PISA 2012

Evaluating school systems to improve education

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OECD
BETTER POLICIES FOR BETTER LIVES

PISA in brief

- **Over half a million students…**
  - **representing 28 million 15-year-olds in 65 countries/economies**

… took an internationally agreed 2-hour test…

- **Goes beyond testing whether students can reproduce what they were taught…**
- **… to assess students' capacity to extrapolate from what they know and creatively apply their knowledge in novel situations**
- **Mathematics,** reading, science, problem-solving, financial literacy
- **Total of 390 minutes of assessment material**

… and responded to questions on…

- **their personal background, their schools and their engagement with learning and school**

- **Parents, principals and system leaders provided data on…**
  - **school policies, practices, resources and institutional factors that help explain performance differences .**

Climbing Mount Fuji

Mount Fuji is a famous dormant volcano in Japan.

Mount Fuji is only open to the public for climbing from 1 July to 27 August each year. About 200 000 people climb Mount Fuji during this time.

On average, about how many people climb Mount Fuji each day?

A. **340**

B. **710**

C. **3400**

D. **7100**

E. **7400**

Climbing Mount Fuji

Correct Answer: C. 3400

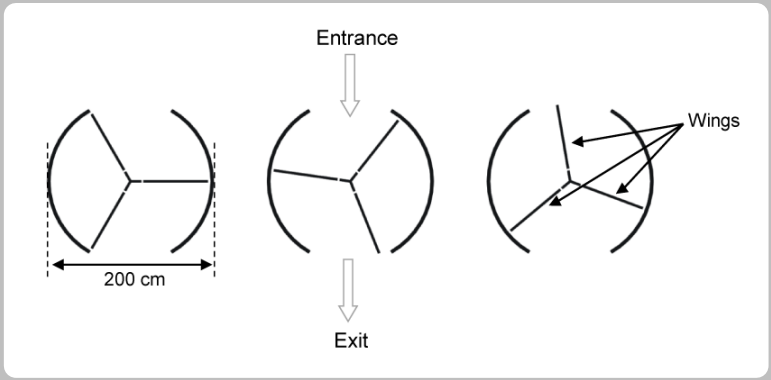
This item belongs to the *quantity* category. The notion of quantity may be the most pervasive and essential mathematical aspect of engaging with, and functioning in, our world. It incorporates the quantification of attributes of objects, relationships, situations and entities in the world, understanding various representations of those quantifications, and judging interpretations and arguments based on quantity.

SCORING:	
Description:	Identify an average daily rate given a total number and a specific time period (dates provided)
Mathematical content area:	Quantity
Context:	Societal
Process:	Formulate

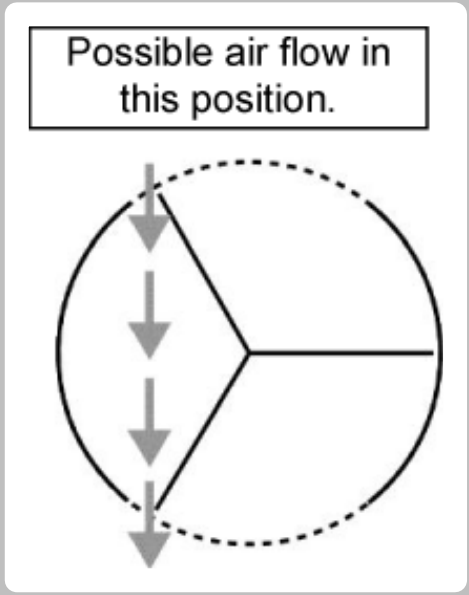
Revolving Door

A revolving door includes three wings which rotate within a circular-shaped space. The inside diameter of this space is 2 metres (200 centimetres). The three door wings divide the space into three equal sectors.

The plan below shows the door wings in three different positions viewed from the top.



The two door openings (the dotted arcs in the diagram) are the same size. If these openings are too wide the revolving wings cannot provide a sealed space and air could then flow freely between the entrance and the exit, causing unwanted heat loss or gain. This is shown in the diagram opposite.



What is the maximum arc length in centimetres (cm) that each door opening can have, so that air never flows freely between the entrance and the exit?

Maximum arc length: _____ cm

Revolving Door

Correct Answer: in the range from 103 to 105.

Accept answers calculated as $1/6^{th}$ of the circumference ($100\pi/3$). Also accept an answer of 100 only if it is clear that this response resulted from using $\pi = 3$.

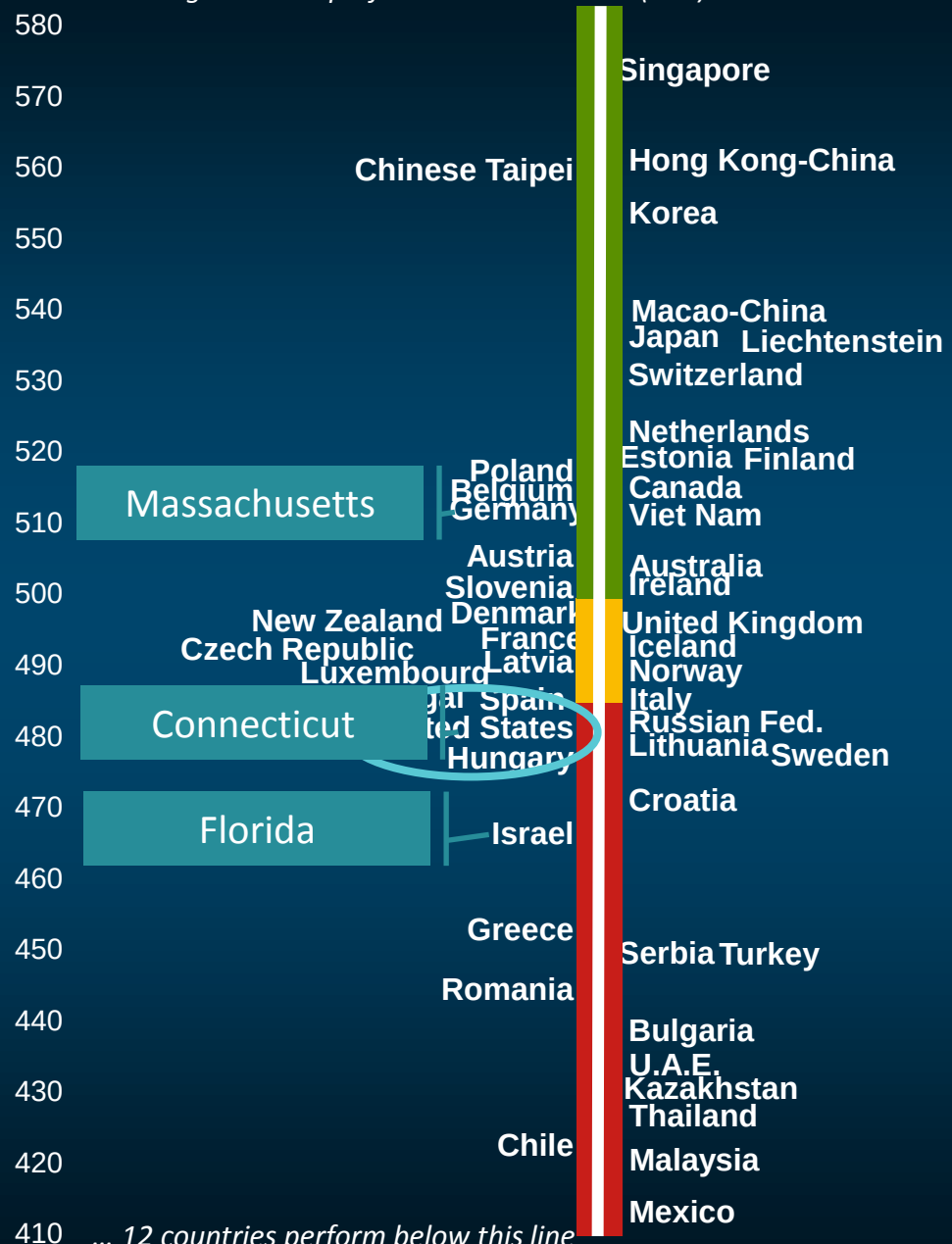
Note: Answer of 100 without supporting working could be obtained by a simple guess that it is the same as the radius (length of a single wing).

This item belongs to the *space and shape* category. Space and shape encompasses a wide range of phenomena that are encountered everywhere in our visual and physical world: patterns, properties of objects, positions and orientations, representations of objects, decoding and encoding of visual information, navigation and dynamic interaction with real shapes as well as with representations.

SCORING:	
Description:	Interpret a geometrical model of a real life situation to calculate the length of an arc
Mathematical content area:	Space and shape
Context:	Scientific
Process:	Formulate

High mathematics performance

Mean score *... Shanghai-China performs above this line (613)*



... 12 countries perform below this line

Low mathematics performance

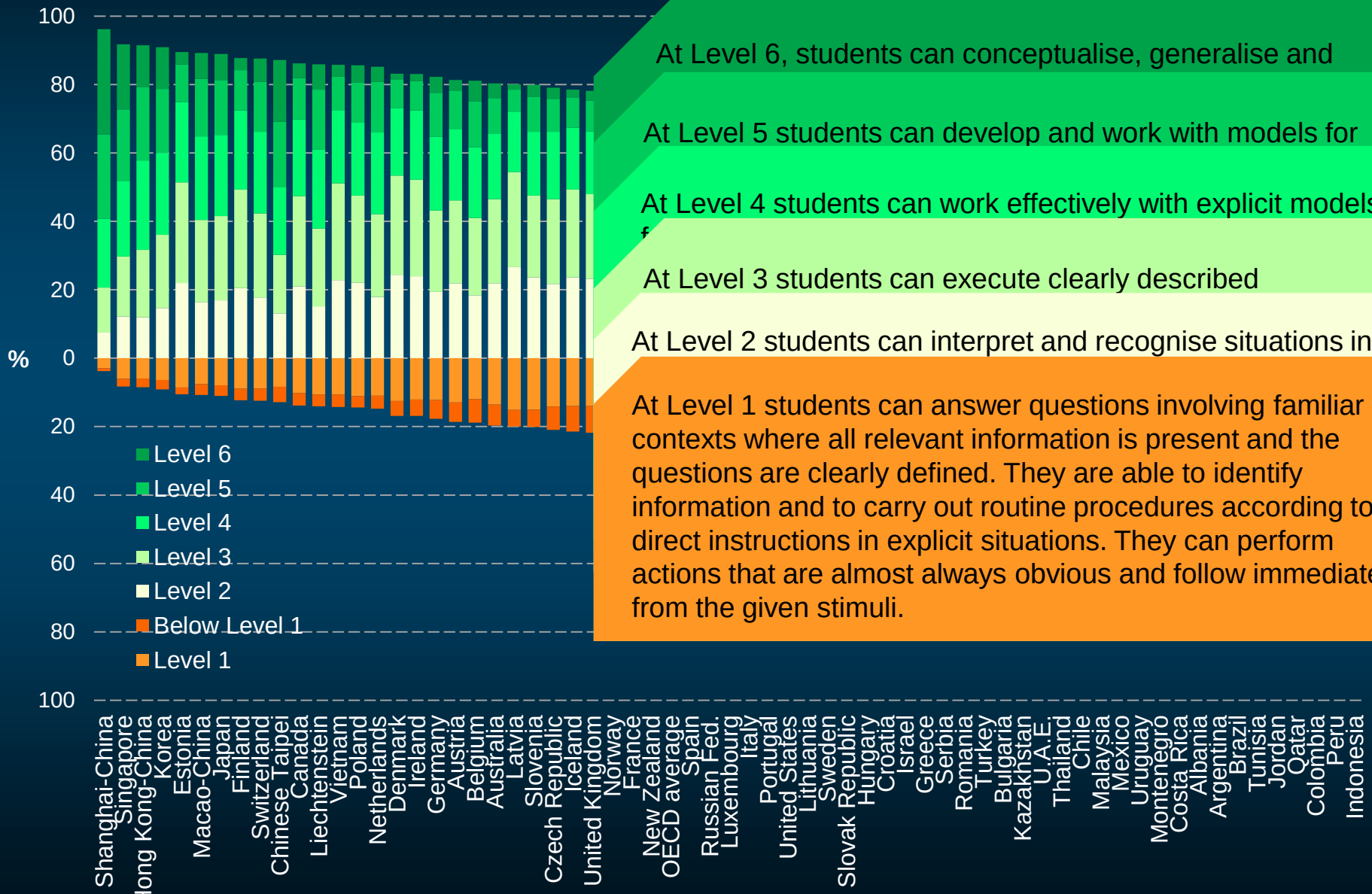
Average performance of 15-year-olds in Mathematics

Fig I.2.13

US

How proficient are students in mathematics?

Fig I.2.22



At Level 6, students can conceptualise, generalise and

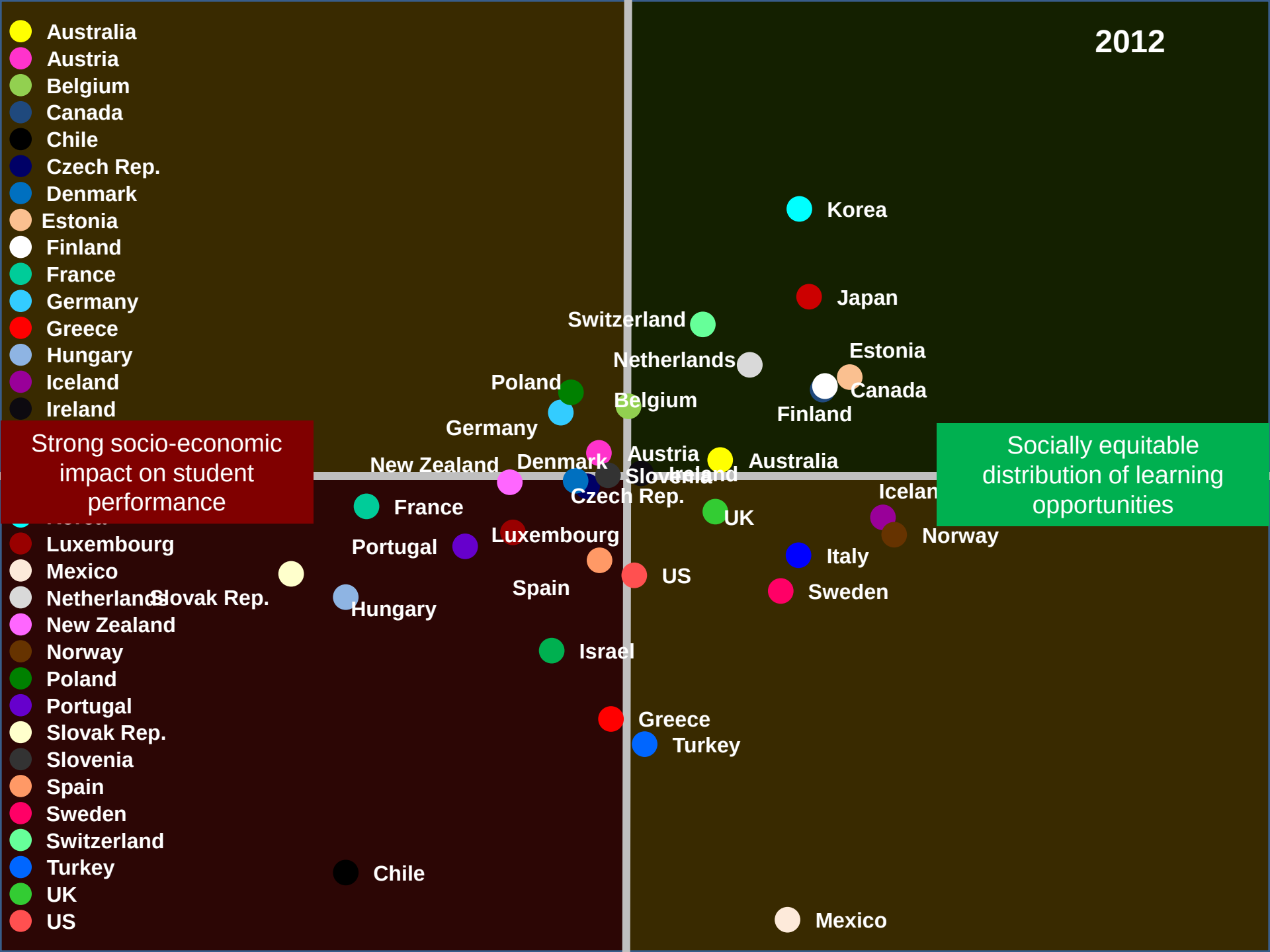
At Level 5 students can develop and work with models for

