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PISA 2009: How does the social attainment gap in England compare with countries internationally?

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The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Education.

Summary

Socio-economic background

- Pupils in England score more highly in terms of social, economic and cultural status than pupils across all OECD countries. In particular, disadvantaged pupils in England are not as disadvantaged as in the average OECD country.

Attainment

- The distribution of pupil attainment in the PISA 2009 reading assessment for pupils in England is very similar to the average for OECD countries and there is no obvious association between average pupil performance in different countries and how widespread pupil results are.

Social attainment gaps

- Social attainment gaps in England are known to be wide, when measured in terms of the gap in attainment at GCSE between FSM pupils and their peers. In PISA publications, social attainment gaps are measured in a different way, based on the OECD's "index of socio-economic status", which makes comparisons between findings from the two sources difficult.

- This report shows that when putting these different measures onto a comparable basis, the size of attainment gaps measured using PISA points and GCSE grades are in fact the same.

- For example, the gap in average PISA reading scores between non-FSM and FSM pupils is virtually identical to the gap between similarly sized groups of pupils split using the OECD's deprivation index. The same is true for PISA mathematics and science scores.

- Similarly, the gap in English GCSE attainment is one GCSE grade whether pupils are split into groups by FSM eligibility or using the OECD's deprivation index.

- Looking at overall attainment, the gap in attainment of the 5A*-C (inc English and mathematics) threshold measure is also similar whether based on FSM eligibility or using the OECD's deprivation index.

Relationship between pupil socio-economic background and attainment

- Using the full OECD deprivation index, the relationship between pupil socio-economic background and attainment can be described in a number of different ways, including:
  - **impact** - how much of a difference scoring higher on the socio-economic scale has on pupil attainment;
  - **strength** – the extent to which factors other than socio-economic background explain variation in pupil attainment (hence a lower strength indicates socio-economic background does not have such a strong hold on pupil attainment as the variation is dependent on a number of other factors too).

- In England the **impact** of pupils' socio-economic background is significantly higher than the OECD average. This indicates that the difference in the attainment of two pupils a set distance apart on the scale of socio-economic deprivation in England is, on average, larger than it would be in other OECD countries.

- England is not the only country in which socio-economic status has a high impact on attainment. Indeed this is also true for some high performing PISA participants, namely: New Zealand, Australia, Singapore and Belgium. However, there are high performing education systems where socio-economic background does not have such a high impact on attainment. Hong Kong does particularly well for its socially and economically disadvantaged students as, compared to England, do Canada, Finland, Iceland, Korea and Shanghai-China.

- Pupils in the bottom half of the OECD's socio-economic scale in England perform less well than their peers in the bottom half of the distribution across the OECD despite not being as disadvantaged. Conversely, pupils in the poorest half of the socio-economic distribution in Hong Kong, Korea and Shanghai-China are substantially more disadvantaged than in England, but the attainment levels they reach are comparable with the attainment of pupils in England with above average socio-economic backgrounds.

- In England the **strength** of the relationship between pupil attainment and socio-economic background is similar to the OECD average. This indicates that student attainment is no more closely related to social-economic background than on average across the OECD.

Average pupil attainment after controlling for social economic background

- Using statistical methods it is possible to control for differing socio-economic background between countries and to say how pupils may have performed in PISA 2009 if they all had equal socio economic background. Were we to control for pupil background in this way, the most notable changes to average pupil attainment would be:
    - Average pupil attainment in England would decrease slightly;
    - Poland, Chinese Taipei, France, Hungary and Turkey would become significantly higher performing than England;
    - Shanghai-China, Hong-Kong, Singapore and Korea would move even further ahead.

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1. Introduction

OECD state that the relationship between pupils' socio-economic background and performance is a key measure of how equitably a country's education system distributes educational opportunities. This note aims to summarise the OECD's findings and relate them to our own understanding of the social attainment gaps in England. The note covers:

- How the OECD measure pupils' socio-economic backgrounds in PISA (section 2);
- The distribution of pupil attainment in England and how this compares with countries internationally (section 3);
- The association between pupils' socio-economic backgrounds and attainment in England and how this compares with countries internationally (section 4);
- How social gaps reported in PISA compare to the gap reported between pupils known to be eligible for free school meals and their peers in England (section 5);
- How average attainment reported by PISA is affected when we control for pupil background (section 6).

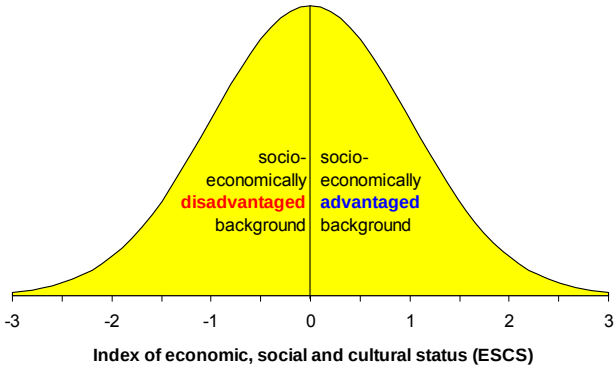
Throughout this note data have been taken from the OECD report *PISA 2009: Overcoming Social Background* and the NPD-PISA 2009 matched dataset provided by the national contractor for PISA 2009 in England, NFER. Comparisons have been made between the position in England and in participating OECD countries and partner countries and economies[1].

2. Index of economic, social and cultural status (ESCS)

The OECD measure students' socio-economic backgrounds using a continuous scale – the PISA index of economic, social and cultural status. This index combines a range of information on parents' education, occupation and home possessions[2].

The values of the index have been standardised across the OECD countries to have a mean of zero and a standard deviation of one so that a positive score indicates a student is more advantaged than the average OECD student and a negative score indicates a more disadvantaged student (figure 1).

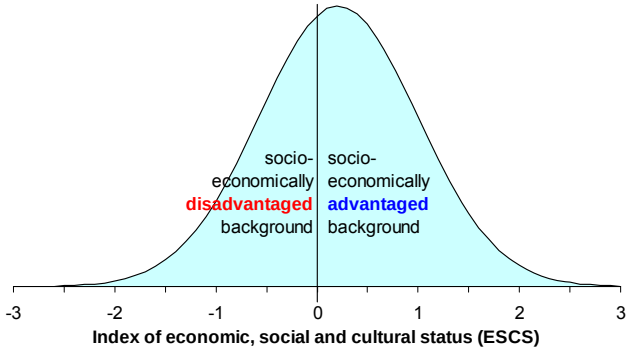
Figure 1: Distribution of pupils' socio-economic backgrounds across OECD countries



2.1 Distribution of pupil ESCS in England

The average pupil ESCS in England in 2009 was equal to 0.21 and the standard deviation 0.79 (figure 2), indicating that an average pupil in England has a more advantaged socio-economic background when compared with the average pupil across all OECD countries and that the spread of pupils on the ESCS index is slightly narrower than across all OECD countries.

Figure 2: Distribution of pupils' socio-economic backgrounds in England



Source: OECD, PISA 2009 Database

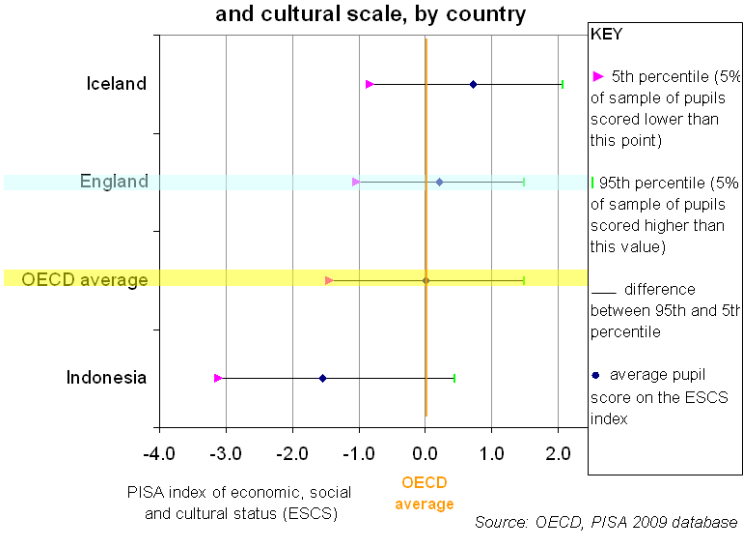
[1] It is important to take into account the marked differences in the distribution of socio-economic characteristics between countries when considering the findings, in particular the proportion of the 15-year old population in some partner countries who are no longer in the school system will have an impact on the inferences drawn from the PISA data on the issue of equity.
[2] See Annex A for a discussion of the nature of this measure and its pros and cons.

