



Brussels, 3 December 2013

## PISA 2012: EU performance and first inferences regarding education and training policies in Europe

### Executive summary

The OECD's Programme for International Student Assessment (PISA) is used for one of the ET 2020 benchmarks, which states that by 2020, the share of 15-year-olds with a low achievement in reading, maths and science should be less than 15%. PISA 2012 is the fifth round of the survey, with a special focus on mathematics performance.

For mathematics, EU Member States rank amongst the best and worst as regards the share of low achievers, revealing an enduring discrepancy between countries. The weighted EU average is slightly better than the overall OECD average, and quite a bit better than the US average.

Six main findings from PISA 2012 can be summarised from a preliminary analysis, each with its own implications for education and training policies.

1. When it comes to progress towards the 2020 benchmark of at most 15% low achievers, the EU as a whole is seriously lagging behind in the area of mathematics. Significant policy reform will be required in order to break with this stagnation.
2. Progress in reading and science is on track, but the slow pace of improvement demands that Member States sustain their efforts to tackle low achievement in school education.
3. The share of low achievement in mathematics and science does not reveal significant differences between boys and girls, which is promising for later STEM fields of study. But the gender gap remains striking in the area of reading, where boys have a strong disadvantage. Measures motivating boys to strengthen their reading skills are the key to reaching the 2020 benchmark in the area of reading.
4. Socio-economic status is a driving determinant for a 15-year-old's achievement in mathematics, but also for a country's performance as regards the ET 2020 benchmark. This illustrates the persisting inequities found in European education and training systems. Education alone cannot tackle this challenge, but a focus on regional discrepancies and more holistic, cross-sectorial solutions are a first step.
5. Migrant status has clear overlaps with the effects of socio-economic background, but also exercises an independent influence on mathematics performance. The strong disadvantage of foreign-born students in maths skills is partly related to language difficulties.
6. Early childhood education and care (ECEC) proves vital for later development of basic skills, demanding more evidence on those not participating in these services, as well as on the quality criteria for ECEC to live up to its potential.

As part of the 2013 European Semester, thirteen Member States received a country-specific recommendation in policy areas related to PISA: school performance, disadvantaged groups, and the teaching profession (AT, CZ, DE, ES, PL, DK, UK, BE<sup>1</sup>, IT, LU, RO, HU and SK). PISA 2012 confirms many of these messages, and identifies challenges in ten further Member States (CY, EL, PT, HR, SE, LT, LV, BE, FR and FI).

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<sup>1</sup> BE: Preliminary findings for Belgium are included in this report.

# 1. Introduction

The OECD's PISA Survey (Programme for International Student Assessment) is a key international educational skills assessment that has sparked educational reform across EU Member States since its first launch in 2000. The 2012 round of the PISA survey was carried out in 27 EU Member States<sup>2</sup> and in more than 60 countries worldwide.

The European Commission's Directorate-General for Education and Culture and the OECD's Department for Education and Skills have agreed on a new cooperation arrangement, to join forces in three important aspects of education and skills development: *Skills Strategies, Country Analyses and International Surveys*. The PISA Programme is a strong component of this cooperation.

The results of the 2012 round of PISA will be officially presented on 3 December in a joint Commission/OECD event in Brussels, representing, similar to the recent launch of the results of the Survey of Adult Skills (PIAAC), a building block of the two institutions' enhanced cooperation. PISA results strengthen the knowledge base of the Commission and, given the prominence and credibility of the international survey, give the Commission's own policy messages more visibility.

The PISA 2012 report provides key insights into the performance of school systems at the EU level, in EU Member States and beyond. The results not only enable comparison at EU level but situate European performance within the broader global context. It provides new evidence on students' skills performance and its development within EU Member States, thereby enabling Member States to assess the success of existing policy reform and to identify the need for future developments. Consequently, PISA has become an important component of the strategic framework for European cooperation in education and training (ET 2020) and a prominent source of information for the Europe 2020 strategy and the European Semester, where it is widely used in fields as literacy, mathematics, early leavers from education and training, low achievers and ICT skills.

Being the landmark skills assessment, PISA is the basis for one of the EU education benchmarks adopted by the May 2009 Council<sup>3</sup>. The benchmark aims at reducing the share of 'low achievers' in reading, mathematics and science to below 15% by 2020<sup>4</sup>. For the measurement of the ET 2020 benchmark – and throughout this document – low achievement equals a performance on the PISA scale for mathematics, reading and science that is below Level 2.

PISA 2012 focused primarily on mathematics skills of 15 year-old students, with reading and science as minor areas<sup>5</sup>. The understanding of mathematics, science and technology is an essential component for a successful professional and social life. Furthermore, the culture of science is fundamental to a technologically and politically complex modern democratic society. In light of this, the current reality of more than 20% of young Europeans not reaching a minimum level of basic skills in mathematics and science is alarming.

With both the Survey of Adults Skills (PIAAC) and PISA results now available, there is a lot of scope for countries to build strong national education policies by combining and applying the evidence provided by the two surveys.

## 2. EU performance in a global context

Four EU Member States (EE, FI, PL, NL) are among the top performing countries with a rate of low achievers in maths below the EU benchmark of 15% (Figure 2.1). At the same time, it should be noted that, at least in maths, the average share of low achievers in the EU is significantly larger

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<sup>2</sup> This is the EU28 minus Malta.

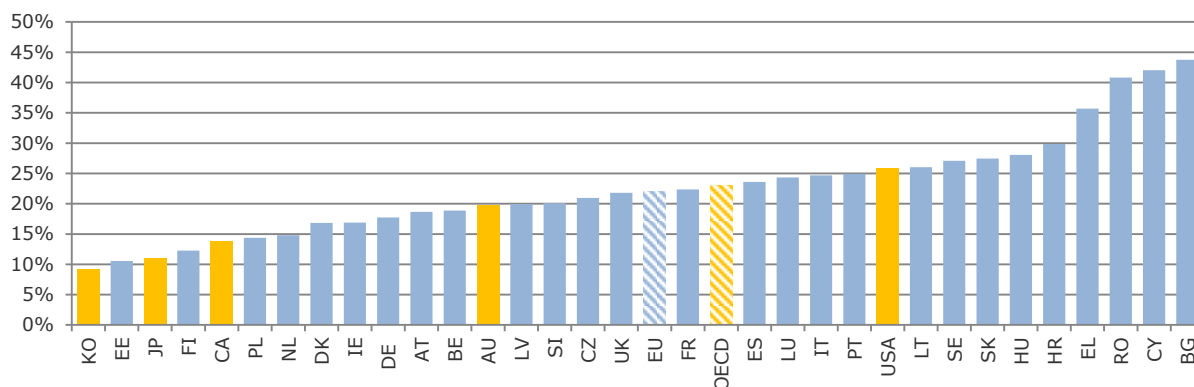
<sup>3</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2009:119:0002:0010:en:PDF>

<sup>4</sup> The PISA 2012 scores in mathematics are divided into six proficiency levels ranging from the lowest, level 1, to the highest, level 6. Low achievement is defined as performance below level 2. According to PISA, in mathematics, pupils that only reach level 1 "can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are obvious and follow immediately from the given stimuli." However, there are not able to complete tasks at higher levels.

<sup>5</sup> Results from further assessments of problem solving skills and financial literacy will be reported later.

than the same share in JP and KO. This resembles the picture revealed by the Survey of Adult Skills.

Figure 2.1. Share of low achieving students in mathematics



Source: OECD (PISA 2012). Note: Countries are ordered by low to high share of low achievers in maths.

The proportion of EU students who score below proficiency Level 2 in mathematics is particularly large in some EU countries (almost double the OECD average in BG, CY, and RO). However, the average proportion of low achievers across the EU (22,1%) is slightly lower than the overall OECD average<sup>6</sup> (23%), and considerably lower than the one found in the USA (25.8%).

### 3. Performance of EU countries with regard to the ET2020 benchmark

#### 3.1. Mixed progress in mathematics, reading and science

The results from PISA 2012 clearly indicate that performance in all three areas of basic skills (mathematics, reading and science) correlate well with each other. Members States that show certain levels of basic skills in one of the areas tend to perform similarly in the other areas. Therefore, policies designed to tackle low achievement in one field often converge with similar policies in another.

##### Mathematics

The average share of low achieving students in maths in EU Member States has essentially remained the same in PISA 2012 (22.1%) in comparison to PISA 2009 (22.3%)<sup>7</sup>, which is an indication that EU countries are not making sufficient progress towards reducing the share of low achievers in mathematics.

##### The EU is lagging behind in its challenge to reduce the share of low achievers in mathematics

Figure 3.1 compares PISA 2012 performance with 2009-2012 change<sup>8</sup>. Since we know the level at which the EU average rate of low achievers should be by 2020 (below 15%), we can calculate the minimum annual change needed for the EU average to reach this benchmark. This enables us to compare the annual improvement observed between 2009 and 2012 (-0.3%) with the annual improvement required (-3.6%). It illustrates how the EU as a whole is lagging behind on its way to 2020.