At Level 4 students can work effectively with explicit models

At Level 3 students can execute clearly described

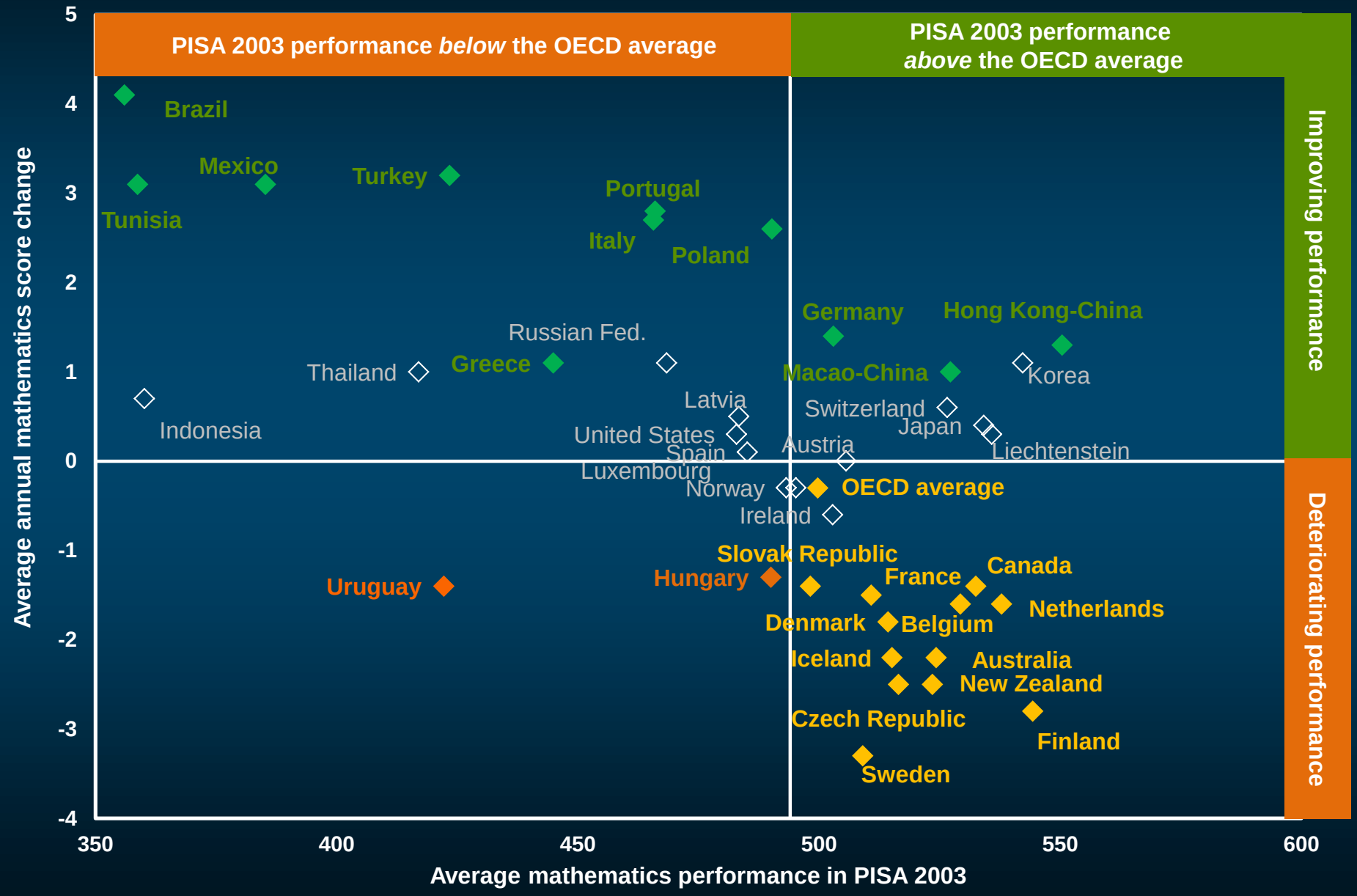
At Level 2 students can interpret and recognise situations in

At Level 1 students 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 almost always obvious and follow immediately from the given stimuli.

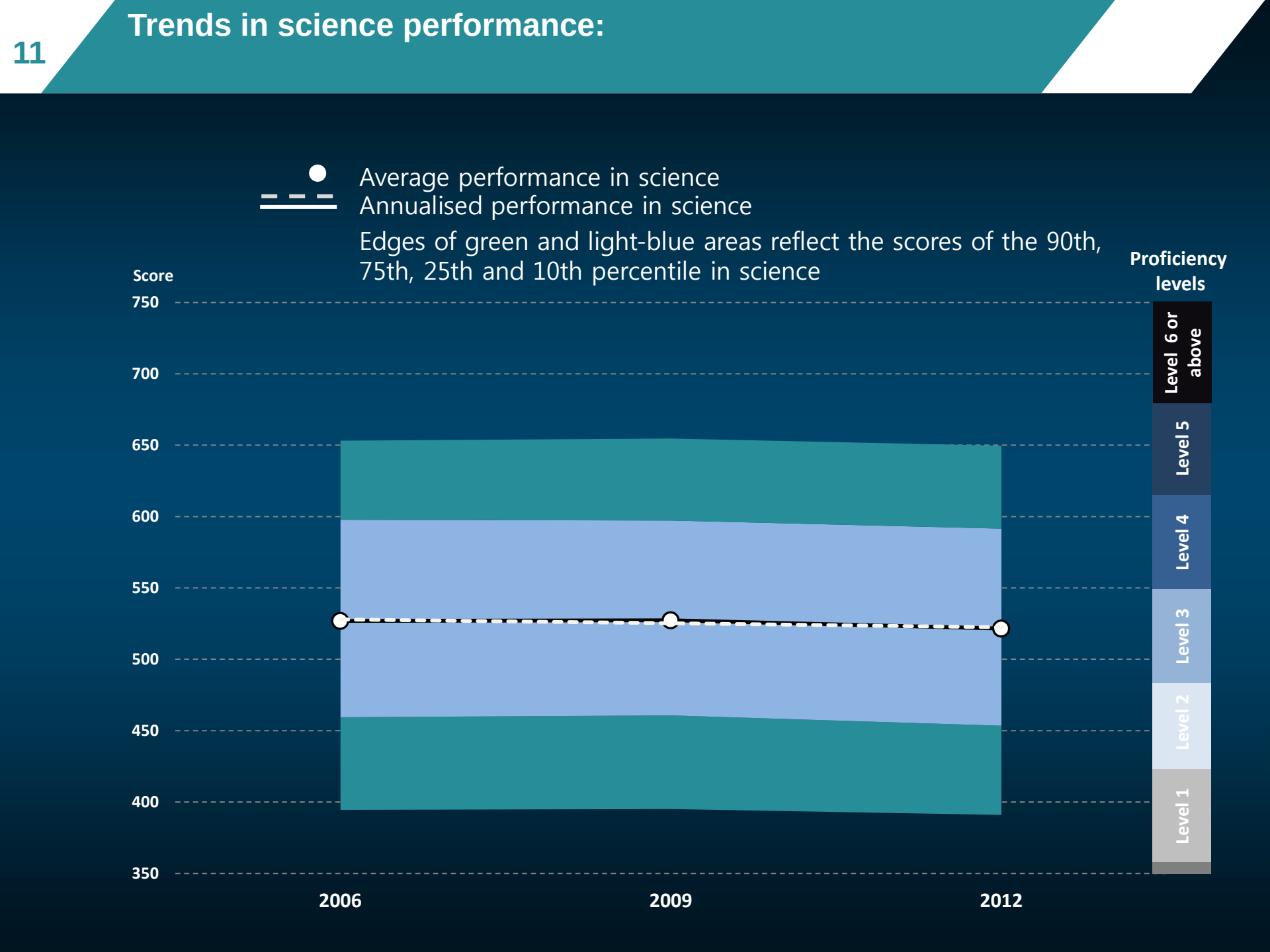

2012
Australia
Austria
Belgium
Canada
Chile
Czech Rep.
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Luxembourg
Mexico
Netherlands
New Zealand
Norway
Poland
Portugal
Slovak Rep.
Slovenia
Spain
Sweden
Switzerland
Turkey
UK
US
Strong socio-economic impact on student performance
Socially equitable distribution of learning opportunities
Korea
Japan
Switzerland
Netherlands
Estonia
Canada
Finland
Poland
Belgium
Germany
Austria
Australia
New Zealand
Denmark
Slovenia
Ireland
Czech Rep.
France
UK
Luxembourg
Portugal
Italy
Mexico
Slovak Rep.
Spain
US
Sweden
Hungary
Norway
Israel
Greece
Turkey
Chile
Mexico

Change in performance between PISA 2003 and 2012

Fig I.2.18



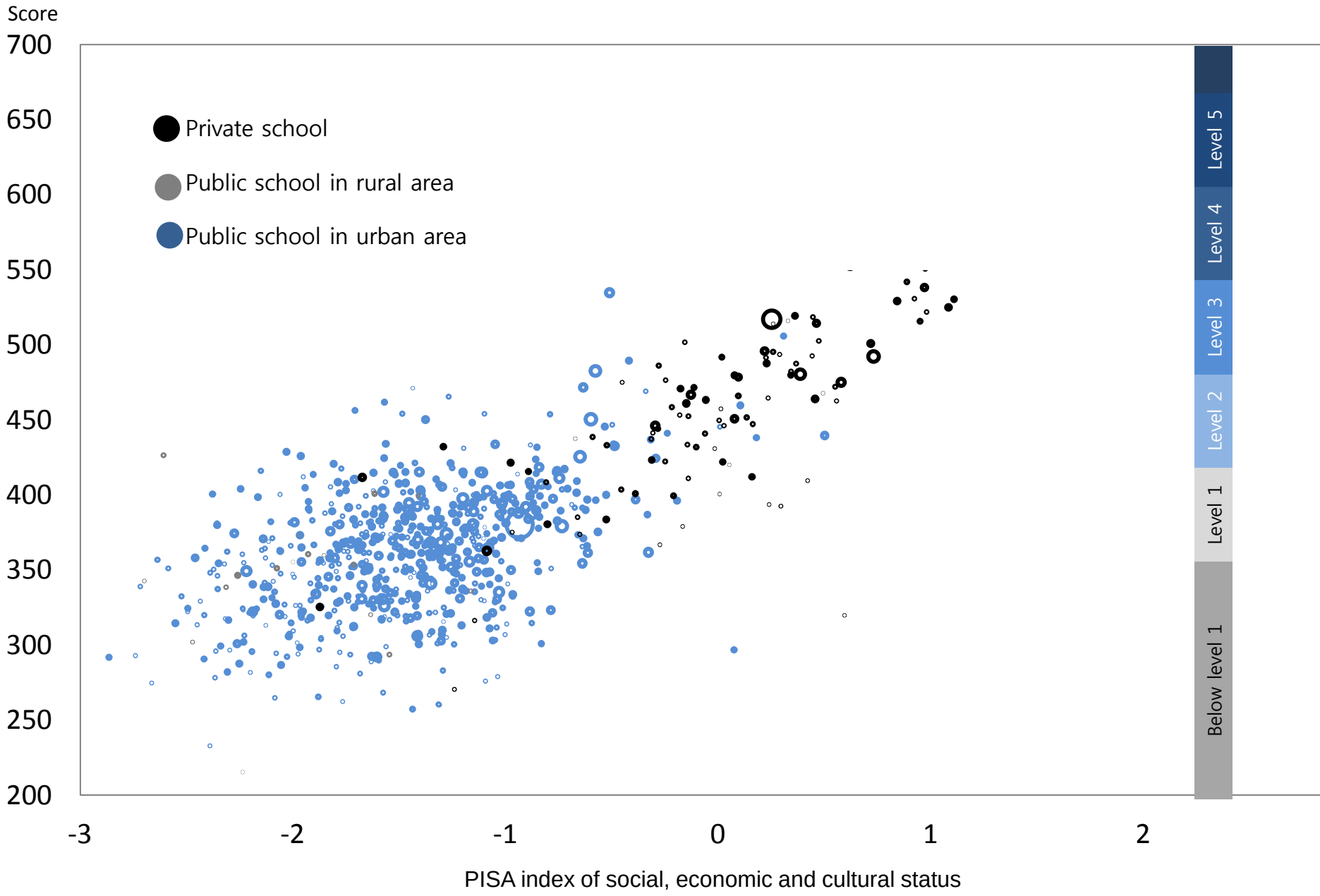
Trends in science performance:



Improvement in mathematics, reading or science

Mathematics, reading and science	**Israel, Poland, Portugal, Turkey, Brazil, Dubai (UAE), Hong Kong-China, Macao-China, Qatar, Singapore, Tunisia**
Mathematics and reading	Chile, Germany, Mexico, Albania, Montenegro, Serbia, Shanghai-China
Mathematics and science	Italy, Kazakhstan, Romania
Reading and science	Japan, Korea, Latvia, Thailand
Mathematics only	Greece, Bulgaria, Malaysia, United Arab Emirates (ex. Dubai)
Reading only	Estonia, Hungary, Luxembourg, Switzerland, Colombia, Indonesia, Liechtenstein, Peru, Russian Federation, Chinese Taipei
Science only	Ireland

Social background and school performance - Brazil



Mean mathematics performance, by school location, after accounting for socio-economic status

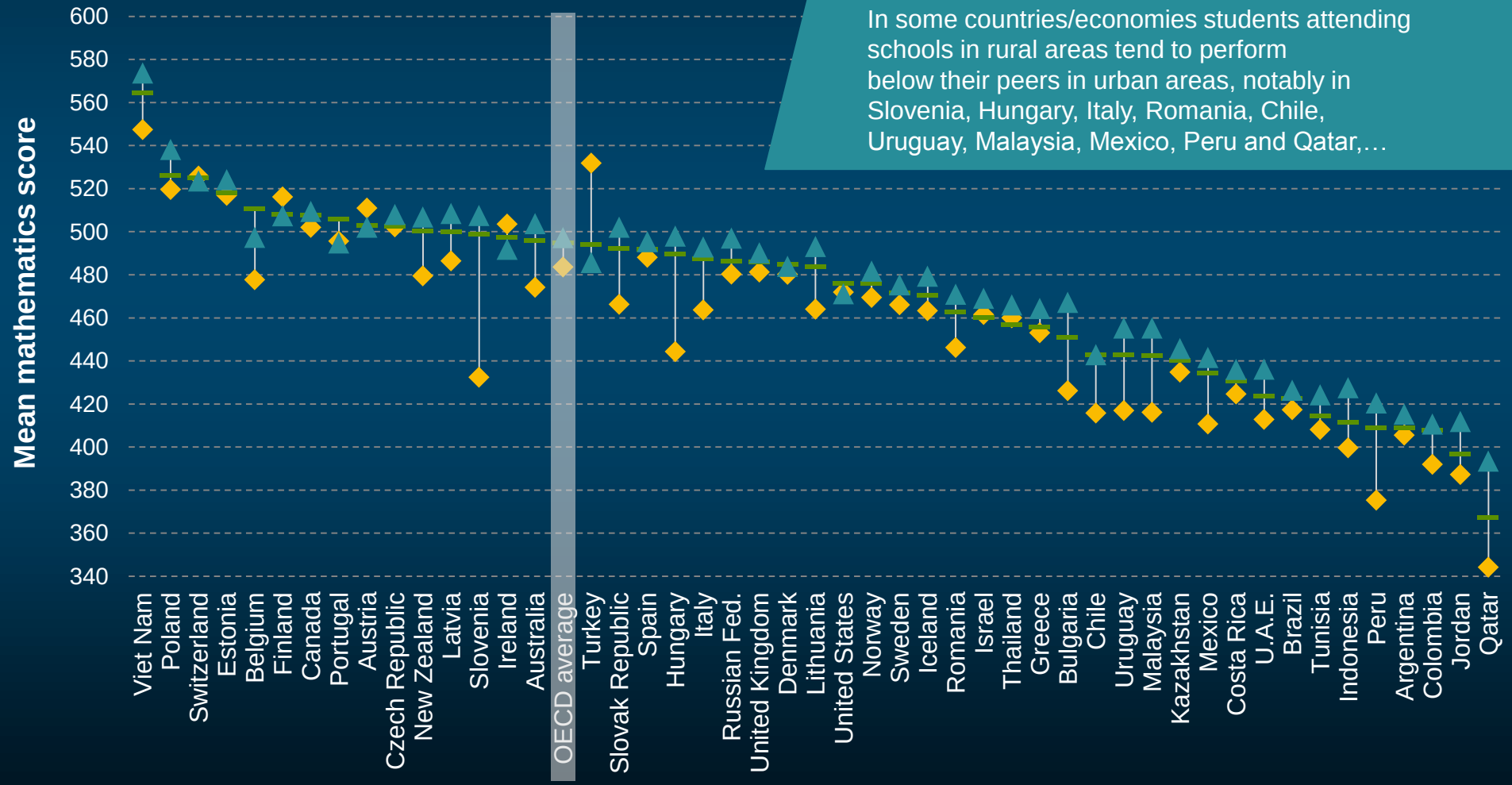
Fig II.3.3

◆ Students attending schools located in a village, hamlet or rural area (fewer than 3 000 people)