2.2 Distribution of pupil ESCS across PISA 2009 participating countries

Annex B provides a chart comparing the average and range of pupil ESCS across all PISA 2009 participating countries. Figure 3 shows these values for England, the OECD average and the PISA 2009 participating countries with the highest and lowest average pupil ESCS (Iceland and Indonesia respectively).

Figure 3:

Average pupil scores and range of scores on the economic, social and cultural scale, by country



Source: OECD, PISA 2009 database

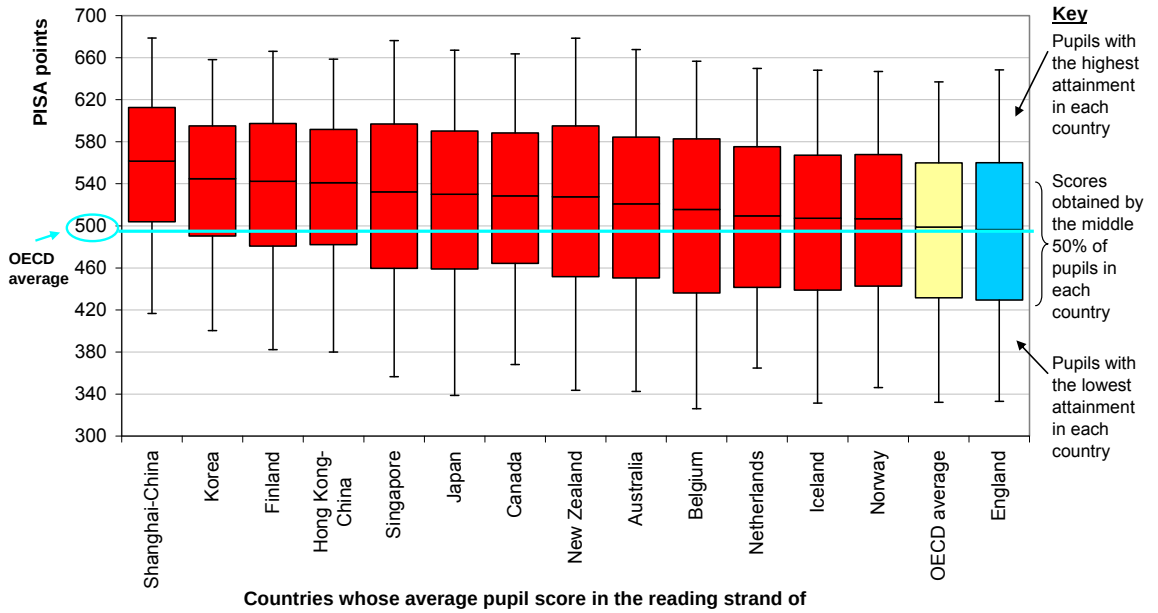
Compared to the OECD average, the range of pupil ESCS in England is lower. This is due to the 5th percentile being higher in England than the OECD, which indicates that the most disadvantaged pupils in England are less disadvantaged in absolute terms than their peers in comparison countries.

3. Distribution of pupil attainment in England

Before examining the relationship between socio-economic background and attainment, it is helpful to consider the distribution of pupil attainment in England. This is in fact very similar to the OECD average picture. Countries where average pupil attainment was significantly above the average for England also showed similar attainment distributions, as can be seen from the box plots in Figure 4. In Shanghai-China, Korea, Finland and Hong Kong-China the distribution of pupil results was slightly narrower than for England; however this is not the case for all top-performing countries – for example both Singapore and Japan have a wider spread of results.

Figure 4:

Box plots to show the distribution of pupils' scores in the 2009 PISA reading assessment for countries where pupils performed significantly higher on average than pupils in England

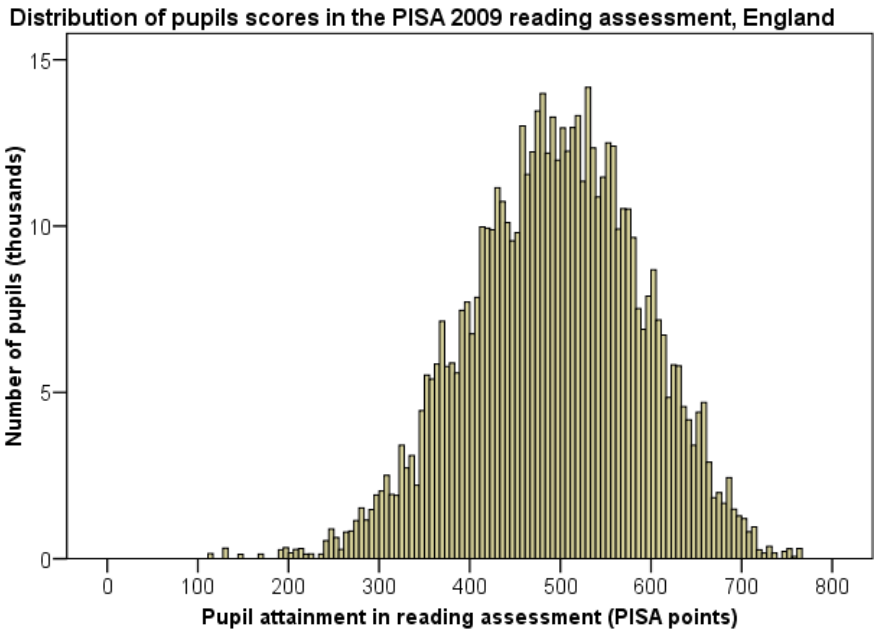


Countries whose average pupil score in the reading strand of PISA 2009 was significantly higher than in England

Source: OECD , PISA 2009 Database

Looking in more detail at the distribution of attainment scores in the PISA 2009 reading assessment for pupils in England, there is evidence of a slight negative skew (skewness = -0.2), indicating that low attaining pupils' scores are further from the average than the scores of high attaining pupils, as can be seen in the histogram in Figure 5 below. Subsequent sections explore whether this distribution of scores is related to socio-economic status.

Figure 5:



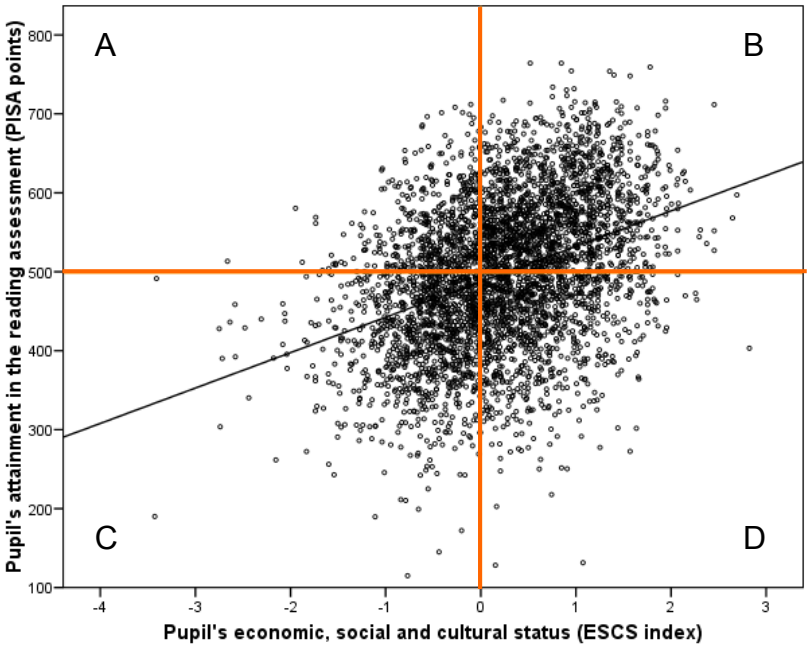
1. Plausible value 1 was used as a measure of pupil attainment in the reading assessment
2. The data has been grossed up to national estimates (base: 570,000 pupils)

Source: OECD, PISA 2009 database

4. Association between socio-economic background and pupil attainment

Figure 6 below depicts the association between pupils' socio-economic background and attainment in the PISA 2009 reading assessment for England. The upwards slope of the socio-economic gradient indicates that pupils with more socio-economically advantaged backgrounds generally perform better. However, as the data points are very spread out we can infer that many pupils do not fit this general trend. The least populated of the quadrants, quadrant A, shows that in England there are relatively few pupils from lower socio-economic backgrounds who have above average attainment.

