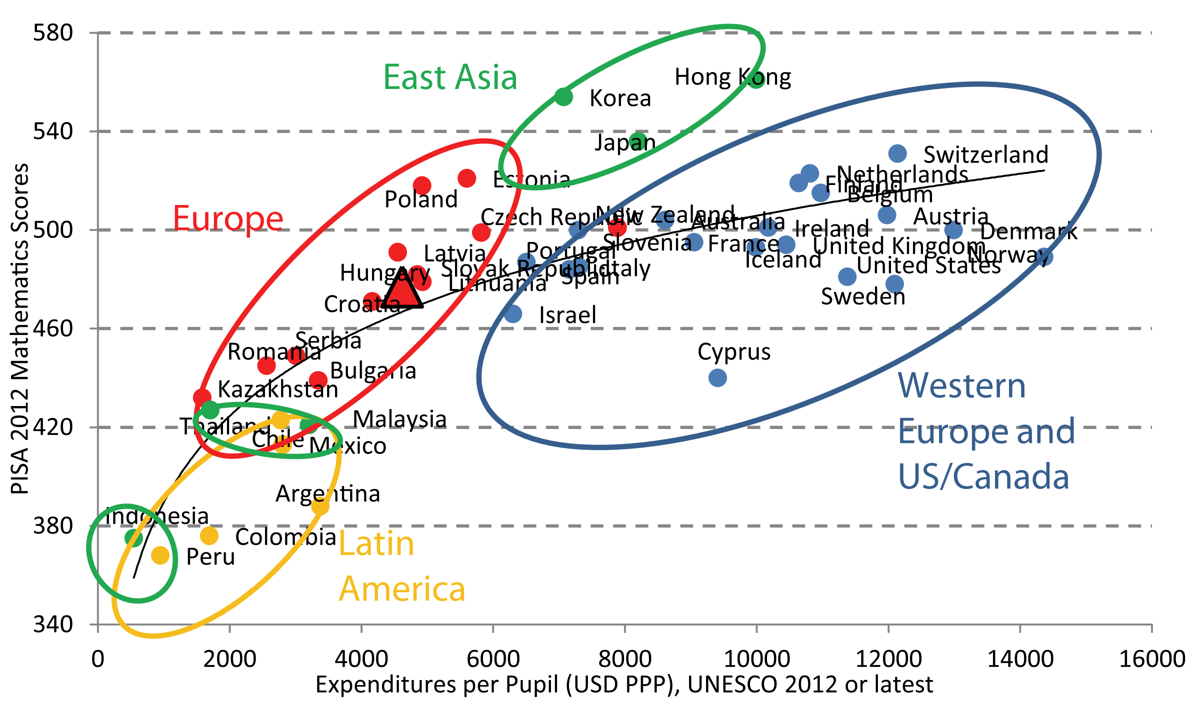
has increased, in part due to the declining student population. The country's performance is marginally above what would be expected given its current level of public expenditure per student, although it is similar to that of neighboring economies. Nonetheless, there are countries with similar levels of investment, like Poland and Latvia, that do have much higher cognitive outcomes (Figure 6).

Table 1. Hungary's public spending on education, 2004 - 2011

	2004	2005	2006	2007	2008	2009	2010	2011
Government expenditure on education								
As percent of GDP	5.4	5.5	5.4	5.3	5.1	5.1	4.9	4.7
As percent of total government expenditure	11.1	10.9	10.4	10.4	10.4	9.9	9.8	9.4
Government expenditure per student (PPP$)								
Primary education	3,781.8	4,361.5	4,703.6	4,800.6	4,482.9	4,545.3	4,759.5	4,395.4
Secondary education	3,808.9	3,931.6	4,269	4,443.4	4,690.5	4,666.3	4,609.5	4,695.2
Tertiary education	3,943.4	4,050.1	4,377.7	4,593.4	5,059.1	5,817	5,351.3	6,450.5

Source: UNESCO UIS, 2015.

Figure 6. PISA scores and public expenditures per student, selected countries worldwide, 2012



Source: World Bank staff estimations using PISA 2012 data and UNESCO 2012 data. Note: The curve represents a logarithmic approximation of the scatter plots.

Chapter 2

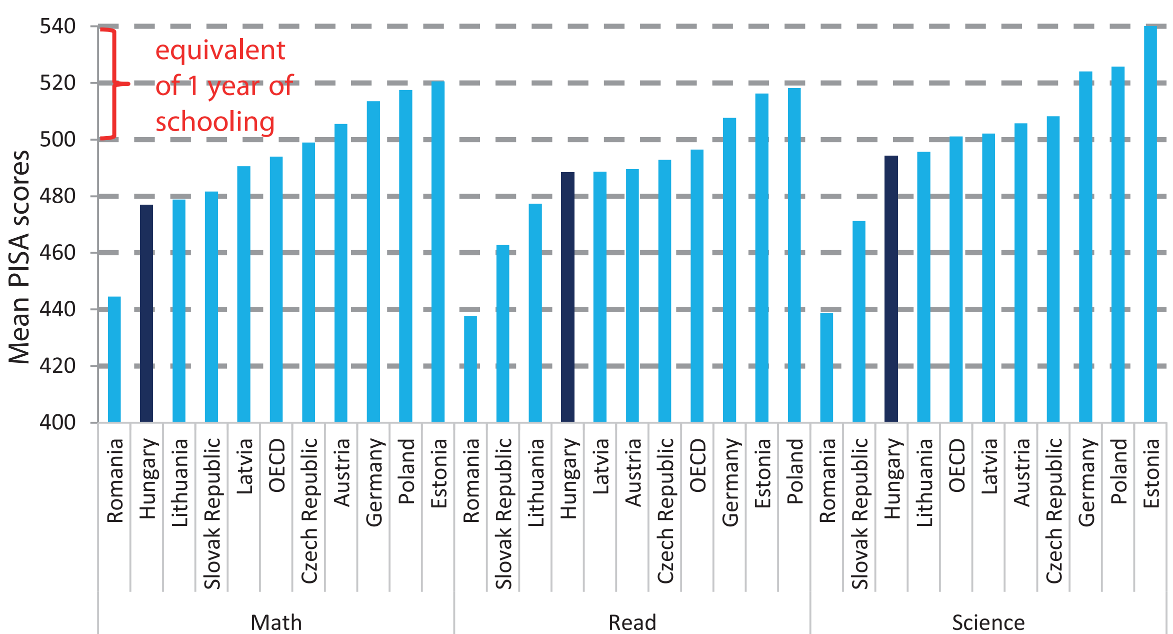
Cognitive Skills of Hungarian 15-year-old Students

Cognitive skills of Hungarian 15-year-olds

Snapshot of Hungary's aggregate performance in PISA

At first glance, Hungary's 15-year-olds performed relatively well in mathematics, reading, and science in 2012. Hungary's PISA 2012 scores were roughly on par with the OECD average and the average of countries in Central Europe and the Baltics (see Figure 7). At the same time, Hungary could be doing better: its 15-year-olds scored worse in PISA 2012 than several of their neighbors in the Visegrad[9] group of countries and in the Baltic countries.