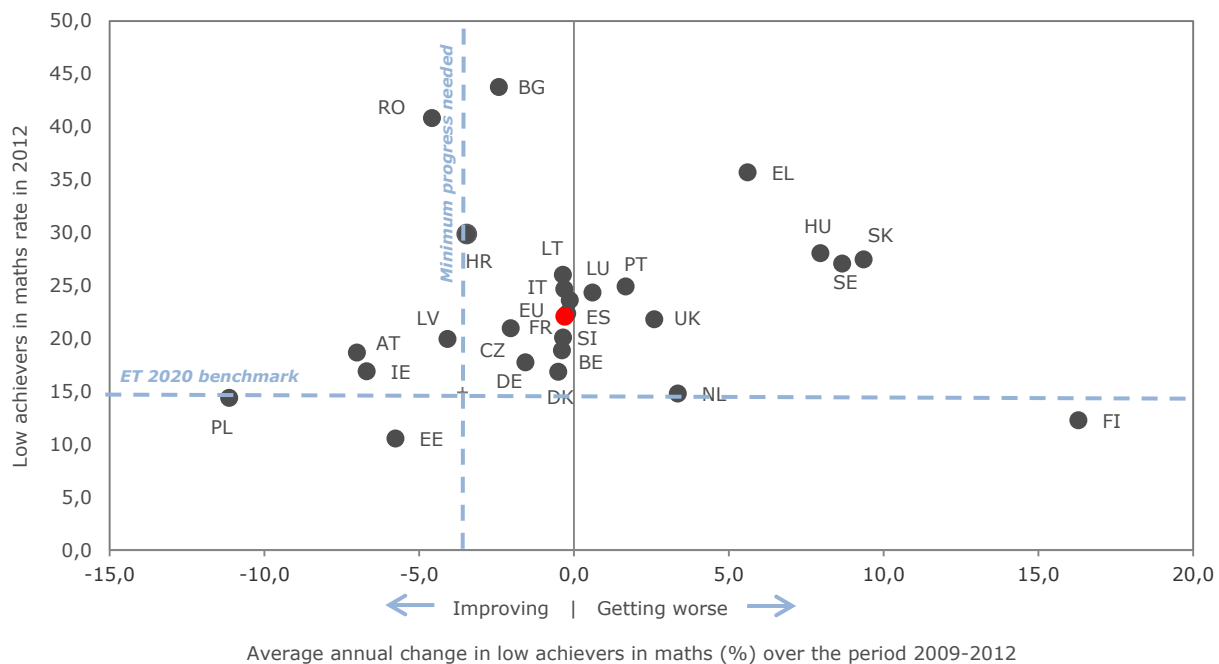
<sup>6</sup> Note, however, that the OECD average is un-weighted whereas the EU average is weighted.

<sup>7</sup> The figure for PISA 2006 was only slightly higher (24.1%).

<sup>8</sup> Note that Figures 3.1, 3.2 and 3.3 depict the 2009-2012 change in relative terms, i.e. the annualised *percentage change* relative to each country's starting position in 2009. This is different from a 2009-2012 change in absolute terms, which would be expressed in percentage points.

This trend does, however, disguise large differences found between and within EU Member States. Many Member States show very little change since 2009 (LT, IT, ES, FR, SI, BE<sup>9</sup>, DK, DE, CZ), while others show an improvement that is equal or beyond the minimum progress required of the EU as a whole to reach the 2020 benchmark. In the latter group of Member States, EE and PL have already reached the benchmark, whereas AT, IE and LV are on track to do so. Only RO and HR feature, despite significant progress, still large shares of low achievers in maths.

Figure 3.1. Percentage of low achieving students and annual change in mathematics



Source: DG EAC and JRC-CRELL calculations on the basis of OECD data (PISA 2009 and 2012). Note: the dashed vertical line denotes the minimum progress needed for the EU as a whole to reach the ET 2020 benchmark of "below 15%". The average annual change is an artificial approximation based on performance differences between in the 2009 and 2012 data.

The situation is worse in the remaining Member States. BG does show some, if insufficient, progress but is the country with the highest share of low achievers in maths (43.8%). LU, PT, UK and NL, with various rates of current performance, reveal slight increases in their rates of low achievers in maths, whereas EL, HU, SE and SK show a significant increase in their rate of low achievers while still far removed from the 2020 benchmark. FI, finally, is only just behind EE as top performers of 2012 but its deterioration relative to its 2009 performance is striking.

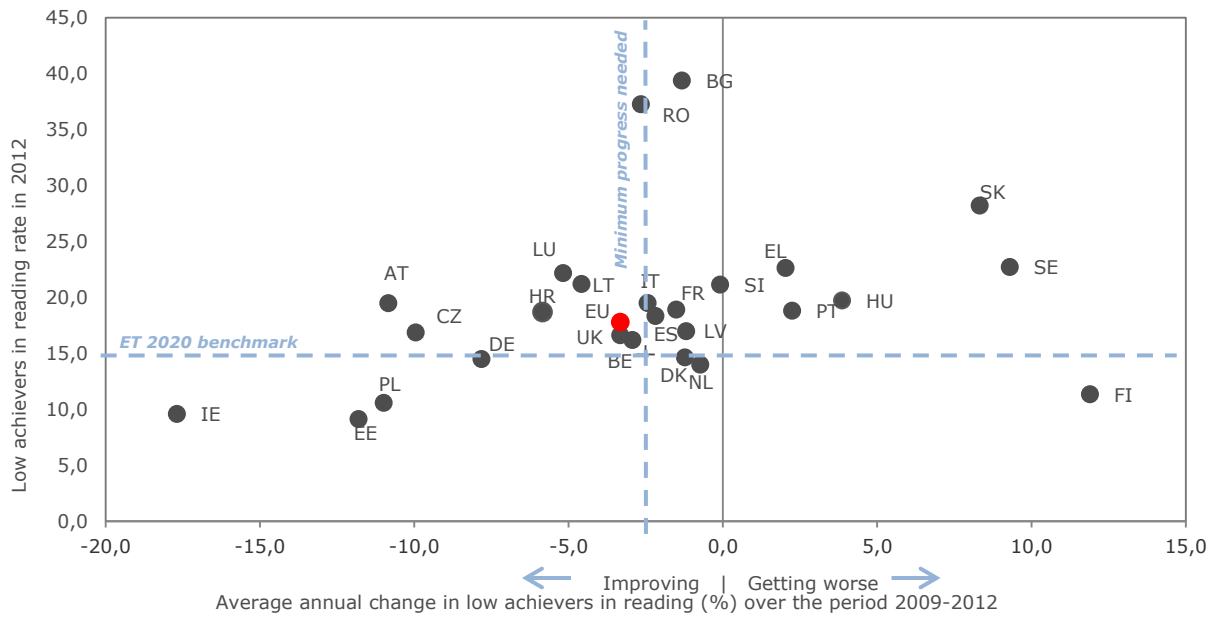
### Reading

The percentage of low achievers in reading has declined from 23.1% in 2006 to 19.7% in 2009 and to 17.8% in 2012. If this trend continues, the benchmark of 15% may be an achievable goal by 2020. Figure 3.2 reveals, however, that the observed annual improvement of the EU average between 2009 and 2012 (-3.3%) is only slightly better than the minimum progress required in order to reach the 2020 benchmark (-2.5%). Sustained efforts are therefore crucial.

This decrease is mainly due to some EU countries where the proportion of low achievers dropped substantially, e.g. AT, IE, PL, DE, EE, and CZ. However, so far, only 7 countries have reached the EU benchmark of less than 15% (EE, IE, PL, FI, NL, DE, and DK). Notably, in some European countries, the proportion of low achievers went up in comparison to their 2009 level to a significant degree (SK, SE and FI).

<sup>9</sup> BE: Preliminary findings for Belgium are included in this report.

Figure 3.2. Percentage of low achieving students and annual change in reading



Source: DG EAC and JRC-CRELL calculations on the basis of OECD data (PISA 2009 and 2012). Note: the dashed vertical line denotes the minimum progress needed for the EU as a whole to reach the ET 2020 benchmark of "below 15%". The average annual change is an artificial approximation based on performance differences between in the 2009 and 2012 data.

### Science

Overall, across the EU, there is a steady trend towards improvement in science skills. The percentage of low achievers has been dropping from 20.3% in 2006 to 17.8% in 2009 and 16.6% in 2012. The EU, on average, is on track to reach the 2020 benchmark of "below 15%". However, as found for reading skills, the observed 2009-2012 annual change (-2.3%) is only marginally better than the annual change that is minimally required (-1.6%), leaving the EU little room for manoeuvre (Figure 3.3).

FR, BE, DK, UK, NL and EL made little or no progress at all between 2009 and 2012, but most of these Member States are already close to or beyond the "below 15%" benchmark. The situation is worse for SE, PT, HU and particularly SK, where low achievement in science is still higher than 15% and significantly increasing since 2009. Again, the increase observed in FI is arguably less of concern because of the overall achievement which well exceeds the benchmark. The success story of Member States like EE, PL, IE, DE, LV, SI and CZ, which managed to significantly reduce the share of their low achievers in science is worth pointing out.

The EU is on track to reach the 2020 benchmarks for reading and science performance, but success hinges on the sustained efforts of Member States

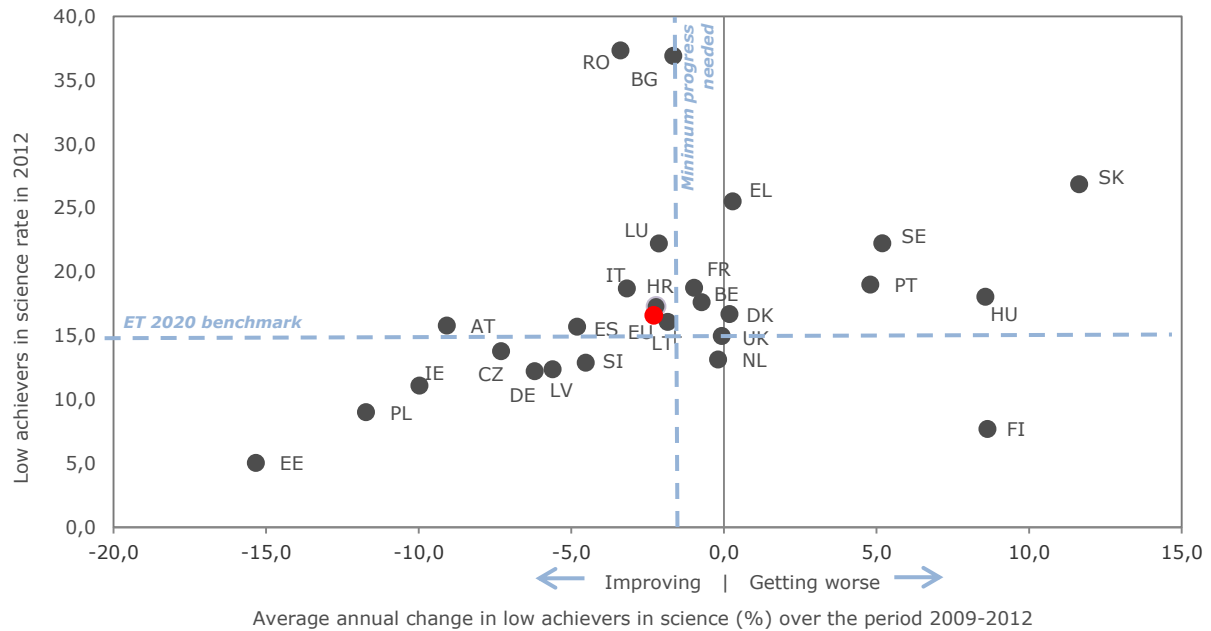
### Implications for education and training policies

The reasons why some Member States succeeded in significantly reducing the share of low achievers may serve as an inspiration for other countries that are struggling to overcome similar challenges or even face a deteriorating situation. Similarly, the lessons learned from certain high-performing regions within a country may provide valuable pointers for successful policy interventions.