– Mean score at the country level after adjusting for socio economic status

▲ Students attending schools located in a city (100 000 or more)

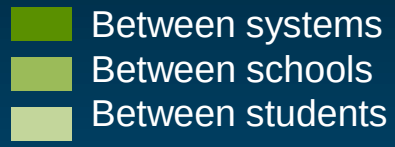
In some countries/economies students attending schools in rural areas tend to perform below their peers in urban areas, notably in Slovenia, Hungary, Italy, Romania, Chile, Uruguay, Malaysia, Mexico, Peru and Qatar,…



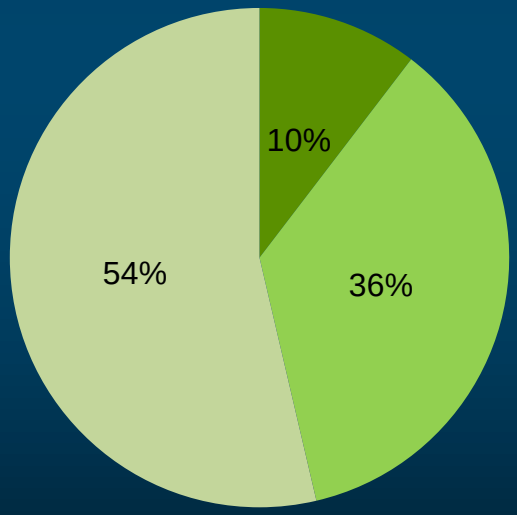
Variation in mathematics performance between systems, schools and students

Fig IV.1.2

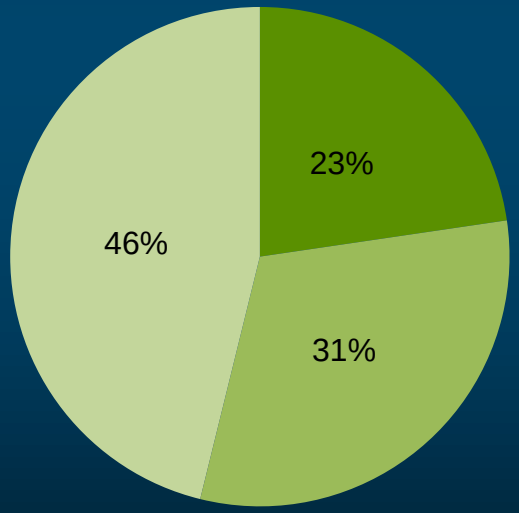
Variation in mathematics performance attributable to differences:



OECD countries

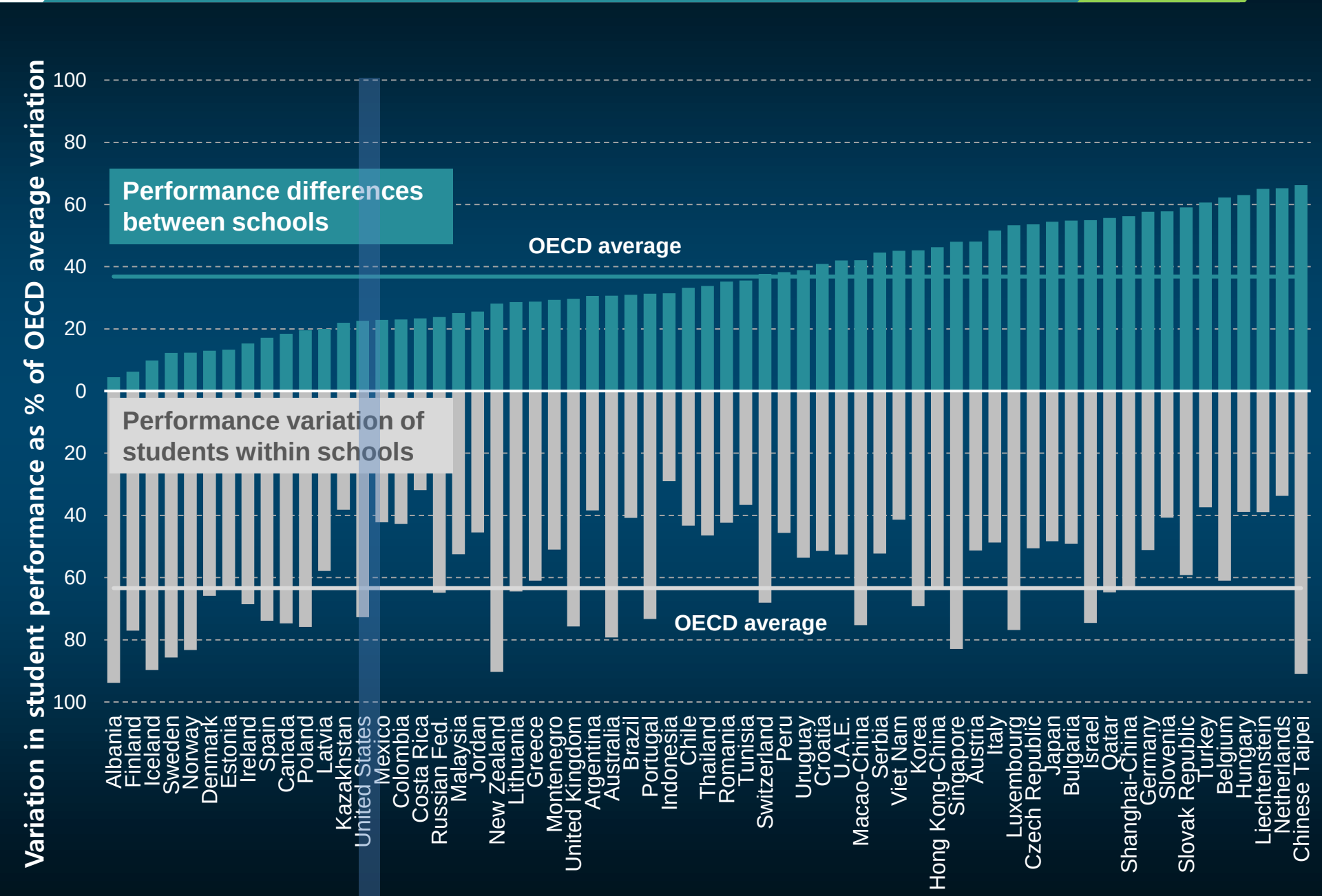


All participating countries and economies



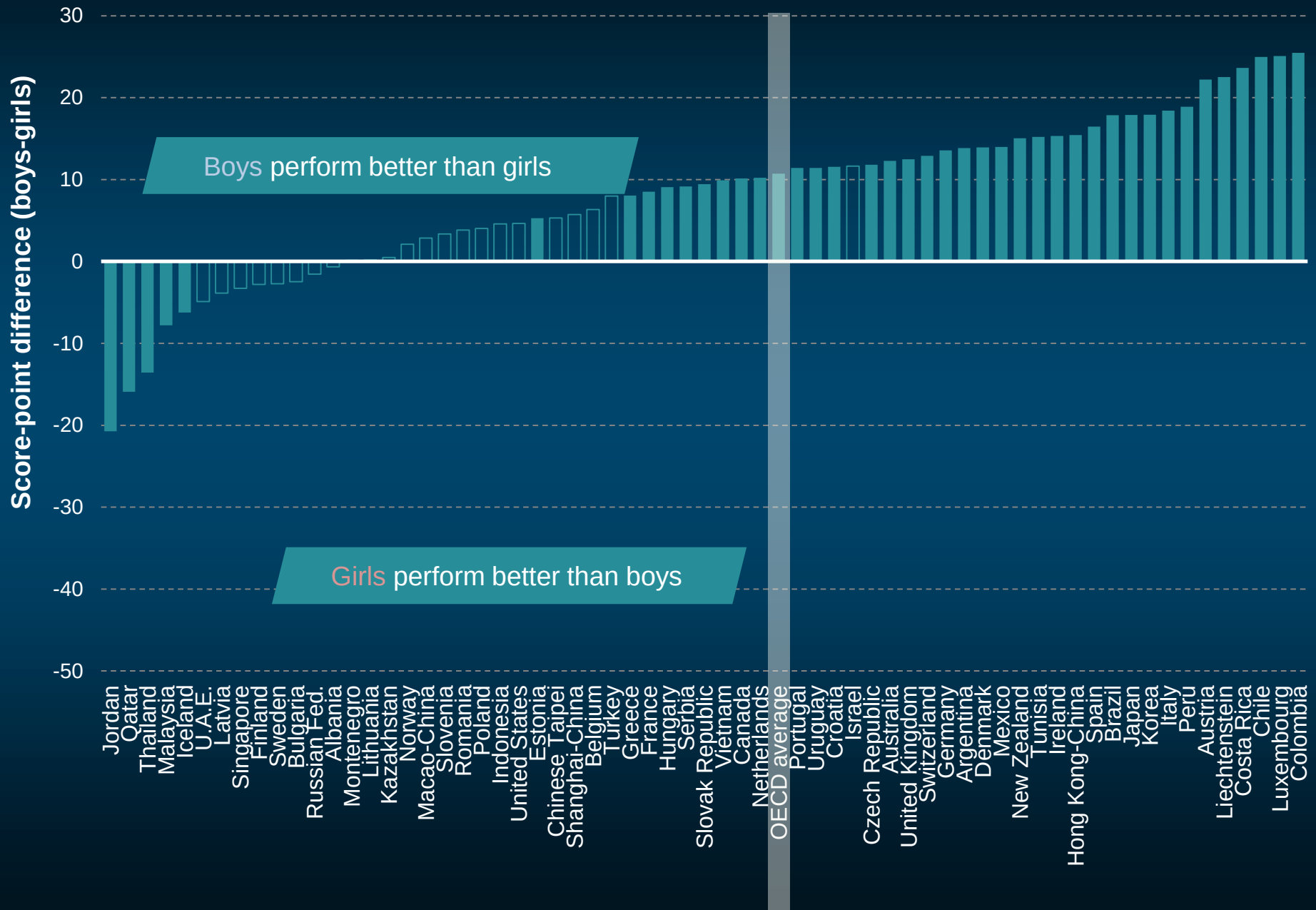
Variability in student mathematics performance between and within schools

Fig II.2.7



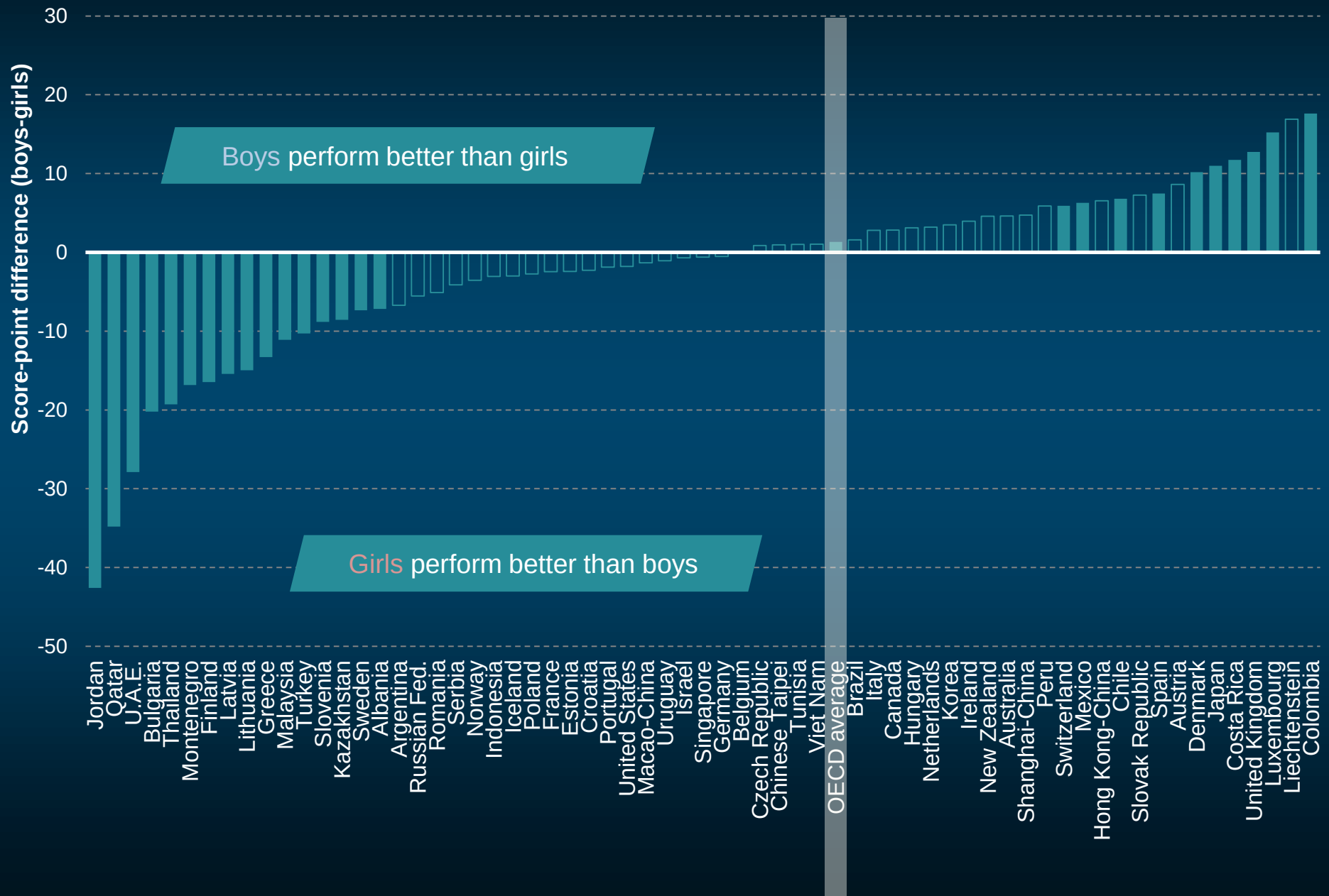
Gender differences in mathematics performance

Fig I.2.25



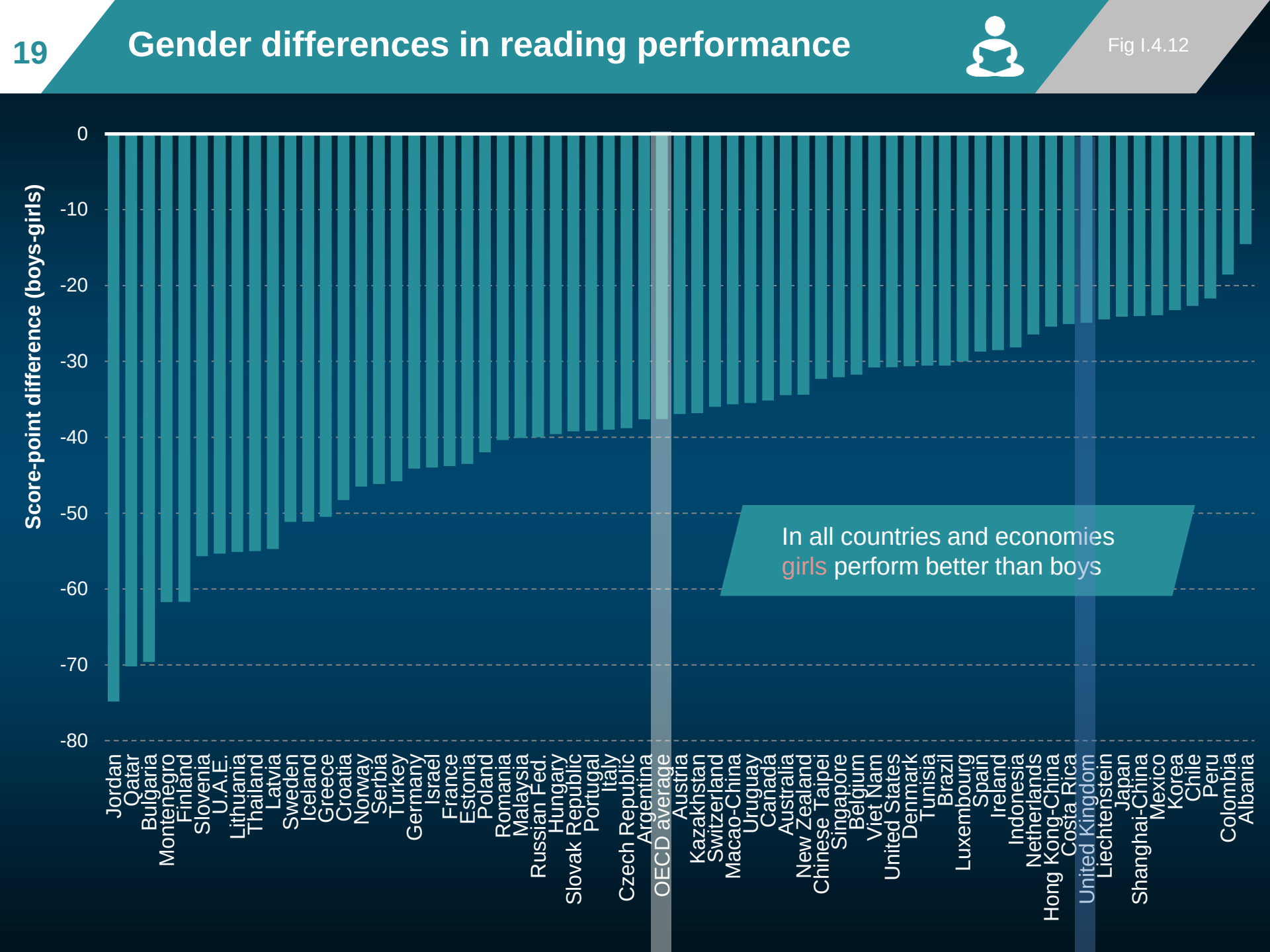
Gender differences in science performance

