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PISA and PIAAC: Similarities and differences

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Outline

- Part I
  - Why are PISA and PIAAC important for Canada?
  - Design features
  - Domain definitions
  - Proficiency levels
  - Questions
- Part II
  - Key results
  - Discussion

Why do we care?

PISA

PISA measures the knowledge and skills that have been cumulatively acquired by 15-year olds and compares them to a global standard.

Do youth in all parts of the country perform equally well?

With the large amount of money spent on public education, how effective are the various systems in ensuring Canada's youth remain among the most skilled youth in the world?

PISA results have been clearly linked to successful completion of secondary education, as well as, participation in and completion of post-secondary education.

PIAAC

Skills measured by PIAAC are considered to be "foundational" skills, in that they form the basis for mastering other, higher-level skills that are necessary to functioning at home, school, and work, and in the community.

Do certain Canadian jurisdictions hold advantage in terms of their average skill levels?

Does the high level of Canadian educational attainment guarantee skills necessary to thrive in today's economy?

"*Skills have become the global currency of the 21st century*."
Angel Gurria, OECD Secretary General

How do PISA and PIAAC compare?

	PISA	PIAAC
Participating jurisdictions	65 countries/economies	24 countries and regions
Population	15-year old students	16-65-year olds
Sample size	470,000 (21,000 in Canada)	157,000 (27,300 in Canada)
Assessment domains	Mathematics, reading, science, and computer-based assessment of problem solving, reading and mathematics (rotating major domain)	Numeracy, literacy, problem solving in a technology rich environment and reading components
Other components	Background questionnaire and school questionnaire completed by school principle	Background questionnaire including a module on skill used on the job
Number of languages	47 (French and English in Canada)	23 (French and English in Canada)
Canadian options	Questions on educational careers and attitudes towards trades	Questions on languages, high school completion, immigration and Aboriginal identity

Defining PISA mathematics and PIAAC numeracy

PISA

An individual's capacity to formulate, employ, and interpret mathematics in a variety of contexts. It assists individuals to recognize the role that mathematics plays in the world and to make the well-founded judgments and decisions needed by constructive, engaged and reflective citizens.

Source: PISA 2012 assessment and analytical framework: Mathematics, reading, science, problem solving and financial literacy, OECD 2012

PIAAC

Numeracy is defined as the ability to access, use, interpret and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life.

Source: Literacy, numeracy and problem solving in technology-rich environments: Framework for the OECD survey of adult skills, OECD 2012

Defining PISA reading, and PIAAC literacy and reading components

PISA

An individual's capacity to understand, use, reflect on, and engage with written texts, in order to achieve one's goals, develop one's knowledge and potential, and participate in society.

Source: Literacy, numeracy and problem solving in technology-rich environments: Framework for the OECD survey of adult skills, OECD 2012

PIAAC

Literacy is defined as understanding, evaluating, using, and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential.

PIAAC also included an assessment of *reading components* designed to provide information about adults with very low levels of proficiency in reading. Respondents with very low literacy skills bypassed the full assessments and went directly to a test of basic "reading component" skills instead. The reading components assessment was also taken by all respondents taking the paper version of the assessment. The skills tested by the reading components assessment are those that are essential for understanding the meaning of written texts.

Source: Literacy, numeracy and problem solving in technology-rich environments: Framework for the OECD survey of adult skills, OECD 2012

Defining PISA problem solving and PIAAC problem solving in technology-rich environment

PISA

An individual's capacity to engage in cognitive processing to understand and resolve problem situations where a method of solution is not immediately obvious. It includes the willingness to engage with such situations in order to achieve one's potential as a constructive and reflective citizen.

Source: Literacy, numeracy and problem solving in technology-rich environments: Framework for the OECD survey of adult skills, OECD 2012

PIAAC

Using digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks". It focuses on "the abilities to solve problems for personal, work and civic purposes by setting up appropriate goals and plans, and accessing and making use of information through computers and computer networks.