Figure 7. PISA 2012 scores: Hungary, neighboring countries, and OECD average

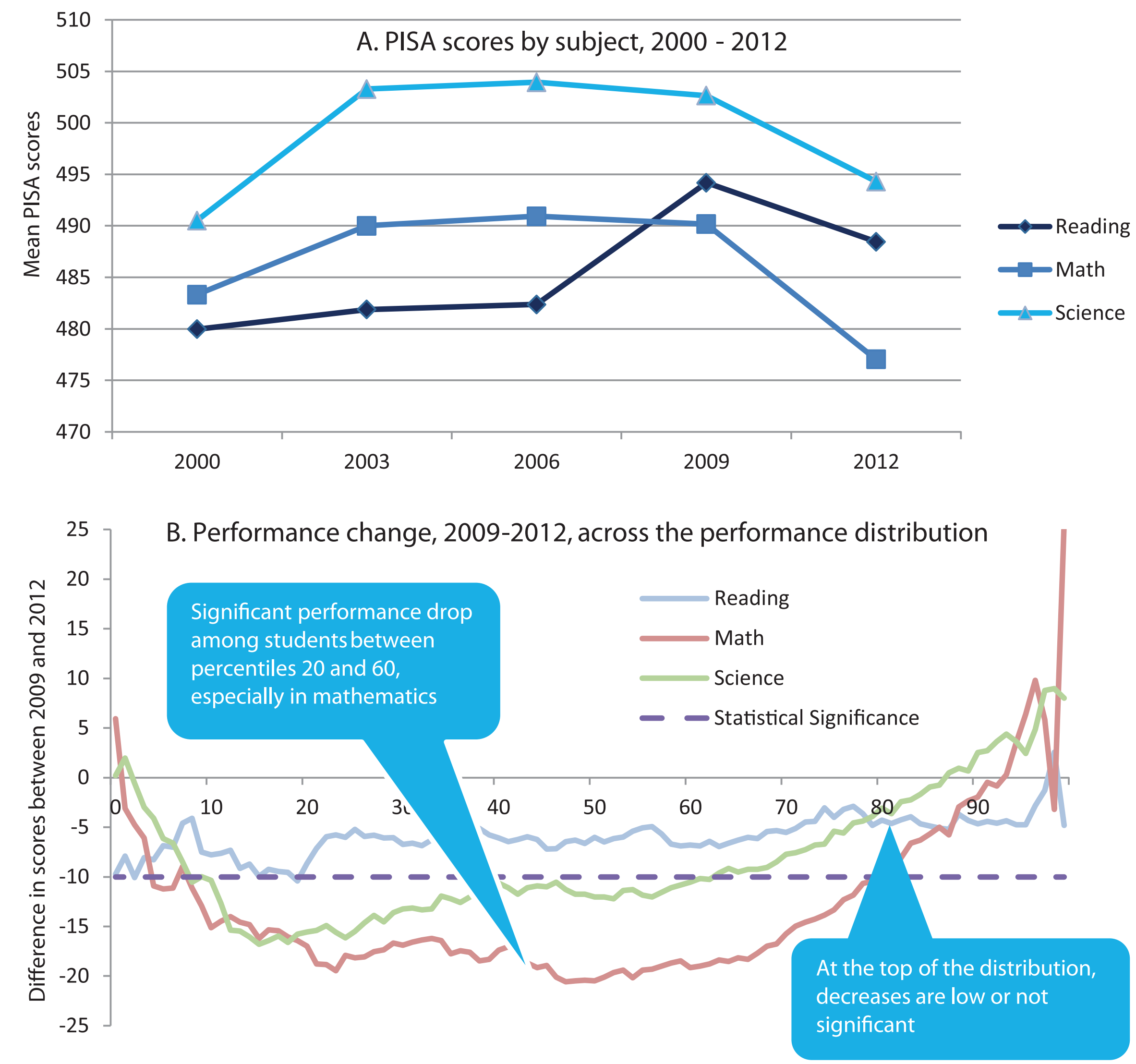


Source: World Bank staff estimates using PISA data.

Hungary's PISA performance in mathematics and science has weakened of late. Hungary has seen a significant decrease in aggregate mathematics and science scores, and a slight (but not statistically significant) decrease in the reading score in 2012 compared to 2009 (Figure 8, panel A.). The decline in performance was particularly pronounced among students in the bottom and middle of the performance distribution (between the 10th and 60th percentile; see Figure 8, panel B). At the same time, Hungary's top PISA mathematics, reading, and science performers in 2012 have remained at similar levels of performance compared to 2009.

[9] The Visegrad group is an economic, energy, and military alliance of four nations: Czech Republic, Hungary, Poland and Slovakia.

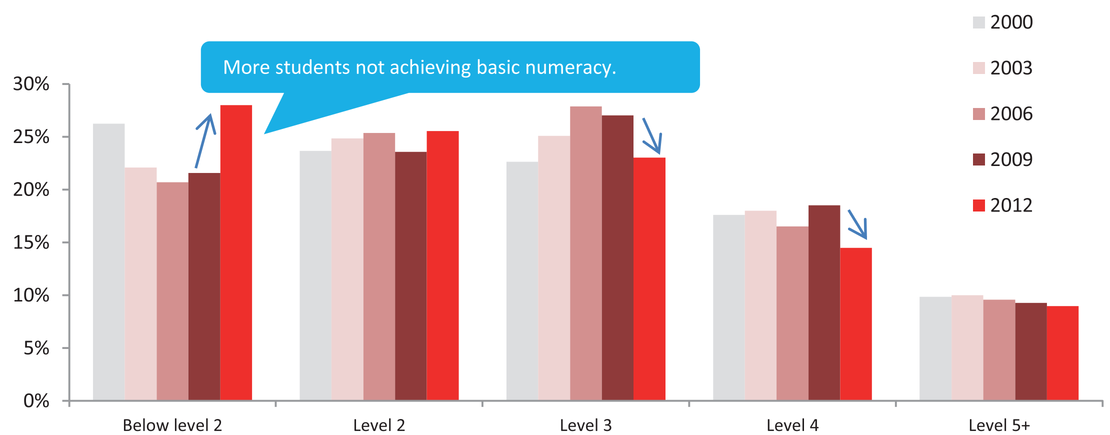
Figure 8. Summary of Hungary's PISA scores, 2000 to 2012, including 2009-2012 performance change by achievement percentile



Source: World Bank staff estimates using PISA data.

The weakening of Hungary's aggregate PISA scores in mathematics and science was also associated with an increase in the share of functionally innumerate students. PISA categorizes scores in six levels of proficiency; students who score below level 2 in the reading and mathematics tests are considered functionally illiterate and innumerate, respectively. This means that they are not able to understand and solve simple problems, severely limiting their development and subsequent cognitive and technical skill acquisition process. As Figure 9 shows, despite its relatively good performance overall, a significant share of students – more than a quarter of 15-year-olds – perform below level 2 in mathematics. The concentration of the performance decline between 2009 and 2012 among students in the middle and bottom part of the performance distribution (Figure 8, Panel B) has meant a shift of students in PISA level 3 and 4 toward levels 2 and 1 in mathematics.

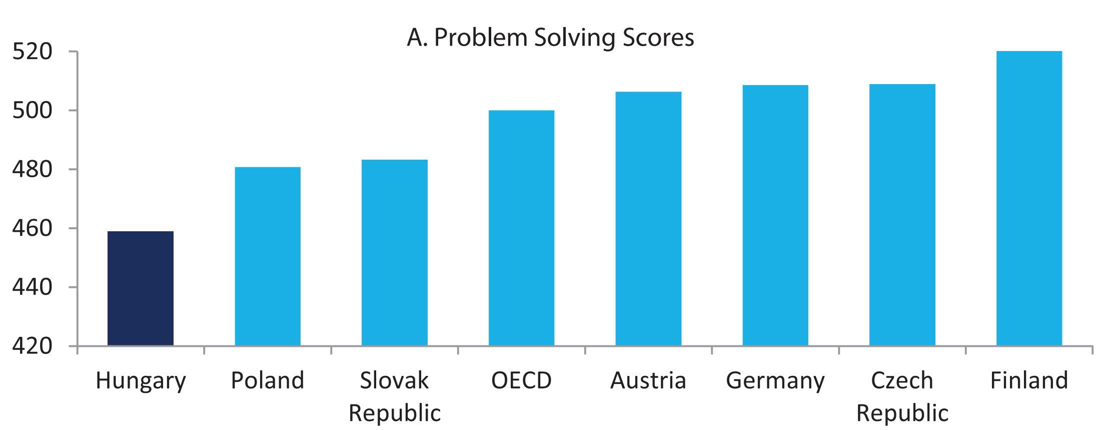
Figure 9. Distribution of students by PISA proficiency level in mathematics, 2000 - 2012

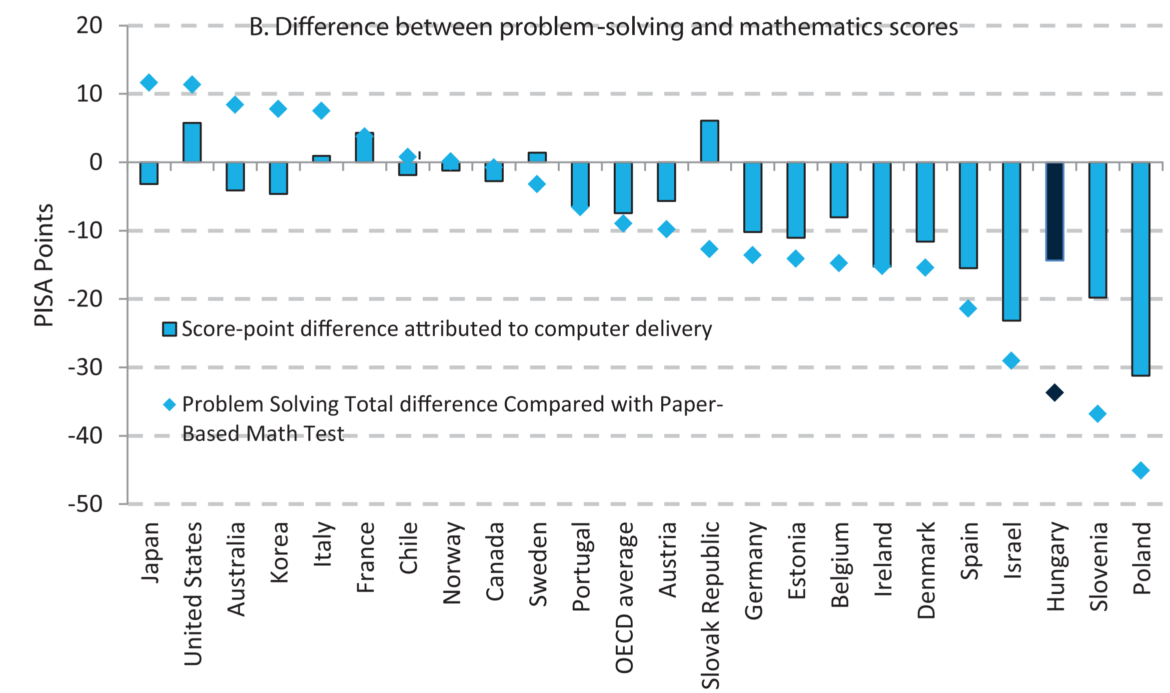


Source: World Bank staff estimates using PISA 2000, 2003, 2006, 2009, and 2012 data.