Fig I.5.12



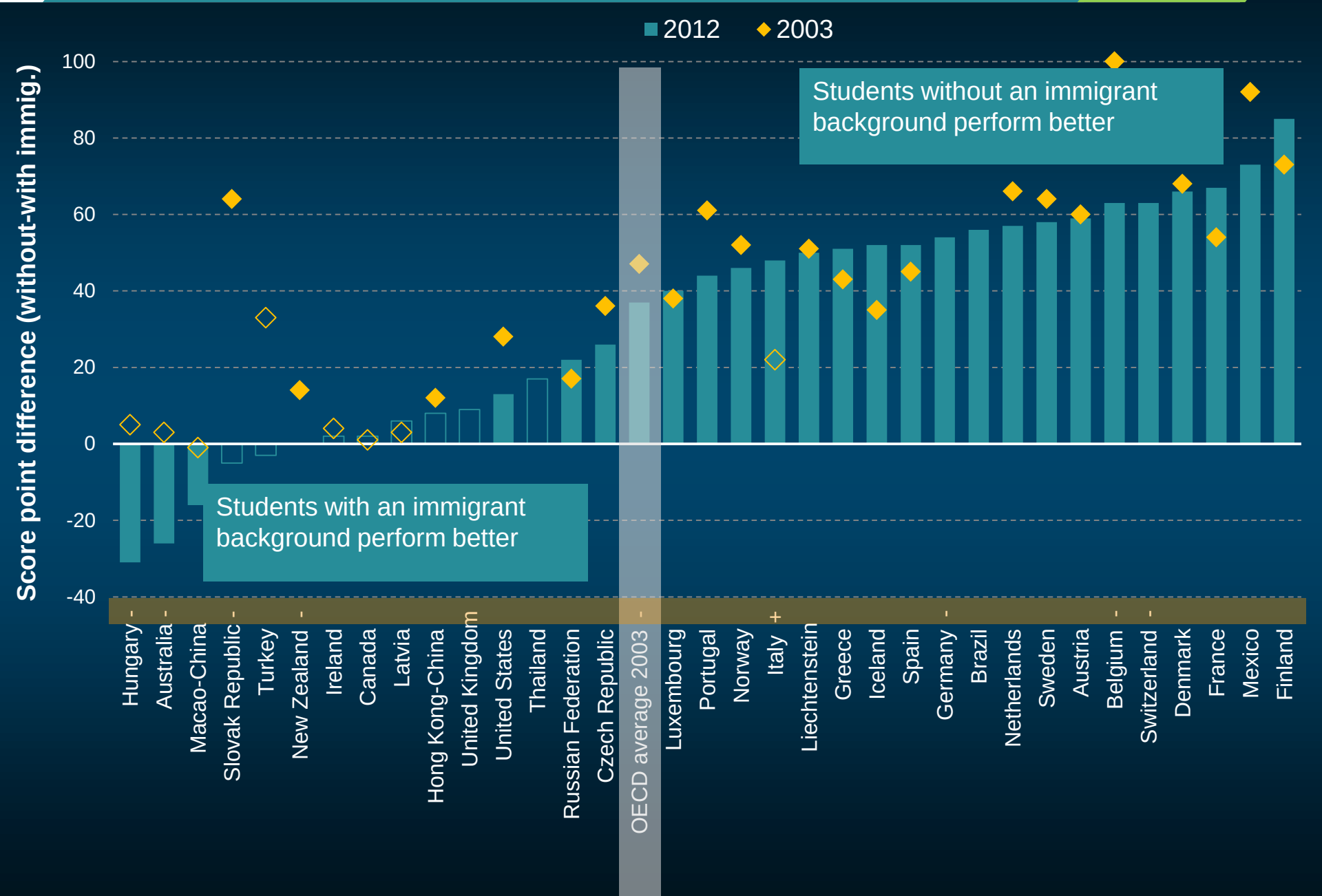
Gender differences in reading performance

Fig I.4.12



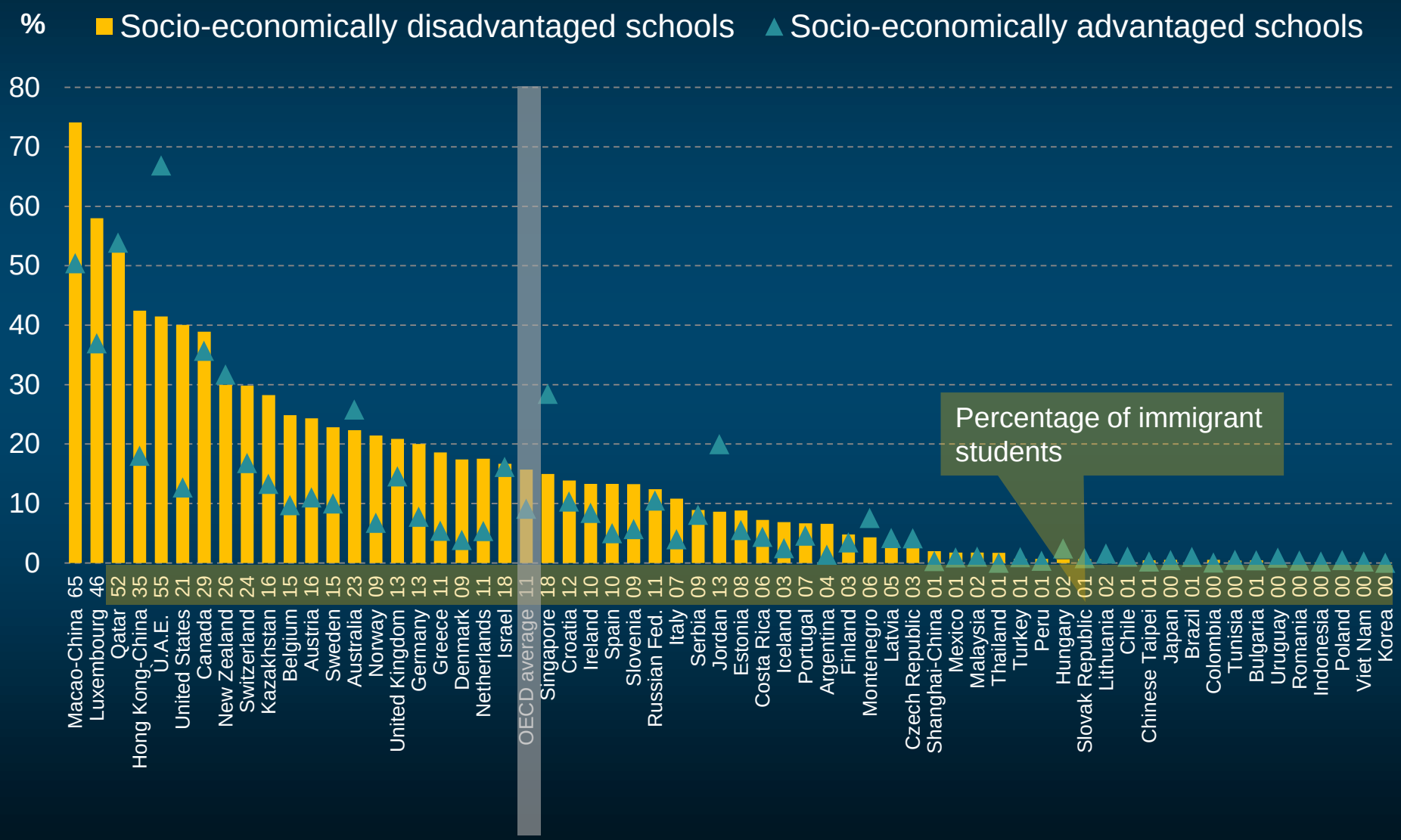
Change between 2003 and 2012 in immigrant students' mathematics performance – **before** accounting for students' socio-economic status

Fig II.3.5



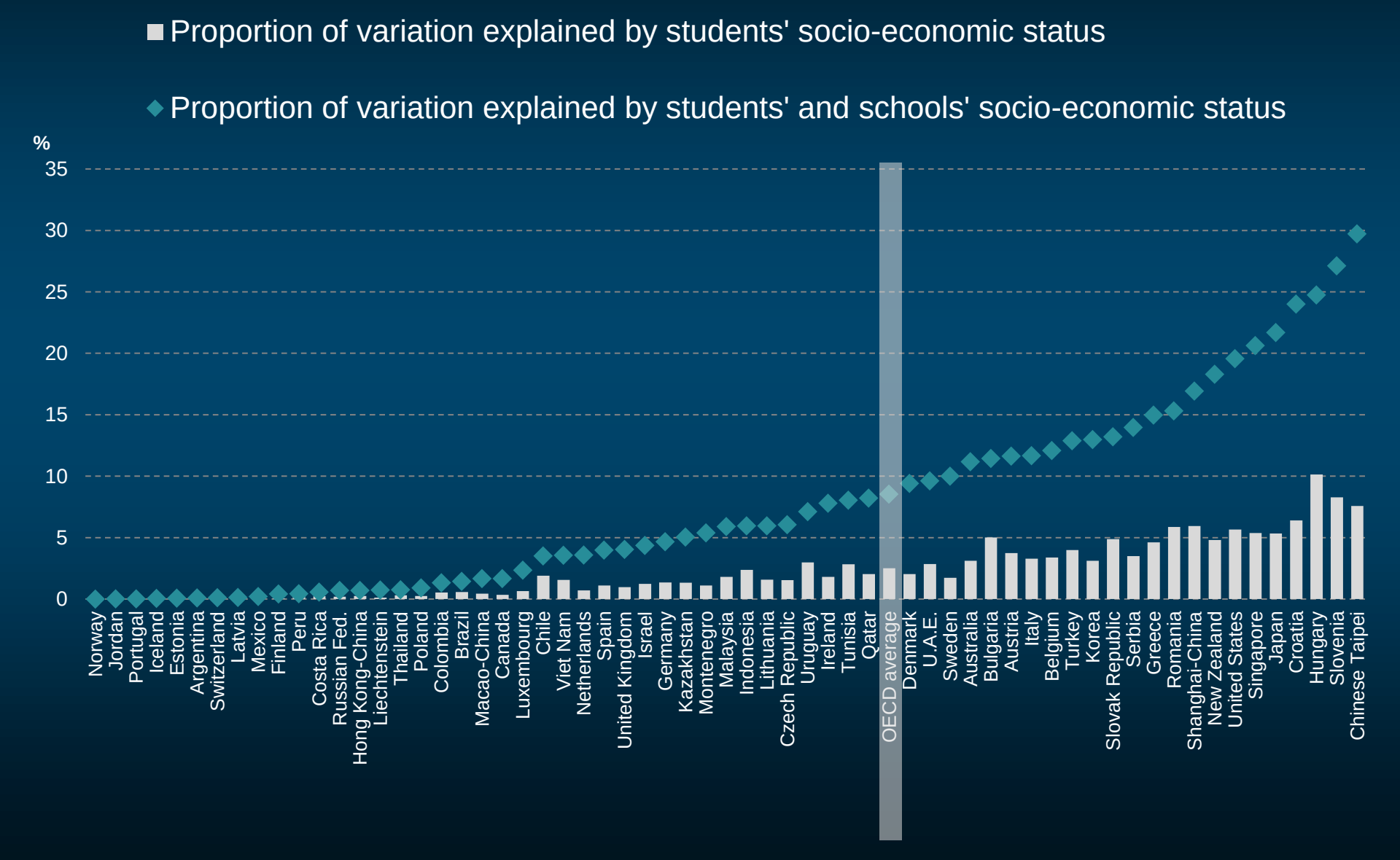
Proportion of immigrant students in socio-economically disadvantaged, average and advantaged schools

Fig II.3.9



Individual and school characteristics: e.g. disciplinary climate, truancy

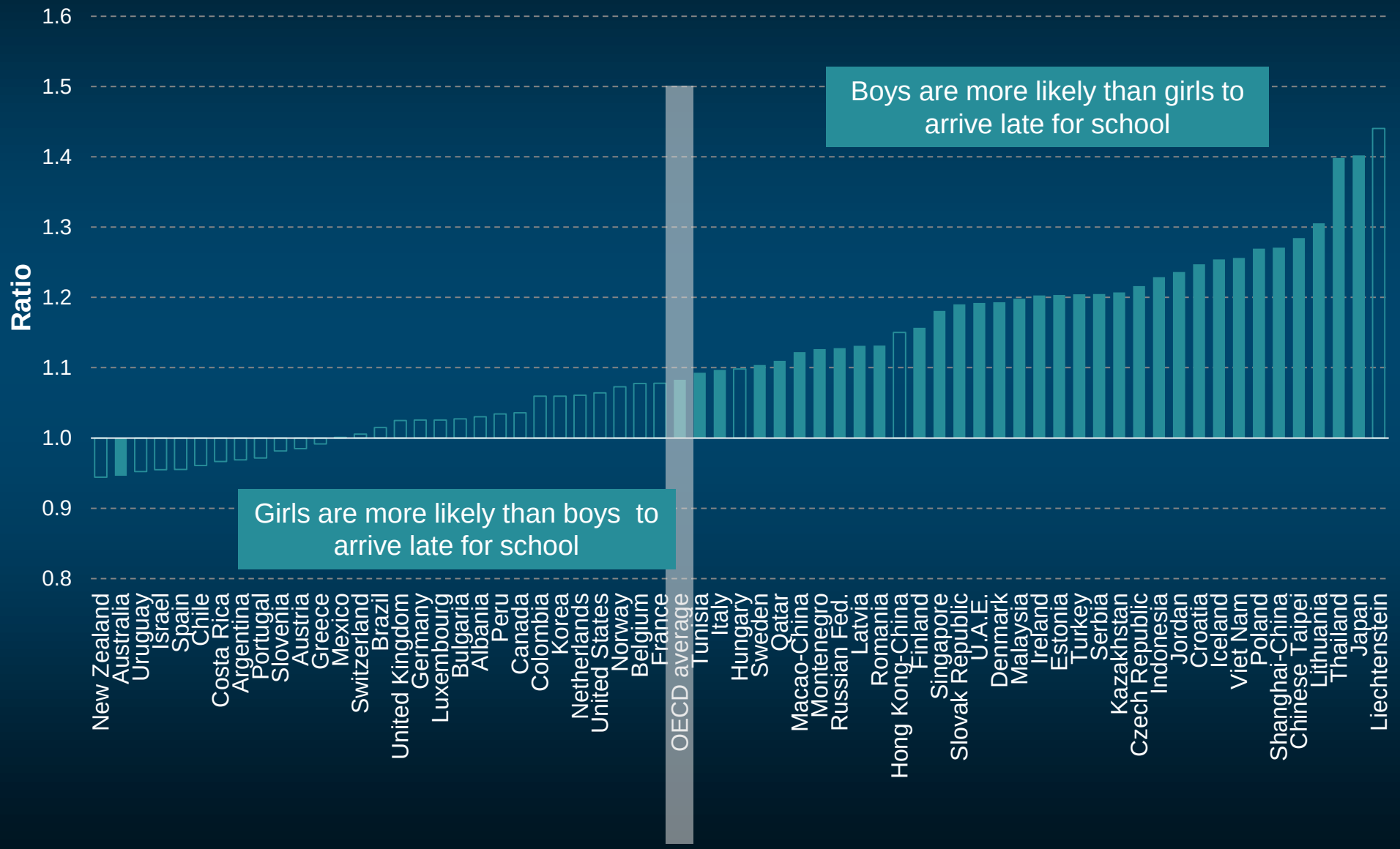
Differences in disciplinary climate explained by students' and schools' socio-economic profile