As noted above, countries which score well above the OECD PISA 2012 average and which have shown good progress in one domain tend to do so in the other domains as well. While synergies need to be studied further, it may be appropriate to look more closely at policies that emphasise a multidisciplinary approach to learning with mutual reinforcement of the three areas of basic skills.

Low achievement needs to be tackled through integrated policies which, based on reliable monitoring, could respond with prevention, intervention or compensation actions.

Figure 3.3. Percentage of low achieving students and annual change in science



Source: DG EAC and JRC-CRELL calculations on the basis of OECD data (PISA 2009 and 2012). Note: the dashed vertical line denotes the minimum progress needed for the EU as a whole to reach the ET 2020 benchmark of "below 15%". The average annual change is an artificial approximation based on performance differences between in the 2009 and 2012 data.

When looking at the success of some of the countries participating in PISA the improvement of the quality education, and of teaching in particular, comes up. PISA points to the fact that teachers are instrumental in promoting students' drive to engage in learning and in solving complex problems. In this context, it seems important to focus on strengthening the teaching professions including for school leaders and raising the attractiveness of these professions. This also includes the use of new technological tools and instruments increasing the quality of teaching as well as on raising the engagement of students. Beyond that, the overall relationships within schools, their internal organisation, engagement of parents and the community can bring significant results.

PISA 2012 already identifies practices which could be considered by different Member States as ways to tackle low achievement:

- Establish policies to improve the quality of teachers (e.g. EE and PL increased the requirements to earn a teaching license, started offering incentives for young people to enter the profession, increased salaries and introduced incentives for teachers to engage in in-service teacher-training programmes.)
- Develop programmes for early detection and monitoring of students at risk as well as of struggling students, followed by provision of strong support in a timely fashion (e.g. PL improved the information infrastructure so that schools could better identify and support struggling students).
- Introduce curricular changes affecting the content, scope and pace of the curriculum.
- Emphasise behavioural management; promote good teacher-pupil relations, self-restraint, perseverance, self-awareness, and interdependence because lack of punctuality, truancy and lack of self-belief are negatively associated with student performance.
- Develop programmes that foster stronger engagement of parents.

- Allocate adequate or even more educational resources to disadvantaged schools (e.g. EE, FI, DE, and SI).

The above-listed examples of practices identified by PISA 2012 demonstrate the scale of the possible co-operation on EU level which could effectively support Member States in designing their policies through the Open Method of Cooperation and the Thematic Working Group on Schools in particular. Such concerted effort seems to be needed to reach the EU benchmark of 15% or below by 2020.

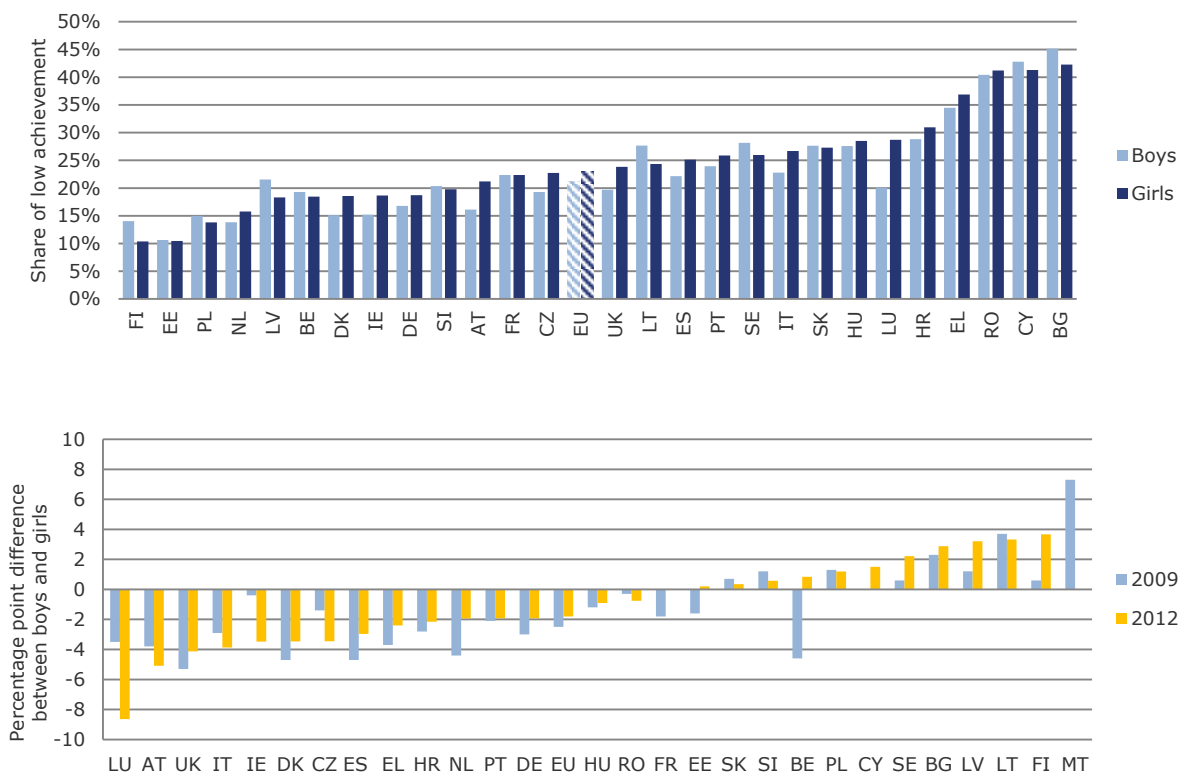
### 3.2. Performance of students by gender

*Mathematics and science: no striking gender gaps*

Gender differences in mathematics and science are already small and keep shrinking

PISA data show that there are no striking differences in the share of low achievers in maths and science between boys and girls, with minor advantages of boys in most cases (see Figures 3.4 and 3.5). Across EU countries, the percentage point difference between boys and girls below Level 2 in mathematics remained small between 2009 and 2012, with a decrease from 2.5 percentage points in 2009 to 1.8 in 2012.

Figure 3.4. Share of low achieving boys and girls in maths (above) and development of the gender gap for low achievement in maths (below)

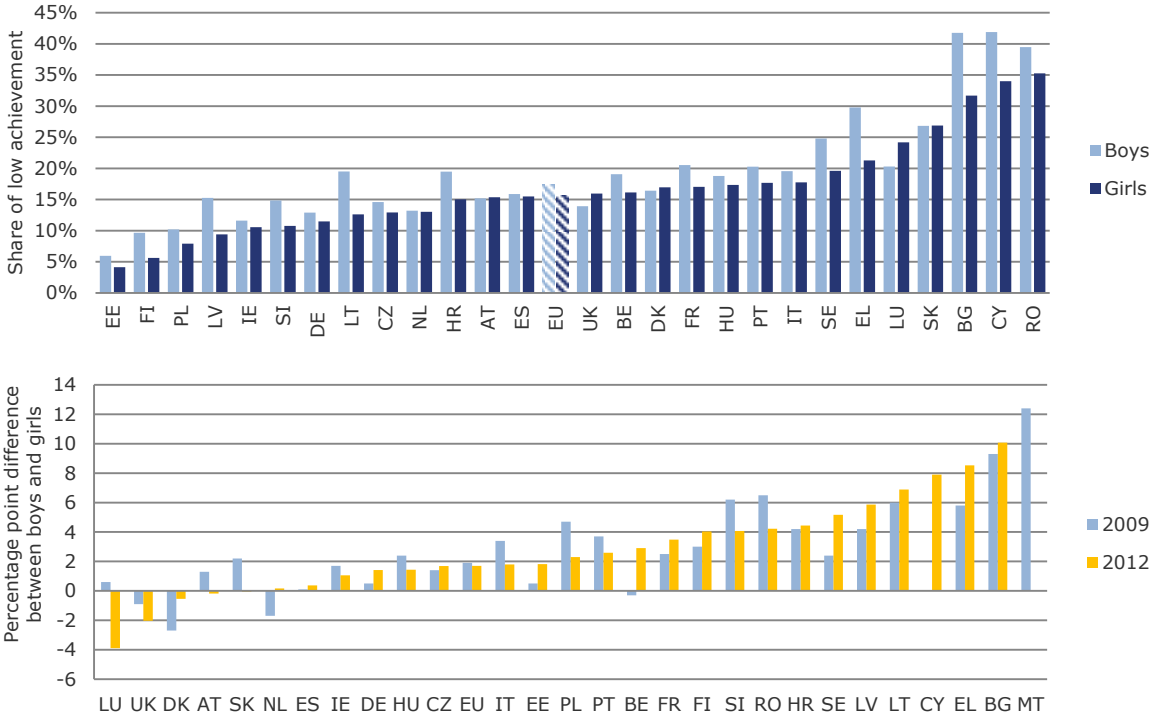


Source: OECD (PISA 2009 and 2012). Note: Countries are ordered by the performances of girls (above) and by 2012 gaps between boys and girls (below). The gaps between boys and girls are illustrated as the score for boys minus the score for girls.

The gender breakdown amongst the low achievers in science is shown Figure 3.5. It indicates a pattern similar to the one found for mathematics. The share of low achievement in science is 1.7 percentage points higher amongst boys (17.4%) than it is amongst girls (15.7%), but the difference is negligible and has barely changed since 2009 (when it was 1.9 percentage points).