Figure 6: Scatter plot to show the association between pupils' economic, social and cultural status and their attainment in the PISA 2009 reading assessment



Key

o pupil in England sample

orange lines show average scores across OECD countries

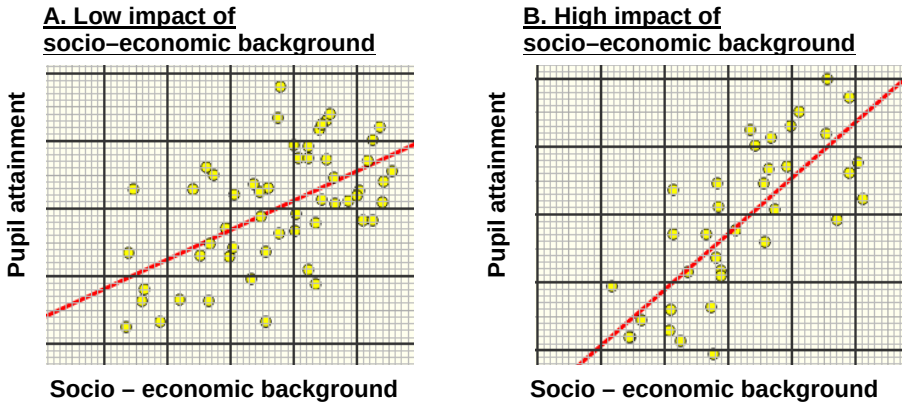
black line shows the socio-economic gradient in England

Source: OECD, PISA 2009 database

4.1 Impact of socio-economic background on attainment

OECD measure the *impact* of the relationship between pupil's socio-economic backgrounds (ESCS score) and their attainment in terms of the steepness of the socio-economic gradient for each participating country. Low values indicate that socio-economic background has less impact on pupil attainment; high values indicate socio-economic background has more impact on pupil attainment, a scatter plot would show a steeper socio-economic gradient in this case (see Figure 7).

Figure 7: Scatter plots to illustrate the difference between low and high impact of socio-economic background on attainment.



In England the slope of the socio-economic gradient is 44, indicating a step of one unit along the ESCS index increases pupil attainment by 44 PISA points. This equates to just over a years progress and is significantly higher than the OECD average of 38. Of the countries where pupils performed significantly higher than England, on average, in the reading assessment:

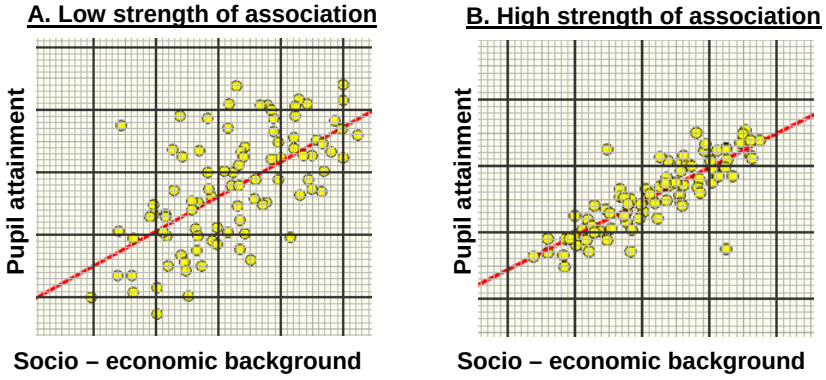
- a significantly steeper socio-economic gradient than the OECD average was found in New Zealand (52), Singapore (47), Belgium (47) and Australia (46);
- a significantly shallower socio-economic gradient than the OECD average was found in Hong Kong-China (17), Shanghai-China (27), Finland (31), Canada (32) and Korea (32).

Annex C shows the slope of socio-economic gradient against the average pupil score in reading for all PISA 2009 participating countries.

4.2 Strength of the relationship between pupils' socio-economic backgrounds and their attainment

OECD also measure the *strength* of the relationship between pupil's socio-economic backgrounds and their attainment in terms of the percentage of variance in pupil scores explained by the pupils' backgrounds. Low values indicate that pupil attainment varies widely, even for pupils with similar backgrounds, while high values indicate that pupil attainment is strongly determined by background, a scatter plot in this case would show points distributed more closely to the line of best fit (Figure 8).

Figure 8: Scatter plots to illustrate the difference between weak and strong associations between pupils' socio-economic backgrounds and attainment.



In England the strength of this relationship is 13.8, very similar to the OECD average of 14.0. This indicates that the amount of variation in pupil attainment explained by the OECD's measure of socio-economic background is no higher than in the average OECD country. Of the countries where pupils performed significantly higher than England, on average, in the reading assessment:

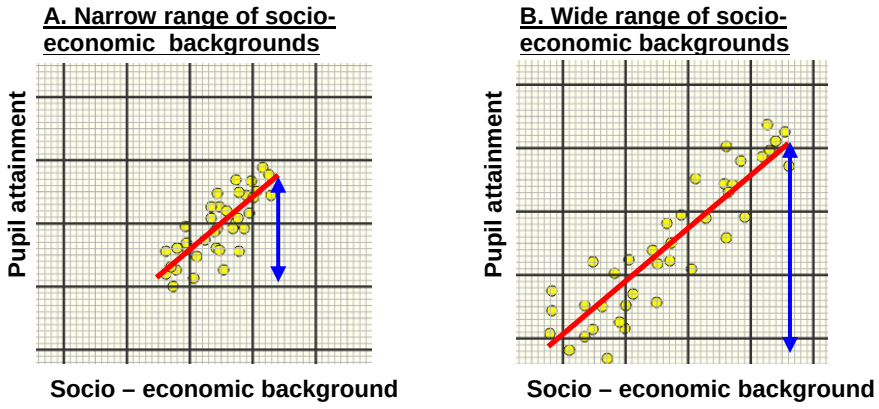
- a significantly lower association between socio-economic background and performance than the OECD average was found in Hong Kong-China (4.5%), Iceland (6.2%), Finland (7.8%), Norway (8.6%), Japan (8.6%) and Korea (11.0%);
- Belgium (19.3%) and New Zealand (16.6%) were found to have a significantly stronger relationship between socio-economic background and performance compared to the OECD average.

Annex D shows average mean score and strength of socio-economic association for all PISA 2009 participating countries.