Boys are more likely than girls to arrive late for school

Fig IV.5.11a

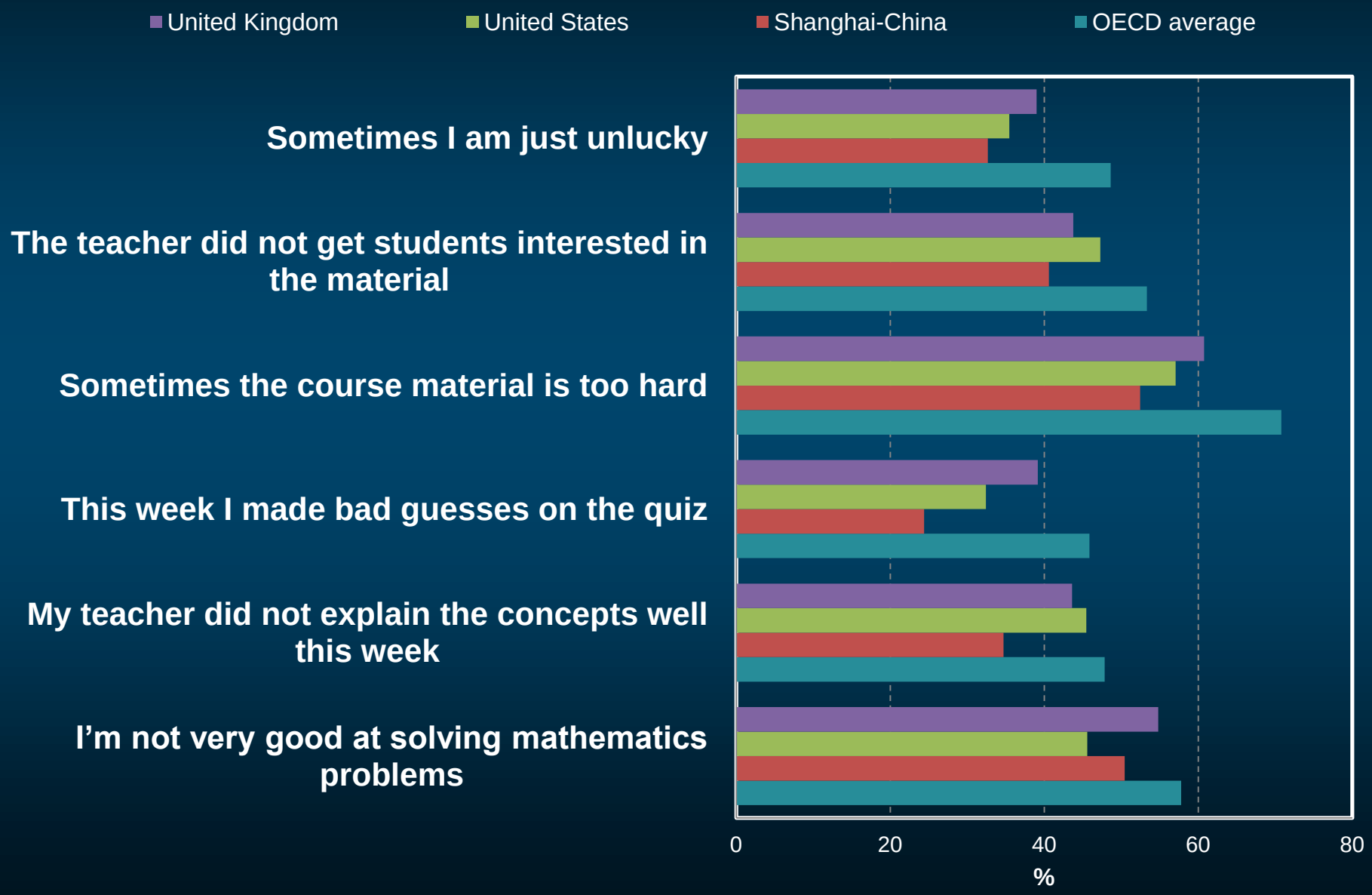
Increased likelihood that boys reported that they had arrived late at least once in the two weeks prior to the PISA test



Social and emotional dimensions matter too

Perceived self-responsibility for failure in mathematics

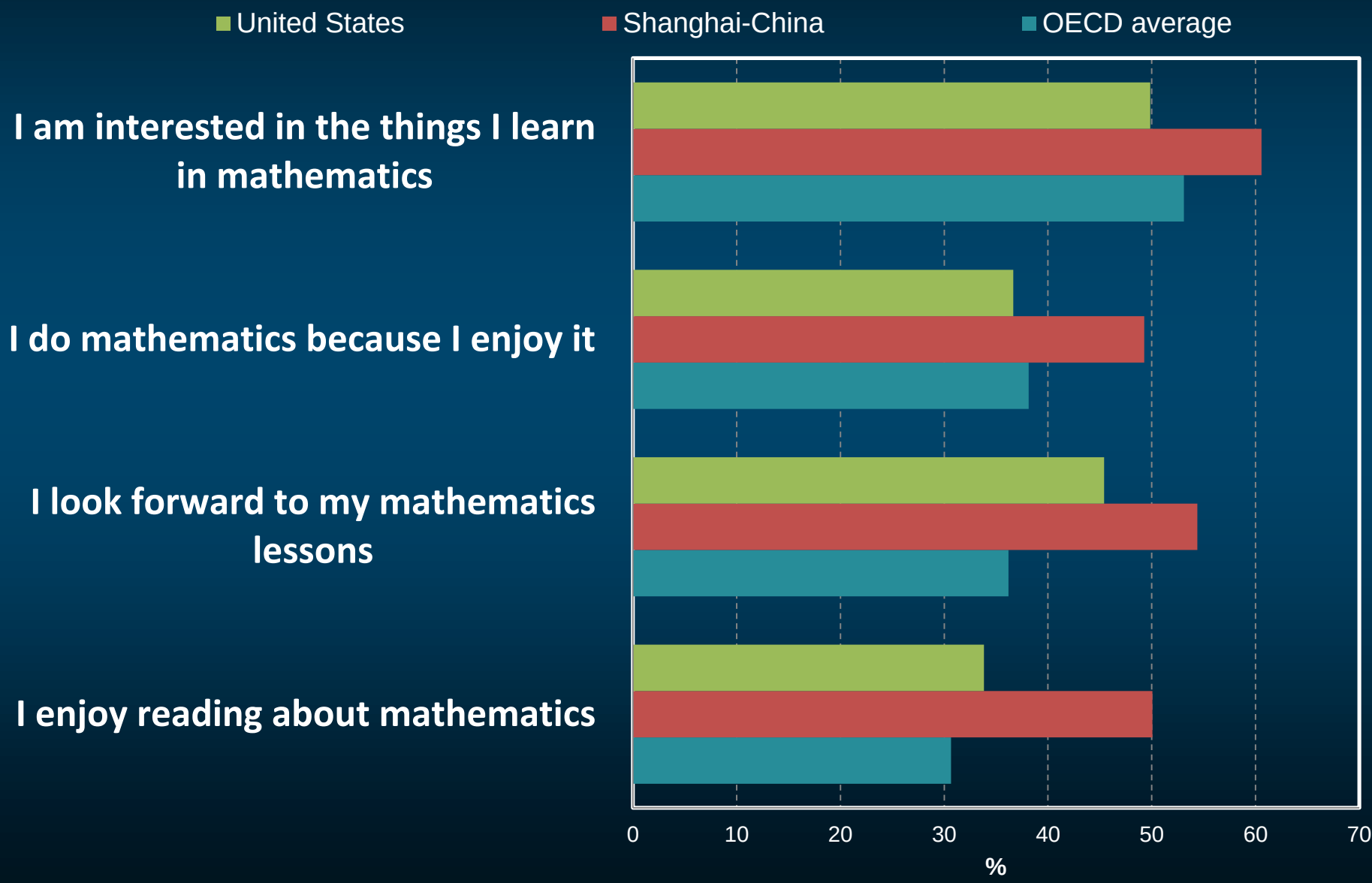
Percentage of students who reported "agree" or "strongly agree" with the following statements:



Motivation to learn mathematics

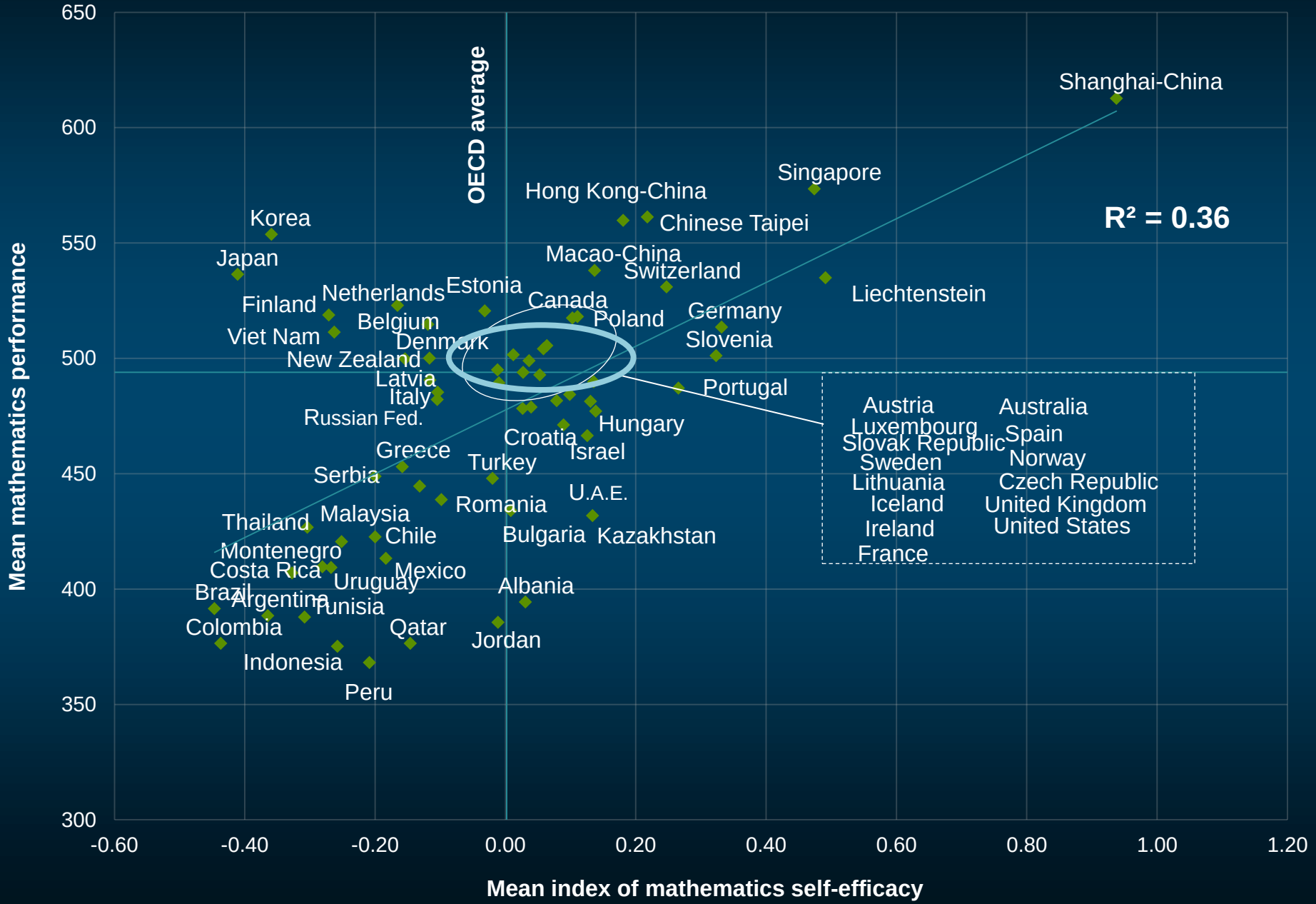
Fig III.3.9

Percentage of students who reported "agree" or "strongly agree" with the following statements:



Countries where students have stronger beliefs in their abilities perform better in mathematics