The comparable share of low achievement amongst girls and boys for mathematics and science holds a positive message for the later fields of study in the categories of science, technology, engineering and mathematics (STEM).

Figure 3.5. Share of low achieving boys and girls in science (above) and development of the gender gap for low achievement in science (below)



Source: OECD (PISA 2009 and 2012). Note: Countries are ordered by the performances of girls (above) and by 2012 gaps between boys and girls (below). The gaps between boys and girls are illustrated as the score for boys minus the score for girls.

*Reading: significant disadvantage for boys*

In reading, girls widely outperform boys in all EU countries, especially in the high performing countries<sup>10</sup>. The countries with the largest gender gap are CY, BG and LT (Figure 3.6). The countries that show a smaller gender gap are UK, NL and IE.

Most EU countries narrowed the gender gap between 2009 and 2012, but this accounts only for a change of 1 percentage point at EU level. The countries that show the strongest decrease of their gender gaps between 2009 and 2012 are IE, LU, CZ and SK. EU Member States that show a widening gender gap between 2009 and 2012 are DK, BE, ES, FR, FI, HU, SE, BG and EL. Where countries show an overall increase of the proportion of low achievers in reading (FI, HU, SE and EL), this is largely due to the growing number of low performing boys.

The persistently large reading skills disadvantage of boys is a main cause for slow progress in reducing low achievement

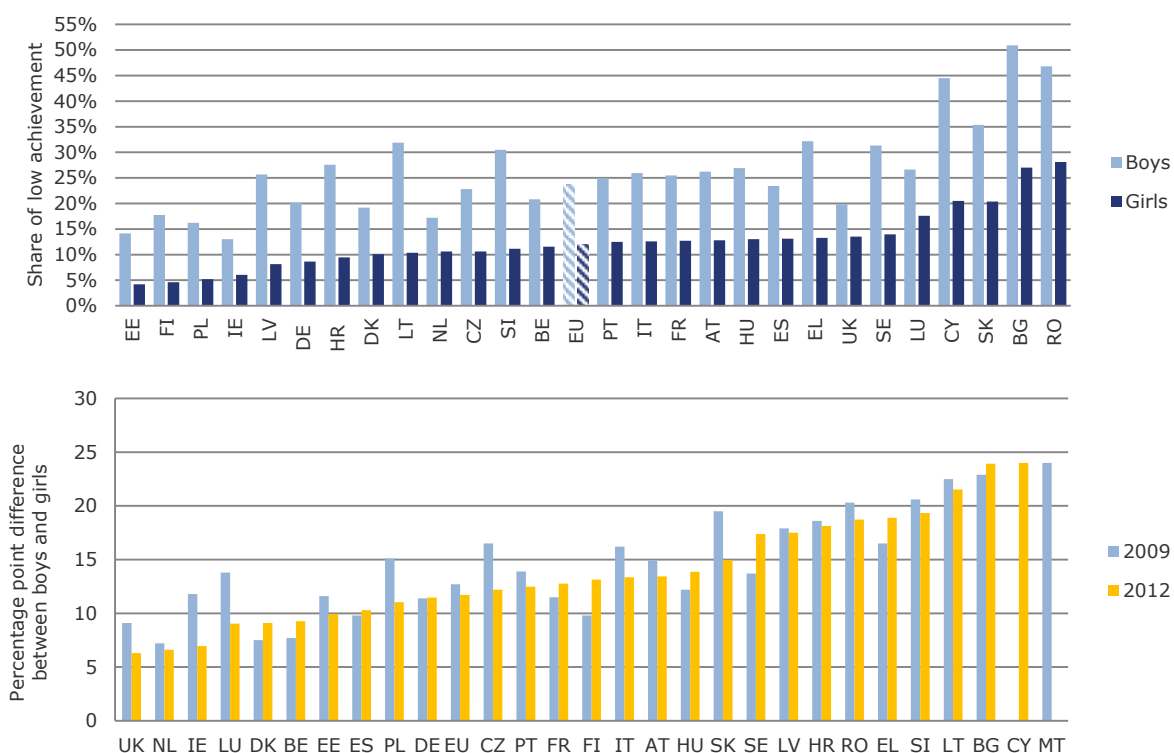
<sup>10</sup> The Survey of Adult Skills (PIAAC) only showed minor differences in the levels of skills among the younger age groups, which are those that participated in previous PISA cycles. It remains to be analysed how these findings relate to the large and persistent gender gap in reading identified in PISA.



### Implications for education and training policies

The nearly universal, persistent and significant gender gap in reading literacy calls for the attention of policy makers<sup>11</sup>. PISA 2012 results also show that almost all underperformance in reading is found amongst boys. These low levels of performance are perhaps related to the low levels of engagement with school and with a low motivation for reading. Therefore, there is a need for specific actions in order to motivate boys to read. This should be done through coherent approaches to reading and writing, taught as essential skills across the curriculum; and through attractive, age- and gender-specific reading material with digital reading as part of the norm in schools. Such approaches must also involve parents and peers to engage boys in reading as a social activity. Engaging male role models in literacy and attracting more men into the teaching professions are other important elements<sup>12</sup>.

Figure 3.6. Share of low achieving boys and girls in reading (above) and development of the gender gap for low achievement in reading (below)



Source: OECD (PISA 2009 and 2012). Note: Countries are ordered by the performances of girls (above) and by 2012 gaps between boys and girls (below). The gaps between boys and girls are illustrated as the score for boys minus the score for girls.

Compared to the large gender gap in reading, the rather insignificant gender gaps in mathematics and science do not require the development of gender-specific policies aimed at tackling low achievement at the level of basic skills.

### 3.3. Performance of students by socio-economic status

Socio-economic status<sup>13</sup> is one of the main determinants for the development of basic skills<sup>14</sup>, driving both individual and country-level performance. In many countries, schools tend to

<sup>11</sup> It has to be noted, however, that the Survey of Adult Skills (PIAAC) shows that this gap may be overcome later in life.

<sup>12</sup> EU High Level Group of experts in the field of literacy, final report 2012: [http://ec.europa.eu/education/literacy/what-eu/high-level-group/documents/literacy-final-report\\_en.pdf](http://ec.europa.eu/education/literacy/what-eu/high-level-group/documents/literacy-final-report_en.pdf).

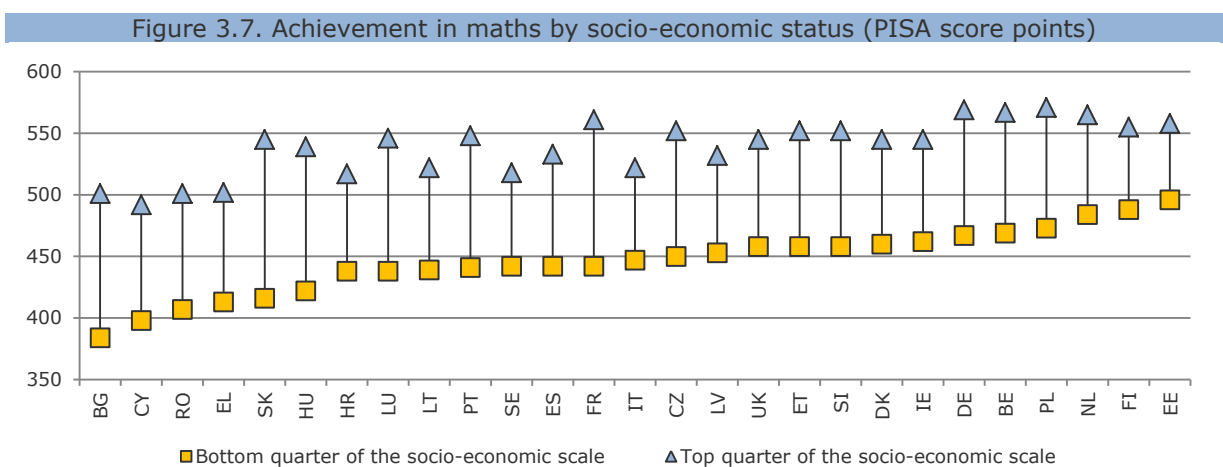
<sup>13</sup> Socio-economic status is a broad concept that summarises many different aspects of a pupil, school or system. In the OECD's PISA study, a pupil's socio-economic status is estimated by the index that is based on such indicators as

reproduce existing patterns of socio-economic advantage, rather than create a more equitable distribution of learning opportunities and outcomes<sup>15</sup>.

**The socio-economic background of a child remains the most influential factor for the acquisition of basic skills**

Figure 3.7 compares the average maths scores for those 15-year-olds at the bottom 25% of PISA's socio-economic index with the average maths scores at the upper 25% of the index. This is not a comparison of extremes. Indeed, 50% of the total sample is covered in this comparison.

The difference in maths score points between the upper 25% and the bottom 25% on the socio-economic index is more than 100 in eight Member States (BG, SK, HU, LU, PT, FR, CZ and DE) which amounts to more than three years of schooling. It is only less than 70 score points in FI and EE. The gaps illustrated in Figure 3.7 capture the persisting inequities found in European education and training systems.



Source: OECD (PISA 2012).

Since 2003 – the last time when PISA provided these breakdowns for mathematics – equity in school achievement has improved for some Member States (most notably BE, DE, NL, SE and DK), whereas it has worsened for others (particularly FR, ES and SK).

**Despite some progress, its growing impact in some countries is worrying**

*Implications for education and training policies*

Socio-economic status is a powerful and universal factor. Addressing this factor may be the key to reducing the level of low achievement in the EU. Member States with larger proportion of disadvantaged students face greater challenges, e.g. PT, ES, HU, BG and RO.

As regards PISA performance as such, some lower performing countries show great variations *within* the country, e.g. BG, SK, HU, PT, IT and LU. This observation points to the need to address possible inequalities between different regions and schools within one and the same country.