Hungarian 15-year-olds also performed considerably below their peers in the creative problem solving assessment. In 2012, the OECD introduced a new element of assessment: a problem solving category that measures students' capacity to respond to non-routine analytical problems in a digital environment in order to achieve their potential as constructive and reflective citizens by making use of the new technological tools. Although Hungary performed on par with OECD averages in reading, mathematics, and science, the results in the creative problem solving test were substantially below those in comparator countries like Poland, the Slovak Republic, and the Czech Republic. Figure 10 presents the evidence on problem-solving (Panel A). It also shows the gap with respect to the mathematics assessment and the influence of computer skills on relative performance in problem solving: the significant gap of 34 points between Hungary's performance on this test and its performance on the paper-based mathematics test can be partially attributed (around 45 percent) to a lack of computer skills, reflecting a gap in both digital literacy and problem-solving skills (Panel B).

Figure 10. Problem-solving scores and comparison with mathematics scores, selected PISA countries, 2012





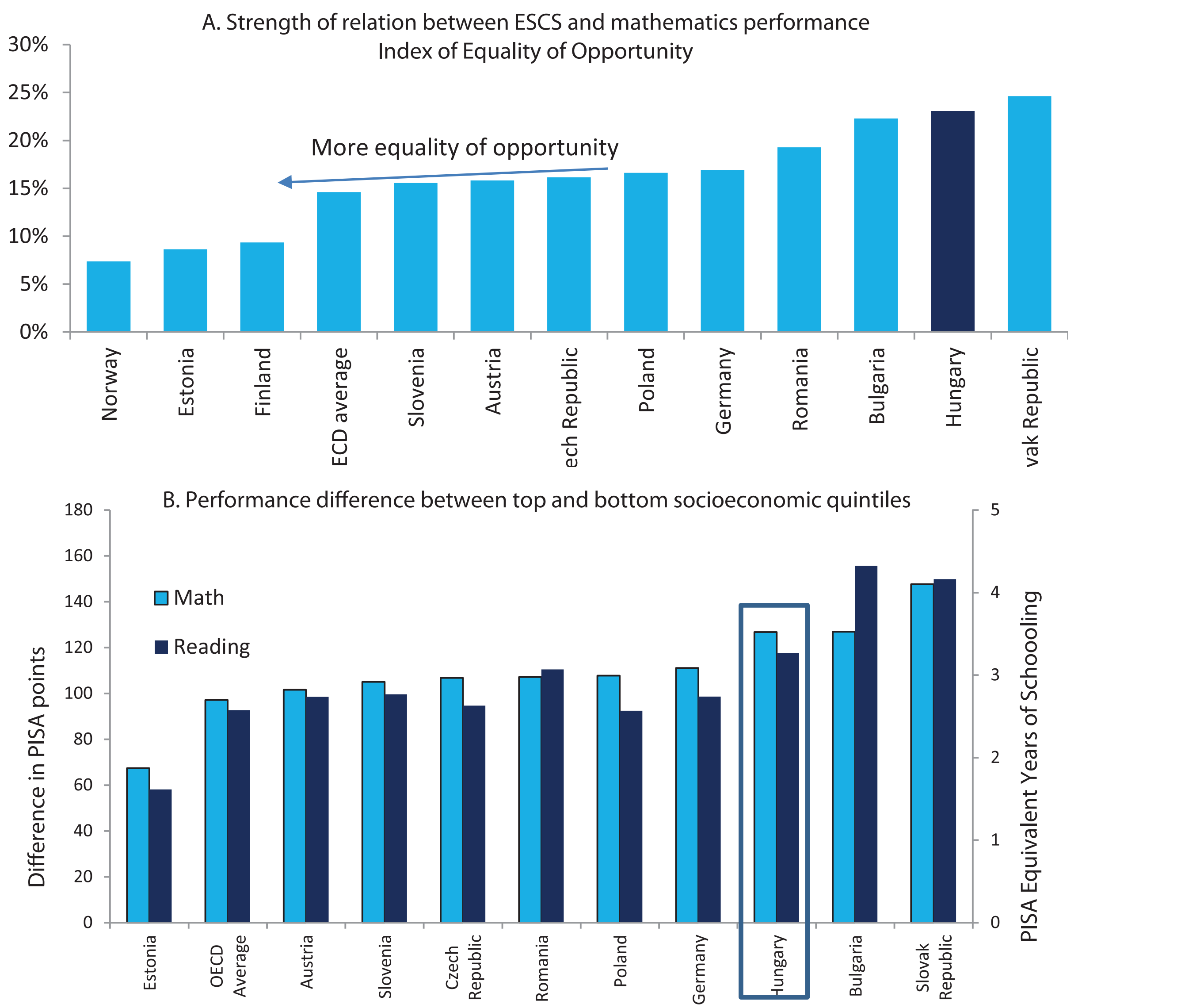
Source: World Bank staff estimations using PISA 2012 data.

Performance and equity

Hungary's students show large wealth-based disparities in cognitive skills. PISA results can be reviewed to assess equity in education systems and its relation to socioeconomic status, because the assessment collects information not only on student performance but also on student background (the OECD's ESCS Index, see Box 1). In this report, two measures are used to examine equity in education: (i) the strength of the relationship between student performance and socioeconomic status, and (ii) the PISA score gap between top and bottom ESCS quintiles.

Figure 11 summarizes the evidence from those two measures. Almost a quarter of the variance in performance in Hungary can be explained by ESCS, significantly more than among neighbors (Panel A). Moreover, the difference in PISA reading and mathematics scores between the top and bottom ESCS quintiles is around 120 points, the equivalent of three years of schooling (Panel B). This means that a student's household background disproportionately determines cognitive skill acquisition as measured in PISA.

Figure 11. Equity performance: Hungary, neighboring countries, and OECD average, 2012



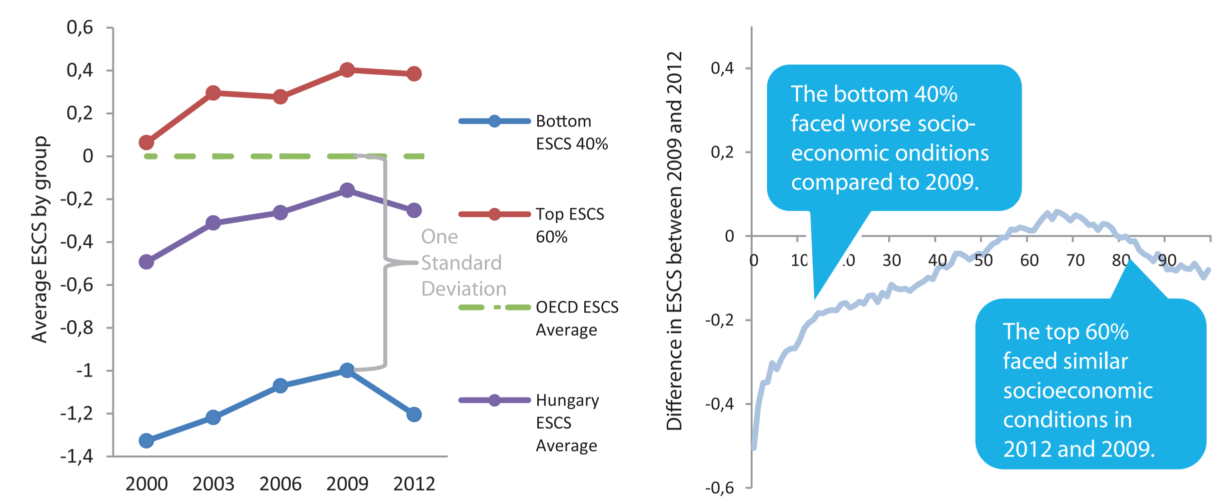
Source: World Bank staff estimates using PISA 2012 data. Note: The Index of Equality of Opportunity is the percent of the variance in reading scores explained by the main predetermined socioeconomic characteristics in a linear regression (Ferreira and Gignoux 2011). Item Response Theory (IRT) was used to derive the Index of Economic, Social, and Cultural Status (ESCS). The estimated parameters of this index may vary between countries, resulting in different levels of reliability.

Box 1: PISA's Index of Economic, Social, and Cultural Status

Created by OECD, PISA's Index of Economic, Social, and Cultural Status (ESCS) is a multidimensional measurement scale that takes into account information reported by students on their family's wealth, occupational, educational, and cultural background. It is derived from a combination of three other indexes: (i) an index of the highest occupational status of parents, indicating not only labor market status, but also the type of job held by parents; (ii) an index based on the highest level of parental education in years of schooling; and (iii) an index of family home possessions, which itself consists of a combination of the family's possessions (such as cars, bathrooms, or technological devices), educational resources (such as desks, computers, textbooks, the number of other books), as well as the type of cultural possessions (such as the type and genre of books or works of art). The ESCS Index is the most important determinant of student achievement and is therefore crucial for analyzing the quality of education.