Fig III.4.5

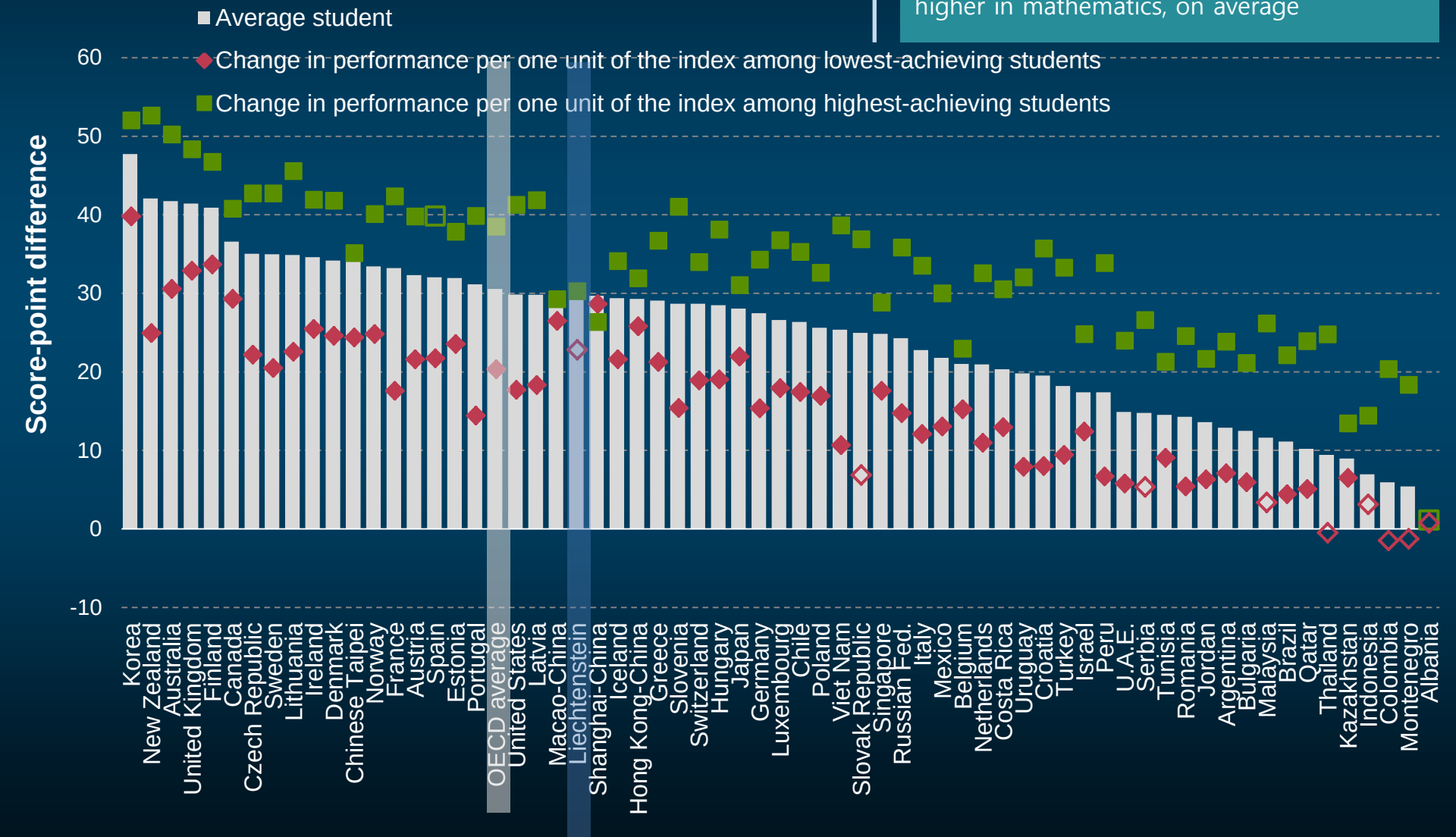


Students open to problem solving perform better

Fig III.3.5

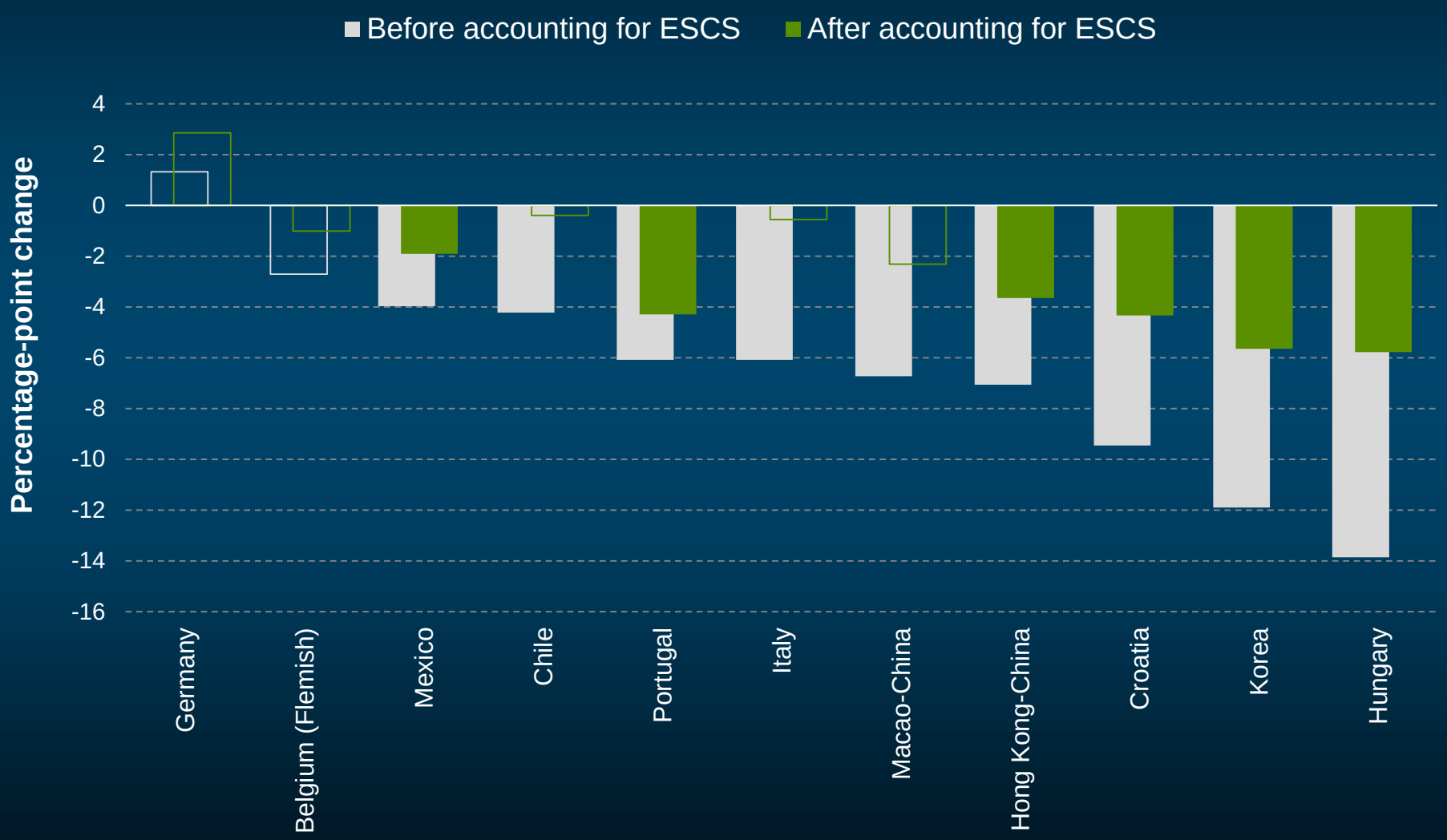
Score-point difference in mathematics associated with one unit of the index of students' openness to problem solving

Students who feel that they can handle a lot of information, seek explanations for things, can easily link facts together, and like to solve complex problems – score 30 points higher in mathematics, on average



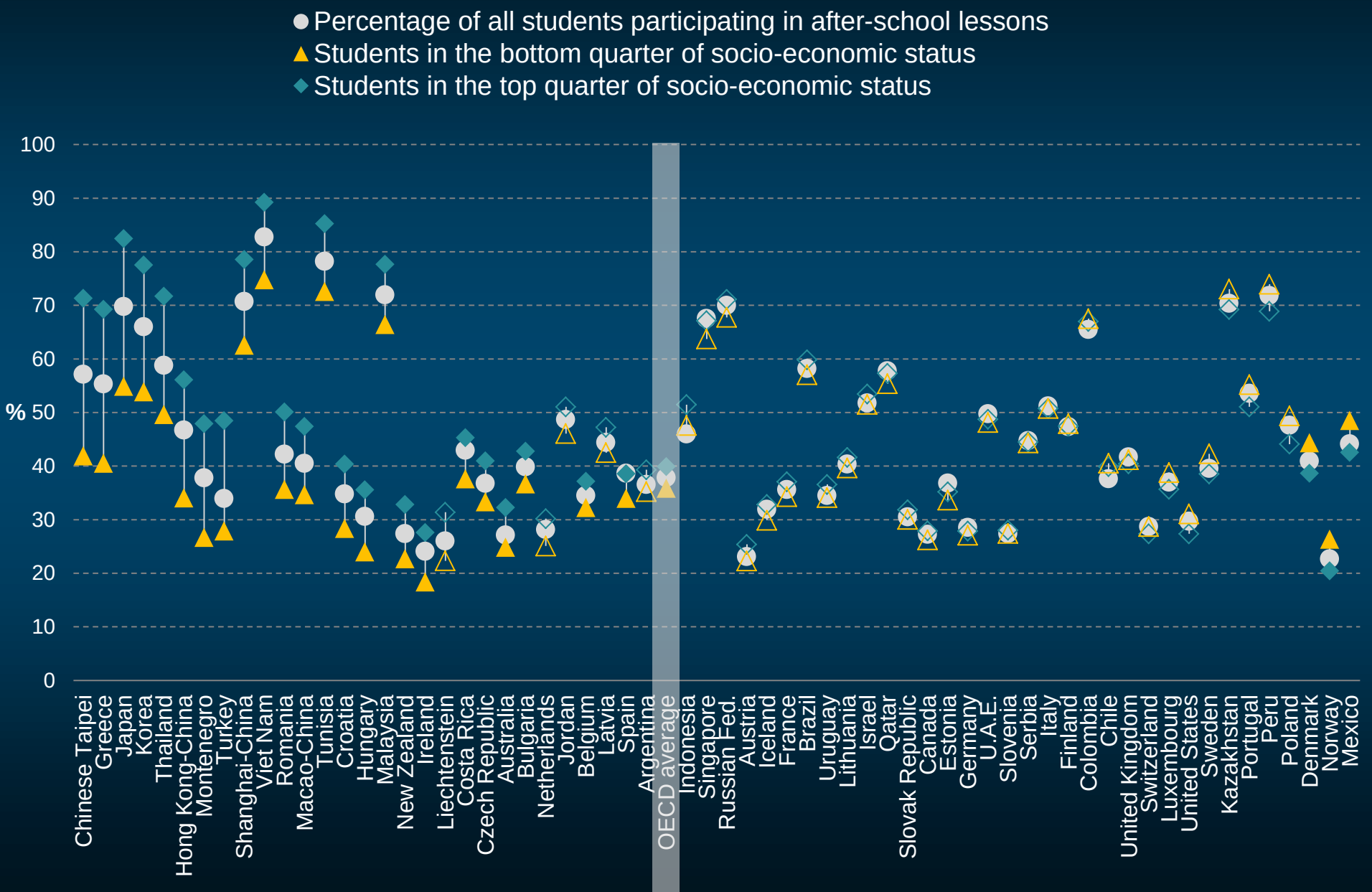
Parents' expectations for their child have a strong influence on students' behaviour towards school

Percentage-point change in arriving late for school that is associated with parents expecting the child to complete a university degree



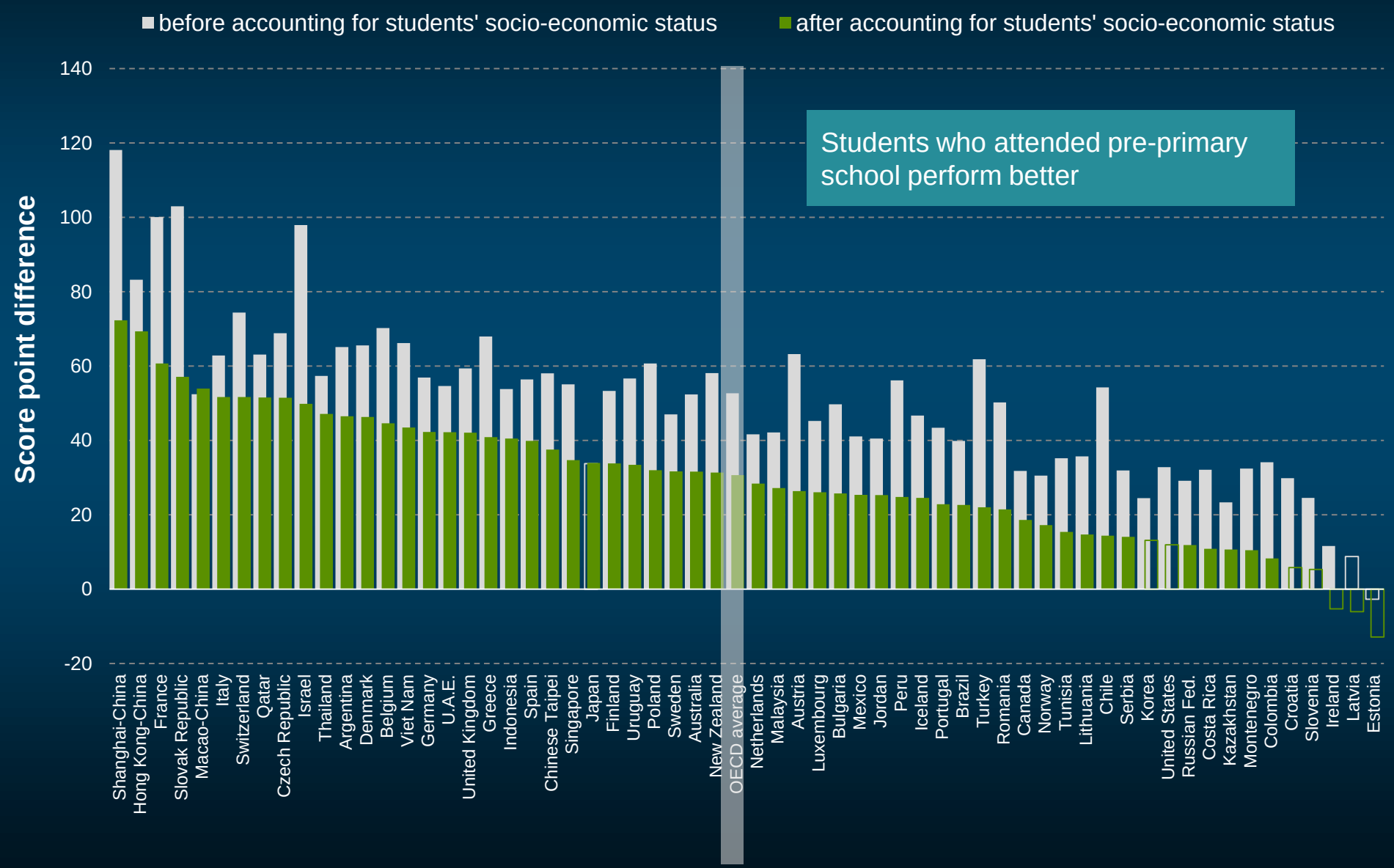
In many countries, more advantaged than disadvantaged students attend after-school lessons

Fig IV.3.11



Difference in mathematics performance, by attendance at pre-primary school

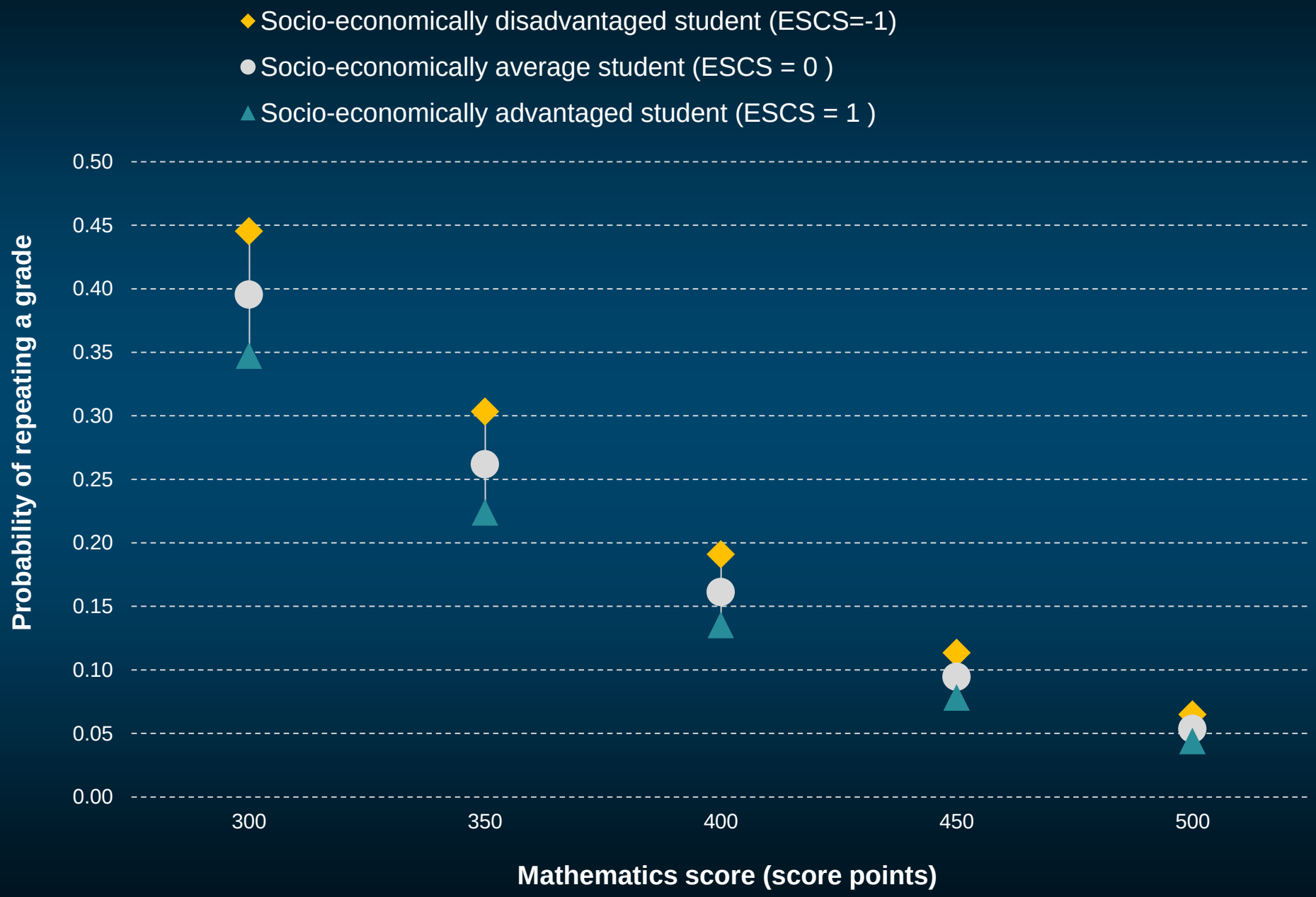
Fig III.4.12



Schools policies and practice

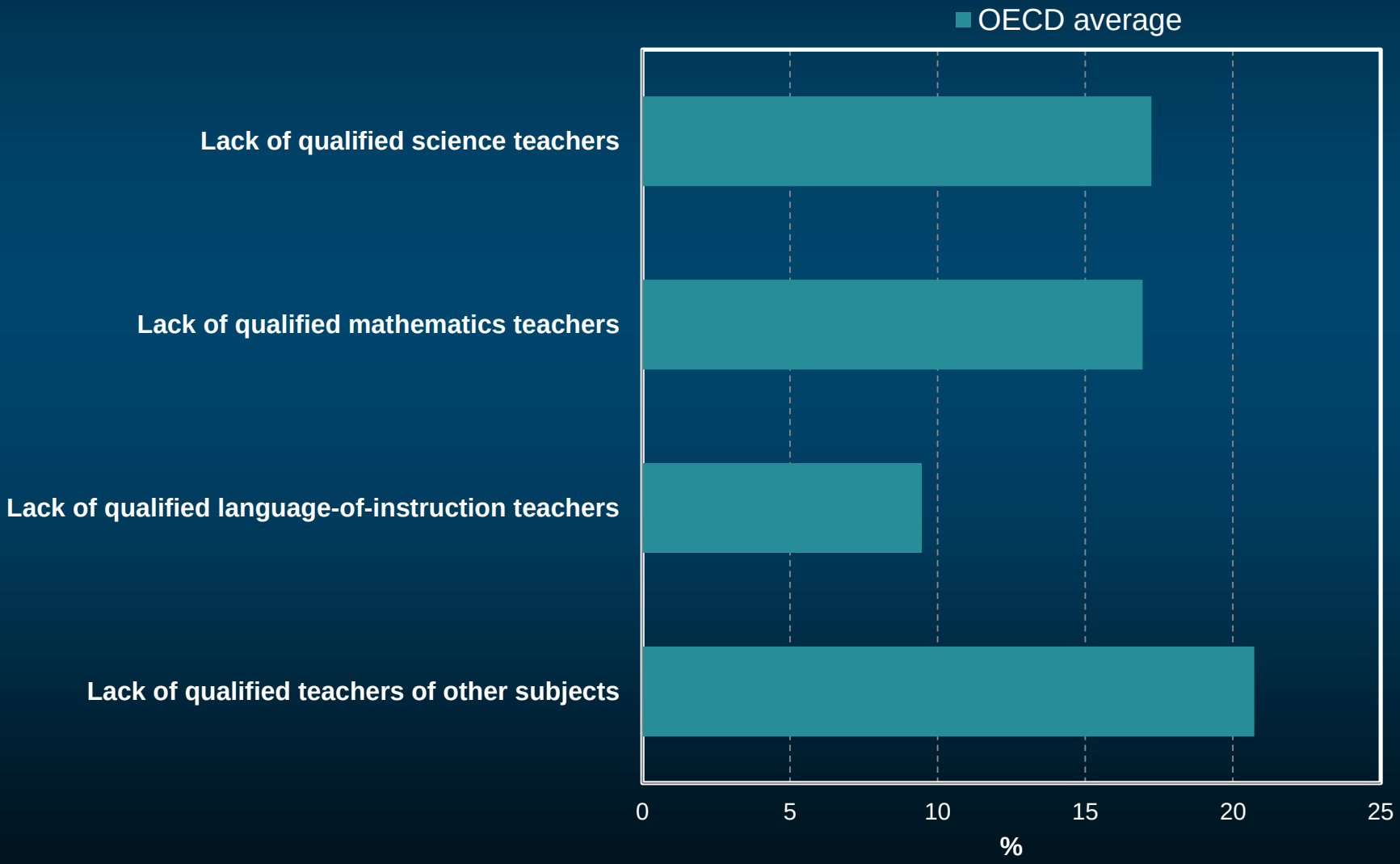
In most countries, disadvantaged students are more likely to have repeated a grade than advantaged students

