

Las claves del éxito de los países asiáticos

Ismael Sanz, 4 de julio 2017
UIMP

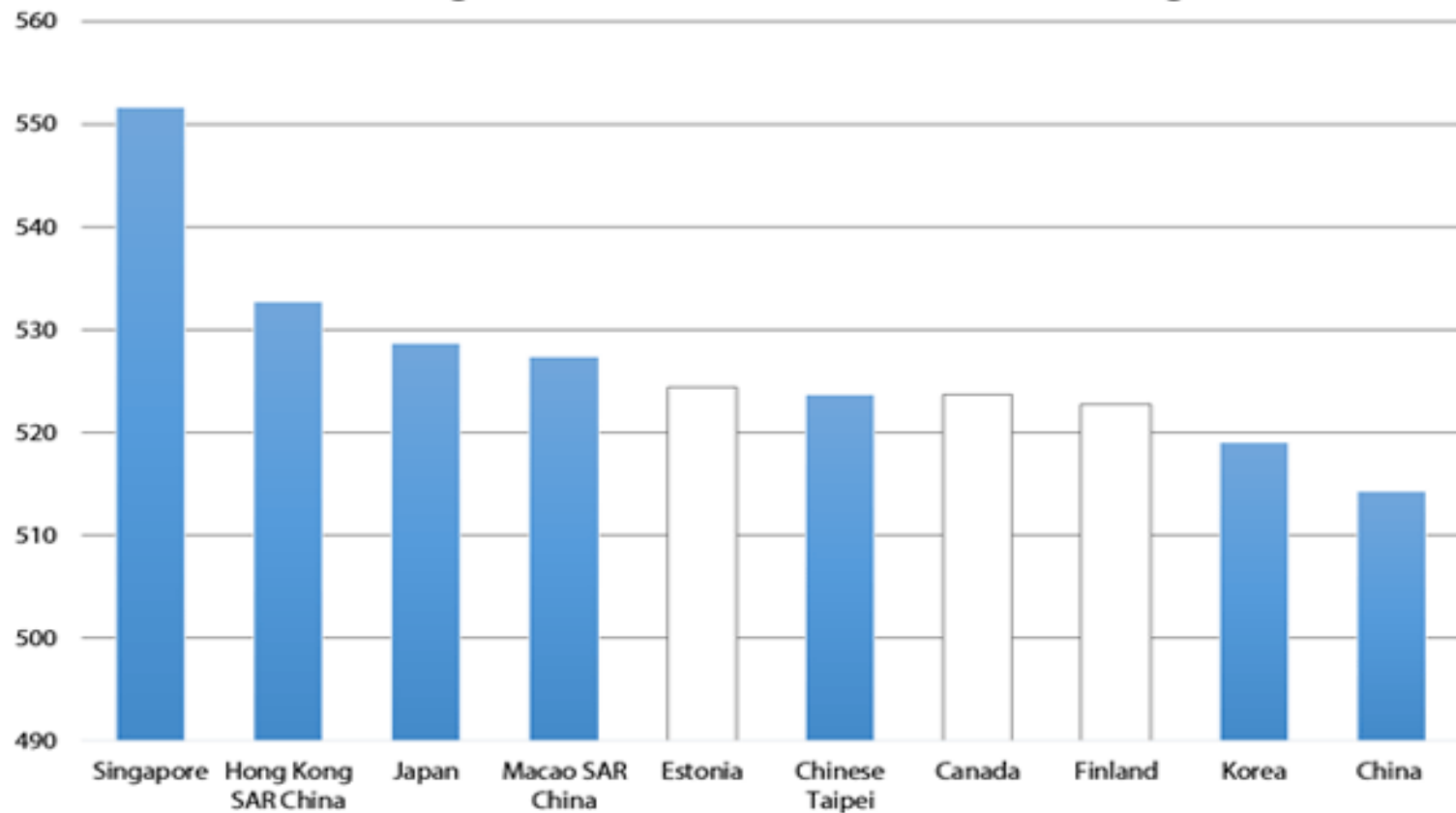
Snapshot of performance in science, reading and mathematics

Countries/economies with a mean performance/share of top performers above the OECD average
Countries/economies with a share of low achievers below the OECD average
Countries/economies with a mean performance/share of top performers/share of low achievers not significantly different from the OECD average
Countries/economies with a mean performance/share of top performers below the OECD average
Countries/economies with a share of low achievers above the OECD average

	Science		Reading		Mathematics		Science, reading and mathematics	
	Mean score in PISA 2015	Average three-year trend	Mean score in PISA 2015	Average three-year trend	Mean score in PISA 2015	Average three-year trend	Share of top performers in at least one subject (Level 5 or 6)	Share of low achievers in all three subjects (below Level 2)
	Mean	Score dif.	Mean	Score dif.	Mean	Score dif.	%	%
OECD average	493	-1	493	-1	490	-1	15.3	13.0
Singapore	556	7	535	5	564	1	39.1	4.8
Japan	538	3	516	-2	532	1	25.8	5.6
Estonia	534	2	519	9	520	2	20.4	4.7
Chinese Taipei	532	0	497	1	542	0	29.9	8.3
Finland	531	-11	526	-5	511	-10	21.4	6.3
Macao (China)	529	6	509	11	544	5	23.9	3.5
Canada	528	-2	527	1	516	-4	22.7	5.9
Viet Nam	525	-4	487	-21	495	-17	12.0	4.5
Hong Kong (China)	523	-5	527	-3	548	1	29.3	4.5
B-S-J-G (China)	518	m	494	m	531	m	27.7	10.9
Korea	516	-2	517	-11	524	-3	25.6	7.7
New Zealand	513	-7	509	-6	495	-8	20.5	10.6
Slovenia	513	-2	505	11	510	2	18.1	8.2
Australia	510	-6	503	-6	494	-8	18.4	11.1
United Kingdom	509	-1	498	2	492	-1	16.9	10.1
Germany	509	-2	509	6	506	2	19.2	9.8
Netherlands	509	-5	503	-3	512	-6	20.0	10.9
Switzerland	506	-2	492	-4	521	-1	22.2	10.1
Ireland	503	0	521	13	504	0	15.5	6.8
Belgium	502	-3	499	-4	507	-5	19.7	12.7
Denmark	502	2	500	3	511	-2	14.9	7.5

PISA 2015: Top 10 PERFORMERS

(averaged scores across science, math reading)



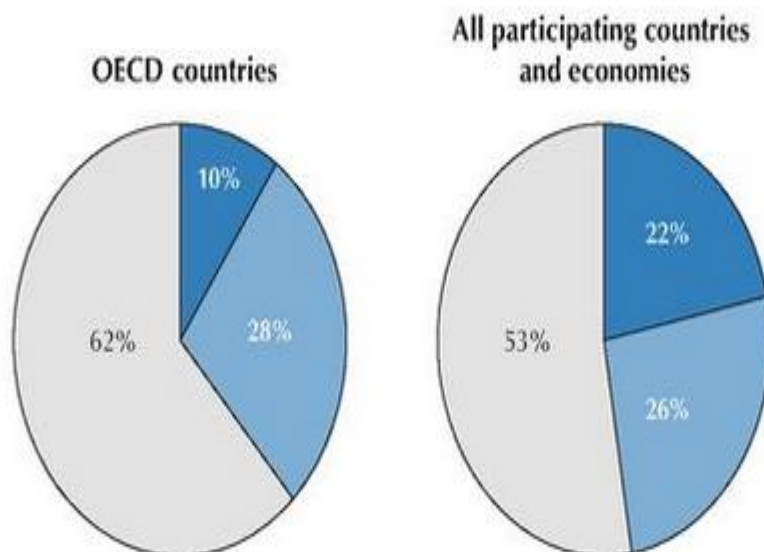
China = Beijing, Shanghai, Jiangsu, Guangdong



Figure II.7.1 ■ **Variation in science performance between systems, schools and students**

Variation in science performance attributable to differences:

- Between systems
- Between schools
- Between students



Source: OECD, PISA 2015 Database.


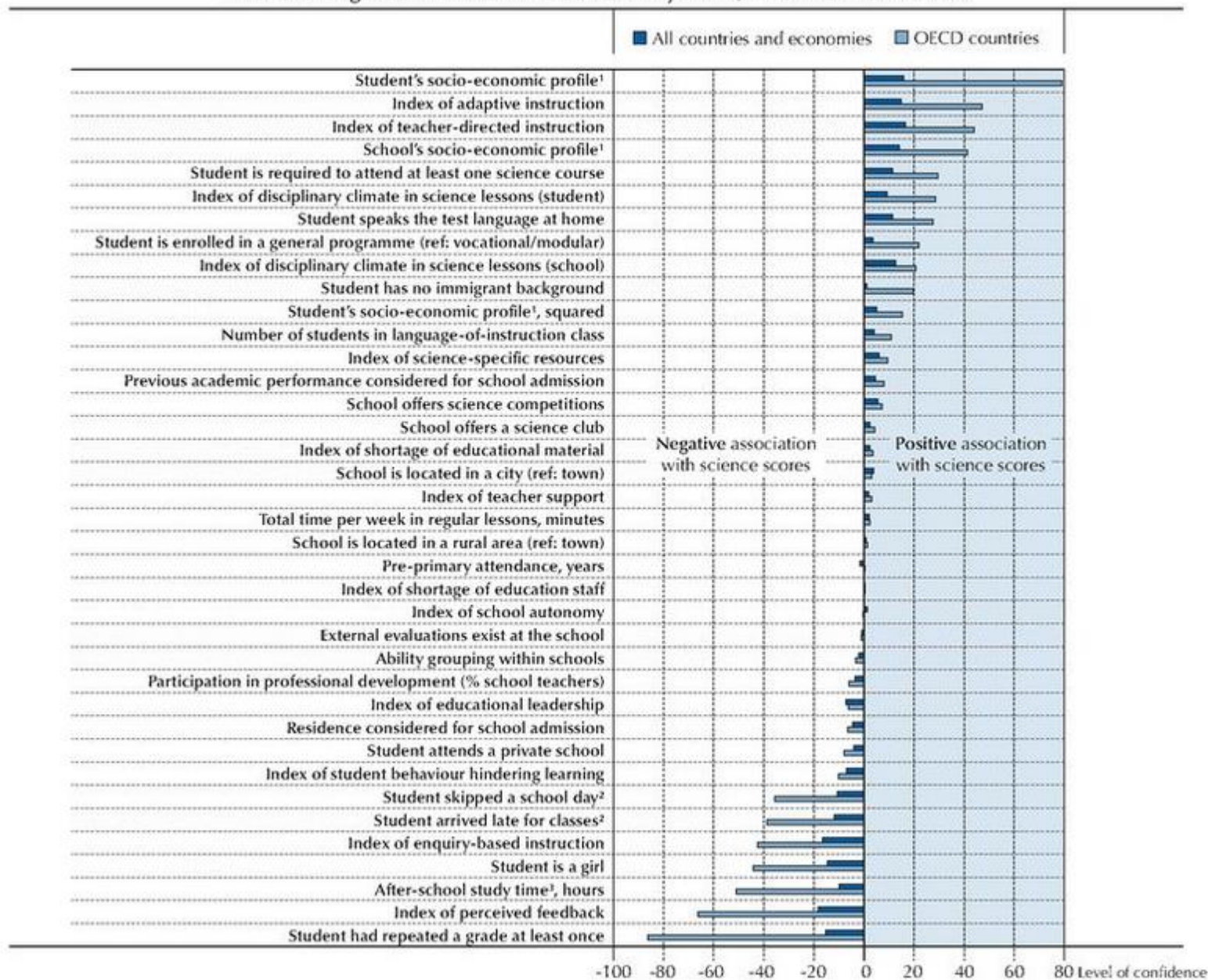
StatLink  <http://dx.doi.org/10.1767/888933436449>

Figure II.7.2 ■ **Factors associated with science performance**
 Multilevel regression models of education systems, schools and students