Socioeconomic conditions among poorer students have worsened in recent years. Child and youth poverty is a significant and growing challenge for Hungary. According to the EU definitions, 42.7 percent of Hungarians below the age of 16 were at risk of poverty and social exclusion in 2013 (see Figure A1 in the Annex). This represents the third highest youth poverty rate in the EU, after Bulgaria and Romania, and it is significantly higher than in 2008 (when the rate was 33 percent). Consistent with this, the socioeconomic conditions (as measured by the ESCS) faced by Hungarian 15-year-olds participating in PISA dropped significantly between 2009 and 2012 due to the effects of the economic and financial crisis that has hit Europe since 2008 (see Figure 12, left panel). This decline in has been concentrated among the most disadvantaged students (the bottom 40 percent of the socioeconomic distribution), with no significant decline occurring among students at the high end of the distribution (Figure 12, right panel). The decline in the ESCS index stems mainly from a change in the composition of the occupational status of parents and a decline in certain home possessions, such as durable goods or space at home, as well as cultural goods or home resources for educational purposes (Table 2).

Figure 12. Evolution of socioeconomic context for Hungarian students in 2009 - 2012



Source: World Bank staff estimates using PISA 2009 and 2012 data. The ESCS index has been rescaled using common item questions for consistent comparisons across years.

Table 2. ESCS evolution between 2009 and 2012, decomposed by factors

			Components of Index of Home Possessions				
	Years of Education (highest)	Occupational Status (highest)	Wealth (index)	Cultural Possessions (index)	Home Educational Resources (index)	Aggregate Home Possessions (index)	ESCS (index)
2009	11.738	47.635	−0.390	0.333	0.005	−0.101	−0.159
2012	12.036	46.137	−0.538	0.171	−0.096	−0.276	−0.253

Source: World Bank staff estimates using PISA 2009 and 2012 data. The Aggregate Home Possessions Index and its three components (Wealth, Cultural Possessions, and Home Educational Resources) have been rescaled using common item questions, for consistent comparisons across years.

Roma households on average face significantly more difficult socioeconomic conditions. Evidence from the 2011 EC/UNDP/World Bank Regional Roma Survey shows that Roma children in Eastern Europe, including in Hungary, face an even higher risk of poverty and social exclusion (World Bank, 2015) than their non-Roma neighbors (see Box 2). Recent quantitative studies investigating the school performance of eighth graders in Hungary (not PISA) point to parental education and poverty as powerful transmission mechanisms for the inequalities experienced by Roma adolescents (Kertesi and Kézdi , 2011; Kertesi and Kézdi, 2013). This evidence shows that the gap in test scores between Roma and non-Roma decreases dramatically once other socioeconomic characteristics are controlled for, becoming insignificant for reading and decreasing by 85 percent for mathematics.

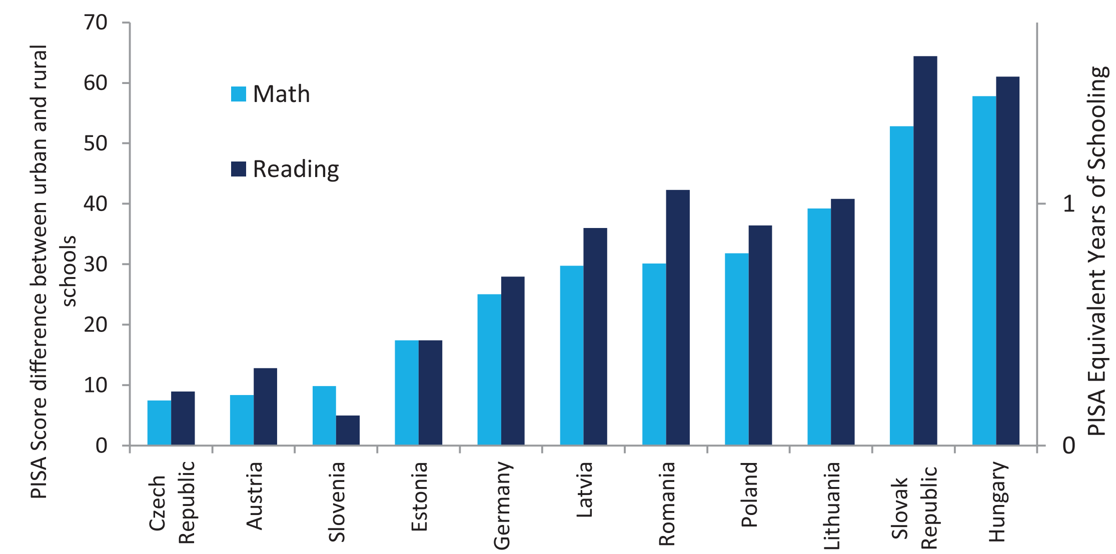
Box 2. Roma Communities in Hungary

Despite commendable policy efforts to address the socioeconomic exclusion of the Roma in Hungary – especially through early childhood education policies targeting the most disadvantaged households – the Roma population remains generally lower-skilled than the non-Roma, lives in poorer conditions, and faces difficulties finding productive formal employment.

According to the 2011 Census, 316,000 Roma citizens live in the country, representing approximately 3 percent of the total population. However, other estimations indicate that their real number is much larger, accounting for 7.5 percent of the Hungarian population (National Social Inclusion Strategy). The relative poverty rates of the Roma in Hungary are low by regional standards; yet Hungarian Roma are generally exposed to deprivation and poor living conditions, as indicated by the high level of malnutrition (35 percent compared to 10 percent among non-Roma living nearby) and by the severe material deprivation index, which at 91 percent is the higher than in neighboring countries. (World Bank, 2015.)

More than 38.2 percent of Roma are below age 15, compared to only 19.8 percent of non-Roma: given the current demographic trends, the share that the Roma represent in the working-age population is expected to increase over the coming years. In addition to being “the right thing to do” to support a cohesive society, interventions to increase the skills and employability of the Roma and help them adequately integrate into the labor market will be essential to contribute to Hungary’s growth and competitiveness.

Figure 13. Performance differences between rural and urban schools, PISA countries, 2012



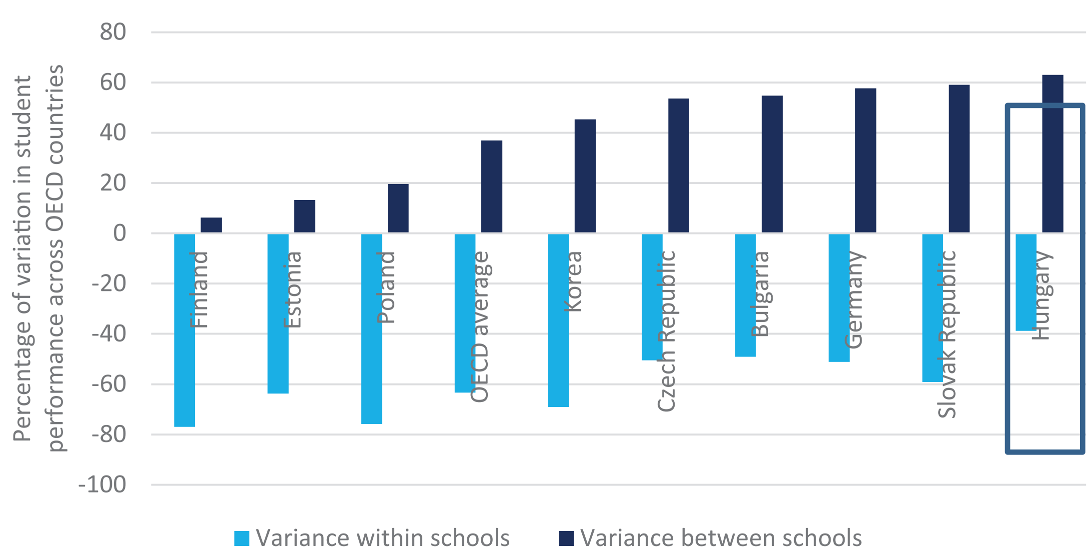
Source: World Bank staff estimates using PISA 2012 data.

Performance in PISA 2012 also varies between students in urban and rural schools across all subjects and between girls and boys in reading. In Hungary, around 19 percent of PISA participants live in rural areas, defined as geographical units with a population smaller than 15,000. The difference between urban and rural students is 58 points in mathematics and 61 points in reading (equivalent to one and a half years of schooling), which is high compared to neighboring countries like Latvia, Romania, Germany, and Poland (where the difference is between 30 and 40 points; see Figure 13). Moreover, student performance gaps disaggregated by gender show that, while performance in mathematics is similar for boys and girls, girls outperform boys in reading by 40 points (the equivalent of one year of schooling). Although this feature is comparable to other countries like the Slovak Republic or Poland, it reflects challenges ahead that need tailored policy interventions. In particular, even though this gap only shows absolute differences, a further decomposition analysis shows that part of the gap can be explained by differences in learning strategies for acquiring reading skills (see Annex).

Performance and school type

There is more variation in student performance in Hungary between schools than within schools. The variation in performance between schools is a measure of how big the “school effects”[10] are, and the results show that these effects are closely related to how students are allocated, or selected into schools. It can be argued that the higher the between-school variance, the more inequitable is the system. Between-school differences in mathematics performance in 2012 accounted for as much as 63 percent of the variation in student performance in Hungary. This is significantly above the OECD average and that of top-performing neighboring countries such as Estonia and Poland (see Figure 14).