4.3 Socio-economic gradient in the context of a country's economy

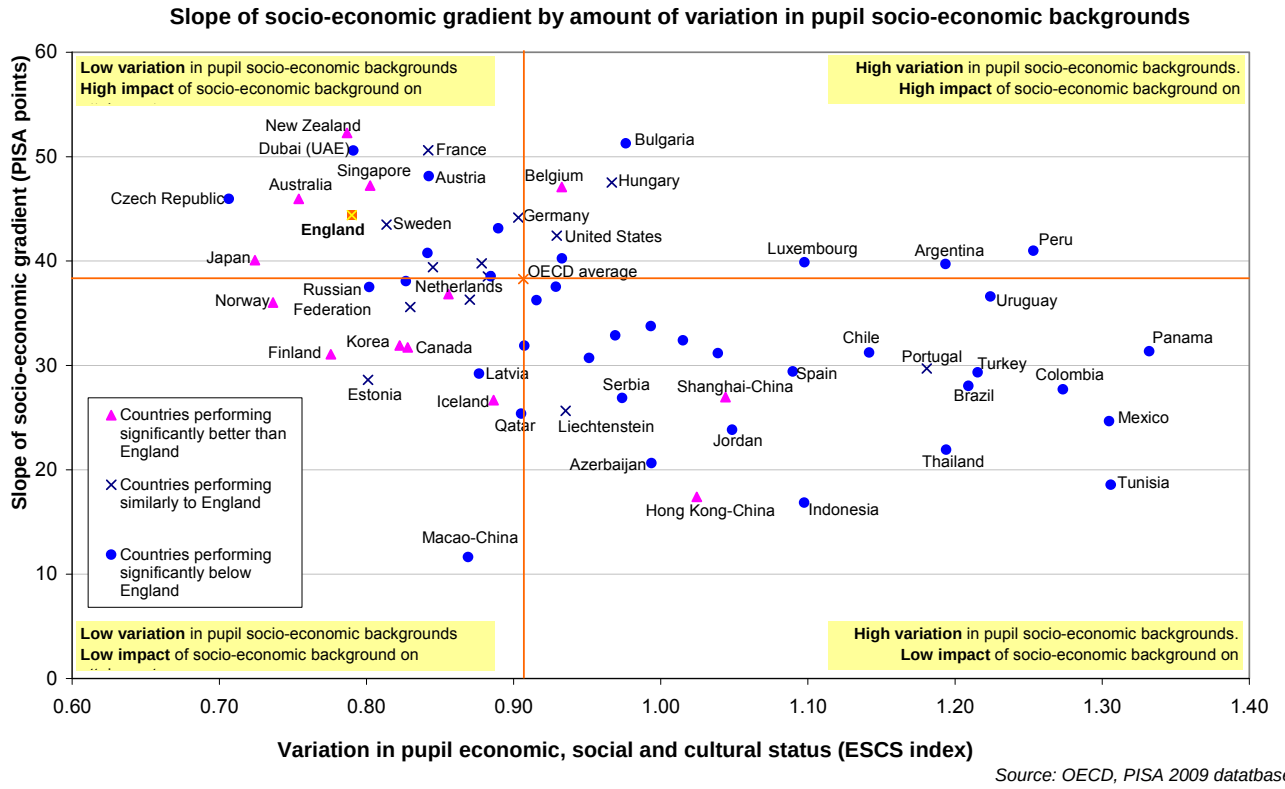
As illustrated in Annex B, the extent of economic, social and cultural inequality varies markedly between PISA 2009 participating countries. Even in countries where the impact of socio-economic background is the same, the range of pupils' socio-economic backgrounds may influence the gap in attainment between pupils at opposite ends of the socio-economic scale. In Figure 9, below, countries A and B have the similar socio-economic gradients (slope of the red line). However, because the *range* of pupils' socio-economic backgrounds in country B is wider, the size of the gap in attainment between the most and least advantaged pupils appears larger (blue arrow).

Figure 9: Scatter plots to illustrate the difference between wide and narrow ranges in pupils' socio-economic backgrounds and the effect this has when comparing social attainment gaps.



Annex E shows that countries with a larger variation in pupil socio-economic backgrounds generally show a stronger association between pupil background and attainment. However, Figure 10 below shows that countries with a large variation in pupil socio-economic backgrounds, including a number of South American countries, tend to have a less steep socio-economic gradient.

Figure 10:



Source: OECD, PISA 2009 datatbase

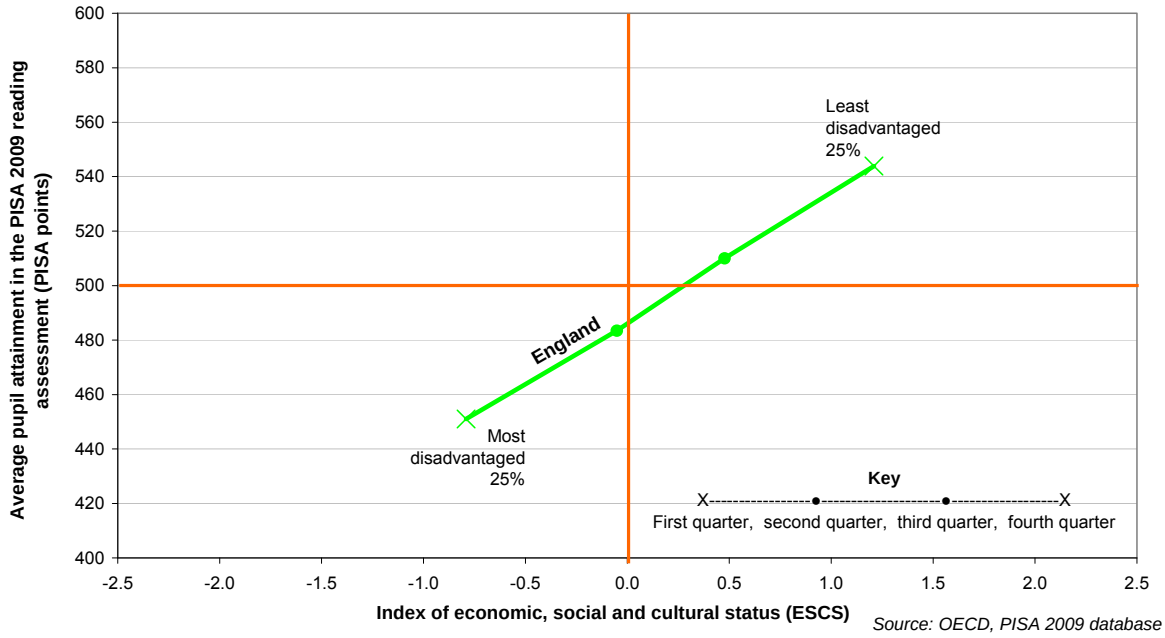
Looking individually at each of the quarters pictured on the chart we see that:

- Of the top-performing countries, only Belgium, Hong Kong-China and Shanghai-China have a greater variation in socio-economic background than on average across the OECD, whereas the size of the slope of the socio-economic gradients of these countries are a lot more varied;
- A number of Central and South American countries, such as Panama, Mexico and Colombia can be found in the bottom right hand corner, indicating a large variation in socio-economic backgrounds yet a low impact of background on attainment. Hong Kong and Shanghai-China also appear in this quarter;
- A number of smaller countries appear in the bottom left hand corner (small range of socio-economic backgrounds and a low impact of background on attainment) including Finland, Norway and Iceland.
- England appears in the top left hand corner (above average impact of background on attainment despite a smaller variation in pupil background) alongside countries that performed significantly better and significantly worse than the OECD average.

We are able to look in more details at how steep the socio-economic gradients are in particular countries by splitting the pupils in each country into quartiles based on their socio-economic background and plotting average pupil attainment by average index of socio-economic background for each of the quarters. Figure 11 shows this for all pupils in England. The cross on the left-hand side of the chart shows how disadvantaged the bottom 25% of pupils in England are according to the OECD's index of economic, social and cultural index and what their average PISA reading attainment was. The cross on the top right-hand side shows the same for the most advantaged 25% of pupils in England and the middle two points show the 2nd and 3rd quarters.