Fig IV.2.3



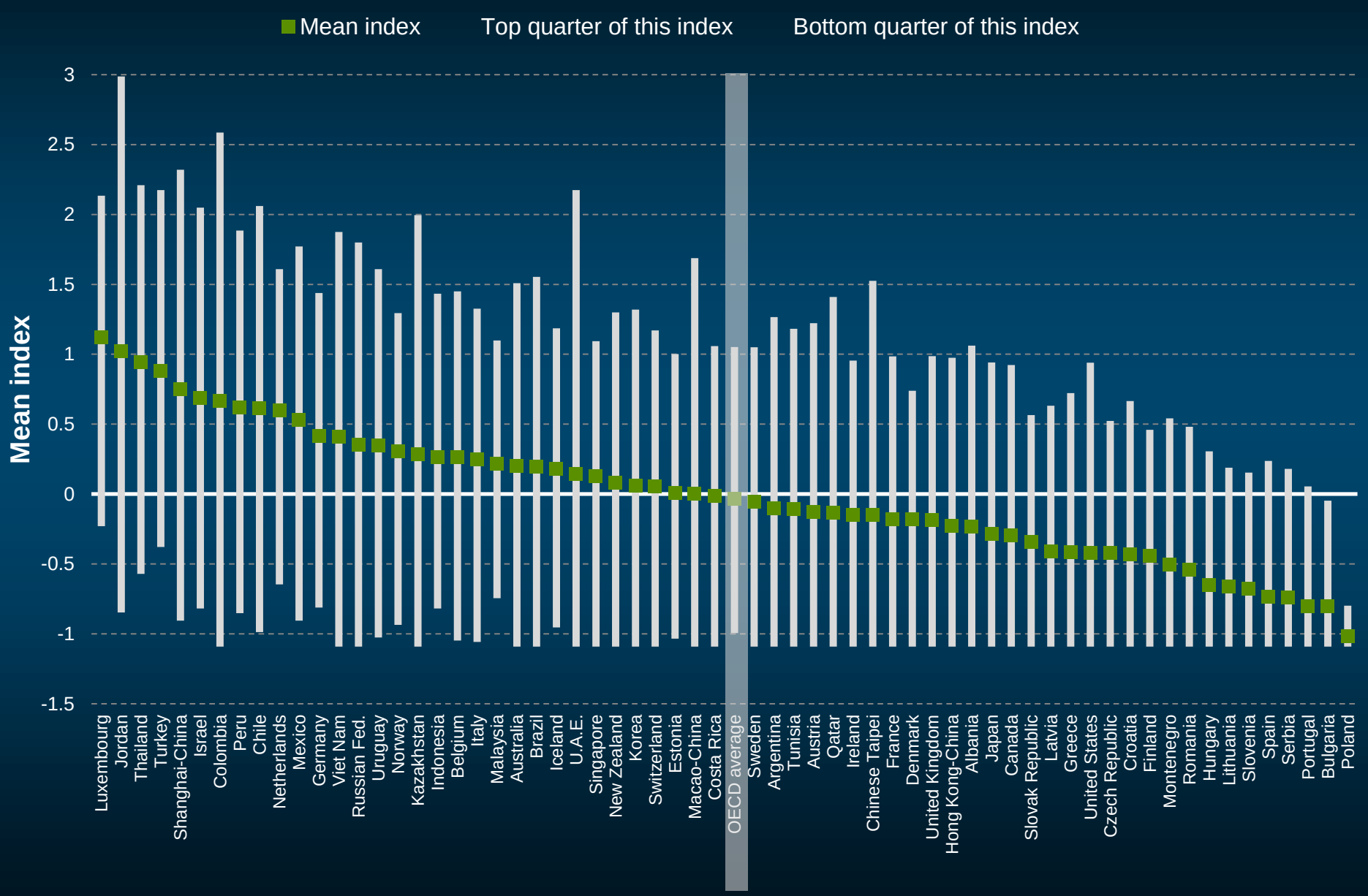
Teacher shortage

Percentage of students in schools whose principals reported that the following phenomena hindered student learning "to some extent" or "a lot":



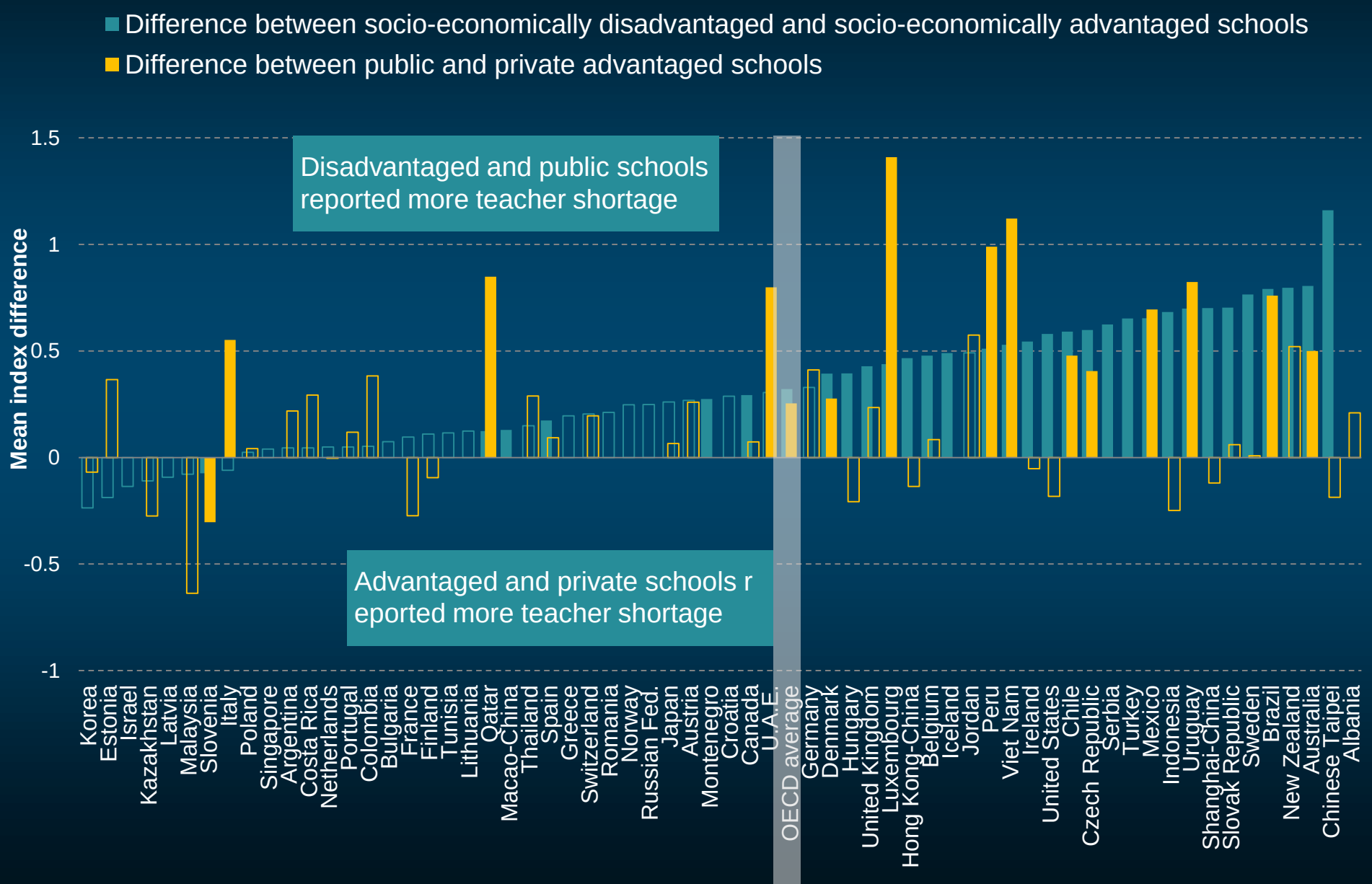
Teacher shortage

Fig IV.3.5



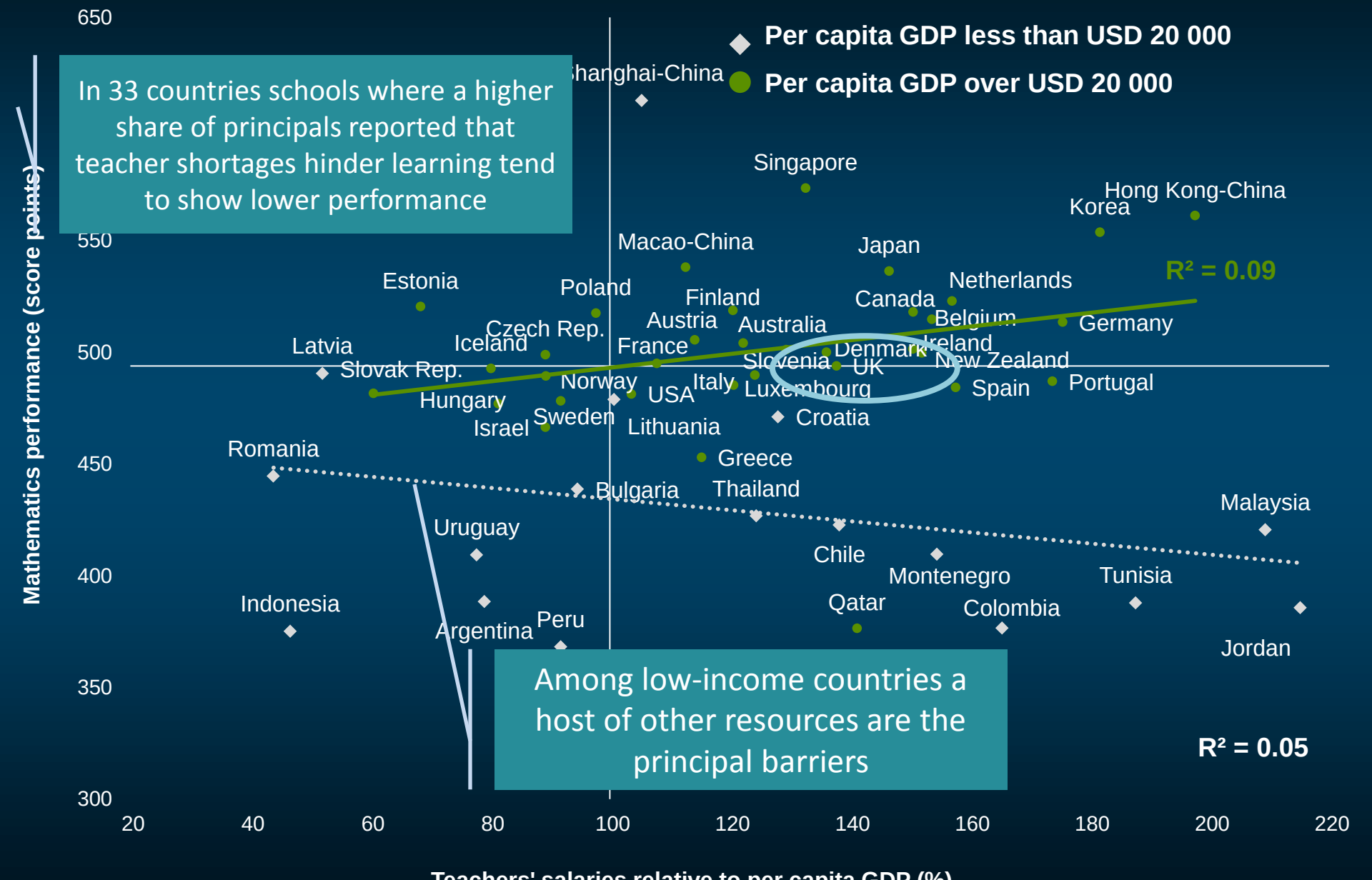
Teacher shortage is more of concern in disadvantaged schools also in public schools, in most countries

Fig IV.3.5



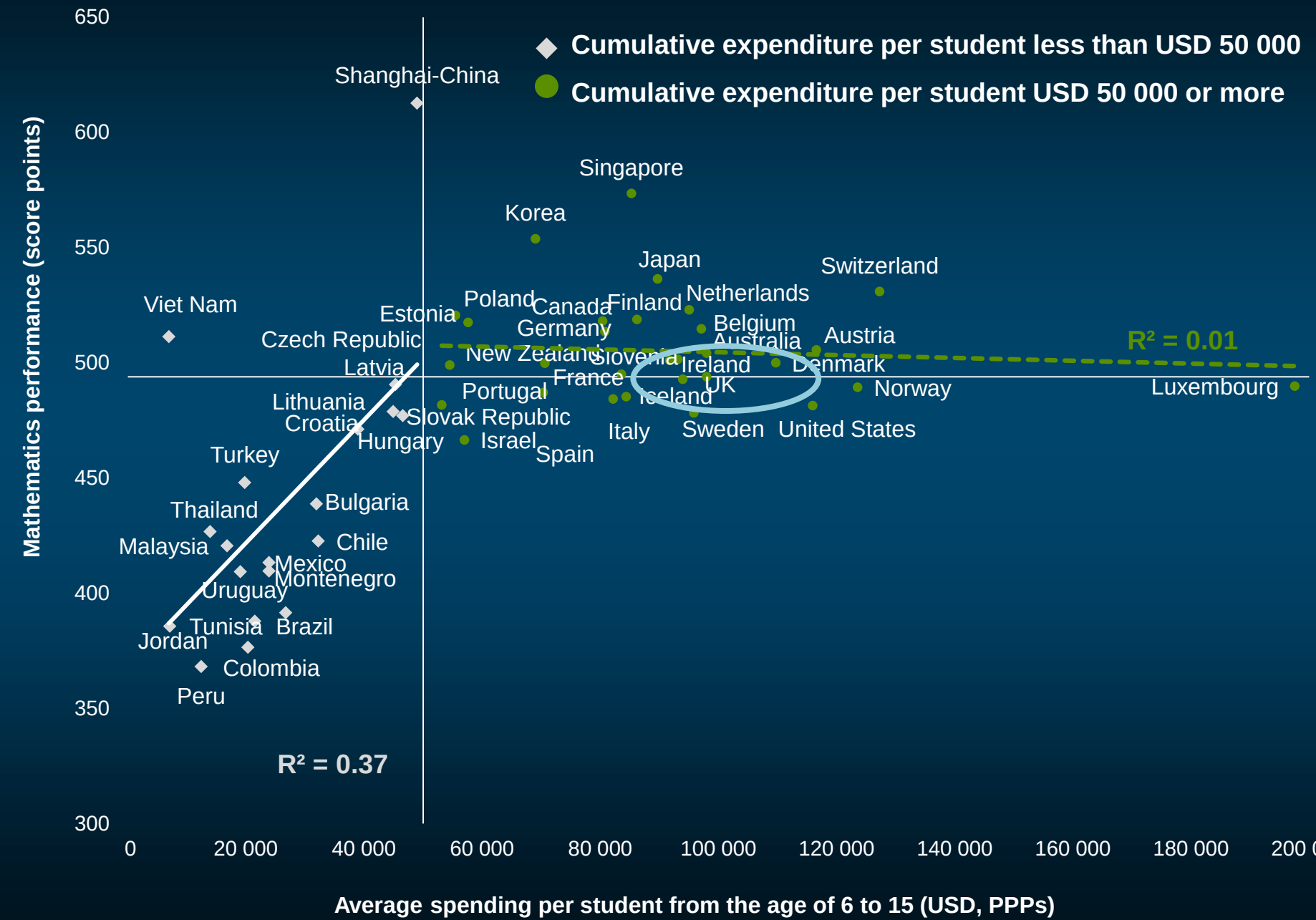
Among high-income countries high-performers pay teachers more