<sup>14</sup> parental education and occupation, and the number and type of home possessions related to education. These are considered proxies for wealth and the educational resources available at home.  
<sup>15</sup> Other important individual-level background characteristics, such as migrant status and pre-primary school participation, are to a large extent entangled with discrepancies in socio-economic status. This is why, in order to assess the real impact of migrant background (section 2.4) and pre-primary schooling (section 2.5), socio-economic status has to be held constant, or confounding effects of socio-economic status have to be kept in mind.  
<sup>15</sup> The Survey of Adult Skills (PIAAC) revealed an equally strong impact of socio-economic status on skills levels among adults, pointing to the lasting effects of this factor.

Inequalities in terms of resources or socio-economic development may be a key reason for the observed differences.

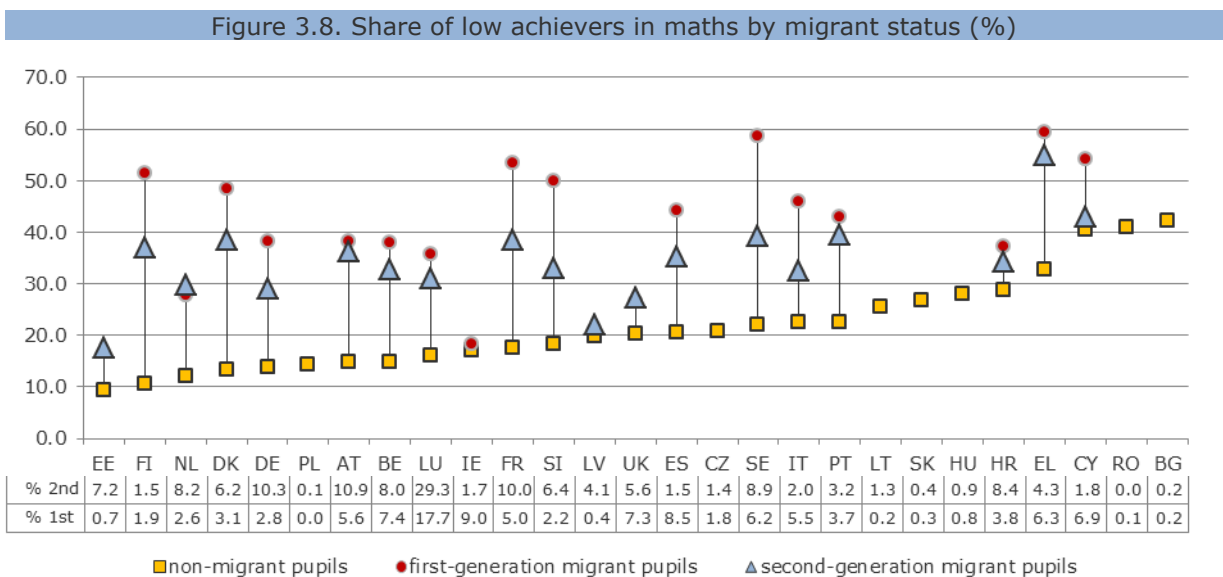
Tackling low achievement in countries facing economic and social hardships may require a concerted effort that involves a variety of actors and resources that go well beyond the sphere of education. Examples are the organization of schools into community learning centres, with the participation of families, public-health and social services, businesses, civic players, public-private partnerships, etc., focusing more on equity and cooperation, and less on choice and competition.

In addition, policies should aim at creating the conditions for early diagnosis of low achievement, monitoring, and provision of the needed support at school level with a special focus on students with disadvantaged socio-economic background. Providing incentives for highly qualified teachers to work with disadvantaged students combined with support structures for teachers to address related impediments can be identified as another important component of such policies.

### 3.4. Performance of students by migrant status

Second generation migrant pupils on average score better than first generation migrant pupils

In almost all Member States, the mathematics skills of migrant students lag behind those for non-migrant students. Second generation students – being born in the host country – generally perform better than first generation students (see Figure 3.8)<sup>16</sup>. Different migrant patterns and immigration policies are, of course, of influence at the country level. The data table below Figure 3.8 captures the share of first- and second-generation migrant students as studied in PISA 2012.



Source: OECD (PISA 2012). Note: Countries are ordered by the performance of non-migrant students. “% 2nd” and “% 1st” refer to the overall percentage of second-generation and first-generation migrants respectively.

The difference between first-generation migrants and their non-immigrant counterparts is significant in several Member States. This gap is between 25 and 40 percentage points in FI, DK, FR, SI, SE, and EL. It is important to note that the overall share of migrant students is marginal in countries such as FI, PL, CZ, LT, SK, HU, RO and BG.

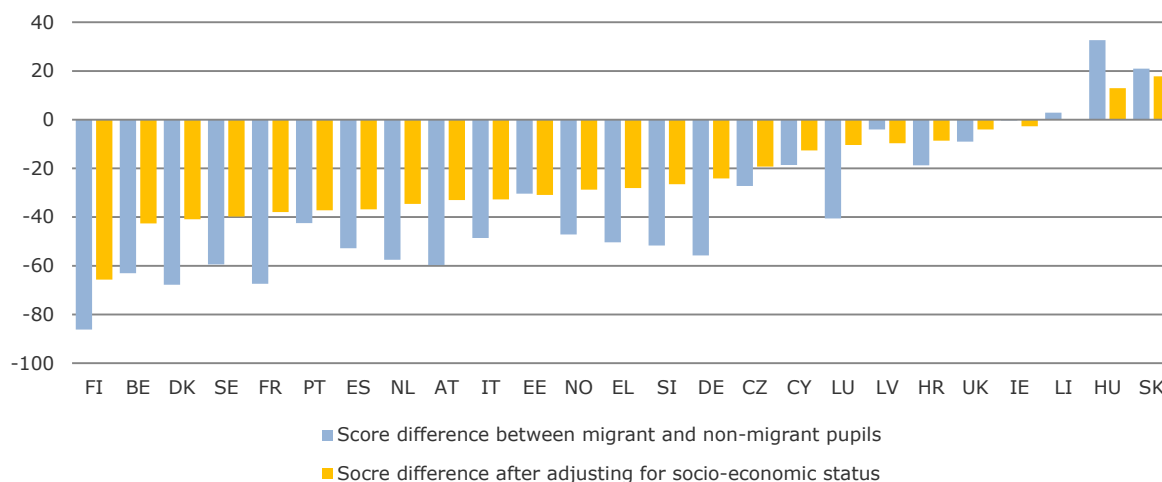
A significant part of the disadvantage observed for migrant pupils is due to their socio-economic status

<sup>16</sup> The Survey of Adult Skills showed varying, but in general smaller effects of migrant status, suggesting that the associated disadvantages can successfully be compensated.

An overlapping determinant is socio-economic status. PISA 2012 shows how part of the difference in mathematics performance between migrant and non-migrant students can be explained by socio-economic status. As can be seen in Figure 3.9, the disadvantage for migrant students is at least 30% smaller in almost all Member States when adjusting for socio-economic status.

What remains of the migrant background effect when adjusting for socio-economic status is partly related to the link between mathematics skills and language skills, due to the language used for the test administered<sup>17</sup>. The reading skills of first generation migrant students are closely related to the age at arrival in the host country and the language spoken at home<sup>18</sup>. Parental support can also be constrained by parents' own difficulties to adapt to the languages and practices of the host country.

Figure 3.9. Difference in maths achievement between migrant and non-migrant students (PISA score points) with and without adjustment for socio-economic status



Source: OECD (PISA 2012).

Since 2003 – the last time PISA provided these breakdowns for the overall PISA math scores – the performance gaps between second-generation migrant students and non-migrant students have been decreasing<sup>19</sup>. At the same time, performance gaps between first-generation migrant students and non-migrant students are increasing in some Member States<sup>20</sup>, where efforts need to be strengthened to help newly arrived migrant children.

### Implications for education and training policies

PISA 2012 points to the examples of IE and DE which have developed specific programmes aimed at migrant and minority children by providing a longer school day in DE and smaller study groups in IE. A recent study on educational support to newly arrived migrant children, produced at the request of the European Commission, has identified some key messages that policy makers should take into consideration while designing integration policies for migrant students<sup>21</sup>.

Two implications for education and training policies, concluded in the study, should be stressed here. Firstly, the integrated approach to the inclusion of migrant students with the involvement of parents and the local community. Therefore, policy makers should pay more attention to the

<sup>17</sup> The TIMSS 2011 survey showed that mathematics achievement is higher for students who frequently speak the language of the test at home: [http://www.iea.nl/timss\\_2011.html](http://www.iea.nl/timss_2011.html).

<sup>18</sup> [http://ec.europa.eu/education/lifelong-learning-policy/monitor12\\_en.htm](http://ec.europa.eu/education/lifelong-learning-policy/monitor12_en.htm).

<sup>19</sup> For those Member States with breakdown data available for 2003 and 2012. Two striking exceptions to this improvement are Latvia and Czech Republic which may be explained by the comparatively low number of migrants in those countries.

<sup>20</sup> For those Member States with breakdown data available for 2003 and 2012. Three striking exceptions to this worsening trend are Germany, Ireland and Belgium.

<sup>21</sup> [http://ec.europa.eu/education/more-information/doc/migrants/report\\_en.pdf](http://ec.europa.eu/education/more-information/doc/migrants/report_en.pdf).

overall structure of the education system and its effects on the inclusion of migrant students rather than the individual support measures. This integrated approach should provide equal opportunities for migrant students to develop, as much as possible, within the mainstream education system and guarantee additional or remedial support in all areas, not only host language teaching.

The second implication is about autonomy and accountability of schools. Even though this issue is not migrant-specific, schools and municipalities should be given a reasonable level of autonomy – so that they can better address the specificities of local needs in regard to migrant children – while at the same time being accountable for their performance.

### 3.5. Performance of students by participation in ECEC<sup>22</sup>

Early foundations for the development of basic skills are crucial. Having attended pre-primary school for more than one year vastly increases average maths scores at age fifteen (see Figure 3.10). The difference between those having attended pre-primary school for more than one year and those not having attended pre-primary school at all is no less than 100 score points on the PISA 2012 mathematics scale for SK and FR. And even between those who attended pre-primary school for more than one year and those who attended pre-primary school for one year only, the difference in average maths performance is over 60 score points in FR, BE and DE.