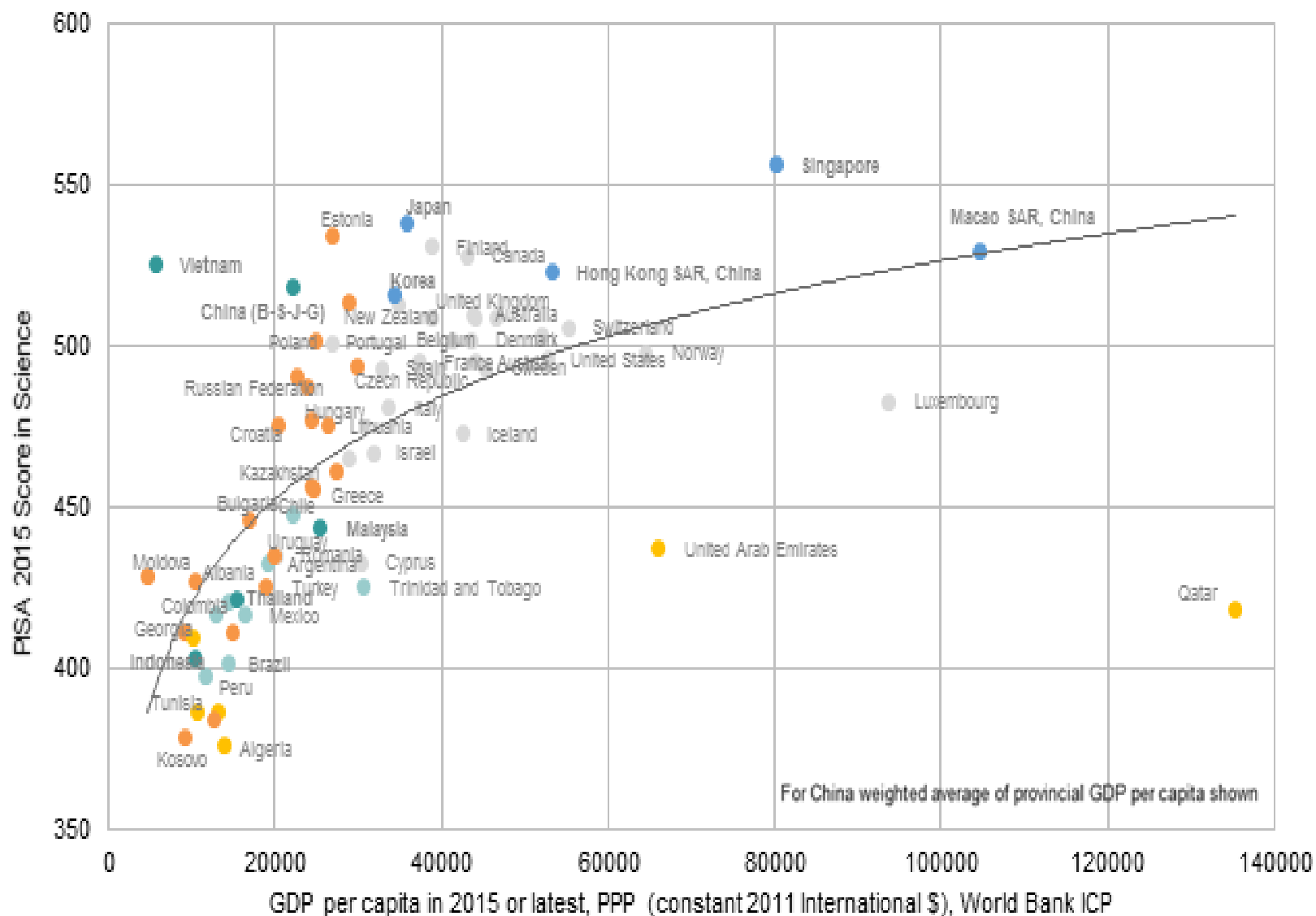


Figure I.1.3 [Part 1/2] ■ Snapshot of equity in education

<div> <div></div> Countries/economies with higher performance or greater equity than the OECD average <div></div> Countries with values not statistically different from the OECD average <div></div> Countries/economies with lower performance or less equity than the OECD average </div>					
	Mean science score in PISA 2015	Inclusion and fairness indicators			
		Coverage of the national 15-year-old population (PISA Coverage index 3)	Percentage of variation in science performance explained by students' socio-economic status	Score-point difference in science associated with one-unit increase on the PISA index of economic, social and cultural status ¹	Percentage of resilient students ³
		Mean index	%	Score dif. ²	%
OECD average	493	0.89	12.9	38	29.2
Singapore	556	0.96	17	47	48.8
Japan	538	0.95	10	42	48.8
Estonia	534	0.93	8	32	48.3
Chinese Taipei	532	0.85	14	45	46.3
Finland	531	0.97	10	40	42.8
Macao (China)	529	0.88	2	12	64.6
Canada	528	0.84	9	34	38.7
Viet Nam	525	0.49	11	23	75.5
Hong Kong (China)	523	0.89	5	19	61.8
B-S-J-G (China)	518	0.64	18	40	45.3
Korea	516	0.92	10	44	40.4
New Zealand	513	0.90	14	49	30.4
Slovenia	513	0.93	13	43	34.6
Australia	510	0.91	12	44	32.9
United Kingdom	509	0.84	11	37	35.4
Germany	509	0.96	16	42	33.5
Netherlands	509	0.95	13	47	30.7
Switzerland	506	0.96	16	43	29.1
Ireland	503	0.96	13	38	29.6
Belgium	502	0.93	19	48	27.2
Denmark	502	0.89	10	34	27.5
Poland	501	0.91	13	40	34.6
Portugal	501	0.88	15	31	38.1
Norway	498	0.91	8	37	26.5
United States	496	0.84	11	33	31.6
Austria	495	0.83	16	45	25.9
France	495	0.91	20	57	26.6
Sweden	493	0.94	12	44	24.7
Czech Republic	493	0.94	19	52	24.9
Spain	493	0.91	13	27	39.2
Latvia	490	0.89	9	26	35.2
Russia	487	0.95	7	29	25.5
Luxembourg	483	0.88	21	41	20.7
Italy	481	0.80	10	30	26.6
Hungary	477	0.90	21	47	19.3

Figure II.5.12 ■ Academic and social inclusion across schools

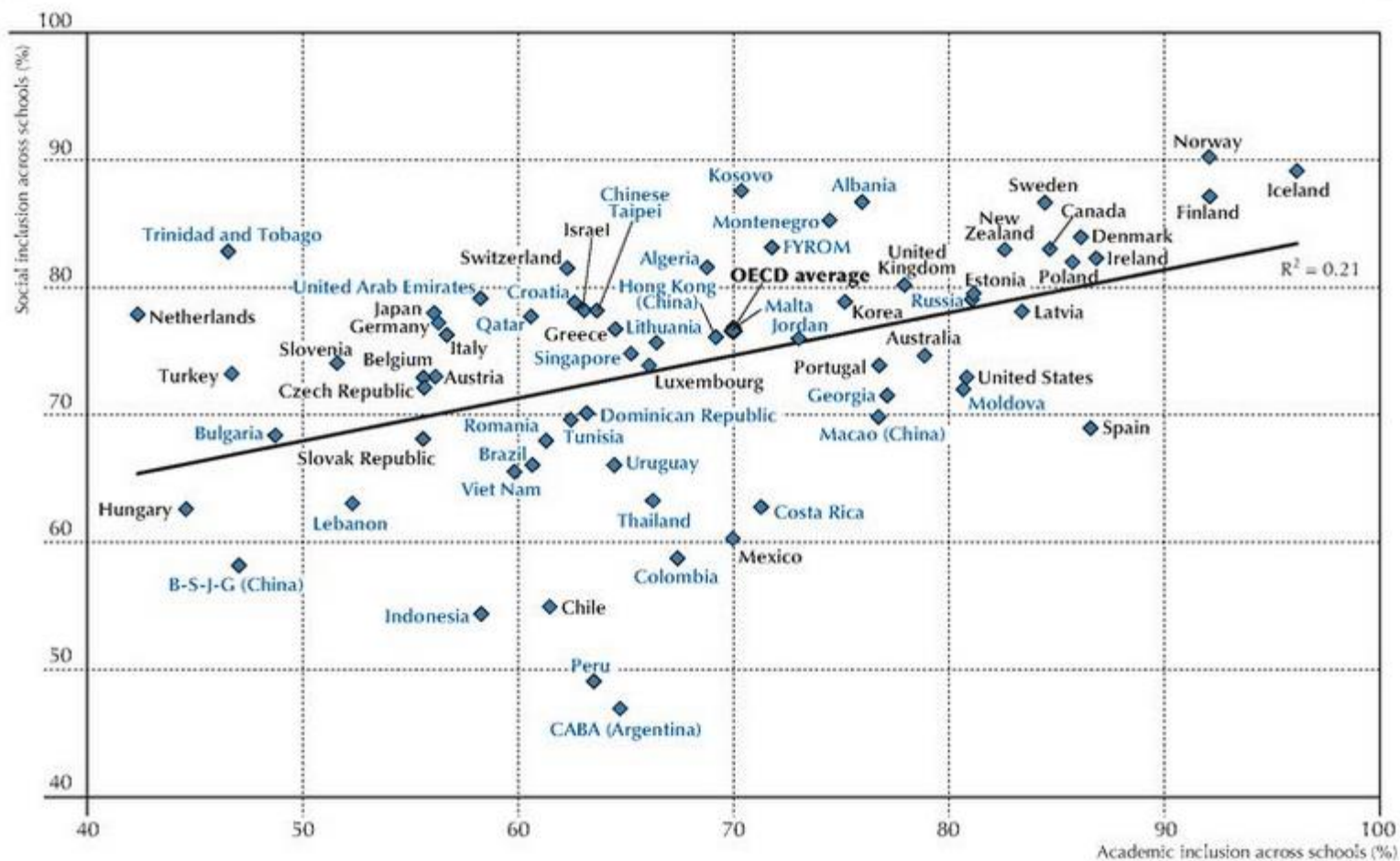


Figure II.6.2 ■ Spending per student from the age of 6 to 15 and science performance

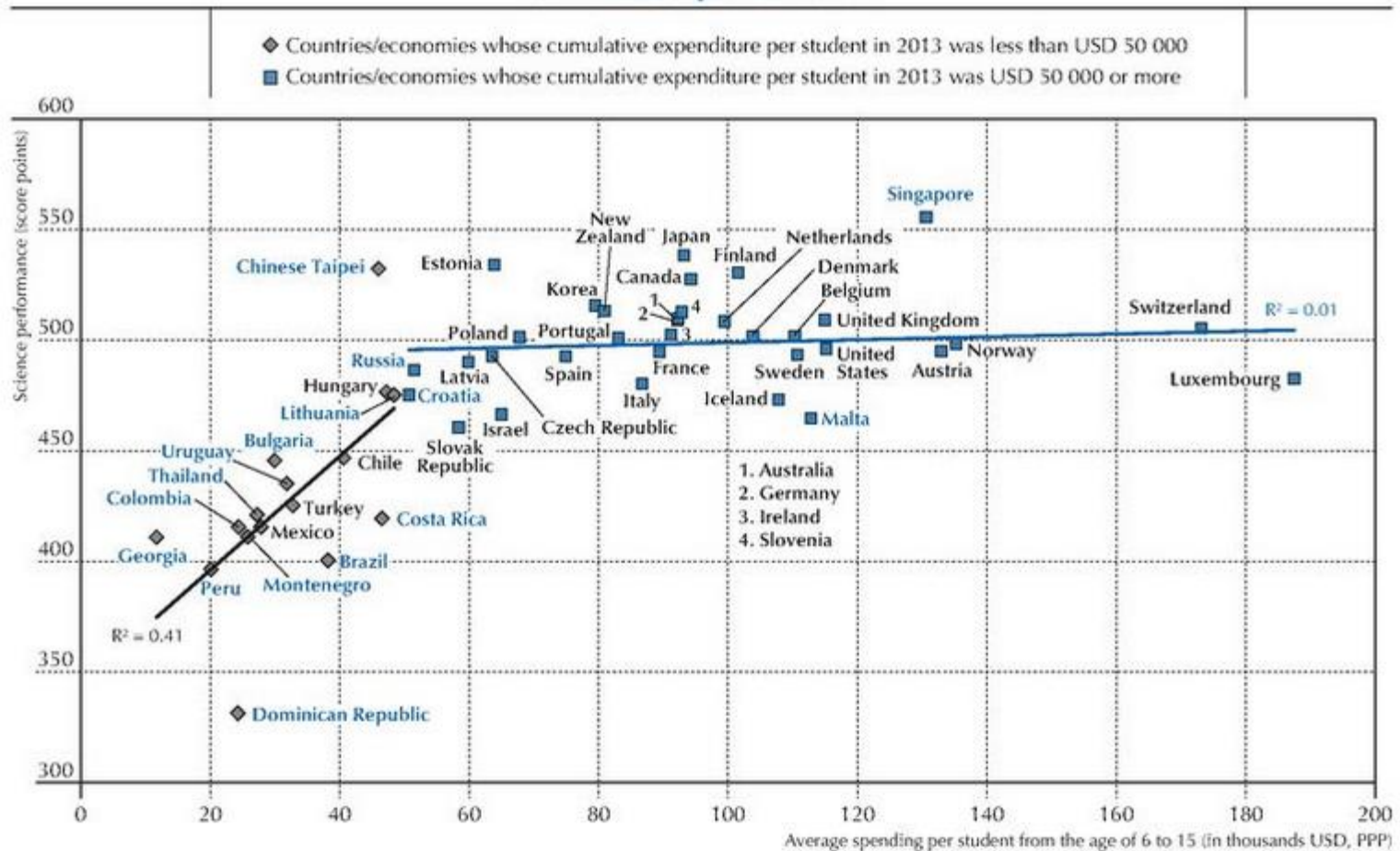
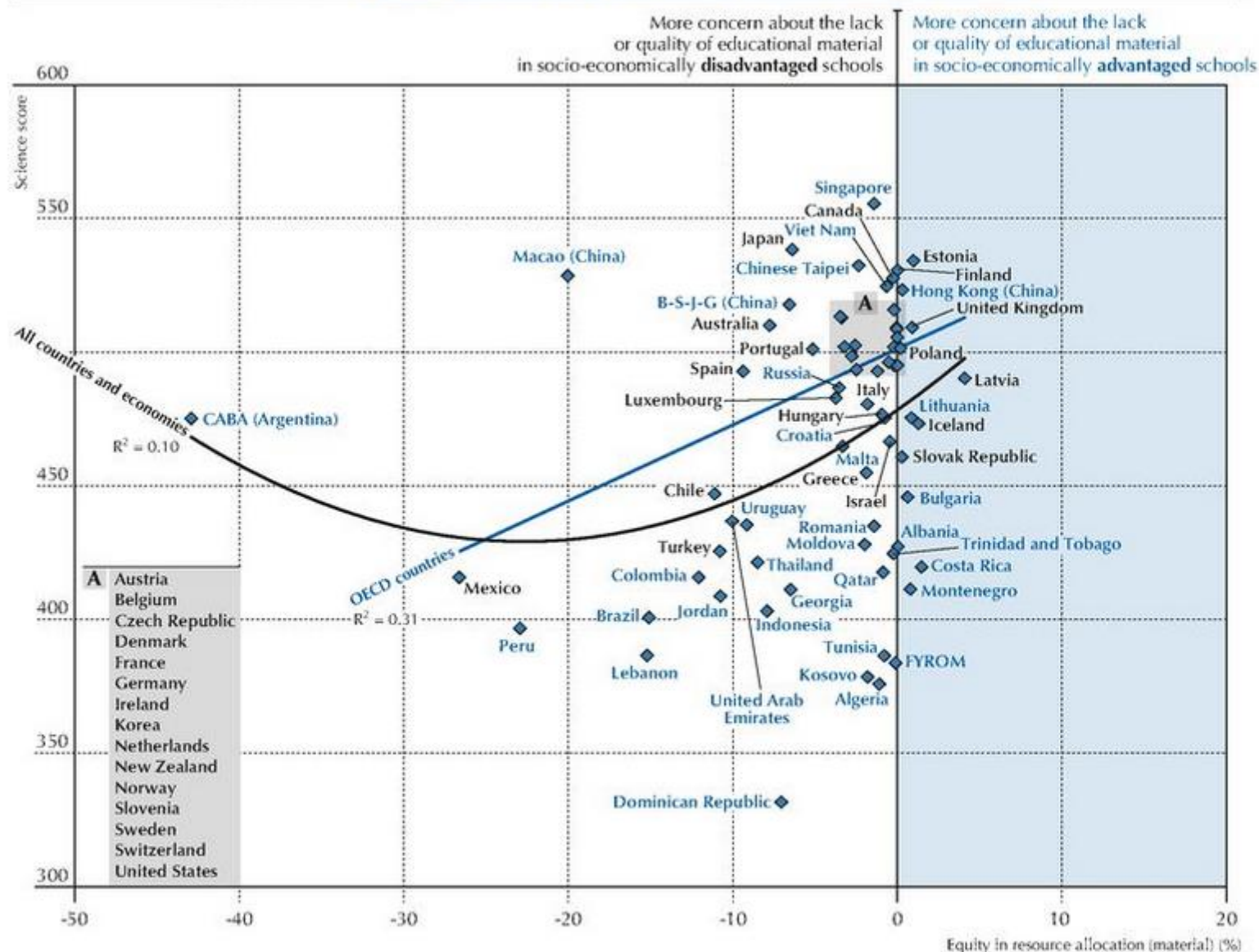