Figure 14. Within-school and between-school variance in mathematics performance, Hungary and select PISA countries, 2012



Source: OECD (2014b)

High performance stratification of lower secondary schools in Hungary goes hand in hand with high stratification in terms of socioeconomic background. The index of school social stratification is defined as the correlation between the PISA student’s socioeconomic status and the school’s average socioeconomic status. In a world without social stratification (and thus with an index equal to zero), families from different socioeconomic backgrounds would randomly settle across the country and students from different backgrounds would study together, making schools as diverse as society as a whole. Although there is variation by country, students usually attend school with peers who have certain similarities in socioeconomic status. PISA data suggests that Hungary has one of the most socially stratified secondary school systems in the EU, similar in stratification to countries in Latin America, characterized by a large socioeconomic segregation between schools (see Figure 15). This is especially striking in a country with relatively low income inequality.[11] Interestingly, Figure 15 also shows that the best performing countries in

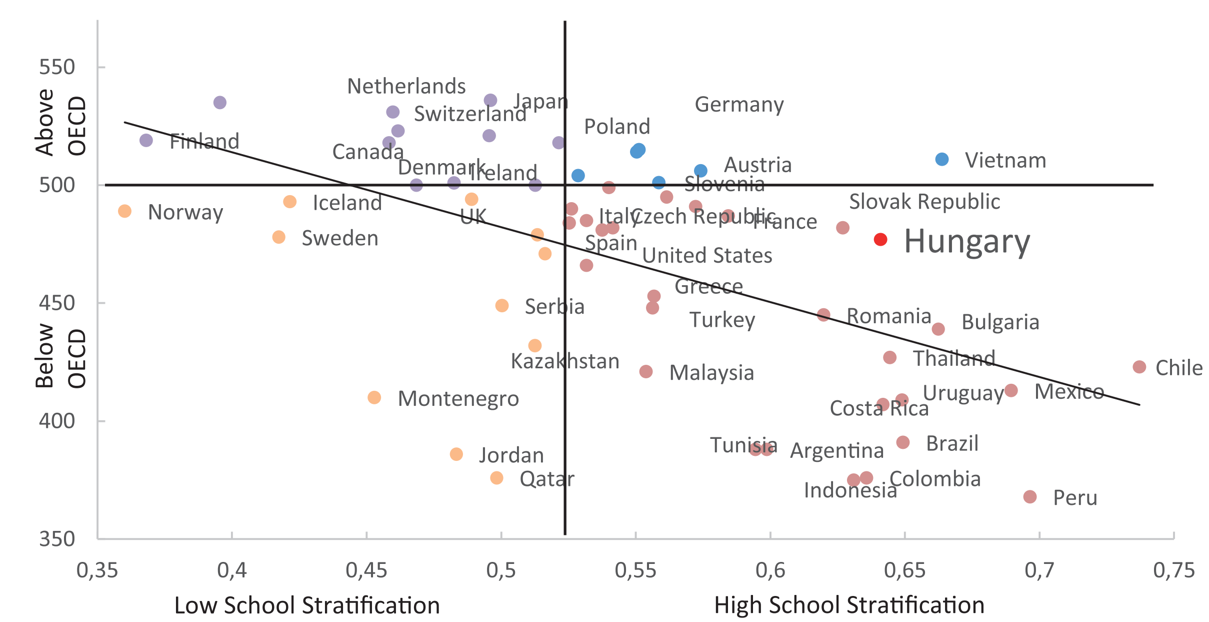
[10] According to the OECD, school effects are the effects on academic performance of attending one school rather than another, with differences in performance that usually reflect schools’ differences in resources or policies and institutional characteristics. See OECD (2013b) for a detailed description.

[11] Income inequality in Hungary, as measured by the GINI index, was 28.0 in 2013, below than the EU28 average of 30.5. For more information, see Eurostat and EU-SILC data.

PISA tend to have less socially segregated school systems, suggesting significant room for a more inclusive policy agenda.

There is also an ethnic dimension to school social stratification, with ethnic segregation of schools on the rise due to a variety of factors. School choice and selective commuting are among the most important mechanisms behind ethnic segregation of Hungarian schools between Roma and non-Roma students. An analysis of long-run geographic trends shows that ethnic segregation between Hungarian schools increased substantially between 1980 and 2011 – with a break between 2006 and 2008 that coincided with the most intensive desegregation campaigns – and that the size of the educational markets (defined as the number of schools) and the fraction of Roma students in the area being the strongest predictors of between-school segregation (Kertesi and Kézdi, 2012). Further analysis reveals that local educational policies that were in place until recently have tended to exacerbate between-school segregation, in addition to the segregation implied by student mobility (Kertesi and Kézdi, 2013).

Figure 15. School social stratification and PISA performance in mathematics, Hungary and select PISA-participating countries worldwide, 2012

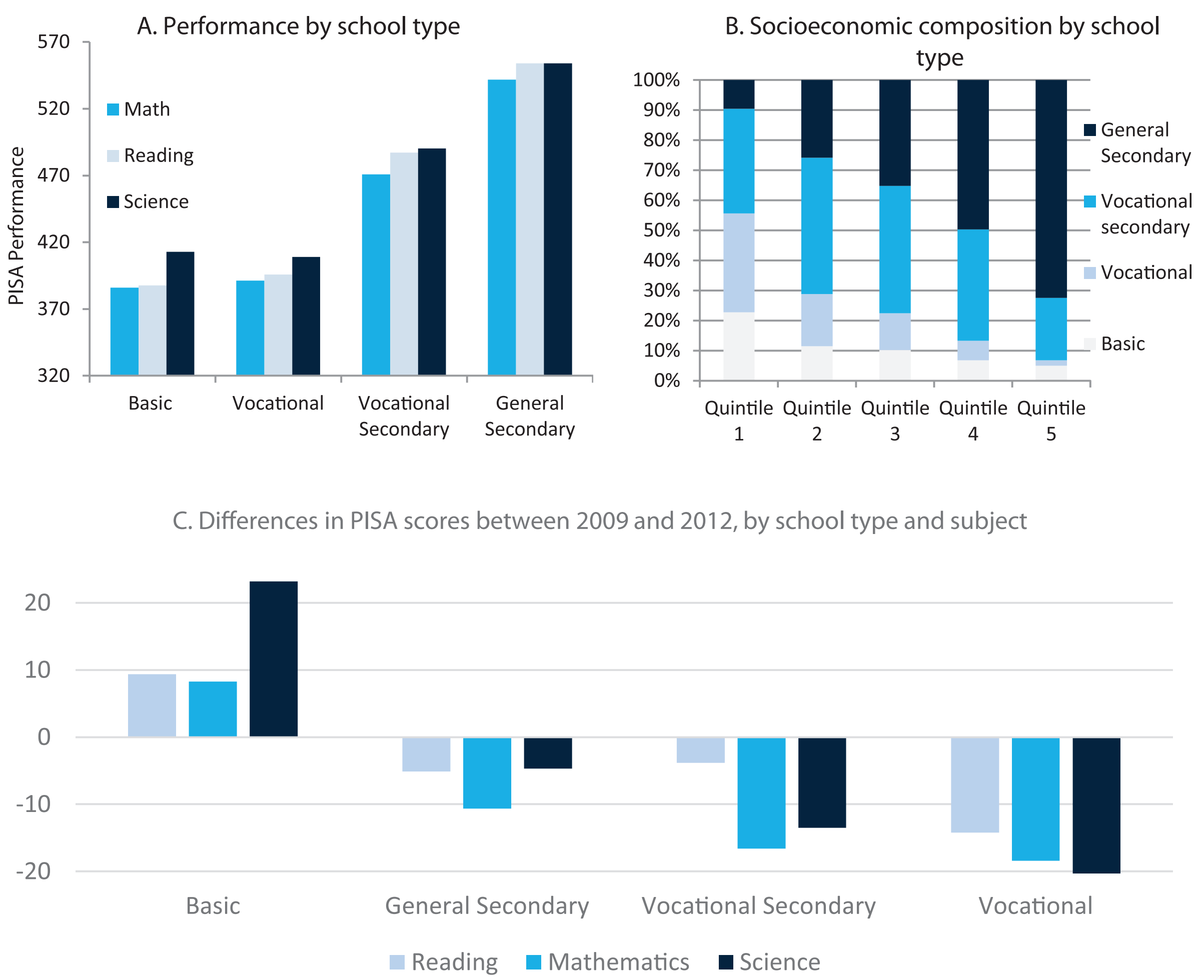


Source: World Bank staff estimates using PISA 2012 data. Note: PISA mathematics scores on vertical axis. Index of School Social Segregation on horizontal axis. The index ranges from 0 to 1. A higher index indicates a higher correlation between students’ and schools’ socioeconomic status. OECD mathematics score average is 500 points. OECD average Index of School Social Segregation is 0.525.

A closer look shows that PISA performance in Hungary varies not just between schools in general but also between different types of schools. The performance of students in the general secondary schools (Gimnázium), which follow a purely academic track, is equivalent to the average of top PISA-performers like Switzerland, Japan, or Korea. The performance of students in vocational secondary schools (Szakközépiskola) is at similar levels to the country average and between one and a half and two years behind the general secondary schools performance. These two tracks represent around 75 percent of PISA participating students in Hungary. The remaining 25 percent are in vocational schools (Szakiskola) or still in basic schools, and their performance lags significantly behind:12 Compared to their peers in vocational secondary and general secondary schools, this third category of students is two years and three and a half years behind in performance, respectively (Figure 16, Panel A).