Fig IV.1.10



Spending per student from the age of 6 to 15 and mathematics performance in PISA 2012

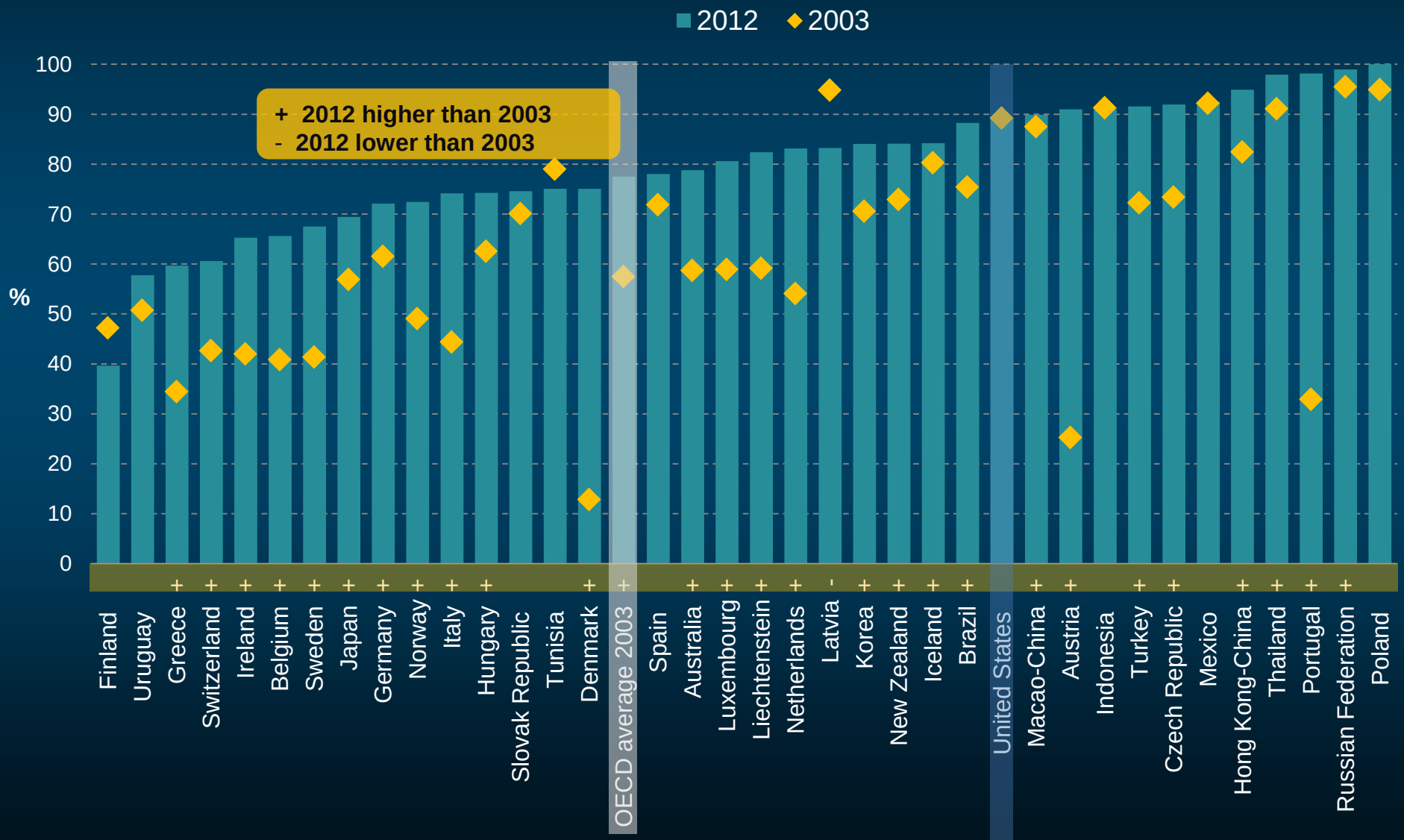
Fig IV.1.8



Change between 2003 and 2012 in using student assessment data to monitor teachers

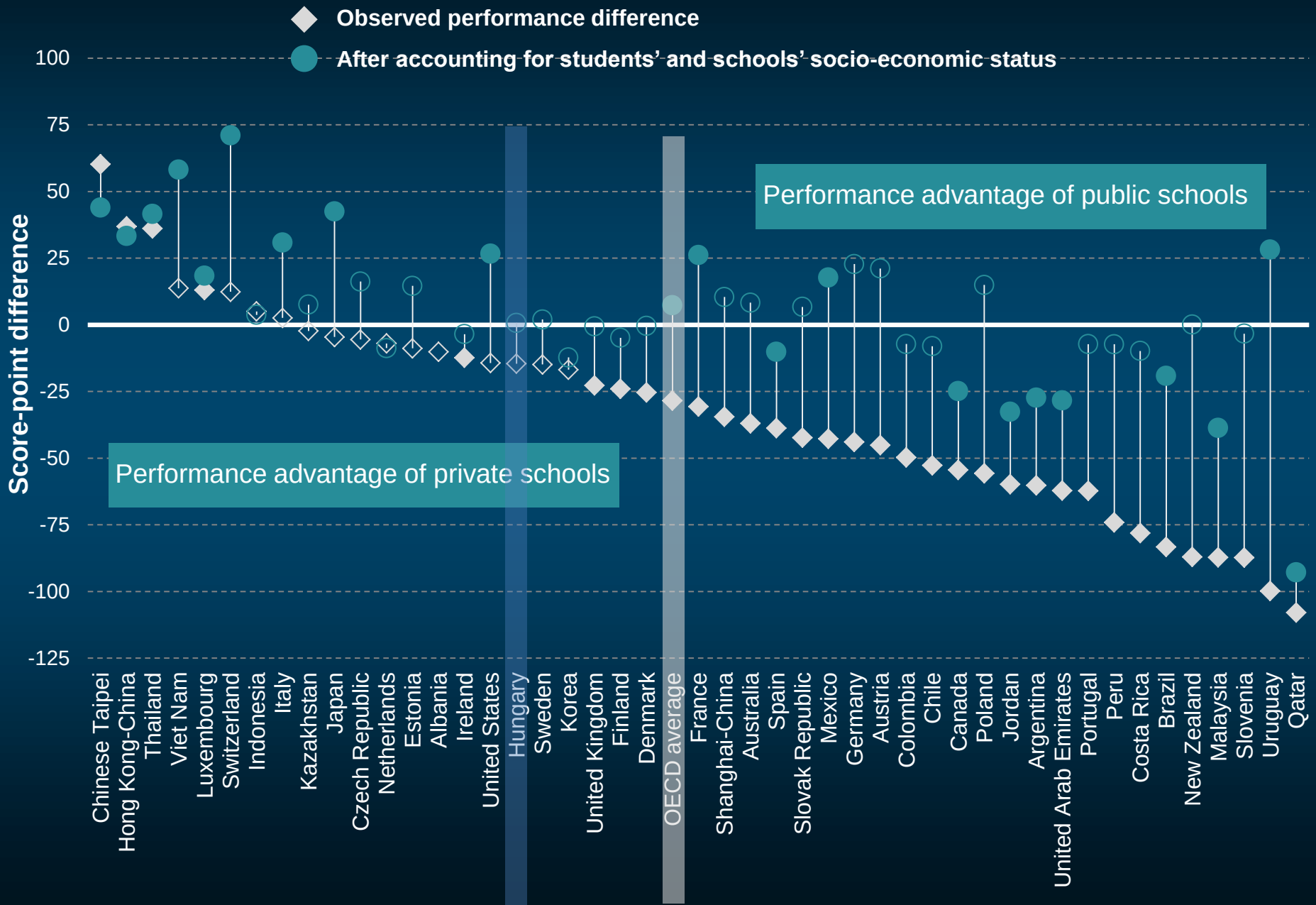
Fig IV.4.19

Percentage of students in schools that use assessment data to monitor teachers:



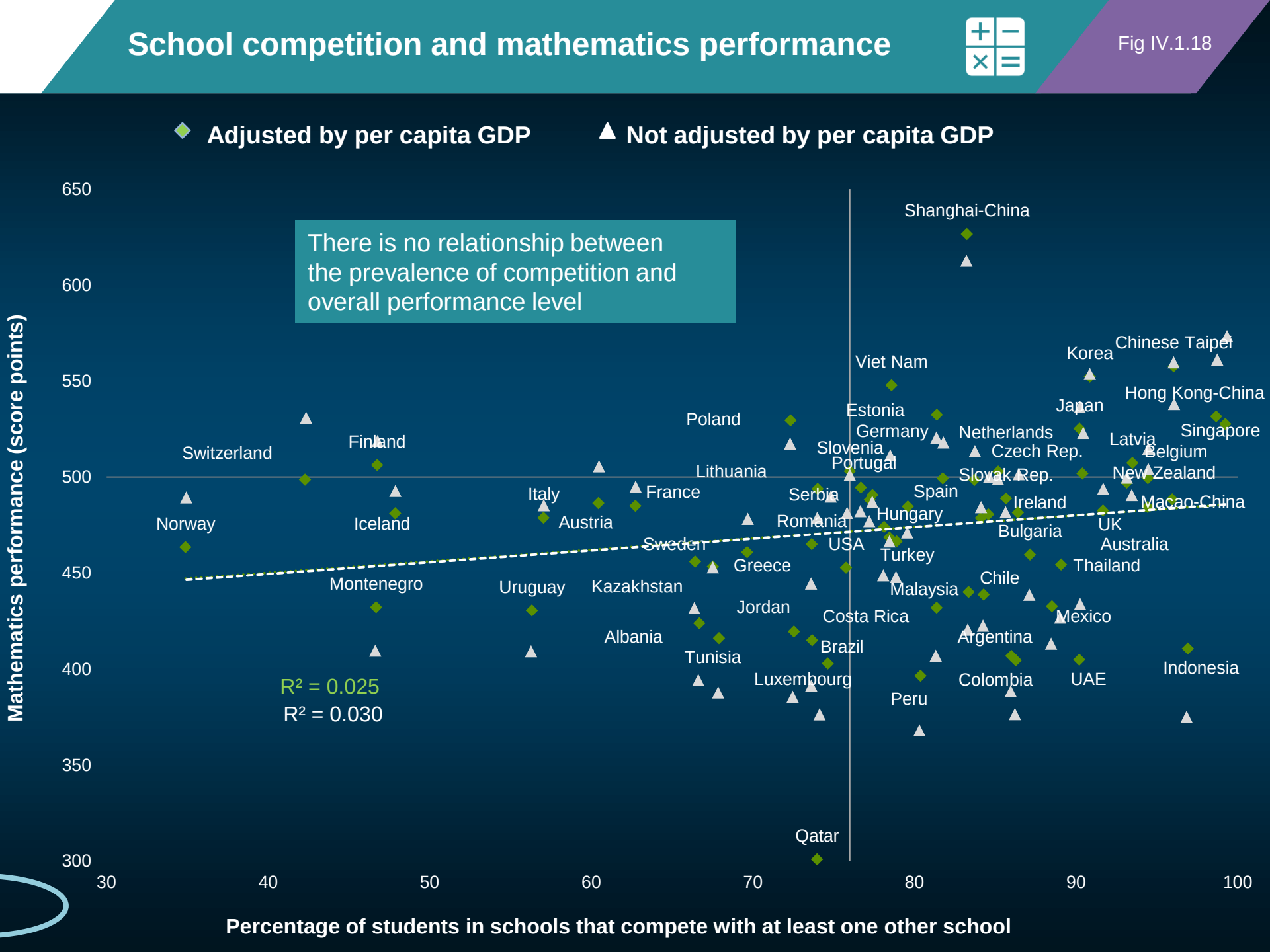
Differences in mathematics performance between private and public schools shrink considerably after accounting for socio-economic status

Fig IV.1.19



School competition and mathematics performance

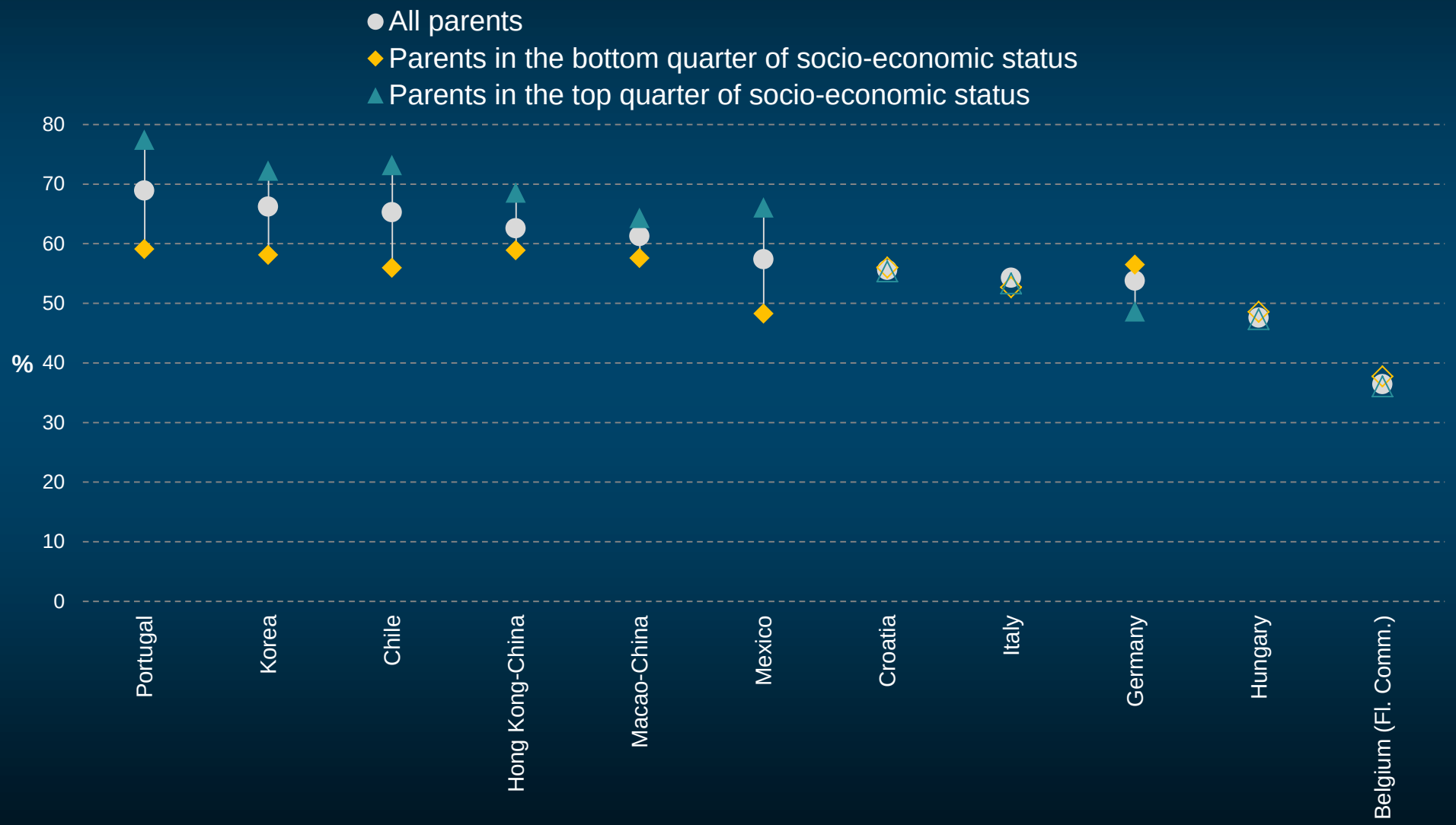
Fig IV.1.18



Parents everywhere look for a safe school environment for their child

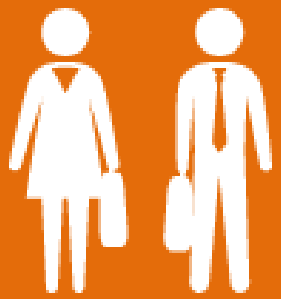
Fig IV.4.5

Percentage of parents who reported that a safe school environment is a very important criterion in choosing a school for their child



Do you have an idea on how to use this data to improve education in your country?

Would you like to work with us to develop that idea?



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- The complete micro-level database

Thank you !

Email: Pablo.Zoido@OECD.org