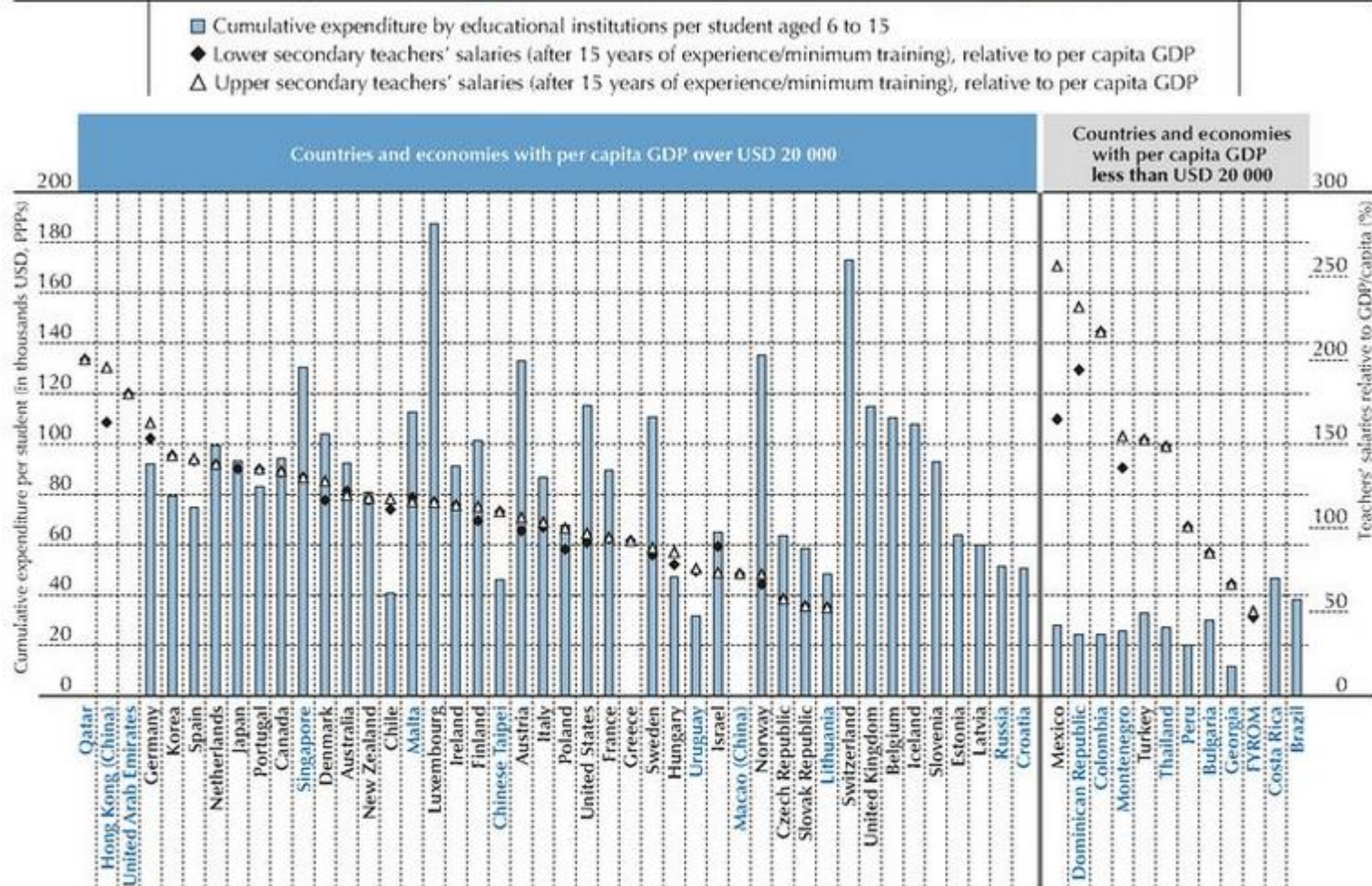
Figure II.6.4 ■ **Equity in resource allocation and science performance**



Note: Equity in resource allocation is the percentage of variance of the principal's concern about the educational material at the school explained by the school's socio-economic profile. A negative sign indicates that principals of socio-economically disadvantaged schools are more concerned about the educational material at the school than principals of advantaged schools.

Source: OECD, PISA 2015 Database, Tables I.2.3 and II.6.3.

Figure II.6.6 ■ **Expenditure on education and teachers' salaries**



Notes: Only countries and economies with available data are shown.

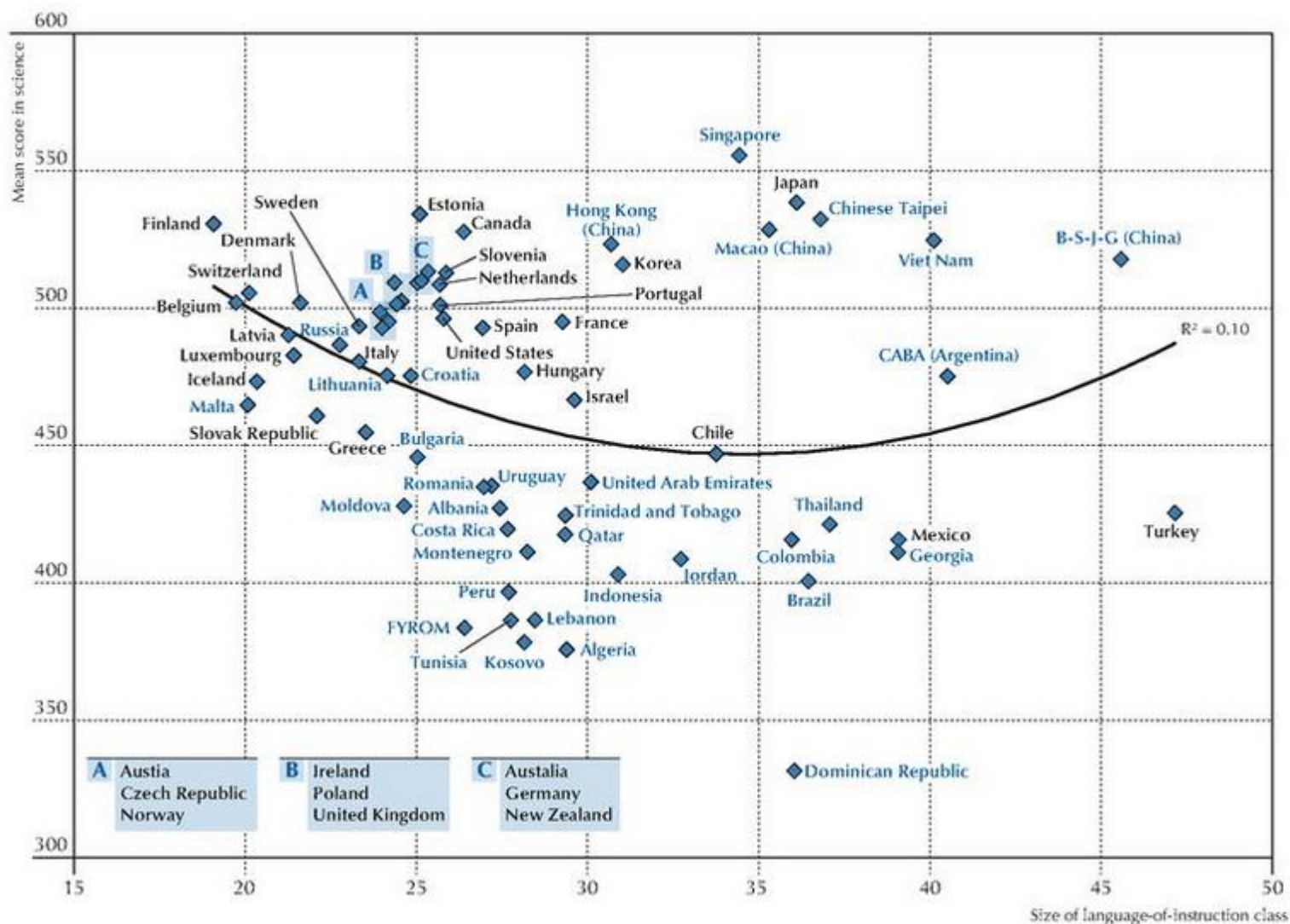
The reference year for the per capita GDP is 2013, except for the following countries: Bulgaria (2012), Canada (2012), Croatia (2015), Macao (China) (2014), Peru (2014) and Uruguay (2014).

Countries and economies are ranked in descending order of upper secondary teachers' salaries.

Source: OECD, PISA 2015 Database, Tables II.6.54, II.6.58 and II.6.59.

StatLink <http://dx.doi.org/10.1787/888933436255>

Figure II.6.16 ■ Relationship between class size and science performance



Source: OECD, PISA 2015 Database, Tables I.2.3 and II.6.26.


StatLink  <http://dx.doi.org/10.1787/888933436345>

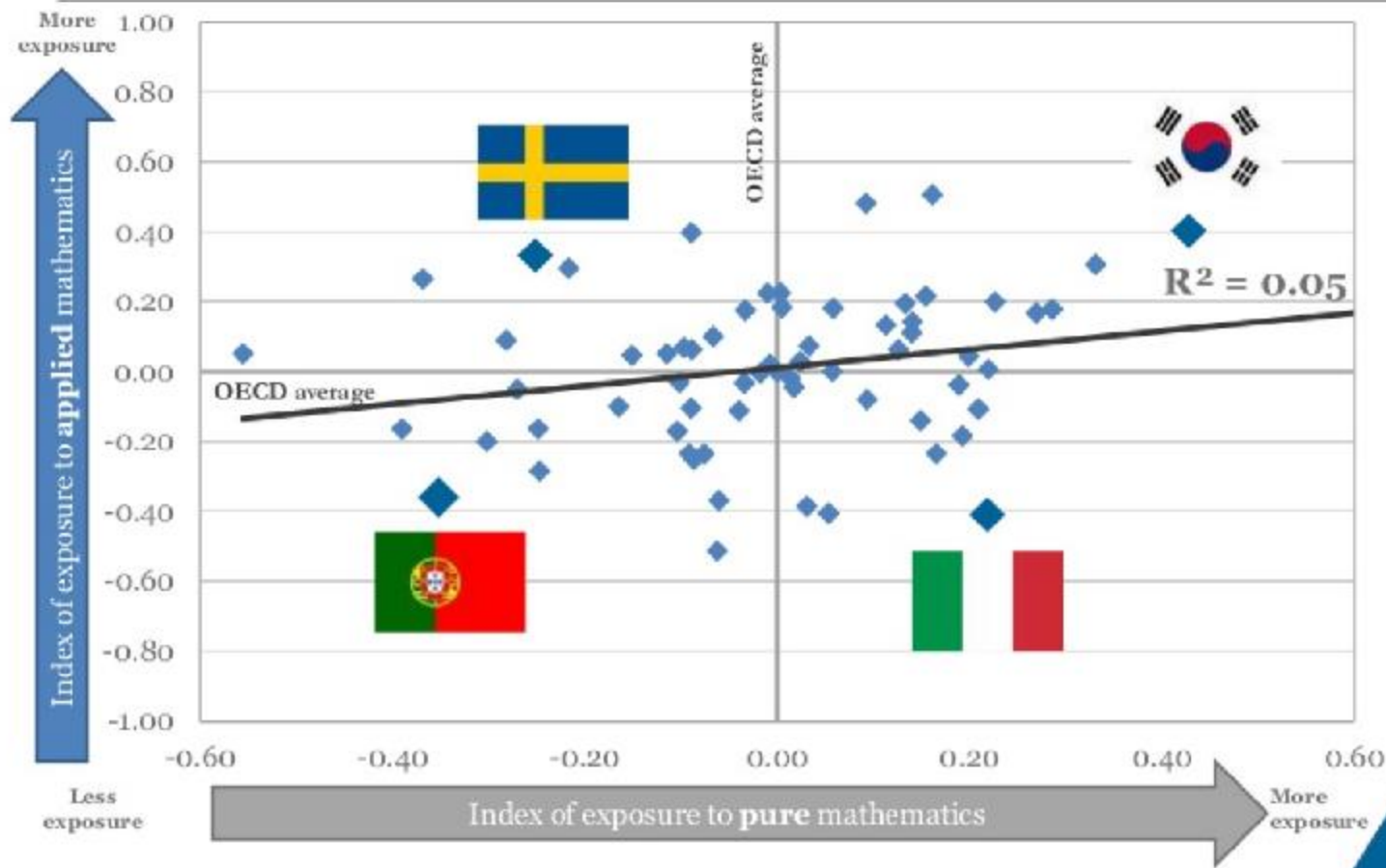
Figure II.6.21 ■ **After-school study time, by schools' socio-economic status**