Moreover, the socioeconomic composition of the student body varies significantly by school type. A closer look at the socioeconomic composition of students in tracks shows that while only 9 percent of students from the bottom ESCS quintile attend general secondary schools, 72 percent of students from the top ESCS quintile do so. Although vocational secondary schools offer a more heterogeneous composition in socioeconomic status, they are mostly populated by students from the bottom 40 percent of the ESCS distribution (Figure 15, Panel B).

Figure 16. PISA 2012 performance and socioeconomic composition by school tracks, Hungary



Source: World Bank staff estimates using PISA 2012 data.

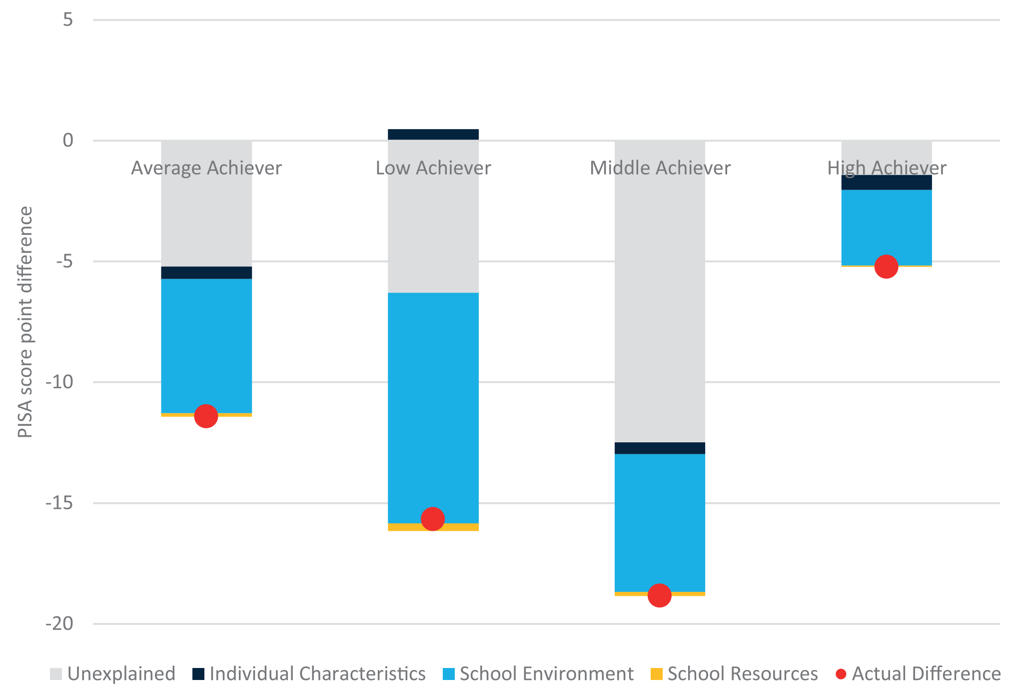
[12] Among 15-year-old Hungarian students who took PISA 2012, 38 percent of students attended grammar schools, 36 attended vocational secondary schools, [14] percent attended vocational schools, and 12 percent were still in primary (mostly due to either late entrance to school or repetition).

The extent of decline in PISA scores between 2009 and 2012 also varied by school type. The performance of students in vocational schools declined significantly across reading, mathematics, and science (Figure 16, Panel C). The same was true for students in vocational secondary schools in mathematics and science but less so in reading. This is not surprising, given that the student body of vocational and vocational secondary schools is disproportionately composed of students from the bottom two ESCS quintiles, and these students faced worse socioeconomic conditions in 2012 than in 2009.

Mathematics competencies were weaker in 2012 than in 2009 for students in *all* types of secondary schools, for example declining by more than 10 points for students in general secondary schools. The decline in mathematics performance is partially explained by changes in the composition of students in schools, especially for the lowest performing students. Econometric analysis shows that changes in peer characteristics of students as well as the student composition of school tracks (both aggregated as school environment in Figure 17) explain around 50 percent of the differences in performance for the average student between 2009 and 2012, and even more for poorly performing students.

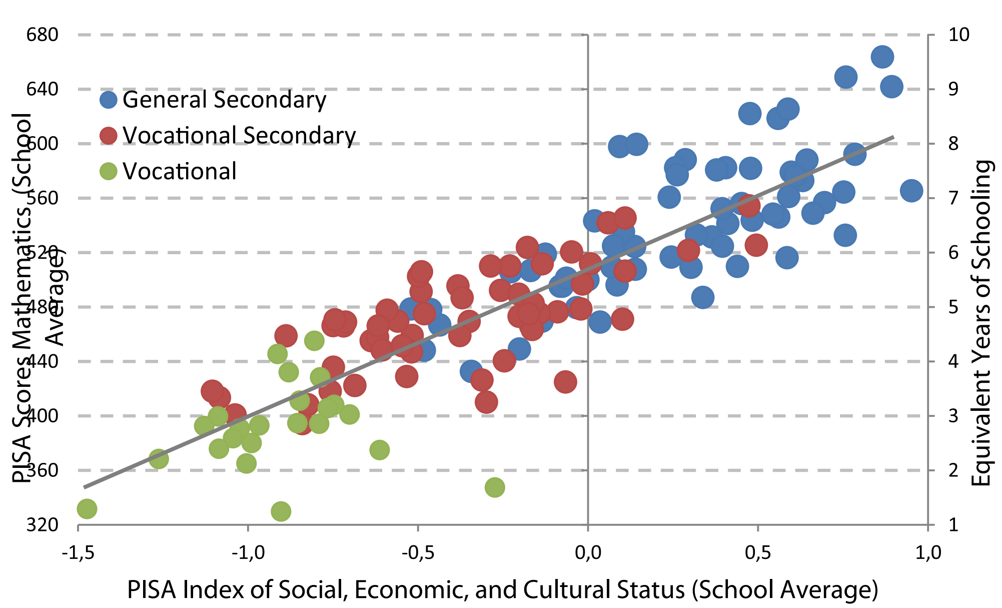
The overall message from the analysis is that education in Hungary does not act as an engine of social mobility but appears to further deepen socioeconomic disadvantage. Three key messages emerge from this analysis. First, performance in PISA varies significantly by the student's socioeconomic background. Second, performance varies by type of school. Third, 15-year-olds from socioeconomically disadvantaged background are disproportionately represented in vocational schools and vocational secondary schools or, indeed, are still in basic schools, where aggregateperformance is significantly behind that in general secondary schools. Figure 18 summarizes the above evidence in a single picture, showing how students from different socioeconomic strata distribute into different educational tracks and achieve widely differing levels of cognitive skills as measured by PISA.

Figure 17. Performance differences in PISA math scores between 2009 and 2012, by student achievement group and contributing factors



Source: World Bank staff estimates using PISA 2012 data. Note: Results decomposition was done using an Oaxaca-Blinder method on RIF-regressions for each quantile of the distribution of performance (Firpo, Fortin, and Lemieux, 2009). Low, middle, and high achievers are students in the 20th, 50th, and 80th percentiles, respectively. By decomposing differences, one often finds that one of the explanatory factors is negative or higher than the actual difference, meaning that other factors outweigh their impact.

Figure 18. PISA 2012 mathematics scores by socioeconomic status and school type



Source: World Bank Staff estimates using PISA 2012 data. Notes: The 2012 PISA sample for Hungary contained 204 schools. For the purposes of this chart, basic education schools (49 schools with very few observations each) and schools with less than 12 students in secondary (7 schools) were removed, leaving 149 schools. 40 points is the equivalent to what an average students learns in a school year. OECD averages of ESCS index and PISA Math Score are 0 and 500, respectively. The ESCS school average is calculated by computing the weighted average of students' ESCS at each school.

Chapter 3

Policy Implications: Remaining Challenges in the Polish Education System

Policy implications: Promoting quality and equity

Hungary is facing the dual challenge of a rapidly aging and shrinking population and significant cognitive skill shortages among youth. The most important response to ensure growth and convergence in times of demographic decline is to raise productivity and, as part of that, the skills base of the population. Yet Hungary is not doing as well as it needs to in equipping all its youth for employment and for longer working lives. Moreover, it is already experiencing negative consequences, evident in a relatively high share of youth ages 15-24 who are not in employment, education, or training (15.4 percent in 2013, according to Eurostat data). While Hungary is not alone among its neighbors in facing this challenge, these statistics are an early indication that too many youth are leaving the education system without the necessary foundation skills to either find employment or continue in education and training. This is exactly the kind of outcome an emerging economy with an aging and declining population should avoid.

Hungary needs to adopt policies that promote quality and address socioeconomic disadvantage at the same time. It is important to note that most students are in their first year of secondary education when they take the PISA test, conducted at age 15, so not all of their varying performance can be attributed to the type of secondary school they are attending. However, the analysis points toward the fact that, for reasons not captured by the PISA data, students in Hungary get selected into different tracks in such a way that enrolment and performance across secondary school types is stratified along socioeconomic background. This suggests that factors related to school segregation based on socioeconomic conditions, even during basic education, do play a role in aggregate performance and the inequity in outcomes.