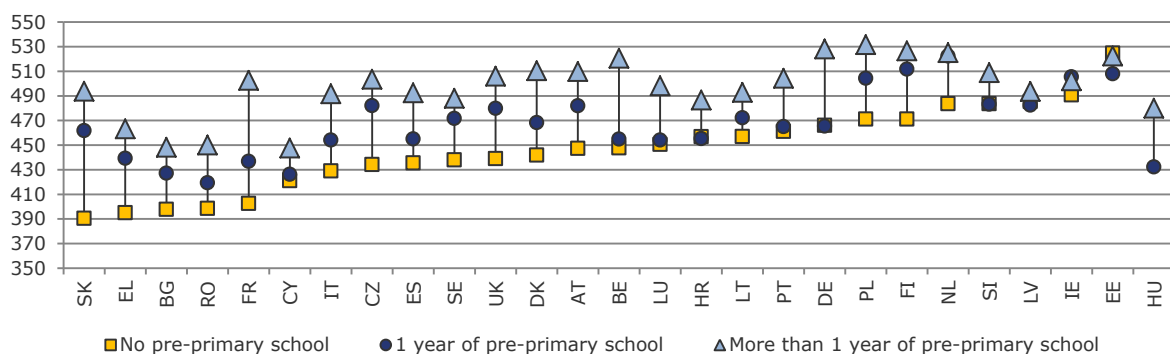
**Pupils who did not attend pre- primary school show a clear skills disadvantage...**

The disadvantage for students who did not attend pre-primary school at all is indisputable. In no less than twelve Member States, the likelihood of ending up amongst the bottom 25% of maths performers is doubled when students did not attend pre-primary school (SK, EL, FR, IT, CZ, UK, DK, BE, ES, SE, RO, BG).

It has to be noted, however, that in the majority of Member States the share of students that never attended pre-primary school is marginal (see Figure 3.11). Similarly, the latest available data on this ET 2020 benchmark show that in 2011, the EU average ECEC participation was already 93.2%<sup>23</sup>. Some Member States have ECEC participation rates at or close to 100% (ES, FR, IE, NL, BE). This might limit the comparability of the PISA scores for the group that did not attend pre-primary education.

**... but thanks to the recent build-up of early childhood education, they constitute an ever smaller group**

Figure 3.10. Achievement in maths by participation in pre-primary school (PISA score points)



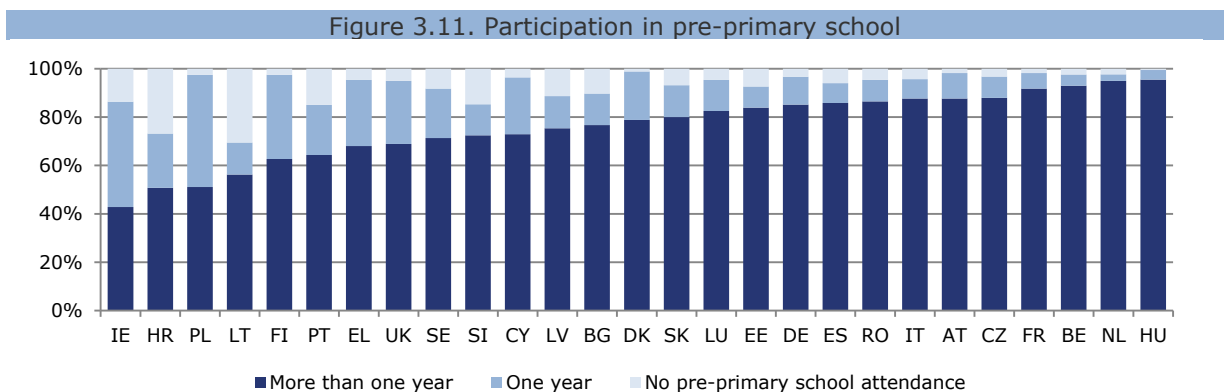
Source: OECD (PISA 2012).

<sup>22</sup> According to the Council Conclusions on ECEC (2011/C 175/03), the concept of ECEC includes pre-primary schools but also other arrangements for children between 0 and compulsory school age.  
<sup>23</sup> See the 2013 Education and Training Monitor (chapter 3) at <http://ec.europa.eu/education/monitor>.

The discussion is, however, not just about pre-primary school attendance. Comparable results from TIMSS 2011<sup>24</sup> show that engaging in early literacy and numeracy exercises before starting primary school is crucial in raising later achievement. Most importantly, high-quality ECEC reduces the negative effect of a disadvantaged family background. This strengthens the argument not only for universal participation in early childhood education and care, but also for a closer look at the quality of its provision. Recent developments in the field of ECEC have indeed been focusing on factors affecting quality<sup>25</sup>.

### Implications for education and training policies

The importance of the ECEC factor in tackling low achievement in basic skills requires Member States to provide access to child care and education for all and to raise the quality of the provision. Only high-quality ECEC can support development of positive attitudes to learning and equip children with initial capital of perseverance and resilience, factors which are keys to staying engaged in learning later in life. High quality ECEC requires well-integrated services of care and education that build on a joint vision of the role of ECEC and balance well the development of intellectual and social skills. It requires the most effective curricular frameworks, and highly qualified staff capable of addressing diverse needs. Coherent inter-sectorial governance arrangements are necessary to deliver it in the most effective manner and ensuring its cost-effectiveness.



Source: OECD (PISA 2012).

Policies should aim at widening access in an inclusive way to high-quality ECEC services, by giving access to disadvantaged groups to mainstream facilities and by establishing comprehensive integrated services (including measures targeting child protection, health, housing, integration), which are particularly beneficial for the disadvantaged. It is important to ensure that high-quality ECEC is available locally at subsidized rates, especially when disadvantaged families are clustered in a specific geographic area.

## 4. A first comparison of PISA 2012 and PIAAC: similarities and differences

The OECD’s Survey of Adult Skills (PIAAC) collected information on the proficiency of people beyond the age 15 in the area of literacy and numeracy. This allows comparing mean proficiency scores of people aged 16-24 with results from PISA on achievements at the age of fifteen. The

<sup>24</sup> [http://www.iea.nl/timss\\_2011.html](http://www.iea.nl/timss_2011.html).

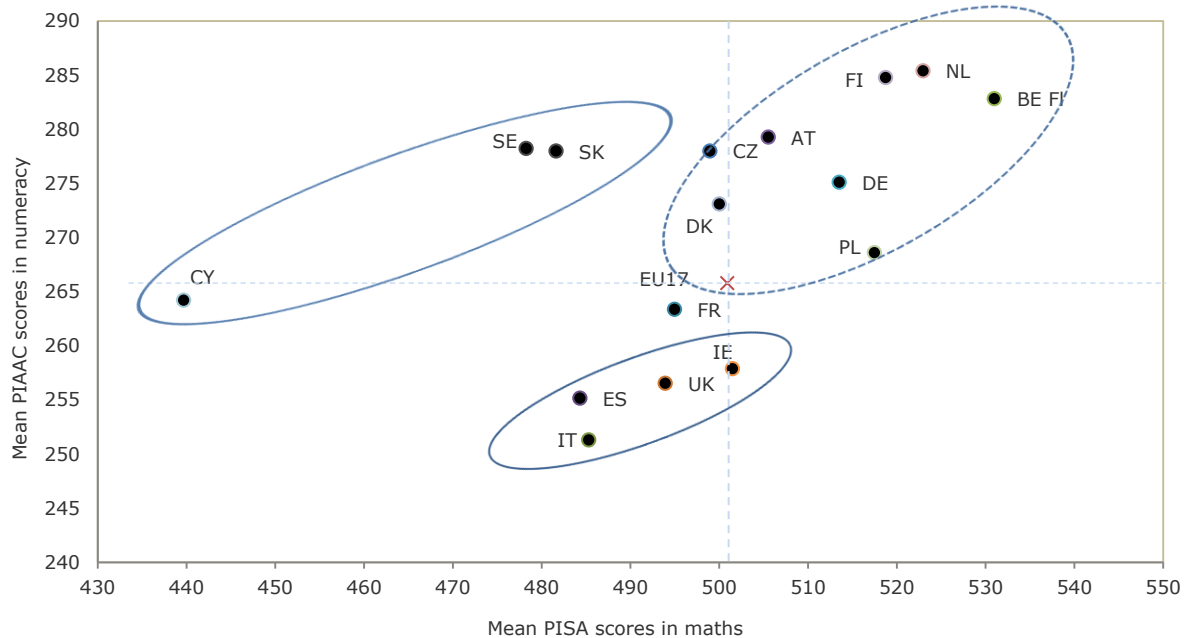
<sup>25</sup> The thematic working group on ECEC working within the Open Method of Coordination is addressing quality issues set out in the latest policy documents (COM(2011)66 final and OJ 2011/C 175/03). The group is currently developing a European Quality Framework that will cover areas such as access, workforce, curriculum, evaluation and monitoring, and funding.

comparison can be made for 17 EU Member States<sup>26</sup>. Figure 4.1 distinguishes three groups of countries with reference to EU mean scores in mathematics/numeracy tests<sup>27</sup>.

- Four countries (IE, ES, IT and UK) with mean scores in maths (age 15) and in numeracy (age 16-24) both below or close to EU average;
- Ten countries (CZ, DK, DE, EE, NL, AT, FI, BE FL and to a lesser extent FR and PL) with mean scores in maths (age 15) and in numeracy (age 16-24) both higher or close to EU average;
- Three countries (CY, SK and SE) with better results from the tests at the age 16-24 than those obtained at the age 15. Mean scores are below EU average in maths (age 15) but above or close to EU average in numeracy (age 16-24).

Comparing results on reading at the age 15 (PISA) with results from the Survey of Adult Skills (PIAAC) in literacy (see figure 4.2) brings similar conclusions although CZ, DK and AT are closer to SE in the group (c) defined above and IE is closer to the situation of PL in group (b).

Figure 4.1. Average performance of 15 year olds in PISA 2012 (mathematics) and 16-24 year olds in PIAAC (numeracy)



Sources: OECD (PISA 2012, PIAAC 2012).