Results based on students' self-reports



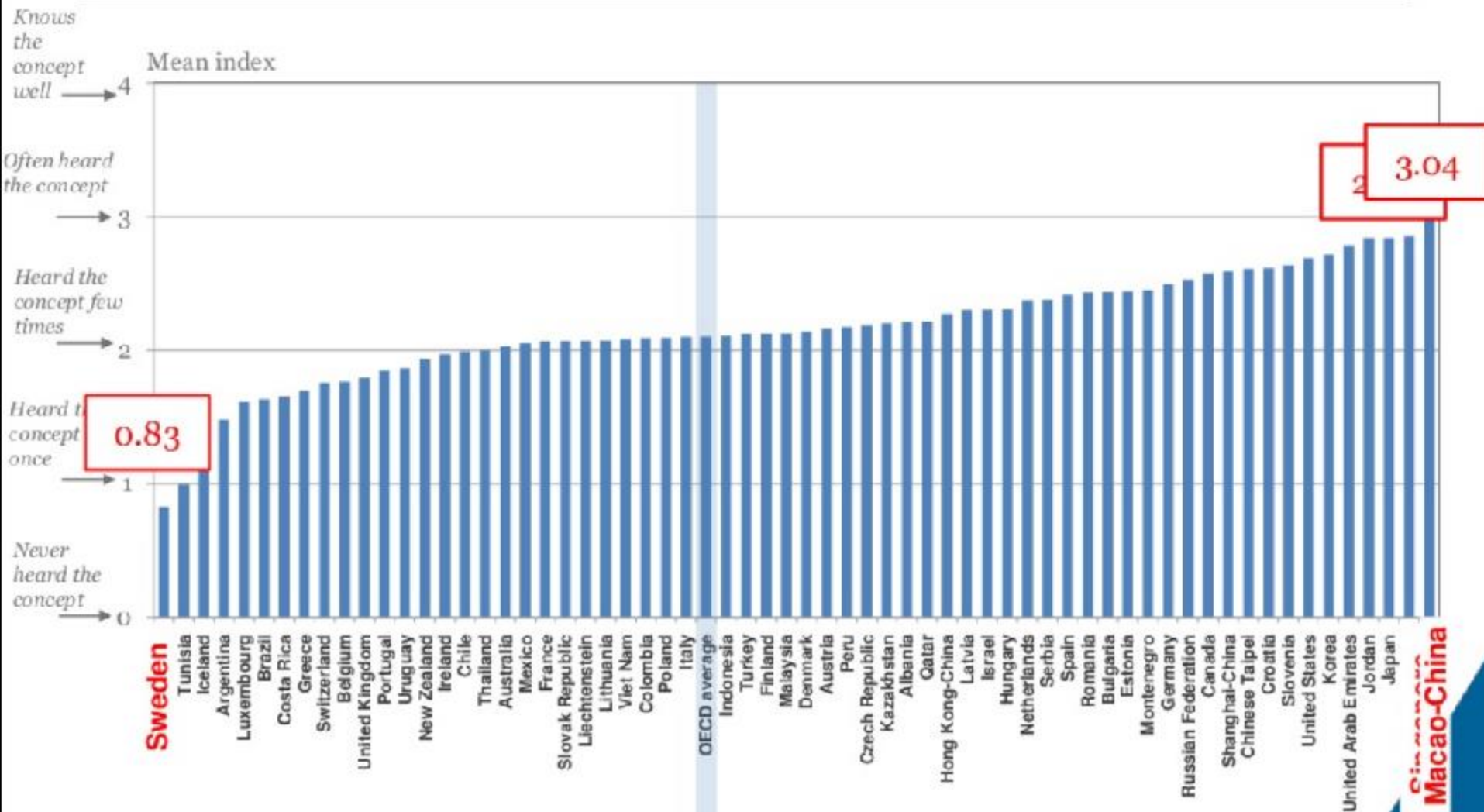


Weak relationship between exposure to applied and pure mathematics



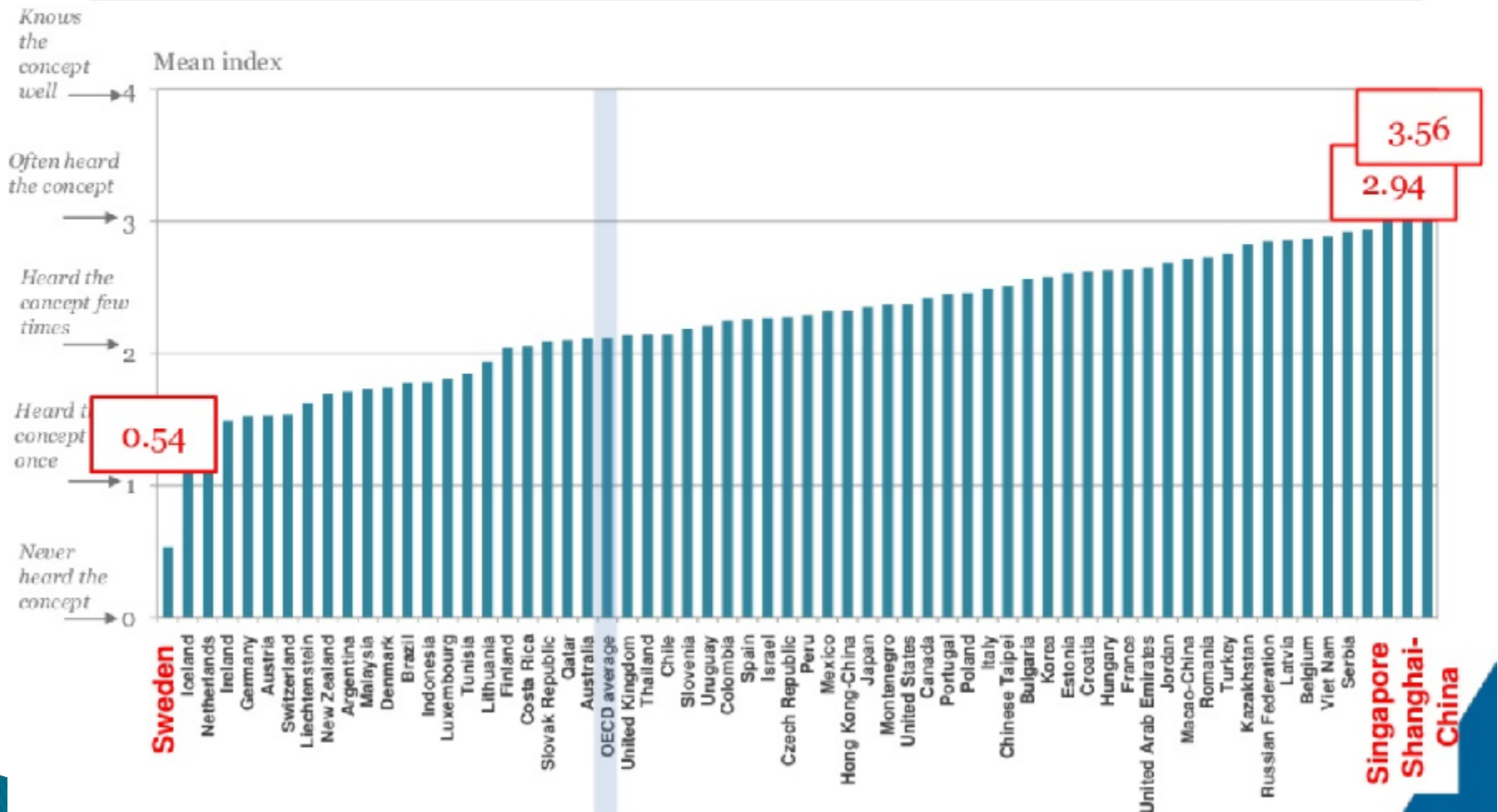


Large international differences in familiarity with algebra....





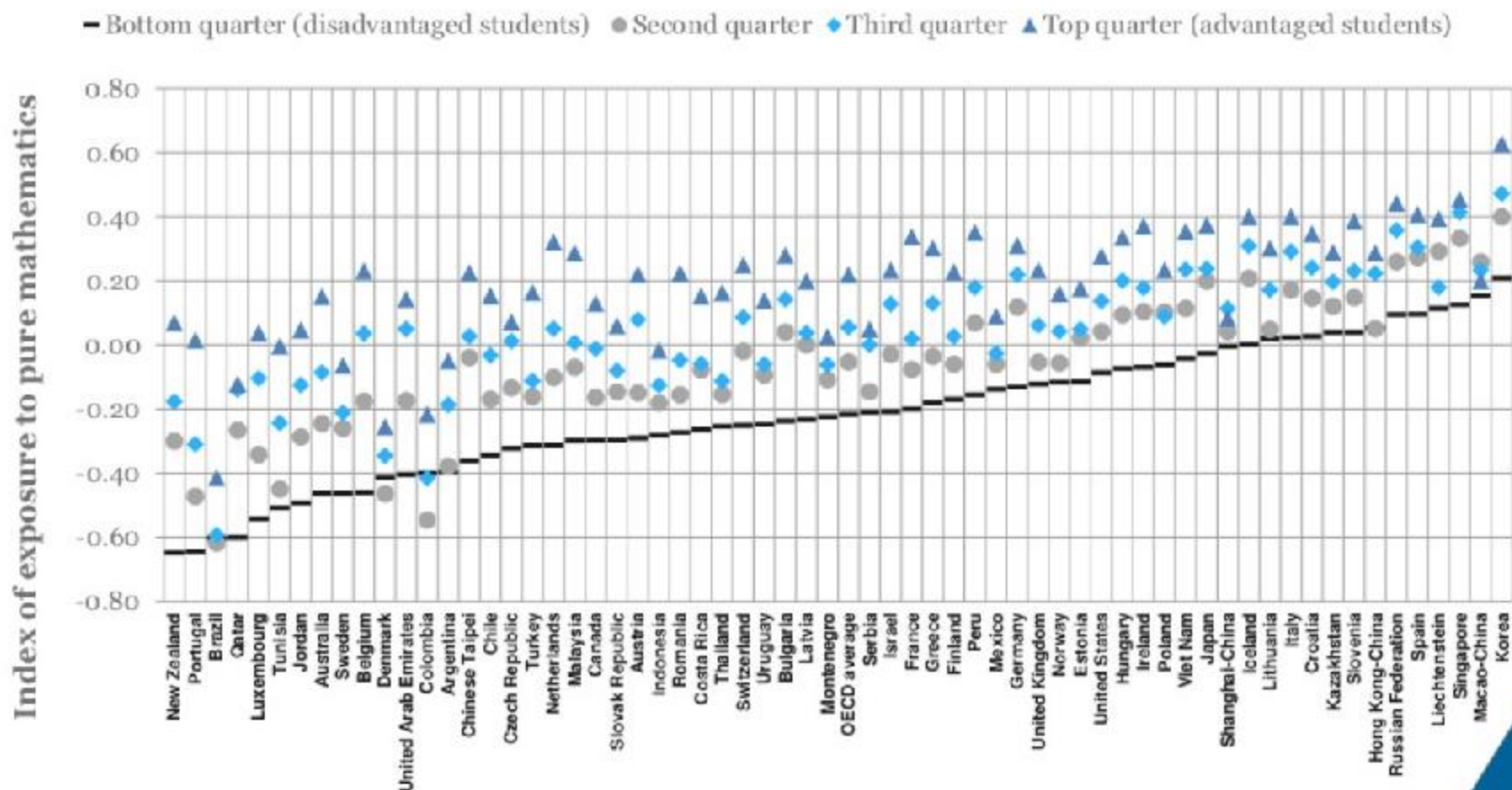
... and in familiarity with geometry



OECD (2016): Equations and Inequalities



Exposure to pure mathematics increases with socio-economic status

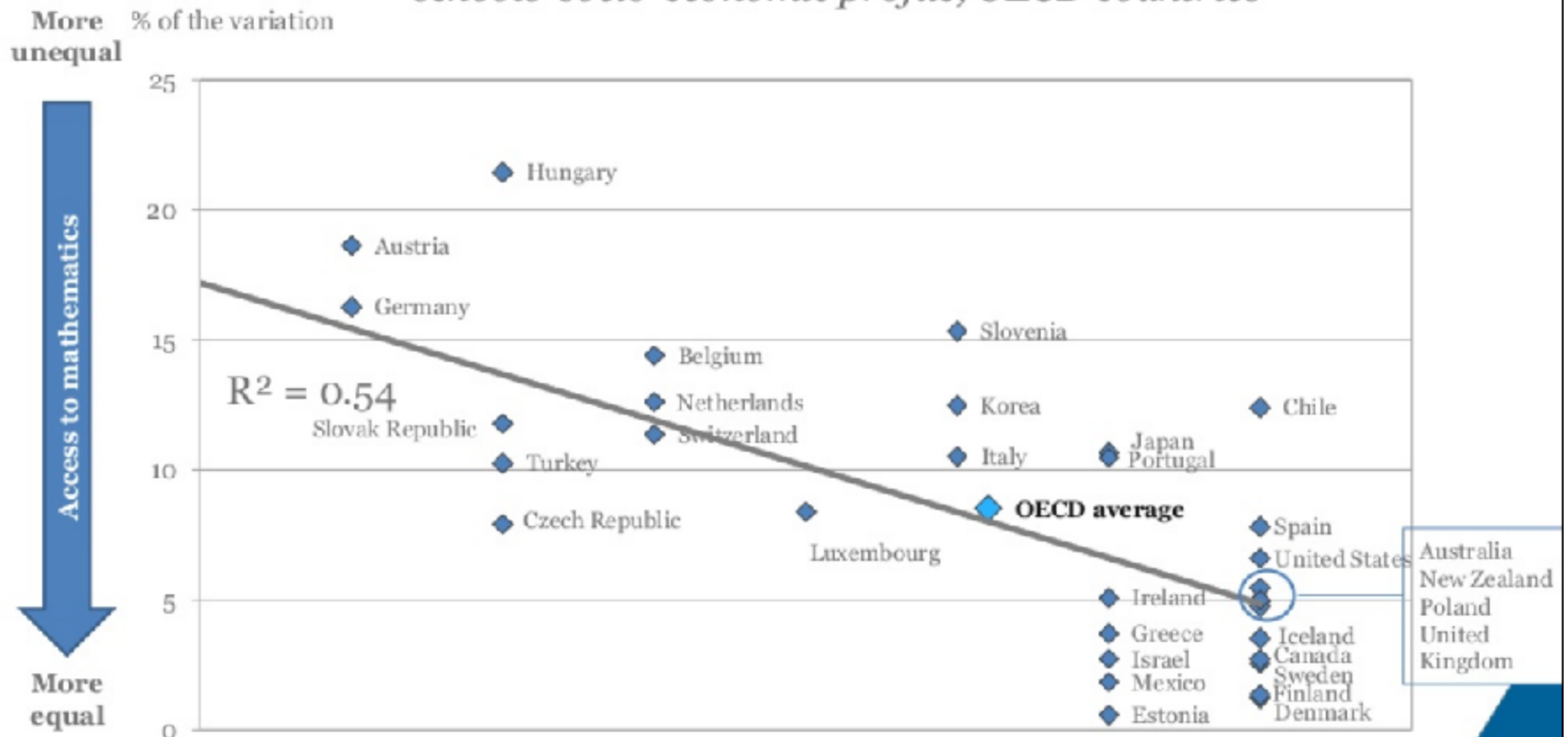


OECD (2016): Equations and Inequalities



Earlier tracking associated with more unequal access to mathematics

Variation in familiarity with mathematics explained by students' and schools' socio-economic profile, OECD countries