Figure 11:

Average pupil performance in reading, by national quarters of the index of economic, social and cultural status in England, PISA 2009

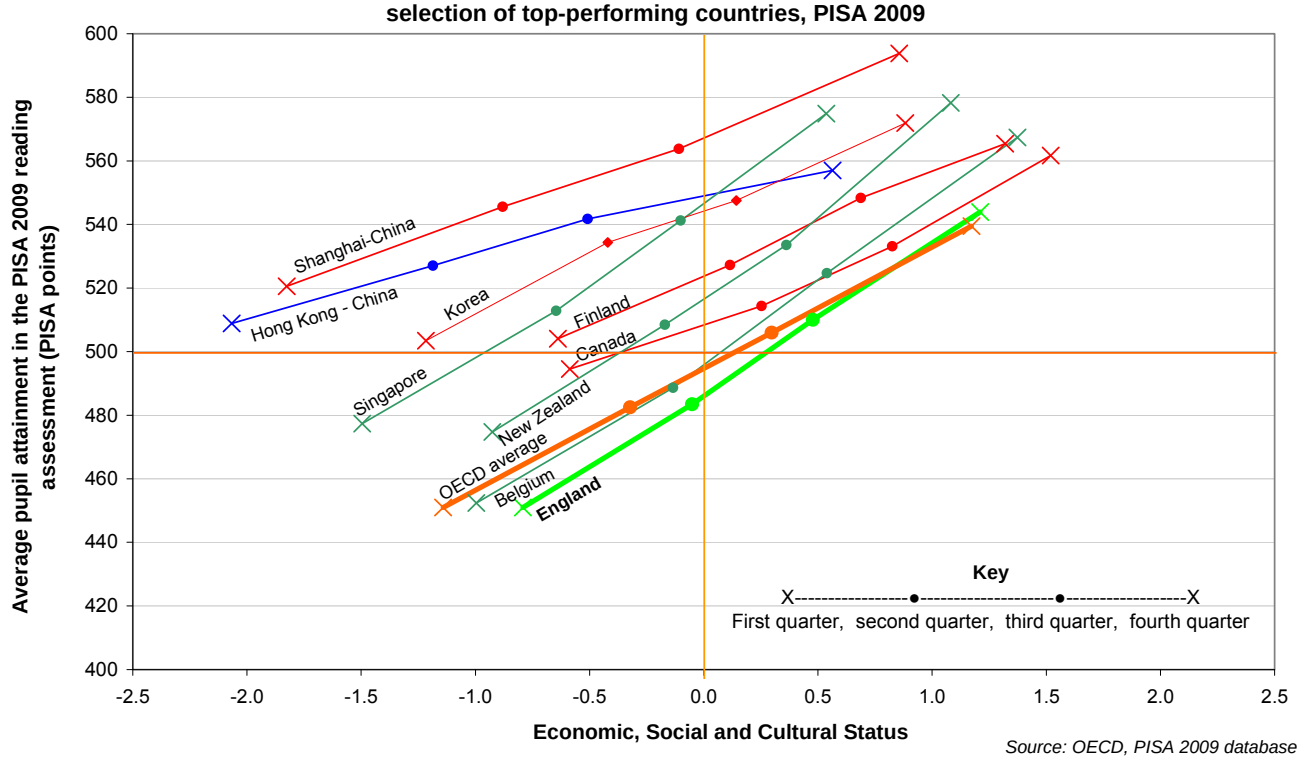


Source: OECD, PISA 2009 database

Figure 12 displays the same figures for a selection of top-performing countries in PISA 2009. For each country the left point shows the level of ESCS on average for the quarter of that country's pupils with lowest ESCS, plotted against their average PISA reading score, while the right-most point shows the equivalent for the most advantaged quarter[3].

Figure 12:

Average pupil performance on the reading scale by national quarters of economic, social and cultural status for a selection of top-performing countries, PISA 2009



Source: OECD, PISA 2009 database

[3] Four countries scoring statistically significantly higher than England in the PISA 2009 reading assessment are not included in the chart as the patterns in these countries were very similar to others that have been included. Namely: Australia was very similar to Belgium; Japan similar to Finland but shifted slightly to the left; The Netherlands very similar to the OECD average; and Norway very similar to England except the most advantaged 25% of pupils did not attain as high a reading score.

Key points to note from Figure 12 include:

- There is greater variation between average pupil attainment for the most disadvantaged quartiles in each country than for the most advantaged;
- England's slope is steeper than the OECD average, with weakest performance in the bottom half of the ESCS range despite pupils not being as disadvantaged;
- Pupils in the poorest quartiles in Hong Kong and Shanghai-China are substantially more disadvantaged than in England, but the attainment levels they reach are comparable with the attainment of pupils in England with above average ESCS;
- Belgium, New Zealand and Singapore (coloured in green) display the most similar socio-economic gradients to England;
- The social attainment gradients observed for Canada, Finland, Japan, Korea and Shanghai-China (coloured in red) are similar to each other and less steep than in England although the Shanghai-China pupils have a much wider range of socio-economic backgrounds.
- Hong Kong-China displays the least steep socio-economic gradient, which is surprising since the gradient covers a wider range of socio-economic backgrounds than in comparison countries. In particular there is less of a difference in attainment between the average attainment of pupils in the highest and 2nd highest quartiles (most advantaged pupils);
- Hong Kong, Korea and Shanghai-China both have a high proportion of 'resilient' students – students from disadvantaged backgrounds that nonetheless have high attainment.

5. How social gaps in PISA compare to the FSM gap reported nationally in England

Section 4 discusses the countries' social attainment gradients, which we are able to do using PISA information since the OECD have collected a range of information on pupils' social, cultural and economic backgrounds. However, nationally we are only able to report the social attainment gap as the difference in average performance between two groups of pupils – those who are known to be eligible for free school meals (FSM) and those who are not known to be eligible for FSM. To put these on a comparable basis, we can construct a binary measure from the ESCS. This allows us to measure the attainment gap between the most disadvantaged group on the ESCS scale and the rest, in a similar way to how the FSM gap is measured.

We can cross-reference the pupils known to be eligible for FSM against those in the bottom 10% of the PISA ESCS distribution[4]. Figure 13 shows that only 29% of pupils known to be eligible for FSM in the PISA-NPD matched dataset also fall into the bottom 10% of pupils on the ESCS scale. However, it is important to note that a further 7% of pupils eligible for FSM did not provide enough information for the OECD to calculate their score on the index of economic, social and cultural status.

Figure 13: Comparison between national and OECD measures of deprivation.

		Pupils known to be eligible for FSM, January 2009		
		No	**Yes**	**Total**
OECD's measure of social background (ESCS)	**Bottom 10%**	*8%*	*29%*	*10%*
	Not bottom 10%	*90%*	*64%*	*88%*
	ESCS missing	*2%*	*7%*	*2%*
	Total	***100%***	***100%***	***100%***

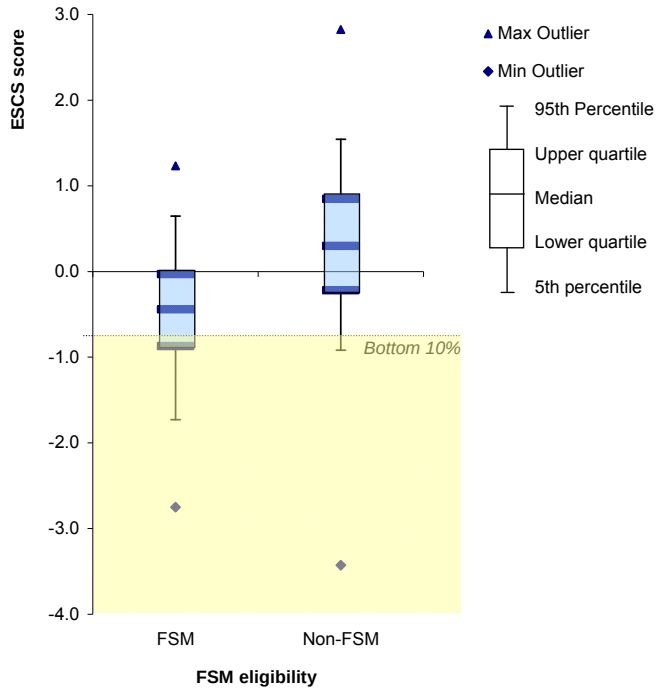
Source: OECD PISA 2009 data matched with National Pupil Database 2009/10

The box plots in Figure 14 below show that although many FSM pupils fall outside lowest 10% on the ESCS measure, they do tend to be towards the lower end of the ESCS scale. The average ESCS score for FSM pupils (0.49) is one standard deviation below the average for non-FSM pupils (0.31) while the spread of ESCS scores for FSM and non-FSM pupils are similar (standard deviations 0.71 and 0.76 respectively).