Given these performance differences, improvements in socioeconomic status should improve student performance in Hungary. However, the strong relationship between socioeconomic disadvantage and student performance also means Hungary needs to enhance quality equally across the entire education system – and not just among schools of one type – so that all students can acquire the cognitive foundation skills needed for good employment outcomes. The examples of other countries in the EU such as Poland, Estonia, and Finland show that access to high quality education does not need to be limited to only a few students. Poland, Estonia and Finland combine high aggregate PISA scores with a high degree of equity. Quality and equity can go hand in hand. This section lays out elements of a policy agenda toward this dual goal, focusing on interventions at the household and school levels targeted to children from poor socioeconomic backgrounds and measures to raise quality and equity across the education system. Raising the quality of education for all can be achieved through two policy channels: (i) delaying the selection of students between vocational and general education tracks, and (ii) raising the quality of education in vocational and vocational secondary schools.

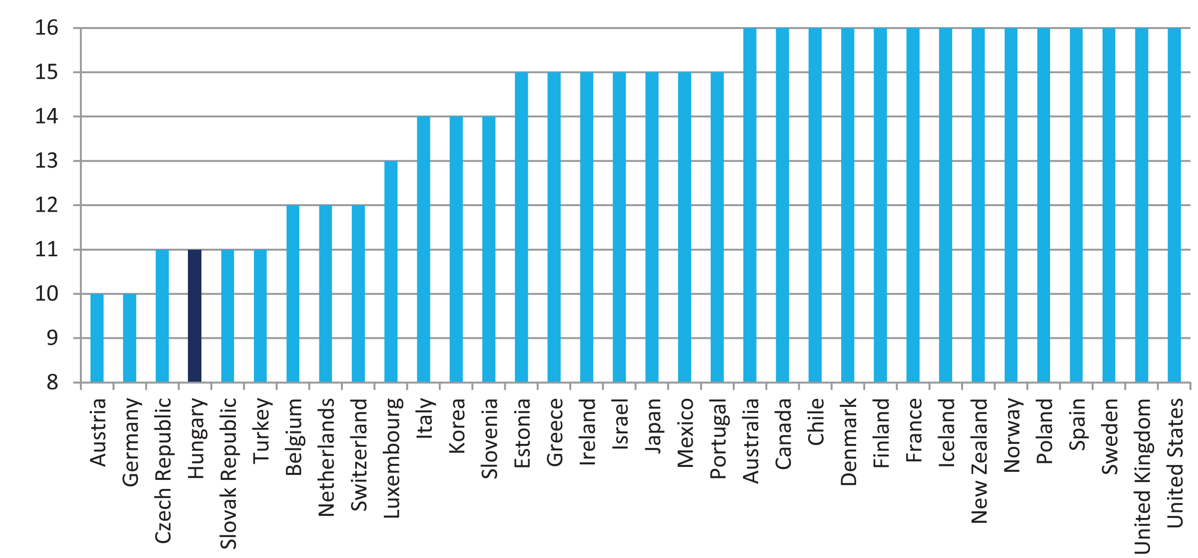
Delaying the age of selection into general and vocational education tracks

The selection into general and vocational education tracks in Hungary happens at an earlier age than elsewhere in the region and across OECD countries. Figure 19 presents OECD data on the ages of first selection into different education tracks. Hungary stands out, alongside Austria, Germany, the Czech Republic and the Slovak Republic, as the OECD members with the earliest age of selection. While Hungary selects students into different secondary tracks at age 14 or after the end of basic education after grade 8, the Hungarian system allows even earlier selection of

students into elite general secondary schools for extended six- and eight-year programs starting at ages 10 or 12. Most countries with successful education systems stream students at later stages of schooling, usually at age 16.

International evidence suggests that early selection is bad for equity and does not improve the overall quality of education. Hanushek and Woessmann (2006) used previous PISA data to show how early tracking systems lead to a systematic increase in inequality of student performance without affecting average performance levels. At the national level, similar evidence has been found in Poland (see Jakubowski et al., 2010) and Germany (Piopiunik, 2014). The findings suggest that there are no efficiency gains from introducing early selection of students and that, in fact, delayed tracking can promote better performance for all students.

Figure 19. Age of first selection between general and vocational tracks, Hungary and select OECD countries



Source: OECD (2010a).

Recent analysis reveals that tracking has a causal effect on student performance in Hungary. Hermann (2013) uses eight and tenth grade National Assessment of Basic Competencies (NABC) data as well as administrative data on admissions to upper-secondary institutions in Hungary. He finds that significantly poorer test score results (0.21-0.28 standard deviation of test scores) in vocational schools compared to secondary vocational schools that can be explained by the school type. He also finds smaller variations between general secondary and the vocational secondary tracks--about half of the vocational track effect. His analysis further shows that the impact of the academic track on performance does not differ consistently from the impact of better schools within tracks. This suggests that if the academic and mixed tracks were replaced by a single general track, the average achievement level and equality of opportunity would probably not change, as school choice and the selection of students would reproduce the present stratified school system with similar outcomes. Lastly, the analysis shows that equality of opportunity could be improved mostly by shrinking the vocational track, even though some of the effect would be expected to be diluted by greater ability sorting within the remaining two tracks.

International experience, including Poland's, shows that delaying the age of selection between vocational and general tracks can promote quality and equity. It is a reform that is highly relevant for Hungary. Early tracking in Hungary is resulting in a high degree of stratification of students into different types of schools along socioeconomic lines. It channels a sizeable proportion of Hungarian students into vocational and vocational secondary schools, where quality is significantly lower on average than in general secondary schools. In the case of the vocational school, it also represents an irreversible choice into a schooling track that is closed in the sense of specializing students early in a certain trade and not allowing students the possibility of proceeding toward higher education.

International evidence suggests that delaying the selection of students into vocational and general tracks, for example until after the end of compulsory education, may be a first step toward achieving excellence and greater equity. The example of Poland is instructive: In 2000, Poland delayed the selection into vocational and general tracks by one year, until the age of 15, thereby extending the exposure to general curriculum content as part of a comprehensive reform of secondary education, and it has seen significant improvements in aggregate PISA scores and in equity indicators since then (Jakubowski et al., 2010).

Raising the quality of education in vocational and vocational secondary schools

The performance of students in vocational and vocational secondary schools is below the performance of students in the general academic secondary schools. While some difference between the three groups may be expected, the gap in performance is very large and results in significant shares of young Hungarians remaining with poor and insufficient cognitive foundation skills. It raises the question whether the curriculum in vocational schools and vocational secondary schools devotes sufficient attention to general cognitive content and whether teachers are equipped with the tools to impart those skills effectively to the students that need particular support. This suggests the need to increase the quality of education in these two types of schools, even if, as recommended in this report, the age of selection between vocational and general secondary schools is raised.

Tackling socioeconomic disadvantage and its impact on learning

Socioeconomic disadvantage has an impact on education performance in Hungary, all else equal. Consequently, raising the skills of the next generation will involve efforts to improve the socioeconomic conditions of children and youth. This will mean, first, household-targeted interventions with an effective mix of social and employment services and benefits and tax incentives to promote the employability of parents and address multiple drivers of poverty and deprivation affecting families with children. Second, it will mean measures targeted to schools with large shares of students from disadvantaged socioeconomic backgrounds to reduce the effect of socioeconomic disadvantage on student performance, for example through additional teacher and educational resources. Extracurricular activities can provide compensatory learning stimulation for disadvantaged children.

Hungary has a network of schools that follow a model developed in Hejőkeresztúr. This model is based on the Complex Instruction Program (CIP) instruction method from the United States, and offers higher quality educational services to children from disadvantaged backgrounds (See Box 3 for more details.). Additionally, special incentives could be offered to attract the most talented teachers to work in hard-to-staff schools and preschools, for example based on the Teach for America/Teach for Bulgaria programs.

Box 3. The Complex Instruction Program (CIP) in Hungary

Complex Instruction evolved from more than 20 years of research at the Stanford School of Education. Its objective is to ensure academic access and success for all students in heterogeneous classrooms. This methodology has three major components: (i) multiple ability curricula and independent and group work that involves open-ended tasks on a topic that requires a wide array of intellectual abilities; (ii) special instructional strategies, as the teacher trains the students to use cooperative norms and specific roles to manage their own groups; and (iii) teachers who learn to recognize and treat status problems, so that all students from diverse backgrounds can make meaningful contributions. Research has shown significant achievement gains in classrooms that have adopted such methods, which are widely used in schools in the U.S. and Europe.

In Hungary, the "Educating the Disadvantaged" (H20) program started at the Hejőkeresztúr primary and secondary school (where the enrolment rate of Roma pupils has been gradually rising). It has used the CIP methodology, among other innovative and educational-inclusion tools, as a means to counteract potential achievement gaps and segregation and to improve learning and performance for all students, regardless of their backgrounds.

By replicating the school's success, the H2O program aims to reduce differences between students and make sure each one reaches the highest level attainable, given students' abilities, motivation, and goals. The H20 program transfers this educational method—in the form of a 90-hour accredited teacher training course—to the entire staff of primary schools that have disadvantaged indicators.