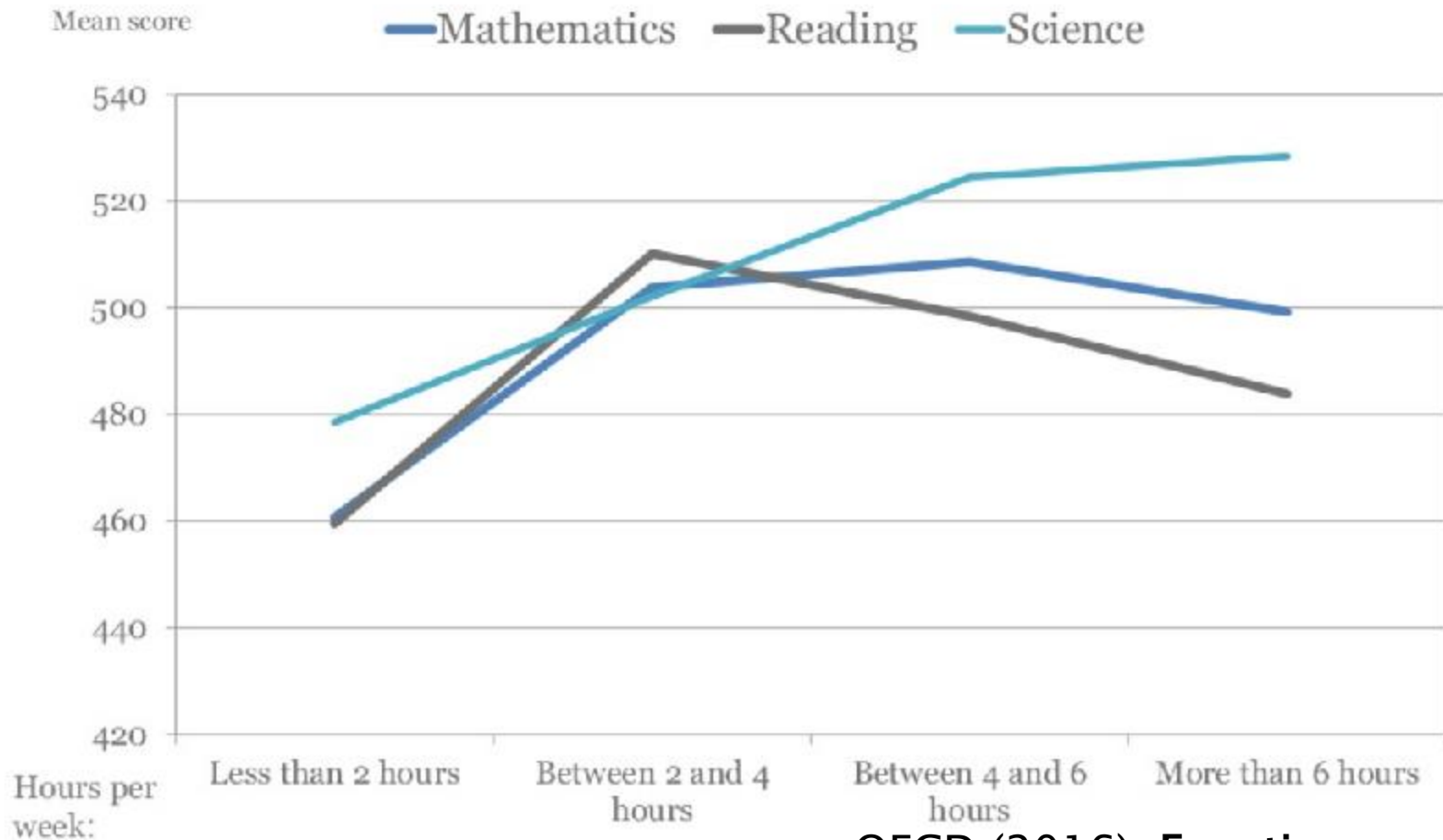


OECD (2016): Equations and Inequalities

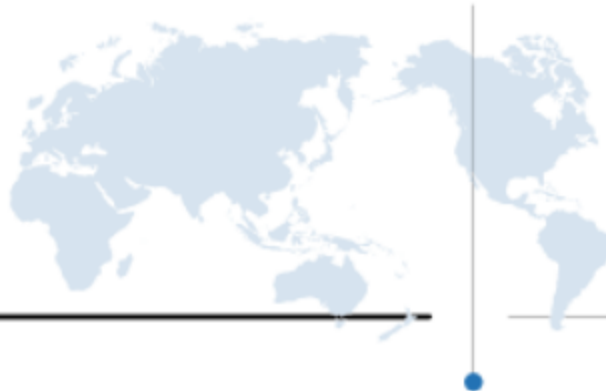


Longer **class time** up to **four hours** per week is associated with a **large improvement in mathematics performance**

OECD average



OECD (2016): Equations and Inequalities



PISA 2015 HIGH PERFORMERS

SINGAPORE

Singapore, a city-state of approximately 700 km² in Southeast Asia, has made great strides since it was established as a republic in 1965. In its early years of independence, Singapore was a poor, undeveloped island with a lack of natural resources, high unemployment, rapid population growth, substandard housing and sanitation, and tension among its various ethnic groups.

As a small nation with limited natural resources, human resources have always been the island republic's most precious asset. Today, Singapore is a vibrant global hub of trade, finance and transportation, with a strong and harmonious community of citizens of different ethnicities and religions. Its transformation "from third world to first" in one generation is one of Asia's great success stories (Lee, 2000; OECD, 2010).

Phases in the development of Singapore's education system

The survival-driven phase: 1959 to 1978

The new education system:

- reduced dropout rates: by 1986, only 6% of students, compared to over 50% in the 1960s, left school with fewer than 10 years of education
- improved the quality of education: the pass rate of O-level English examinations increased from 40% in the 1960s to 90% by 1984, and students in Singapore performed very well in the 1995 Trends in International Mathematics and Science (TIMSS) study.

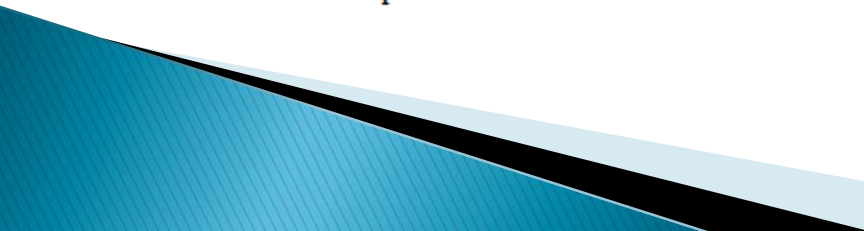
The quality of vocational education, in particular, was enhanced. The Institute of Technical Education (ITE) was created in 1992 to provide high-quality technical and vocational education. Industries helped develop the Institute with the aim of producing graduates with the industry-relevant skills. Universities and polytechnics were also expanded to train a larger number of scientists and engineers, thereby meeting the demands of a more technologically-driven economy.

Ability-based, aspiration-driven phase: 1997 to 2011

With the emergence of a knowledge-based economy, Singapore has pivoted its economy away from one based on high-skilled manufacturing to one based on high value-creation services and products. To prepare its citizens for navigating this new economic paradigm, Singapore developed a new education philosophy, “Thinking Schools, Learning Nation” (TSLN). Instead of simply imparting knowledge to students, “thinking schools” would develop creative and critical thinking skills and a passion for lifelong learning. Complementing this, the “learning nation” would place education at the heart of the national identity (Lee et al., 2008).

To achieve these goals, Singapore increased flexibility and variety in its school system. The curriculum was reduced to create space for more inquiry-based activities. Common time was created for teachers to collaborate on planning lessons and active learning activities for students. Furthermore, significant investment in information and communications technology (ICT) facilitated new modalities of learning. Schools were organised around clusters of 10 to 14 schools, with greater autonomy and collegial sharing enabling schools to be innovative in their programmes and teaching. All these efforts facilitated the development of a culture of continual improvement, and an open and collaborative school environment (Poon et al., 2016).

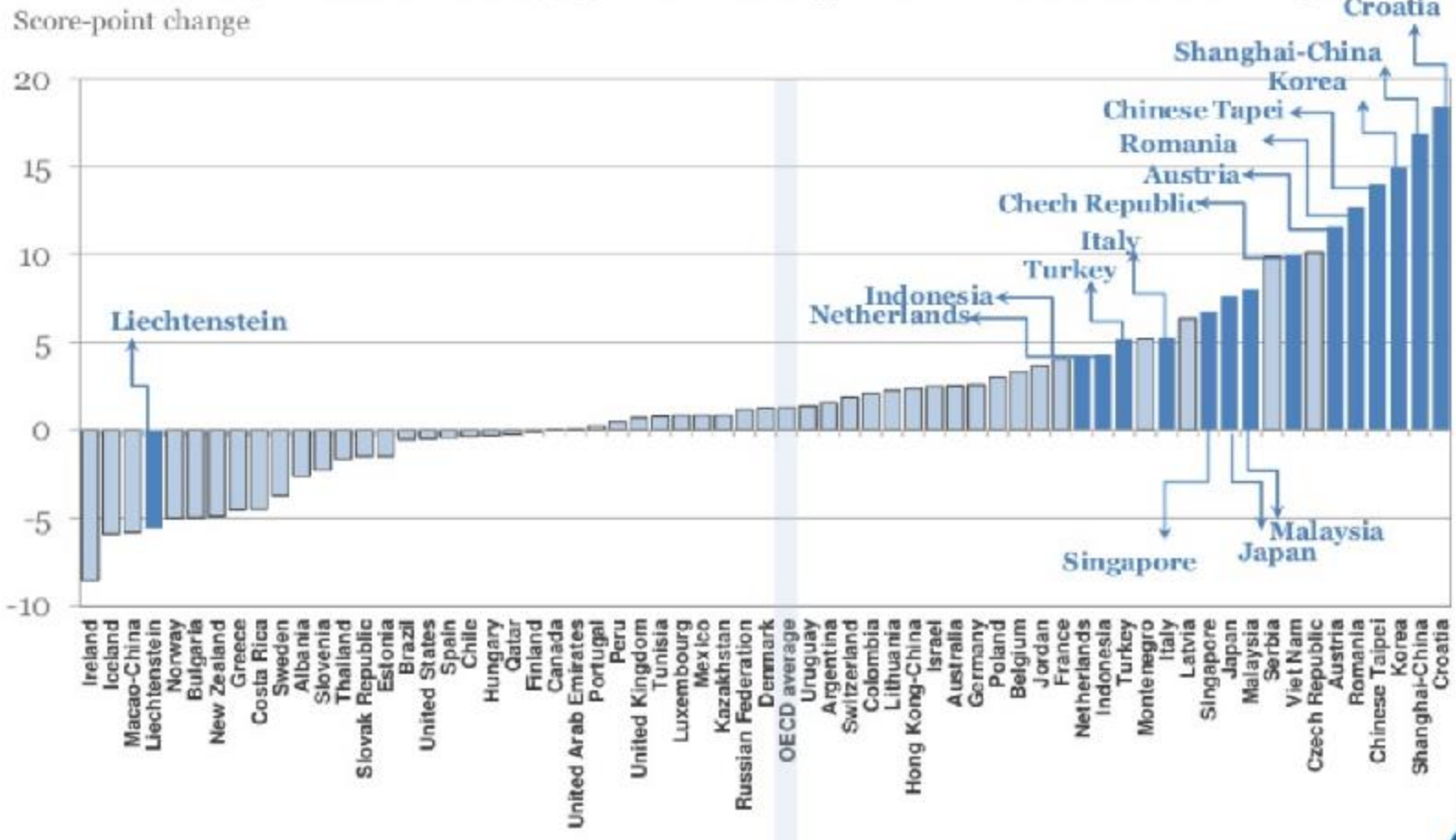
A wide range of enrichment programmes complement the formal curriculum at both the school and national fronts. Science fairs, competitions, learning trails, camps, workshops, and attachments to research institutes serve to engage and inspire students across all levels of learning. At the national level, MOE works closely with partners such as the Agency for Science, Technology and Research (A*STAR), institutes of higher learning, industries and the Singapore Science Centre, to design programmes for both the general student population (at all levels) and those with deeper interests and talents in science. Examples of some such programmes include:

- The A*STAR Talent Search (ATS), a competition for student science projects, where participants must proceed through three rounds of judging. The aim is to stimulate a lifelong passion for science and scientific enquiry and to encourage top students, aged 15 to 21, to strive for excellence. Students are mentored by a professor at an A*STAR institute or Singaporean university, and the Chief Judge of the ATS is always a Nobel Prize laureate.
 - CRADLE, a network of scientists, educators and support staff who facilitate hands-on, interactive invention by both lending equipment to schools and by holding workshops for secondary students at their prototyping lab at Science Centre Singapore. The aim is that students see the practical applications of school science and mathematics and think of science as fun. CRADLE also runs professional development workshops for teachers.
 - The International Science Drama Competition, which aims to use drama to present scientific content. Although originally aimed at primary school students, it is now also open to the public.
- 



The relationship between time and performance is much **weaker** after accounting for school characteristics

Relationship between time and performance among students in the same school and grade