These patterns are an obvious echo of the occurrence of low achievers in reading and maths at the age 15 and low performers in literacy and numeracy<sup>28</sup> just beyond the age 15. The following features are based on the country grouping presented above.

- Low performers in ES, IT and UK represent above 20% of people aged 15 for maths and 16-24 for numeracy, above 15% for reading and literacy (few points less in IE except for numeracy). In IE and UK, the proportion of low performers tend to be larger at the age 16-24 than at the age 15. This is also the case for IT for literacy tests.

<sup>26</sup> Reported as "EU17": Austria, Belgium (Flanders), Cyprus, Czech Republic, Denmark, Estonia, United Kingdom (England/Northern Ireland – 87% of the UK working age population), Finland, France, Germany, Ireland, Italy, Netherlands, Poland, Slovak Republic, Spain, Sweden.

<sup>27</sup> People aged 16-24 in 2011 (average age 20) were 15 years old in 2006. Looking at 2006 PISA results allows tracking the same cohort of people. This brings to conclusions similar to those drawn in this section (no data for that year in CY).

<sup>28</sup> See [http://ec.europa.eu/education/news/20131008\\_en.htm](http://ec.europa.eu/education/news/20131008_en.htm), in particular Key finding (1). Low proficiency corresponds to level 1 and below.

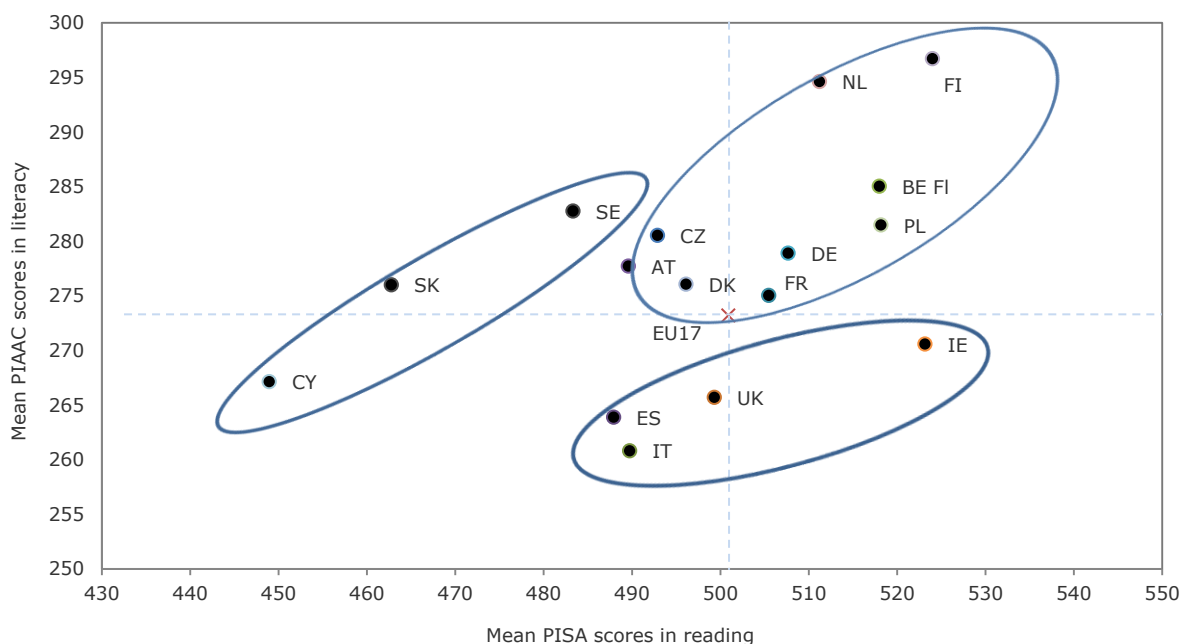
- b) In countries with mean scores close to or above EU average at the ages 15 and 16-24, low performers tend to be fewer at the age 16-24 than at the age 15 proportionally (except in PL for numeracy: 2 percentage points more). The percentage of low performers shrinks more across ages in CZ, BE FI, AT and NL for all tests as well as in FI for reading and literacy (at least 5 points less in all these cases).
- c) In CY, SK and SE, the percentage of low achievers at the age 15 is above 25% in reading and maths (23% in reading for SE). Low performers at the age 16-24 are significantly fewer proportionally, about 15 % or less for both literacy and numeracy.

#### Implications for education and training policies

The PISA results are an important source for reflection for educational policy decisions because PISA assesses performance in the basic skills of maths, literacy and science at the most critical age of children: the age of 15 is towards the end of compulsory education. This is the time when some fundamental decisions for the future career choices are being made by children and their parents.

The Survey of Adult Skills' results complement the picture by indicating that skills developed early in life play a decisive role, but the window of opportunity for the acquisition of basic skills gradually closes with age. Therefore, to be effective, policy efforts need to focus on improvement of primary and secondary school education. Beyond that it is usually too late to compensate for the missed opportunity in school.

Figure 4.2. Average performance of 15 year olds in PISA 2012 (reading) and 16-24 year olds in PIAAC (literacy)



Sources: OECD (PISA 2012, PIAAC 2012).

The Survey of Adult Skills also demonstrates that there are significant differences among and within countries. There are countries where the contribution of secondary education towards the development of basic skills is insufficient, with important variations in performance between lower and upper secondary education. Therefore, the quality of different stages of school education and the transitions between them will need further investigation and development.



## 5. Performance in PISA 2012 and the 2013 country specific recommendations

### 5.1. Countries with country-specific recommendations in 2013 in policy areas assessed in PISA

In the 2013 European Semester, 13 countries received a country-specific recommendation (CSR) in policy areas related to PISA. Those recommendations can be grouped into three broad fields: school system (also including early school leaving and basic skills), disadvantaged groups and the teaching profession. Overall, school systems are covered for 10 countries, disadvantaged groups for 7 countries and the teaching profession for 3 countries.

For the 13 countries with a PISA-related CSR, Table 5.1 first presents an overview of the overall shares of low achievers in reading, maths and science in 2012 and their recent trends; then it highlights the most interesting results according to the following sub-categories: gender; socio-economic status; migrant status<sup>29</sup>; participation in early childhood education and care (ECEC).<sup>30</sup>

As regards the shares of low achievers and their recent trends as presented in the previous sections, these 13 countries can be clustered into 4 groups:

- 1) Countries with shares of low achievers below or close to the EU average AND improving trend: AT, CZ, DE, ES (with the exception of maths) and PL.
- 2) Countries with shares of low achievers below or close to the EU average AND broadly stable performance: DK, UK (with the exception of maths).
- 3) Countries with shares of low achievers higher than the EU average AND improving trend: BG, IT, LU (with the exception of maths), RO.
- 4) Countries with shares of low achievers higher than the EU average AND worsening trend: HU, SK.

Concerning the breakdowns discussed in this analysis, the following challenges can be identified: gender gaps in performance are particularly high in BG (reading and science), LU (maths), RO (reading) and SK (reading). The relationship between socio-economic status and performance appears very strong in BG, CZ, DE, HU, LU and SK. Secondly, in DE, ES and IT, there is a large performance gap between native-born and first-generation migrants, but the performance of second-generation migrants significantly improves compared to first-generation ones. By contrast, in AT, DK and LU a large performance gap between native-born and first-generation migrants is coupled with limited improvement for second-generation migrants compared to first-generation ones. Finally, the relationship between ECEC participation and performance is very strong in SK, which also has one of the lowest participation rates among EU countries (76.9% in 2011).

Table 5.1. 2013 country-specific recommendations and performance in PISA

Country	2013 CSR relevant to PISA	Performance in PISA 2012
AT	CSR 5: Improve educational outcomes, in particular of disadvantaged young people, including by enhancing early childhood education and reducing the negative effects of early tracking. Field: disadvantaged groups.	Share of low achievers somewhat lower than the EU average in maths and science, but somewhat higher in reading. After significantly worsening between 2006 and 2009, performance improved and is close to that of 2003 in reading and maths and to that of 2006 in science. Quite high (and increasing) gender gap in maths; no gender gap in science. Large performance gap between native-born and first-generation migrants; second-generation migrants only perform slightly better than first-generation ones.

<sup>29</sup> Data on migrants are not available for BG, CZ, HU, PL, RO, SK.

<sup>30</sup> Only results in maths are available for socio-economic status, migrant status and participation in ECEC.