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Annex

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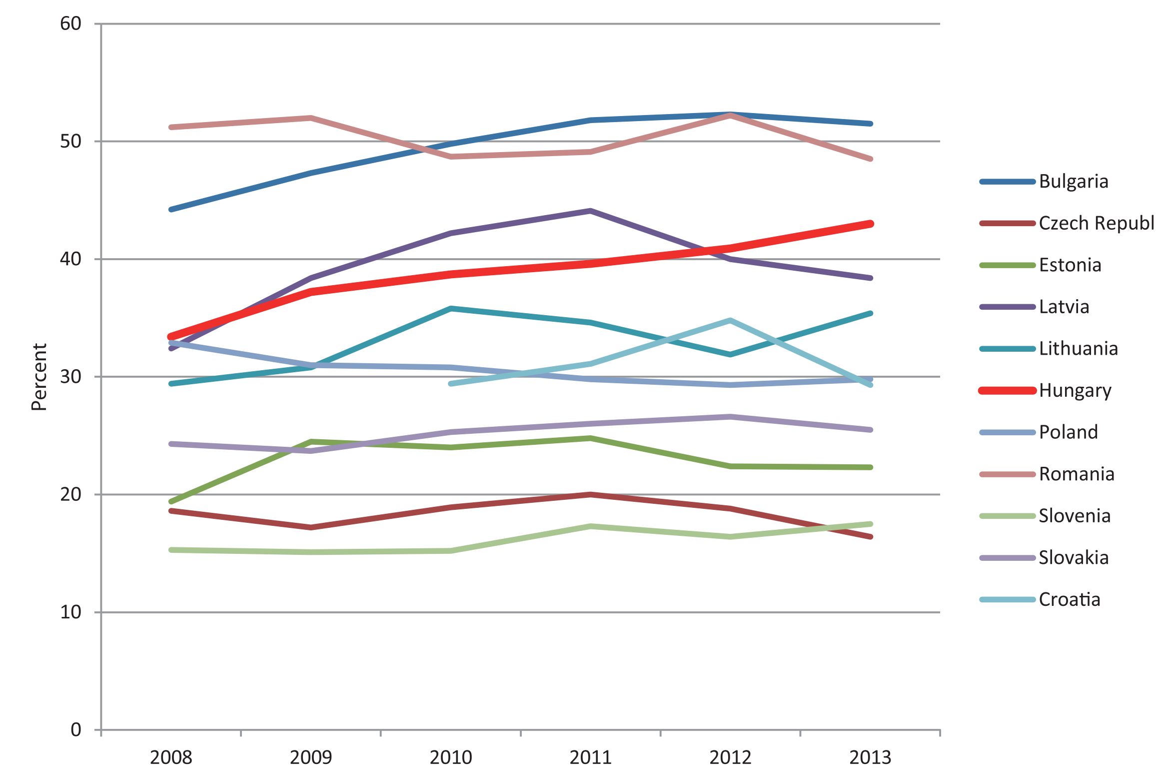
Annex

Figure A1. Share of under-18-year-olds at risk of poverty and social exclusion, Hungary and neighboring countries, 2008 – 2013



Source: World Bank Staff estimates using Eurostat data

Table A1. Percent of population ages 15 and older, by highest level of schooling attained and average years of schooling, Hungary, 1990-2010

Year	Highest level attained						Average years of schooling			
	Primary		Secondary		Tertiary		Total	Primary	Secondary	Tertiary
	Total	Completed	Total	Completed	Total	Completed				
1990	56.4	35.6	33.7	18.0	8.8	7.5	8.79	7.08	1.38	0.33
1995	26.9	22.1	61.7	33.0	10.4	8.5	10.41	7.73	2.31	0.38
2000	10.5	9.8	77.8	44.0	11.0	9.4	11.20	7.92	2.88	0.41
2005	5.9	5.2	78.2	50.3	15.3	12.6	11.66	7.92	3.18	0.56
2010	2.0	1.8	80.6	52.9	17.2	15.4	11.85	7.69	3.51	0.65

Source: Barro-Lee Dataset (2012)

Table A2. Indices of learning strategies and teaching practices

Learning Strategies	Control	How students set clear goals for themselves and monitor their own progress in reaching them
	Memorization	To what extent students try to memorize texts
	Elaboration	How students relate acquired knowledge to other contexts (own life, outside school, and prior knowledge)
	Metacognition: understanding and remembering	Compares students' strategies for understanding and remembering with what experts rate as the most appropriate strategies
	Metacognition: summarizing	Compares students' strategies for summarizing with what experts rate as the most appropriate strategies
Teaching Practices	Discipline, order, and time management	What is the disciplinary climate in the classroom (e.g., noise and time taken for students to quiet down)?
	Discussion and debate	Extent to which teachers engage students in discussion
	Relating knowledge	Whether teachers help students relate knowledge to different contexts (prior knowledge, and personal experiences)
	Clarifying expectations	Whether teachers outline how student-teacher interaction will be from the beginning
	Managing assignments	Whether teachers mark assignments, check if students understood the lesson, and motivate students
Quality of Educational Resources	Shortage or inadequacy of the following factors (as reported by school principals)	Science laboratory equipment, instructional materials (including textbooks), computers for instruction, internet connectivity, computer software for instruction, library materials, and audio-visual resources

Note: Indices were constructed by World Bank staff based on PISA 2009. See OECD 2014, "PISA 2009 Results: Learning to Learn – Student Engagement, Strategies and Practices (Volume 3)" for more details on the indices.

The analytical approach used in the third section of this report is based on the Firpo, Fortin, and Lemieux (2009) methodology. Typically, the literature on decomposition of student scores in PISA through groups (Amermueller 2004) and years (Barrera et al. 2011) has focused on the mean differences, with little attention to what happens at the tails of the distribution. The Firpo, Fortin, and Lemieux (FFL) method allows one to decompose gaps in student performance not only for the mean but also for other statistics of the distribution. Traditionally, the problem with quantile regressions has been that the law of iterated expectations does not apply, thus making it impossible to interpret the unconditional marginal effect of each independent variable on a student's performance. However, recent econometric techniques, such as the one proposed by FFL, have solved this methodological difficulty. The FFL technique is based on the construction of re-centered influence functions (RIF) of a quantile of interest, q_τ, as a dependent variable in a regression:

$$RIF(I; q_\tau) = q_\tau + \frac{\tau - D(I \leq q_\tau))}{f_I(q_\tau)} \qquad (1)$$

where D is an indicator function and $f_I(.)$is the density of the marginal distribution of scores. A crucial characteristic of this technique is that it provides a simple way of in

Table A3. Decomposition of PISA scores in math between 2009 and 2012.

VARIABLES	Average	Percentile 15	Percentile 50	Percentile 85
Year 2012	479.6***	382.6***	476.3***	577.9***
	(5.440)	(2.337)	(4.921)	(4.669)
Year 2009	491.0***	398.3***	495.1***	583.1***
	(5.729)	(13.50)	(7.293)	(3.245)
Difference	−11.42	−15.68	−18.84**	−5.228
	(7.900)	(13.70)	(8.798)	(5.686)
Unexplained	−5.216	−6.304	−12.49**	−1.419
	(3.565)	(11.82)	(4.864)	(4.021)
Explained	−6.208	−9.373	−6.358	−3.808
	(7.142)	(16.00)	(8.782)	(3.274)
Age	0.0656	−0.0230	0.0941	0.0378
	(0.0657)	(0.144)	(0.0992)	(0.0477)
Female	−0.504	−0.780	−0.601	−0.241
	(0.577)	(0.912)	(0.692)	(0.278)
ESCS Index	−0.737	−0.280	−0.754	−0.715
	(0.555)	(0.545)	(0.599)	(0.540)
Entrance Age Primary	0.657**	1.563**	0.771**	0.298**
	(0.258)	(0.698)	(0.329)	(0.142)
ESCS Index (School)	−5.292	−7.470	−5.511	-3.317
	(3.933)	(5.941)	(4.157)	(2.540)
Rural	0.0470	0.278	0.00411	−0.00436
	(0.506)	(2.991)	(0.0611)	(0.0526)
Quality of Educational Resources	−0.141	−0.311	−0.168	−0.0610
	(0.429)	(0.964)	(0.517)	(0.202)
Vocational School	0.0557	0.536	−0.0549	−0.0374
	(0.494)	(4.745)	(0.488)	(0.332)
Vocational Secondary	−1.118	−5.791	−1.096	0.274
	(3.424)	(17.73)	(3.359)	(0.847)

Grammar School	0.758	2.905	0.957	−0.0417
	(4.762)	(18.25)	(6.013)	(0.280)
Constant	−29.98	31.95	−54.33	−182.3**
	(85.98)	(268.5)	(127.5)	(85.19)
Observations	9,118	9,118	9,118	9,118

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: Robust standard error in parentheses and clustered at the school level. *** $p < 0.01$, **$p < 0.05$, and *$p < 0.1$. Variable effects are grouped and include individual characteristics (age, gender, entrance age, and socioeconomic status), school environment characteristics (socioeconomic status of peers at school, rural/urban area, or type of stream of school), and quality of school resources.