[4] Nationally, FSM pupils make up 16% of the state-funded secondary school pupil population. For the PISA 2009 cohort (aged 15 on 31 August 2009) the FSM rate at January 2010 was 13% in state-funded schools. However, in the PISA-NPD matched dataset only 10% of pupils are known to be eligible for FSM, partly due to independent schools being included in the PISA sample. We therefore create the ESCS binary measure by selecting the 10% of the sample with the lowest ESCS scores.

Figure 14:

Comparison between ESCS scores of pupils eligible for FSM and those who are not eligible and known to be claiming FSM



Source: OECD PISA 2009 database matched with National Pupil database 2009/10

Figure 15 below sets out the size of the gaps between the attainment of pupils defined as deprived, using both the FSM definition and the equivalent proportion of pupils at the bottom end of the OECD's ESCS distribution, and their peers. The table includes PISA reading, mathematics and science attainment and comparable national attainment measures. The sizes of the gaps can be compared using effect sizes (for point score measures) or odds ratios (for threshold measures) as these are standardised measures and hence not affected by differences in the scales used to measure attainment (e.g. PISA points vs. GCSE grades).

Despite only one in three pupils categorised as 'deprived' falling into both groups used to define deprivation, Figure 15 and Figure 16 show the sizes of the attainment gaps between 'deprived' and 'non-deprived' pupils are highly consistent. In particular:

- The gap in average PISA reading scores between non-FSM and FSM pupils is around 65 PISA points, or 0.7 of a standard deviation. This is virtually identical to the gap in attainment between pupils not in the bottom 10% of the ESCS distribution in England and those who are in the bottom 10%. The same is true for PISA mathematics and science scores.
- Similarly, the gap in English GCSE attainment is one GCSE grade (also 0.7 of a standard deviation) when pupils are split into groups by FSM eligibility or using the OECD's ESCS index.
- The gap between the proportions of pupils achieving the 5 A*-C (inc. English and mathematics) threshold measures are slightly larger when considering the ESCS split rather than the FSM gap. This is likely to be due to the fact that the ESCS, a derived variable based on a number of social, economic and cultural factors, is more strongly correlated with pupil attainment than the determining factors for FSM eligibility (i.e. parental income and eligibility to various benefits) are.

Figure 15: Difference in average point scores between disadvantaged and non-disadvantaged pupils, expressed in terms of effect sizes

Point score measures of attainment	Attainment gap between pupils known to be eligible for FSM and those not eligible: Non-FSM pupils	FSM pupils	FSM gap			Attainment gap between pupils in the bottom 10% of the OECD's ESCS distribution and the other 90%: Other 90%	Bottom 10%	ESCS split		
PISA 2009 attainment	*PISA points*	*PISA points*	*PISA points*		*Effect size*	*PISA points*	*PISA points*	*PISA points*		*Effect size*
Reading	503.3	438.0	65.4		0.7	503.2	438.7	64.5		0.7
Mathematics	502.5	437.8	64.7		0.7	502.2	440.4	61.8		0.7
Science	524.8	454.7	70.1		0.7	524.6	455.8	68.8		0.7
Key Stage 4 attainment	*KS4 point score*	*KS4 point score*	*KS4 point score*	*GCSE grades*	*Effect size*	*KS4 point score*	*KS4 point score*	*KS4 point score*	*GCSE grades*	*Effect size*
English GCSE point score	41.7	36.0	5.7	1.0	0.7	41.7	35.6	6.1	1.0	0.7
Maths GCSE point score	41.1	34.4	6.7	1.2	0.6	41.1	34.1	7.0	1.2	0.7

Source: OECD PISA 2009 database matched with National Pupil database 2009/10

Figure 16: Difference in proportion of pupils achieving Key Stage 4 threshold measures, expressed in terms of odds ratios

Key Stage 4 threshold measures	*Percentage achieving*	*Percentage achieving*	*Percentage point difference*	*Odds ratio*	*Percentage achieving*	*Percentage achieving*	*Percentage point difference*	*Odds ratio*
5 A*- C including English and maths	65.6%	39.5%	26.1	2.9	66.1%	34.7%	31.4	3.7
5 A* - C including English and maths, GCSEs only	61.2%	31.5%	29.7	3.4	61.6%	27.4%	34.2	4.2

Source: OECD PISA 2009 database matched with National Pupil database 2009/10

6. How is average attainment, reported by PISA, affected when we control for pupil background?

Thus far this note has focussed on comparing pupil attainment and attainment gaps between countries relative to the national distribution of pupils' socio-economic backgrounds. However, it is also possible to compare pupil attainment between participating countries after accounting for countries' socio-economic profiles. To do this we can compare the average pupil attainment in each country for a pupil whose average ESCS matches the OECD average.

Figure 17 shows countries' average performance in the PISA 2009 reading assessment, observed and after accounting for socio-economic profile. Key points to note include:

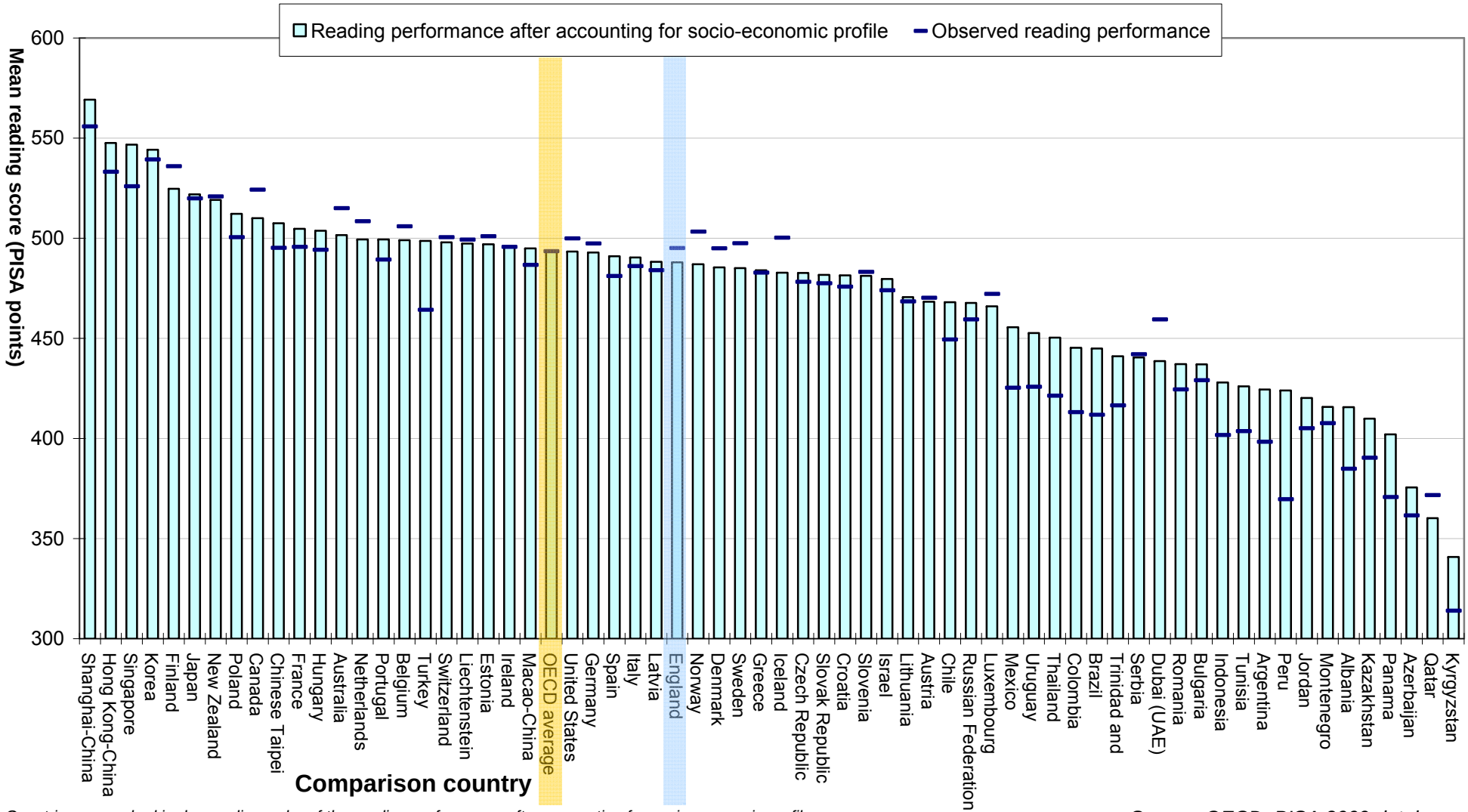
- After adjusting for socio-economic profile the average pupil attainment in England would decrease slightly (from 495 to 488). The average attainment in Finland, Canada, Australia, Netherlands and Belgium would also decrease, since these countries are less disadvantaged than the OECD average.