<b>BG</b>	CSR 4: Adopt the School Education Act [...]. Improve access to inclusive education for disadvantaged children, in particular Roma. Fields: school system, disadvantaged groups.	Share of low achievers much higher than the EU average in all 3 fields. Improving trend in performance in all 3 fields since 2006. Large gender gap in reading and science; girls outperform boys also in maths. There is a strong relationship between socio-economic status and performance.
<b>CZ</b>	CSR 6: Establish a comprehensive evaluation framework in compulsory education and take targeted measures to support schools that rank low in educational outcomes. Field: school system.	Share of low achievers somewhat lower than the EU average in all 3 fields. Large improvement in reading and science performance compared to 2009; performance in maths slightly improved compared to 2009, but is still worse than in 2003 and 2006. Slightly increasing gender gap in maths compared to 2009. There is a strong relationship between socio-economic status and performance.
<b>DE</b>	CSR 2: Raise the educational achievement of disadvantaged people. Field: disadvantaged groups.	Share of low achievers significantly lower than the EU average in all 3 fields. Improving trend in reading and maths performance since 2003 and in science performance since 2006. There is a strong relationship between socio-economic background and performance, as well as a large performance gap between native-born and first-generation migrants, but significantly better performance for second-generation migrants compared to first-generation migrants.
<b>DK</b>	CSR 2: Implement the reform of primary and lower secondary education in order to raise attainment levels and improve the cost-effectiveness of the education system. Field: school system.	Share of low achievers significantly lower than the EU average in reading and maths, around the EU average in science. Performance in all 3 fields remained broadly stable between 2009 and 2012; performance in maths is worse than in 2003 and 2006. Boys still slightly outperform girls in science, although the gap shrank compared to 2009. Very large performance gap between native-born and first-generation migrants and still large gap between native-born and second-generation migrants.
<b>ES</b>	CSR 5: Continue with efforts to increase the labour market relevance of education and training, to reduce early school leaving and to enhance life-long learning, namely by expanding the application of dual vocational training beyond the current pilot phase and by introducing a comprehensive monitoring system of students' performance by the end of 2013. Field: school system.	Share of low achievers somewhat higher than the EU average in maths, around the EU average in reading and somewhat lower in science. Improving trend in reading and science performance since 2006, no large variation in maths since 2003. Large gap in performance between native-born and first-generation migrants, but significantly better performance for second-generation migrants compared to first-generation migrants.
<b>HU</b>	CSR 6: Implement a national strategy on early school-leaving [...]. Improve access to inclusive mainstream education, for those with disadvantages, in particular Roma. Support the transition between different stages of education. Fields: school system, disadvantaged groups.	Share of low achievers somewhat higher than the EU average in reading and science, significantly higher in mathematics. Worsening performance in all 3 fields compared to 2009, but especially in maths and science; reading performance is however better than in 2006 and 2003. There is a strong relationship between socio-economic status and performance.
<b>IT</b>	CSR 4: Step up efforts to prevent early school leaving. Improve school quality and outcomes, also by enhancing teachers' professional development and diversifying career development. Fields: school system, teaching profession.	Share of low achievers somewhat higher than the EU average in all 3 fields. Improving trend in reading and science performance since 2006; stagnation in maths compared to 2009, but better performance than in 2003 and 2006. Slightly increasing gender gap in maths compared to 2009. Moderate relationship between socio-economic background and performance; large performance gap between native-born and first-generation migrants, but significantly better performance for second-generation migrants compared to first-generation migrants.
<b>LU</b>	CSR 5: Strengthen general and vocational education to better match young people's skills with labour demand, in particular for people with migrant background. Fields: school system, disadvantaged groups.	Share of low achievers significantly higher than the EU average in reading and science, somewhat higher in maths. Improving performance in reading and science compared to 2009, but not to 2006; slightly worsening trend in maths performance since 2003. Large and increasing gender gap in maths performance; boys significantly outperforms girls in science. There is a strong relationship between socio-economic background and performance and second-generation migrants only perform slightly better than first-generation ones.
<b>PL</b>	CSR 3: Improve the quality of teaching. Field: teaching profession.	Share of low achievers significantly lower than the EU average in all 3 fields. Large improvement in all 3 fields compared to 2009. Girls outperform boys in maths.
<b>RO</b>	CSR 5: Speed up the education reform including the building up of administrative capacity at both central and local level and evaluate the impact of the reforms. [...]. Implement a national strategy on early school leaving focusing on better access to quality early childhood education, including for Roma children. Fields: school system, disadvantaged groups.	Share of low achievers much higher than the EU average in all 3 fields. Improving trend in all 3 fields since 2006. Large gender gap in reading.

<b>SK</b>	CSR 4: Take steps to attract young people to the teaching profession and raise educational outcomes [...]. Step up efforts to improve access to high-quality and inclusive pre-school and school education for marginalised communities, including Roma. Fields: school system, disadvantaged groups, teaching profession.	Share of low achievers significantly higher than the EU average in all 3 fields. Large worsening in performance in all 3 fields compared to 2009; however, reading performance is close to 2006 levels. No gender gap in maths and science performance. Large (although decreasing) gender gap in reading performance. There is a strong relationship between socio-economic status and performance, as well as between participation in early childhood education and care (ECEC) and performance (combined with a low participation rate in ECEC).
<b>UK</b>	CSR 3: Reduce the number of young people aged 18-24 who have very poor basic skills. Field: school system.	Share of low achievers somewhat below the EU average in reading and science, around the EU average in maths. Improving trend in reading, but worsening trend in maths since 2006; stagnation in science compared to 2009, but better performance than in 2006. In all 3 fields, the share of low performing girls is higher than the EU average; in science, boys outperform girls. Very low performance gap between native-born and migrants (with no significant difference between first-generation and second-generation ones).

## 5.2. Countries with no CSRs in 2013 but challenges identified in PISA

There are a further 10 countries, listed in Table 5.2, which did not receive a CSR in 2013 in policy areas related to PISA, although the 2012 PISA results now suggest a need for closer monitoring. 4 out of the 10 countries are either “programme countries” (CY, EL, PT) or a new Member State (HR). With regard to the share of low achievers and recent trends, in the following countries the share of low achievers is higher than the EU average AND the trend is worsening: EL, PT and SE. In addition, the share of lower achievers is significantly higher in CY than the EU average, however no trend for CY can be analysed, as data is only available for 2012.

Concerning the breakdowns discussed in the analysis above, firstly, gender gaps in performance are particularly high in HR (reading), EL (reading, science), LT (reading, science) and LV (reading). Secondly, the relationship between socio-economic status and performance appears to be very strong in FR and PT. Finally, in CY, FI, SE and FR, there is a large performance gap between native-born and first-generation migrants, but the performance of second-generation migrants significantly improves compared to first-generation ones. By contrast, in BE, EL and PT a large performance gap between native-born and first-generation migrants is coupled with limited improvement for second-generation migrants compared to first-generation ones.

Table 5.2. No country-specific recommendations in 2013 and but challenges shown in PISA

Country	Performance in PISA 2012
<b>BE</b>	Share of low achievers is lower in reading and maths, and somewhat higher in science than the EU average. Improving trend in reading and stagnation in maths and science over the last decade. Big gender gap in reading, although not more significant than the EU average. Large gap in performance between native-born and first-generation migrants and still large gap between native-born and second-generation migrants.
<b>CY</b> Programme country	Share of low achievers is significantly higher (twice as many low achievers) than the EU average in all 3 fields. There is a gap in performance between native-born and first-generation migrants but the performance of second-generation migrants is close to the native-born.
<b>EL</b> Programme country	Share of low achievers is higher than the EU average in all 3 fields, and significantly higher in reading. Slightly worsening trend in performance in all 3 fields compared to 2009 and stagnation in all 3 fields over the last decade. Important gender gap both in reading and in science i.e. girls outperform boys. Large gap in performance between native-born and first-generation migrants and still large gap between native-born and second-generation migrants.
<b>FI</b>	Share of low achievers is significantly below the EU average. However, worsening performance compared to 2009, with a continuous worsening trend since 2006 in all 3 domains. Large gap in performance between native-born and first-generation migrants but significantly better performance for second-generation migrants compared to first-generation migrants. (See, however, the data table below Figure 3.8.)
<b>FR</b>	Share of low achievers is somewhat higher than the EU average, with a slightly improving trend since 2009, in all 3 domains. There is a strong relationship between socio-economic status and student performance. There is also a large gap in performance between native-born and first-generation migrants but significantly better performance for second-generation migrants compared to first-generation migrants.
<b>HR</b> New Member State	Share of low achievers is above the EU average in all 3 domains, with the highest gap in reading, but there is an improving trend in all 3 domains compared to 2009. There continues to be a large gender gap in reading, over a quarter of boys being low achievers.

<b>LT</b>	Share of low achievers is higher than the EU average in reading and maths, but below the EU average in science. Improving trend compared to 2009 in all 3 domains. Large gender gap in reading (share of low achieving boys is 3-times higher than low achieving girls), although the gap became slightly smaller compared to 2009, and in science, with an increased gap.
<b>LV</b>	Share of low achievers is below the EU average in all 3 domains and there is an improving trend compared to 2009 in all 3 domains. There continues to be a large gender gap in reading, over a quarter of boys being low achievers.
<b>PT</b> Programme country	Share of low achievers is somewhat higher than the EU average in all 3 domains. Worsening performance in all 3 fields compared to 2009, especially in science, although better performance in all 3 fields than in 2006. There is a strong relationship between socio-economic status and student performance. There is also a large gap in performance between native-born and first-generation migrants and still large gap between native-born and second-generation migrants.
<b>SE</b>	Share of low achievers is higher than the EU average in all 3 domains. Worsening performance compared to 2009, with a continuous worsening trend since 2003 in all 3 domains. Large gap in performance between native-born and first-generation migrants but significantly better performance for second-generation migrants compared to first-generation migrants.

## 6. Conclusions

PISA 2012 reveals mixed results for Member States. The EU results as a whole are positive for science and reading where Europe is on track to achieve its 2020 target for reducing the percentage of low achievers to below 15%. However, the EU is lagging behind in maths. The findings reveal that ten Member States (BG, CZ, DE, EE, IE, HR, LV, AT, PL and RO) have achieved significant progress in diminishing their share of low achievers across all three basic skills since 2009. But five EU countries (EL, HU, SK, FI, SE) have seen an increase in the number of low achievers.

Barriers relating to gender, socio-economic status and migration need to be overcome. Policies will need to look at what motivates young people to learn; to explore; to excel; how to change their attitudes and their engagement with school; how to give them new tools and instruments; how to teach them to steer the learning process and, more importantly, how to ensure that they work with the best qualified teachers. PISA results show that change and progress is possible in all circumstances and in all education systems, whatever the starting point is. But even in well-performing countries there can be challenges. Co-operation at EU level can provide significant assistance.

There is a positive relationship between spending per student and mean mathematics performance - expenditure per student explains 17% of the variation in mean performance between countries. However, moderate spending per student cannot simply be equated with poor performance. Some of the higher performing countries have significantly lower spending per student than other countries that perform similarly. Therefore, the main challenge is not about increasing spending but about investing better, with stronger returns to investment.

This preliminary analysis holds important messages for the 2014 European Semester and helps strengthening the evidence-base in the EU coordination of education and training policies. Key findings from PISA 2012 can be used in the peer-learning exercises that the European Commission initiates - and will be crucial in Member States' efforts to reach the 2020 benchmark.

## Annex 1: Country abbreviations

AT	Austria
BE	Belgium
BE FL	Belgium – Flemish Comm.
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
EU	European Union
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom
CH	Switzerland
IS	Iceland
LI	Liechtenstein
MK	The former Yugoslav Republic of Macedonia
NO	Norway
TR	Turkey
AU	Australia
CA	Canada
KO	South Korea
JP	Japan
US	United States of America