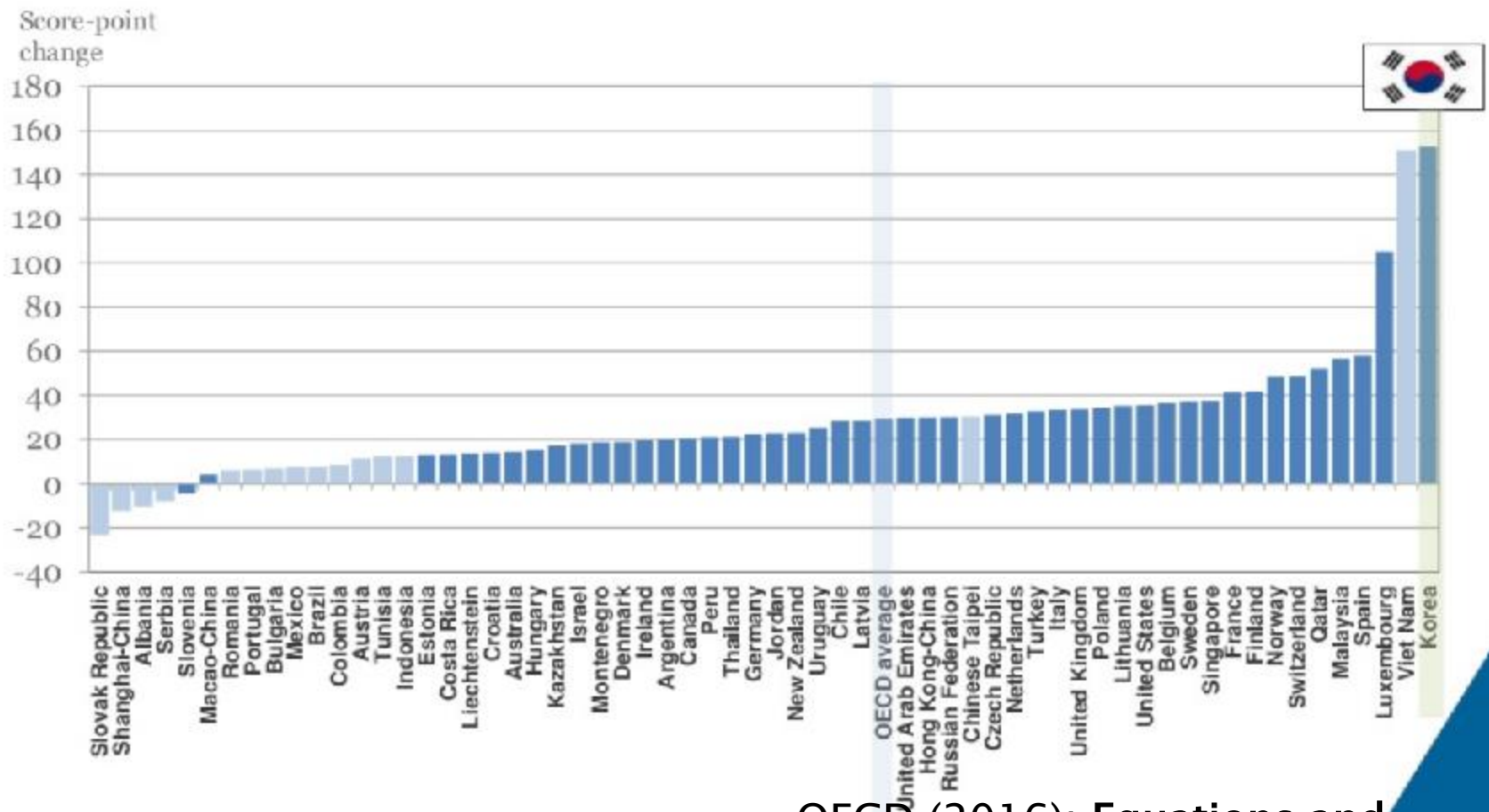


OECD (2016): Equations and Inequalities



Exposure to pure mathematics is related to higher performance, even after accounting for school characteristics

Relationship between exposure and performance among students in the same school

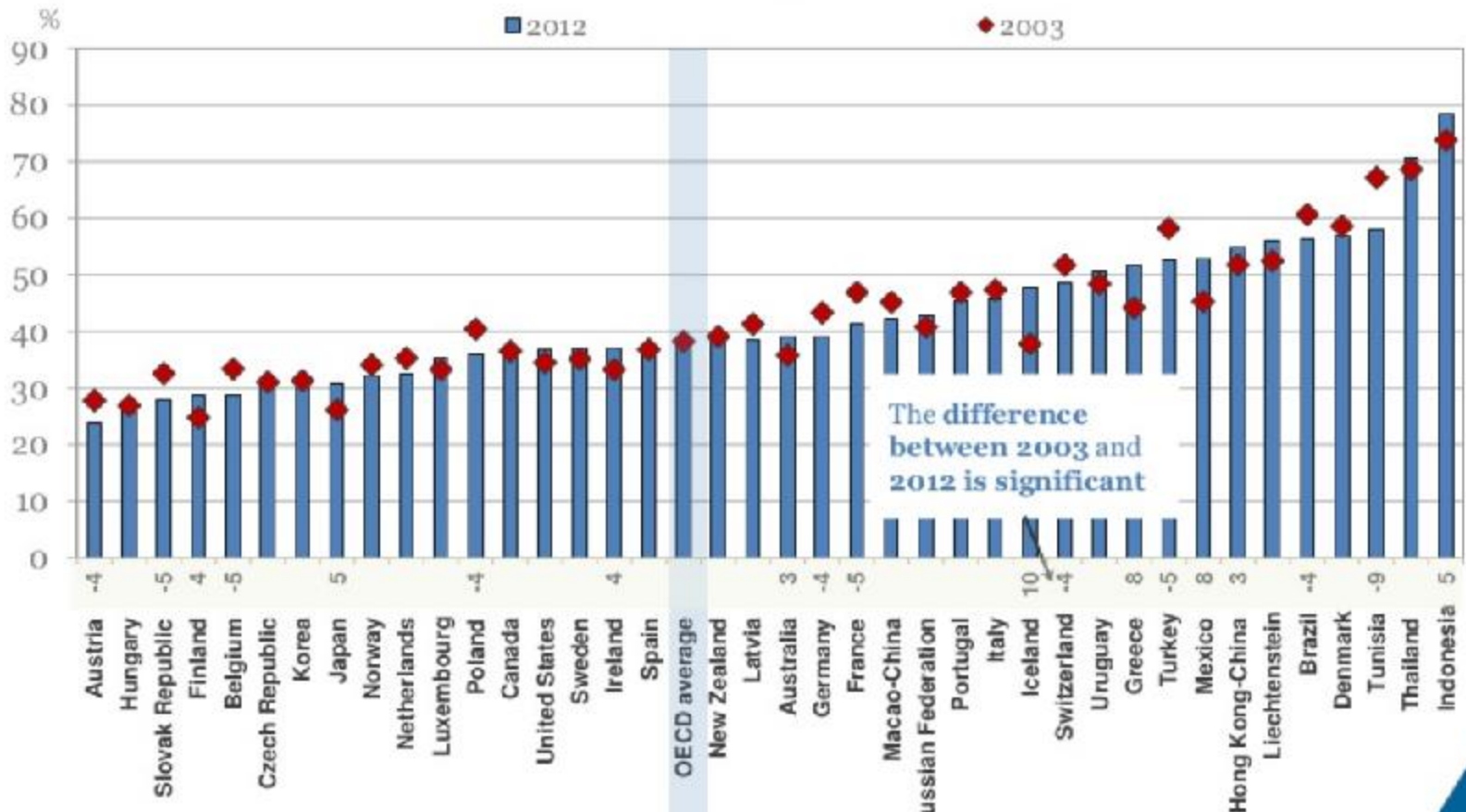


OECD (2016): Equations and Inequalities



Less than half of students enjoy studying mathematics

Percentage of students who agree with the statement "I do mathematics because I enjoy it"



OECD (2016): Equations and Inequalities

Figure II.3.7 ■ **Index of disciplinary climate in science classes, school characteristics and science outcomes**

Results based on students' reports

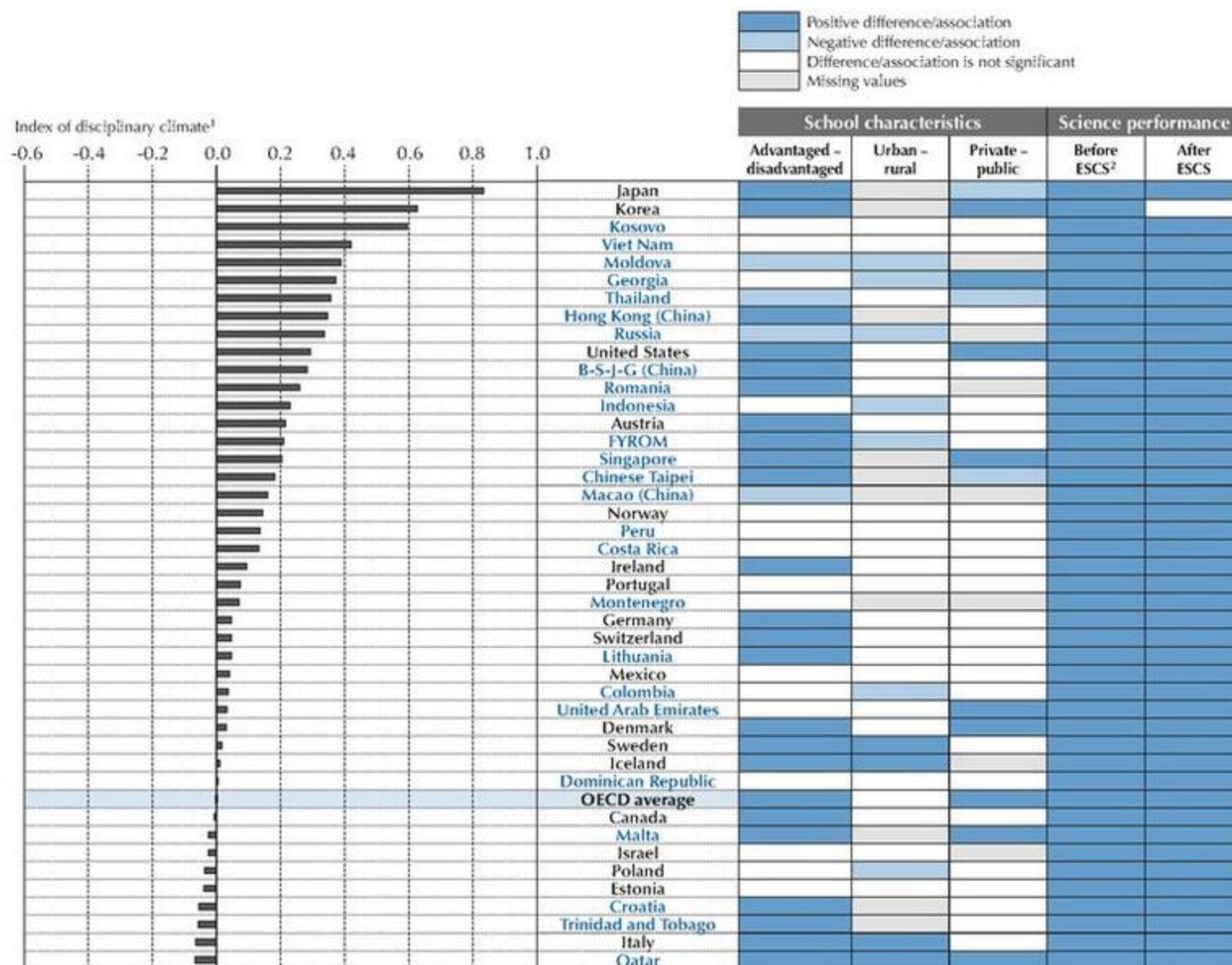


Figure II.4.4 ■ **Distribution across the education system of responsibility for the curriculum**
Assuming the responsibilities of the five actors combined amount to 100%

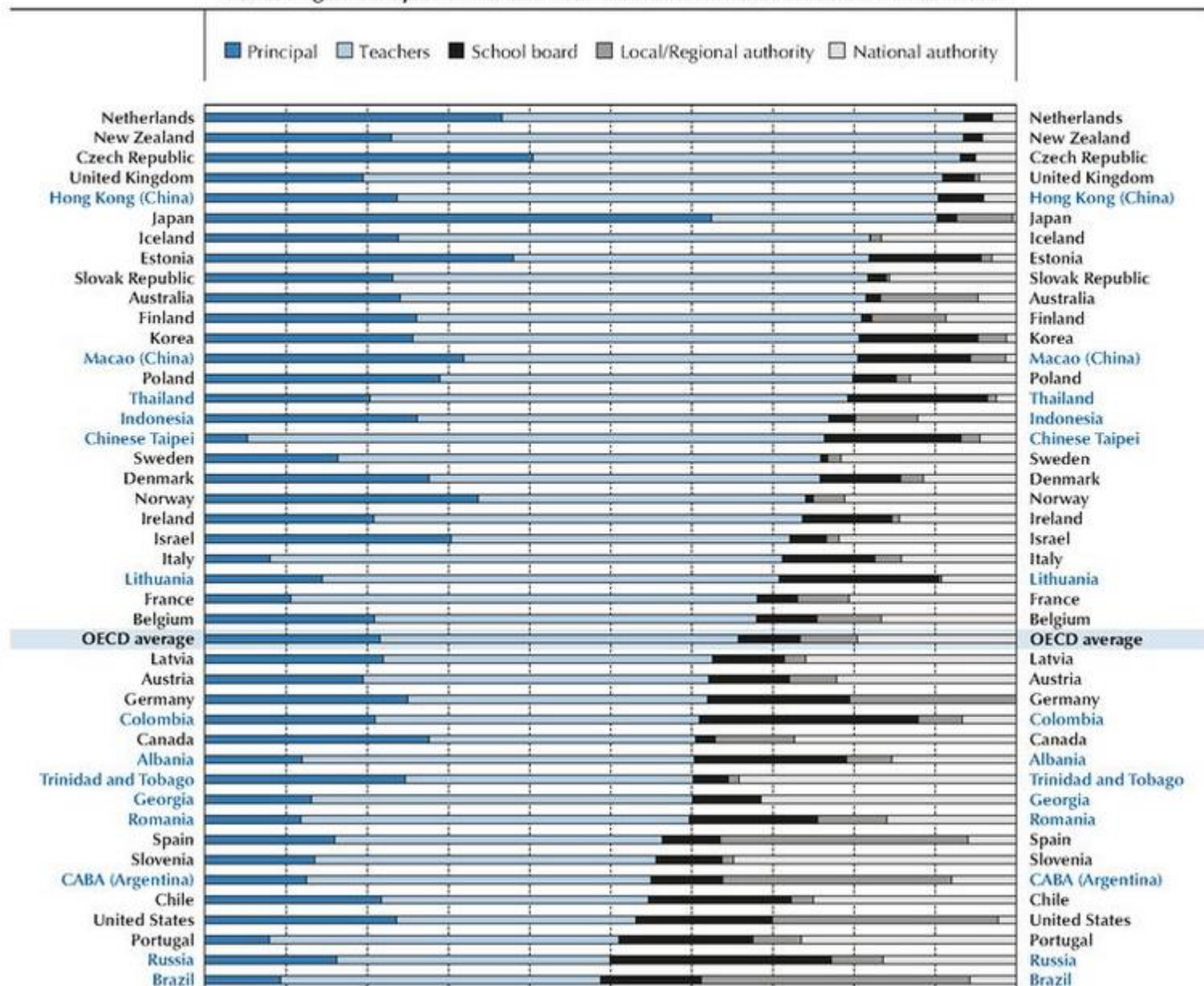


Figure II.4.31 ■ **Monitoring teaching practices**
Results based on school principals' reports