- After controlling for socio-economic profile, a number of countries that were already observed to significantly out-perform England, but where average ESCS is low, would move further ahead. Examples include: Shanghai-China, Hong Kong-China and Singapore.

- A number of countries who in absolute terms recorded similar attainment to England would become significantly higher performing, namely: Poland, Chinese Taipei, France and Hungary.

- Countries whose average reading attainment would increase noticeably (over 30 PISA points) after controlling for socio-economic background include Turkey (who would overtake England to become significantly higher performing), Peru, Brazil, Colombia, Albania, Panama and Mexico.

Figure 17: Countries' mean reading performance, observed and after accounting for socio-economic profile



Countries are ranked in descending order of the reading performance after accounting for socio-economic profile.

Source: OECD, PISA 2009 database

Annex A

The OECD collects information on student socio-economic background via the student questionnaire, which includes questions on student characteristics, home background and parent qualifications. Three of these family background variables are then used to derive the OECD's index of economic, social and cultural status (ESCS), namely:

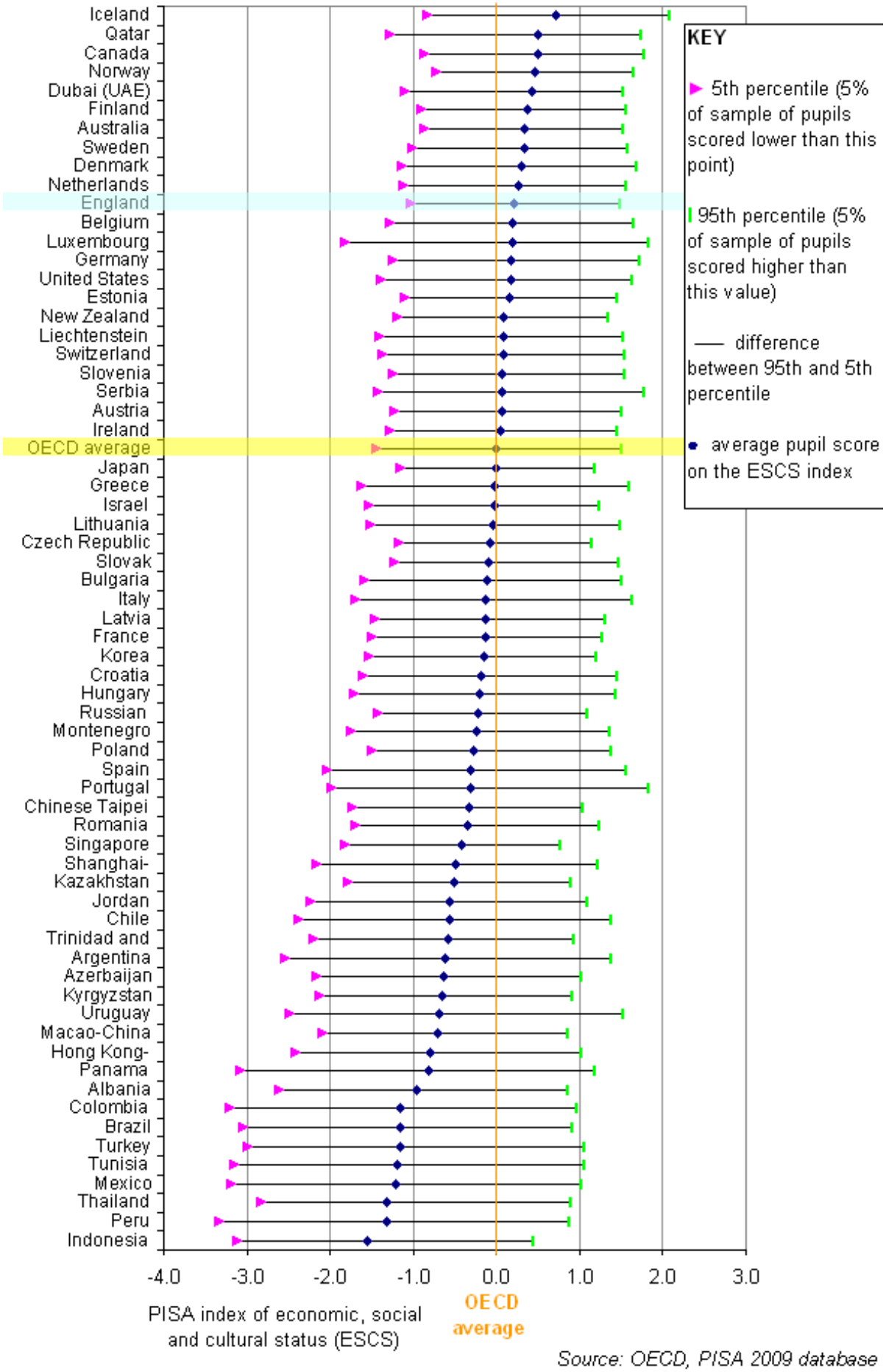
1. Highest level of parental education (in number of years of education);
2. Highest parental occupation;
3. Number of home possessions (which acts as a proxy for household income).

Since no direct measure of parental income or wealth was available an index of home possessions was derived. A pupil's score on this index was obtained by asking student whether they had particular possessions, such as: a desk, their own room, a link to the internet, their own calculator; and also the numbers of cell phones, TVs, computers, cars and books at home.

The validity of the OECD's ESCS index has been critiqued by a number of experts in the field, the majority of which are generally positive about the OECD's attempts to general a culturally sensitive measure of socio-economic background. But concerns surrounding the validity of student reports on family background, the varying importance and weight of home possessions and the proportion of pupils attending full-time education in each of the participating countries and jurisdictions have been raised.