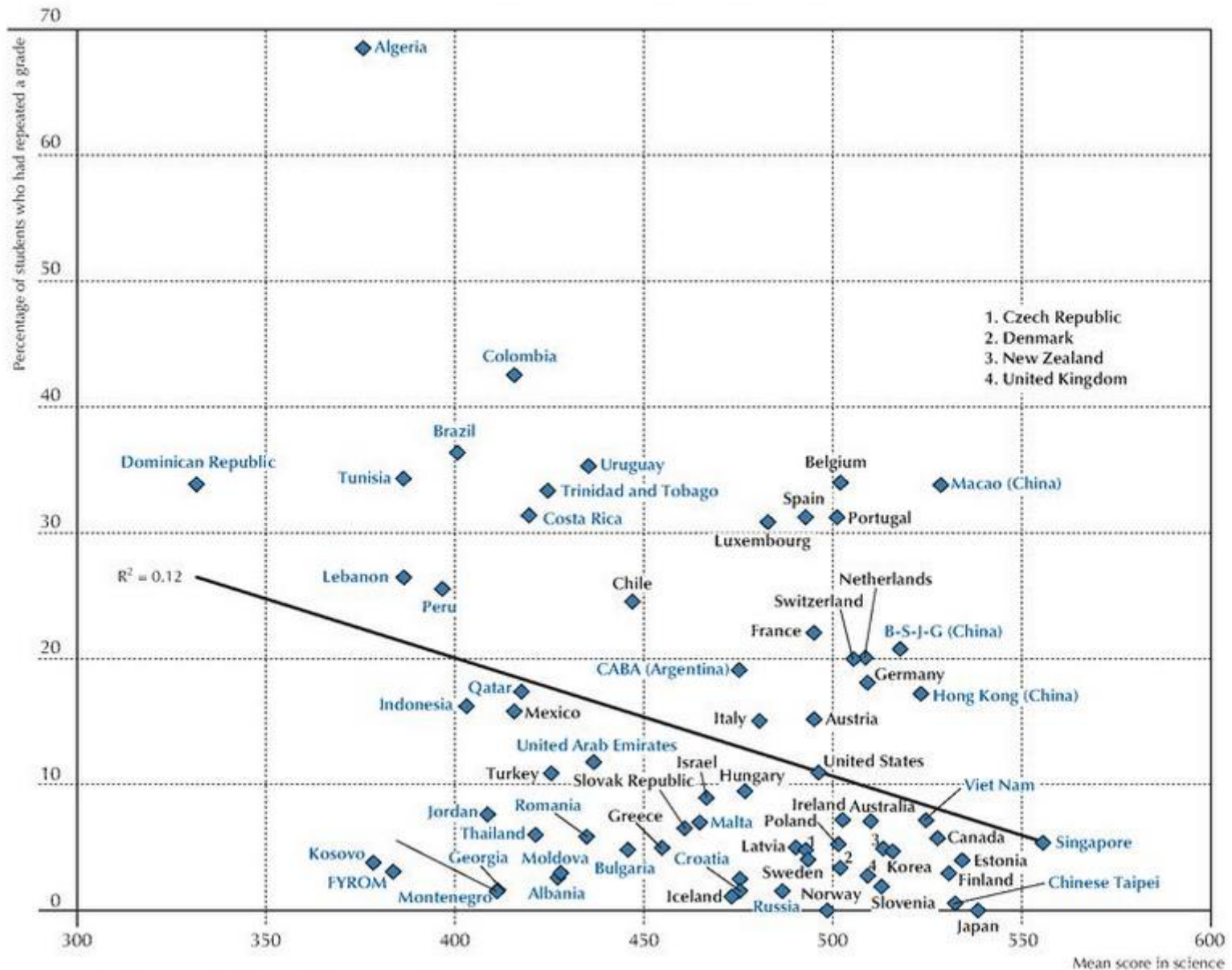


	Percentage of students in schools that use the following methods to monitor teaching practices			
	Tests or assessments of student achievement	Teacher peer review	Principal or senior staff observations of lessons	Observation of classes by inspectors or other persons external to the school
Jordan	97	94	99	99
Moldova	100	95	99	94
Qatar	100	95	98	88
United Arab Emirates	97	90	100	93
B-S-J-G (China)	97	92	99	91
Dominican Republic	90	90	100	95
Romania	97	87	99	90
Korea	95	96	97	84
Viet Nam	99	94	99	78
United Kingdom	97	95	100	78
Russia	100	100	100	69
Thailand	100	99	99	61
FYROM	86	76	100	97
Indonesia	88	89	97	85
Macao (China)	94	100	98	56
Albania	100	94	99	53
Algeria	94	65	96	91
Costa Rica	95	93	91	65
Kosovo	87	90	98	68
Hong Kong (China)	98	93	99	53
Lithuania	97	88	99	55
Netherlands	97	80	99	64
Singapore	100	93	100	42
United States	95	72	100	64
New Zealand	91	96	98	45
Latvia	97	88	99	46
Lebanon	86	73	93	77
Bulgaria	97	37	100	92
Peru	78	90	92	63
Croatia	76	74	100	74
Montenegro	69	91	100	61
Uruguay	70	76	91	81
Trinidad and Tobago	92	77	96	52
Belgium	78	74	90	76
Austria	86	77	94	55
Czech Republic	93	70	100	48

Figure II.6.11 ■ **In-house professional development activities***Results based on school principals' reports*

	Percentage of students in schools where the following types of in-house professional development activities exist			
	The teachers in our school co-operate by exchanging ideas or material when teaching specific units or series of lessons	Our school invites specialists to conduct in-service training for teachers	Our school organises in-service workshops that deal with specific issues that our school faces	Our school organises in-service workshops for specific groups of teachers
United Kingdom	100	94	100	98
New Zealand	100	93	99	98
United States	99	92	98	97
Australia	99	92	98	97
United Arab Emirates	100	91	98	97
Singapore	100	90	98	96
Qatar	100	88	97	97
B-S-J-G (China)	100	90	98	94
Netherlands	94	94	93	95
Macao (China)	100	95	84	93
Canada	100	89	95	88
Iceland	98	89	95	87
Korea	95	90	96	88
Chinese Taipei	94	92	91	91
Ireland	100	93	94	77
Germany	98	92	96	78
Israel	96	88	93	80
Estonia	97	97	92	70
Hong Kong (China)	99	87	89	78
Russia	99	68	98	89
Poland	100	95	97	62
Austria	99	93	84	75
Portugal	98	90	90	71
Switzerland	98	82	85	83
Albania	100	69	88	90
CABA (Argentina)	96	79	92	71
Montenegro	99	77	80	83
Trinidad and Tobago	94	87	91	66
Dominican Republic	95	83	91	68
Malta	100	93	90	51
Romania	99	72	83	78
Jordan	94	75	83	80
Thailand	90	88	88	64
Moldova	99	43	99	90
Luxembourg	96	84	76	72
OECD average	96	80	80	69
Latvia	97	87	74	65
Belgium	97	76	75	72
Japan	71	80	84	85

Figure II.5.4 ■ Science performance and grade repetition



Unraveling a Secret

Vietnam's Outstanding Performance on the PISA Test

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Education Global Practice Group

April 2016

Abstract

This paper seeks to find an empirical explanation of Vietnam's outstanding performance on the Programme for International Student Assessment (PISA) in 2012. Only a few developing countries participate in the assessment. Those who do, with the unique exception of Vietnam, are typically clustered at the lower end of the range of the Programme for International student Assessment scores. The paper compares Vietnam's performance with that of a set of seven developing countries from the 2012 assessment's data set, using a cut-off per capita GDP (in 2010 purchasing power parity dollars) of \$10,000. The seven developing countries' average performance lags Vietnam's by more than 100 points. The "Vietnam effect" is difficult

to unscramble, but the paper is able to explain about half of the gap between Vietnam and the seven countries. The analysis reveals that Vietnamese students may be approaching their studies with higher diligence and discipline, their parents may have higher expectations, and the parents may be following up with teachers regarding those expectations. The teachers themselves may be working in a more disciplined environment, with tabs being kept on their own performance as teachers. Vietnam may also be benefiting from investments in pre-school education and in school infrastructure that are disproportionately higher when compared with Vietnam's per capita income level.

Students: The student related variables reflect two policy elements that could be useful for other countries that seek to learn from Vietnam. The investment made by Vietnam in pre-schools appears to have long lasting effects, and indeed in Vietnam the government continues to invest deeply not only for universal pre-school, but also for early childhood care services even prior to pre-school. A policy lesson can also be derived from the effect of class repetition - cause and effect is difficult to extract in the case of repetition and test score performance, but one can see that repetition is much lower in Vietnam (Table 1) and the regression coefficient on a student being a repeater has a large negative value, even in the final specification with all other variables included. The other student related variables regarding being late for school and skipping classes perhaps do not have clear policy implications for other countries but help us understand a cultural effect regarding Vietnam.

Parents: As noted in the text, the household wealth/possessions, parents' education levels and socio-economic indices reflect Vietnam's per capita GDP and act against explanations of the test score gap. Applying this trend, Vietnam would have benefited from a much higher gap if it had been a wealthier country, *ceteris paribus*. There is an "advantage" that Vietnamese children have in having more demanding parents, though perhaps Vietnamese teenagers may not always see it that way. Parents are demanding not only of their children, but apparently also of schools and generally parents appear to back up their demands by contributing on their own as volunteers. Interestingly, even though the individual coefficients of parent related variables are not statistically significant except for one variable, the variables appear to collectively influence the dummy coefficient up to one-tenth of a standard deviation of test scores. As Amy Chua [Chua, 2011](#) attested, parental attitudes and behav-

iors are deeply influenced by cultural norms. There is a policy lesson here concerning the freedom of access provided to parents to take part in the school life. Sometimes schools tend to be insular places without much scope for parents to contribute, but measures to harness parents' contributions in their time as well as in cash and kind may yield positive results.

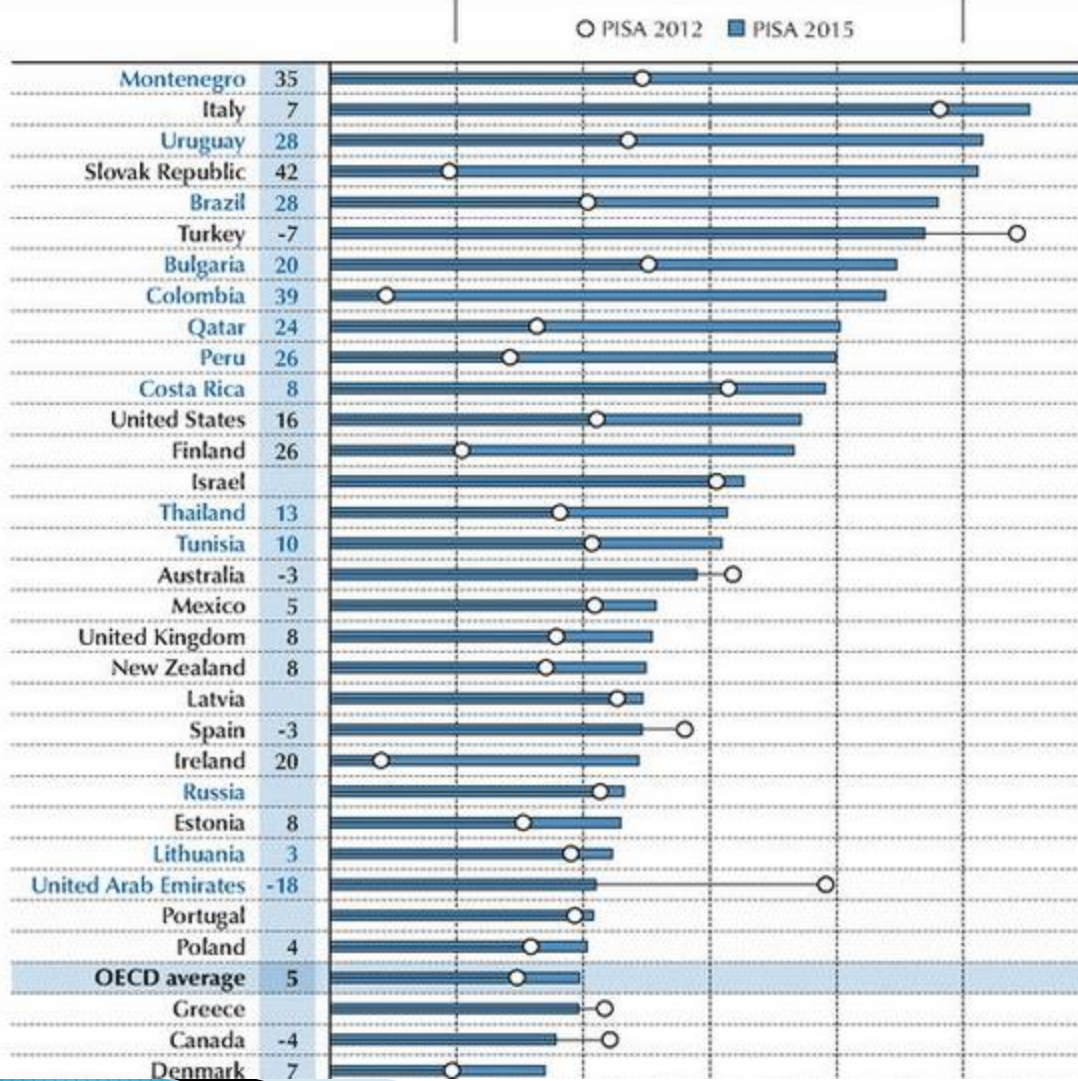
Teachers: Teachers are widely recognized to be the most important factor in many studies of student achievement. Yet, in this case, the inclusion of a number of teacher related variables does not appear to be useful in explaining Vietnam's achievement gap. It is interesting to note that in the regressions, the variables individually tend to have statistically significant coefficients, but do not affect the dummy coefficient. One teacher variable, the proportion of certified teachers, is clearly economically and statistically significant, and it is one where Vietnam has an advantage (80% vs. 68% certified). Variables that relate to the use of student assessment in providing feedback to teachers on their performance are seen to be important. The presence of other assessment and feedback related variables are also in line with intuition. It is possible that the advantages which Vietnam enjoys with regard to teachers are 'swamped' by the effects of variables for which Vietnam does not have an advantage, so the net result is that the gap is not explained by PISA related teachers variables. It is also possible that the effect of teachers is particularly context specific, revealing a weakness of the pooled regression approach of Fryer and Levitt. This last explanation is further investigated in the next section of the paper.

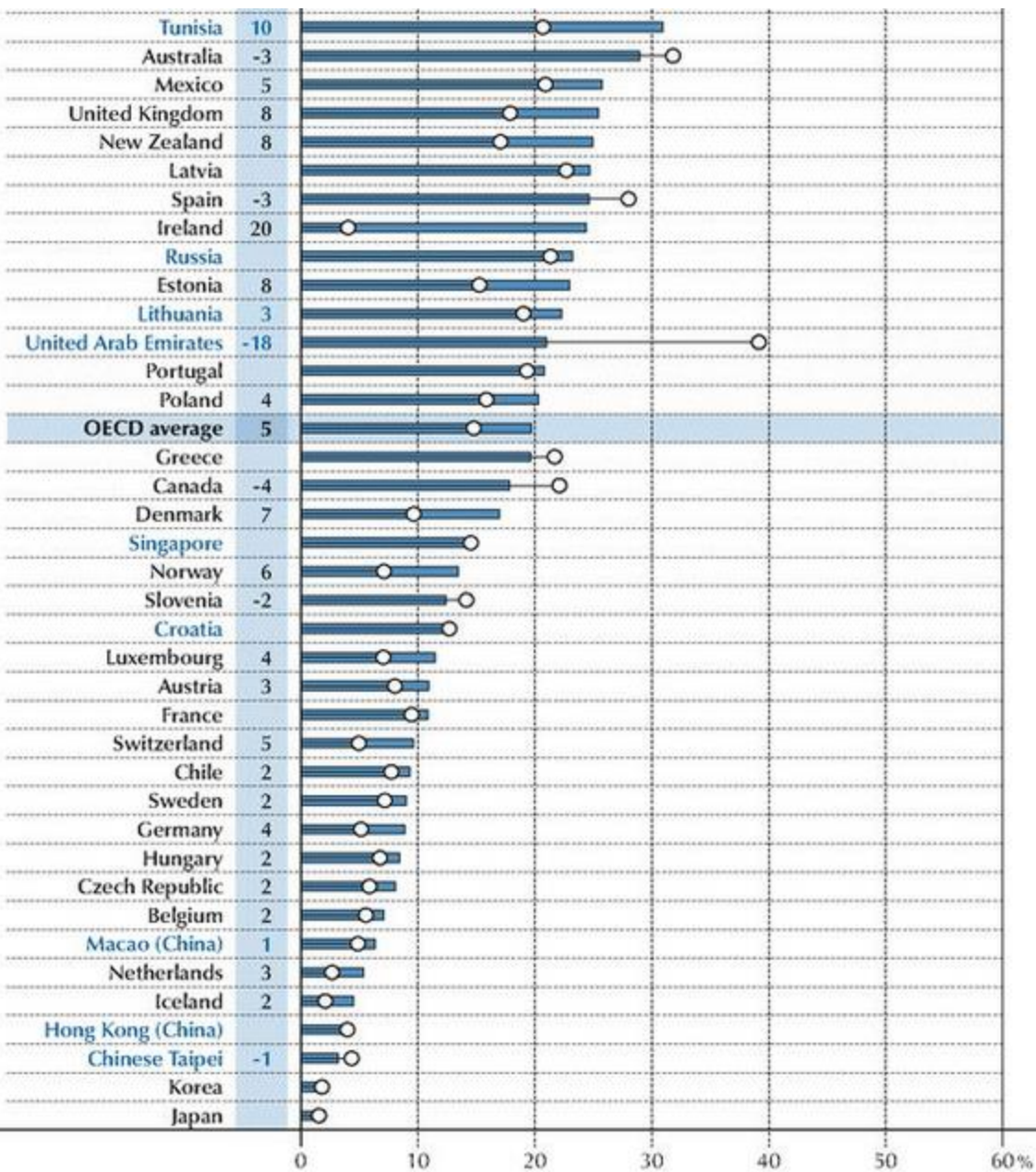
School School resources matter with regard to PISA results in the international perspective, as the scatter plot in Figure 1 motivating this paper clearly shows. Developing countries with the notable exception of Vietnam are clustered at the bottom left hand side. And there is a positive slope with high scoring countries tending to be on the higher income side. In this section, we see that the effort made by the Vietnamese government to invest in education plays an important part in explaining the achievement gap. Even though Vietnam may be poor with regard to per capita income, it is not as poor with regard to the quality of educational resources and the quality of physical infrastructure. This can be seen in Figure 4 comparing the average PISA 2012 mathematics scores with a school infrastructure quality index. Compared to Figure 1, where Vietnam is the country with the lowest GDP per capita in the PISA 2012 data set and thus placed in the left hand side of the figure, Vietnam moves more towards the middle in Figure 4. Using SCMATBUI (quality of school infrastructure), Vietnam jumps ahead 11 places, with a similar story (not shown) regarding SCMATEDU (quality of educational materials). A key reason is the investments by the Vietnamese government in schools in smaller towns and rural areas as classified by PISA, given that the dispersion of school infrastructure is lower in Vietnam compared to other countries.

2. Cultural factors are likely very important: A combination of three sets of factors appear to be the most potent explanation for Vietnam's performance: First, Vietnamese students work harder - we see they have less instances of skipped classes and being late for school, spend about the same time or more learning in school and substantial extra time studying after school. While at school, Vietnamese students are more disciplined and focused on their studies. Second, Vietnamese teachers appear to benefit from a closer supervision of their work by the school principal and others, and there may be a stronger harmony between the hard working students and their teachers. Third, parents may have an important role to play, by taking an active part in combining high expectations of their children, following up with their children's teachers and contributing at school.

Figure II.1.2 ■ **Change between 2012 and 2015 in student truancy**

Percentage of students who reported having skipped a day of school at least once in the two weeks prior to the PISA test





CSAE Working Paper WPS/2014-28

Emergence and evolution of learning gaps across countries:

Linked panel evidence from Ethiopia, India, Peru and
Vietnam*

Abhijeet Singh
University of Oxford

August 8, 2014

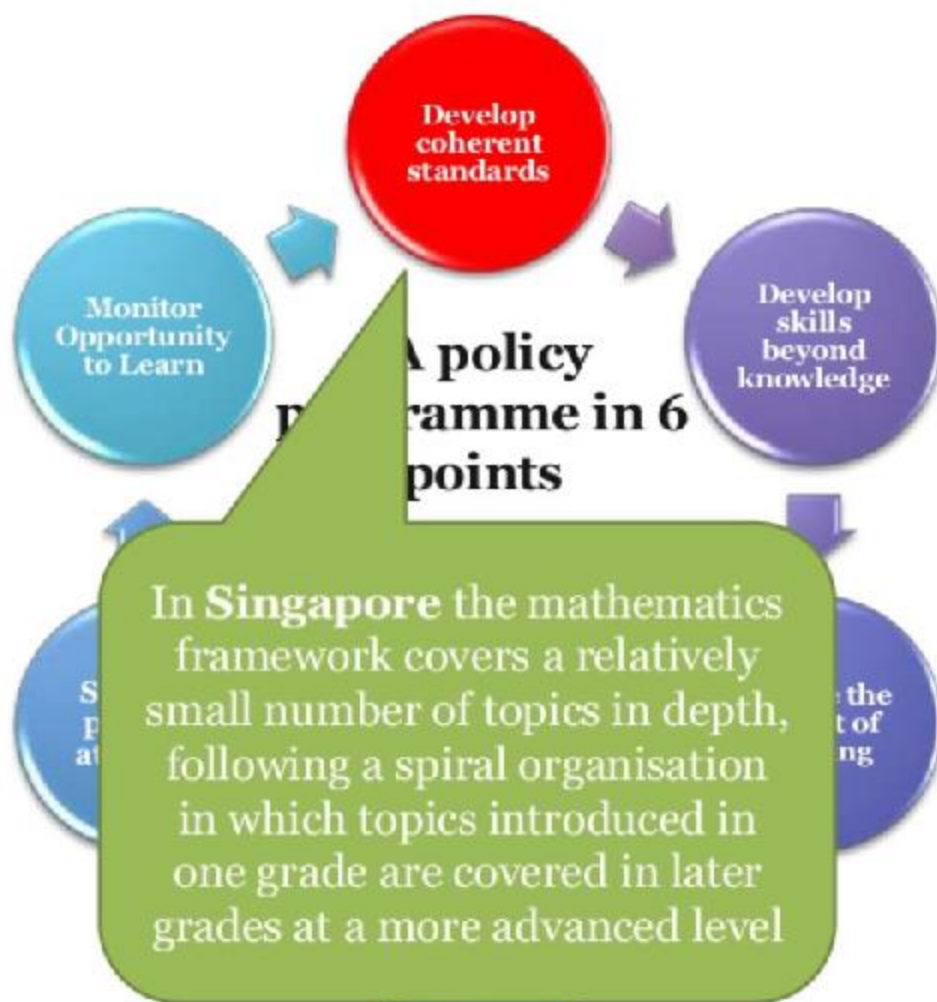
Abstract

There are substantial learning gaps across countries on standardized international assessments. In this paper, I use unique child-level panel data from Ethiopia, India, Peru and Vietnam with identical tests administered across these countries to children at 5, 8, 12 and 15 years of age to ask at what ages do gaps between different populations emerge, how they increase or decline over time, and what the proximate determinants of this divergence are.

I document that a clear pattern of stochastic dominance is evident at the age of 5 years, prior to school enrolment, with children in Vietnam at the upper end, children in Ethiopia at the lower, and with Peru and India in between. Differences between country samples grow in magnitude at



A policy framework to widen opportunities to learn



Develop coherent standards, frameworks and instruction material for all students

How:

- Cover core ideas more in depth
- Increase connections between topics
- Review textbooks and teaching material accordingly



A policy framework to widen opportunities to learn



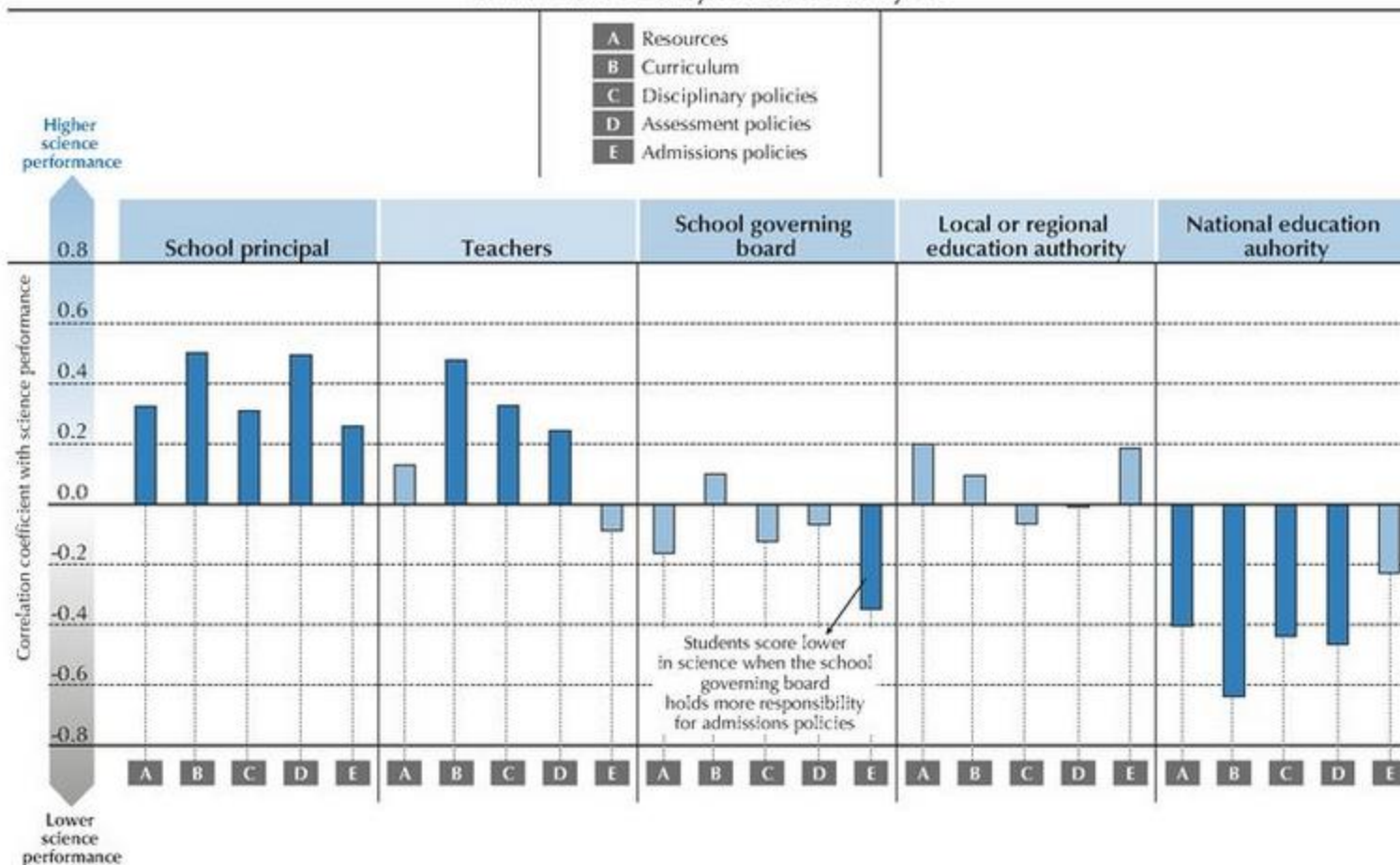
Help students acquire mathematical skills beyond content knowledge

How:

- Replace routine tasks with challenging, open problems
- Develop specific training for teachers
- Integrate problem-solving abilities into assessments

Figure II.1.4 ■ **Correlations between the responsibilities for school governance¹ and science performance**

Results based on system-level analyses



1. The responsibilities for school governance are measured by the share distribution of responsibilities for school governance in Table II.4.2.

Notes: Results based on 70 education systems.

Statistically significant correlation coefficients are shown in a darker tone (see Annex A3).

Source: OECD, PISA 2015 Database.

StatLink <http://dx.doi.org/10.1787/888933435864>

Life satisfaction among 15-year-old students

Percentage of students who reported a level of life satisfaction of 7 or higher on a scale from 0 to 10