Annex B

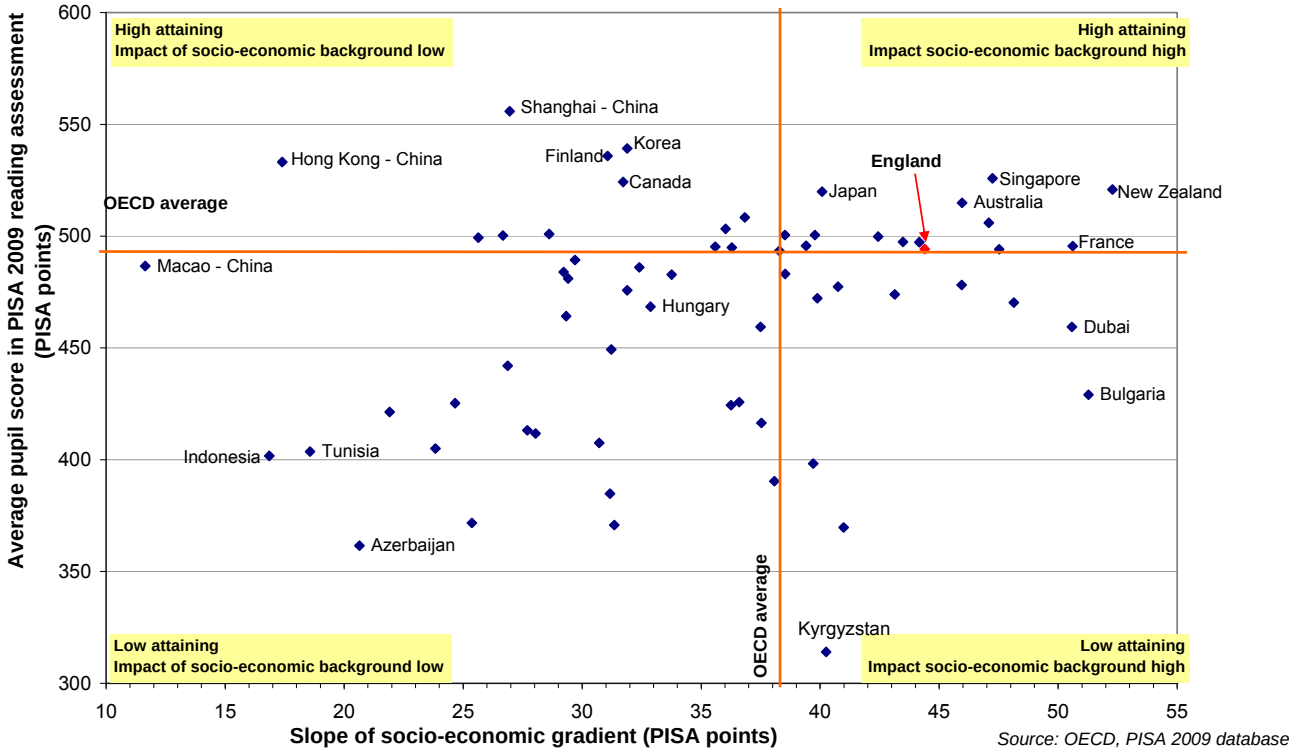
Average pupil scores and range of scores on the economic, social and cultural scale, by country



Source: OECD, PISA 2009 database

Annex C

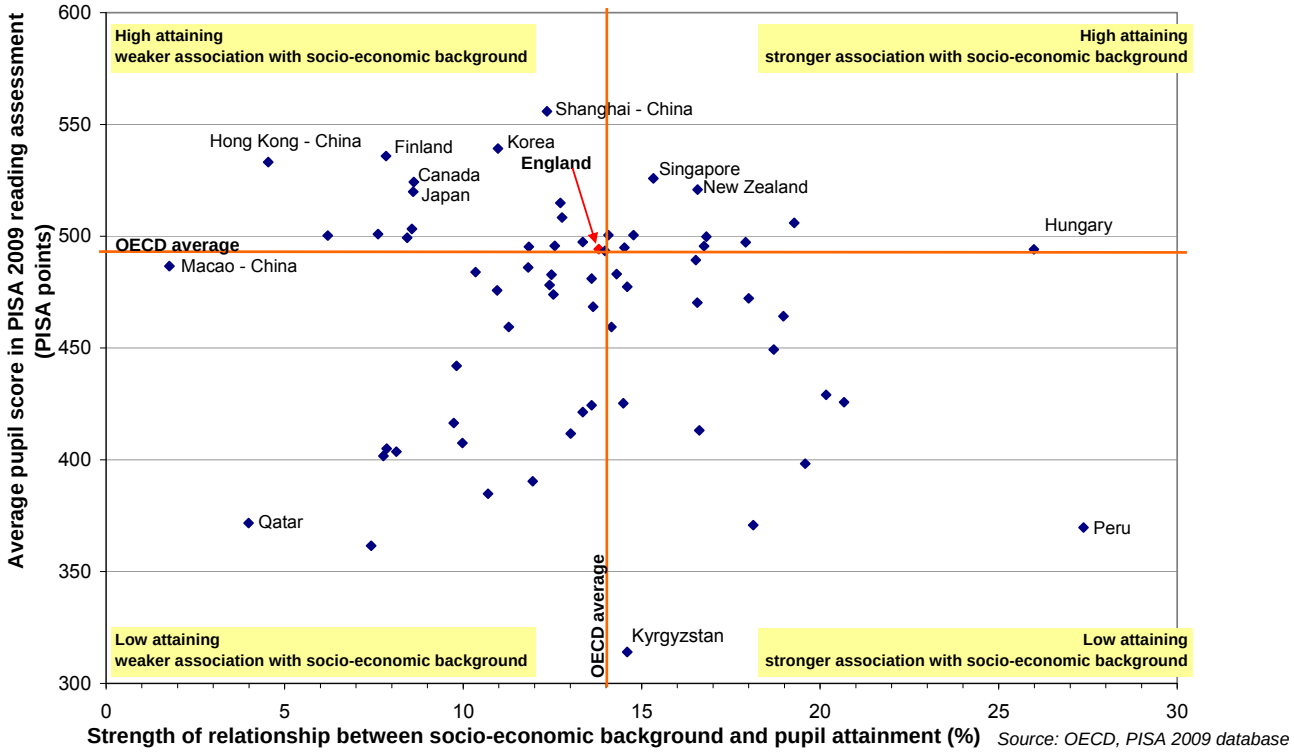
Impact of socio-economic association against average pupil attainment in PISA 2009, by country



Source: OECD, PISA 2009 database

Annex D

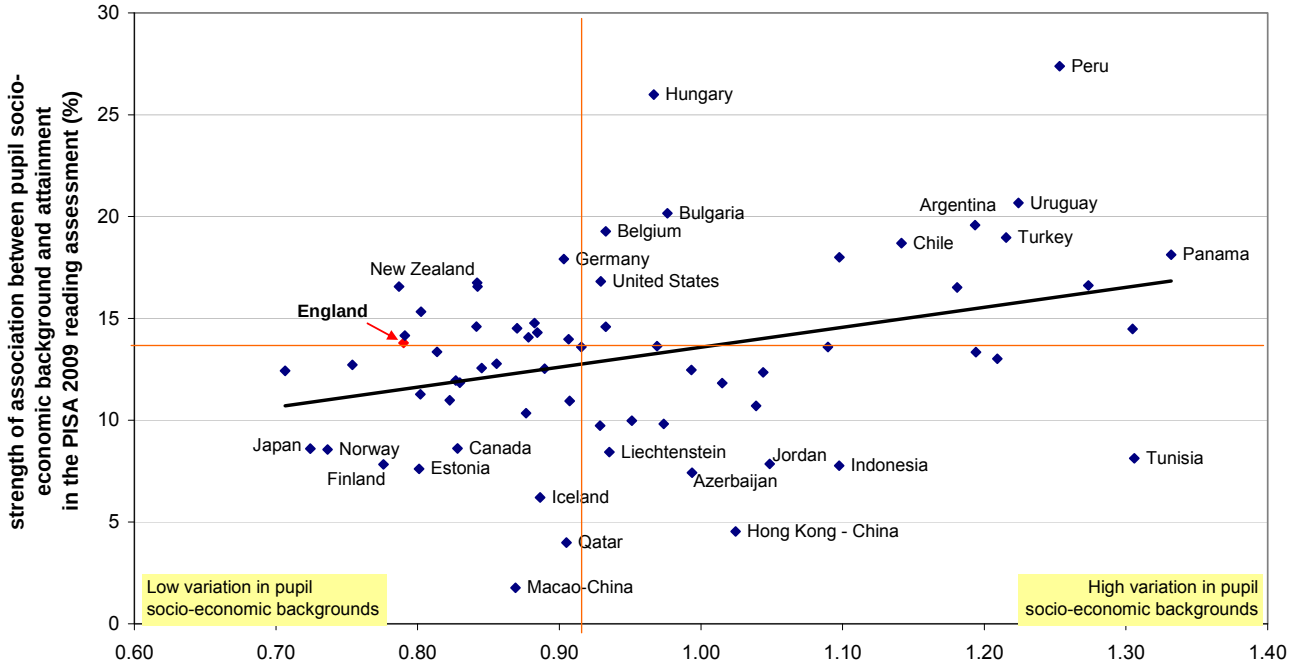
Strength of socio-economic association against average pupil attainment in PISA 2009, by country



Source: OECD, PISA 2009 database

Annex E

Strength of socio-economic association with attainment by amount of variation in pupil socio-economic backgrounds



Source: OECD, PISA 2009 datatbase

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