Source: Literacy, numeracy and problem solving in technology-rich environments: Framework for the OECD survey of adult skills, OECD 2012

Defining skills set in PISA and PIAAC

PISA

Level 6 – students can conceptualise, generalise, and utilise information based on their investigations, and modelling of complex problem situations.
Level 5 – students can develop and work with models for complex situations, identifying constraints and specifying assumptions.
Level 4 – students can work effectively with explicit models on complex concrete situations that may involve constraints or call for making assumptions.
Level 3 – students can execute clearly described procedures, including those that require sequential decisions.
Level 2 – students can interpret and recognise situations in contexts that require no more than direct inference.
Level 1 – students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined.
Below level 1 – students are incapable of performing level 1 tasks.

PIAAC

Level 5 – individuals can understand complex representations and abstract and formal mathematical and statistical ideas, sometimes embedded in complex texts.
Level 4 – individuals understand a broad range of mathematical information that may be complex, abstract, or embedded in unfamiliar contexts.
Level 3 – individuals can successfully complete tasks that require an understanding of mathematical information that may be less explicit, embedded in contexts that are not always familiar, and represented in more complex ways.
Level 2 – individuals can successfully perform tasks that require identifying and acting upon mathematical information and ideas embedded in a range of common contexts in which the mathematical content is fairly explicit or visual with relatively few distractors.
Level 1 – individuals can complete tasks involving basic mathematical processes in common, concrete contexts in which the mathematical content is explicit, with little text and minimal distractors.
Below Level 1 – Individuals can only cope with very simple tasks set in concrete, familiar contexts in which the mathematical content is explicit, and that require only simple processes such as counting, sorting, performing basic arithmetic operations with whole numbers or money, or recognizing common spatial representations.

ANY QUESTIONS?

Key messages from PISA and PIAAC

PISA

- As in the past, Candian 15-year olds demonstrated high levels of mathematics, reading and science skills.
- However, for the first time, Canadian results in mathematics and science have declined significantly caused by a smaller proportion of Canadians performing at the highest levels of these domains.
- A consistent gender gap favouring boys in mathematics and girls in reading has remained unchanged since 2000.
- As a result of these developments and improvements in scores in other countries, Canada is starting to lose its competitive advantage.

PIAAC

- Canada ranks at the OECD average in literacy, with a larger proportion of its population at both the highest and lowest levels.
- Canada ranks below the OECD average in numeracy, with a larger proportion of Canadians performing at the lowest levels.
- Canada ranks above the OECD average in PS-TRE. However, 17% of Canadians didn't do the test because they didn't have the skills to do it on computers (11%), or preferred not to use a computer (6%).

Canadian students continue to perform well in mathematics, both on the paper-based assessment…

Average mathematics scores, paper-based, OECD countries, Canadian provinces, and Chinese regions

OECD average: 494					
Above OECD average		**At OECD average**		**Below OECD average**	
Country	Score	Country	Score	Country	Score
Shanghai-China	613	Czech Republic	499	Luxembourg	490
Hong Kong-China	561	**NOVA SCOTIA**	**497**	Italy	485
Chinese Taipei	560	France	495	Spain	484
Korea	554	United Kingdom	494	Slovak Republic	482
Macao-China	538	Iceland	493	United States	481
Japan	536	**MANITOBA**	**492**	**PRINCE EDWARD ISLAND**	**479**
QUEBEC	**536**	**NEWFOUNDLAND AND LABRADOR**	**490**	Sweden	478
Switzerland	531	Norway	489	Hungary	477
Netherlands	523	Portugal	487	Israel	466
BRITISH COLUMBIA	**522**			Greece	453
Estonia	521			Turkey	448
Finland	519			Chile	423
CANADA	**518**			Mexico	413
Poland	518				
ALBERTA	**517**				
Belgium	515				
ONTARIO	**514**				
Germany	514				
SASKATCHEWAN	**506**				
Austria	506				
Australia	504				
NEW BRUNSWICK	**502**				
Ireland	501				
Slovenia	501				
Denmark	500				
New Zealand	500				

Source: PISA 2012

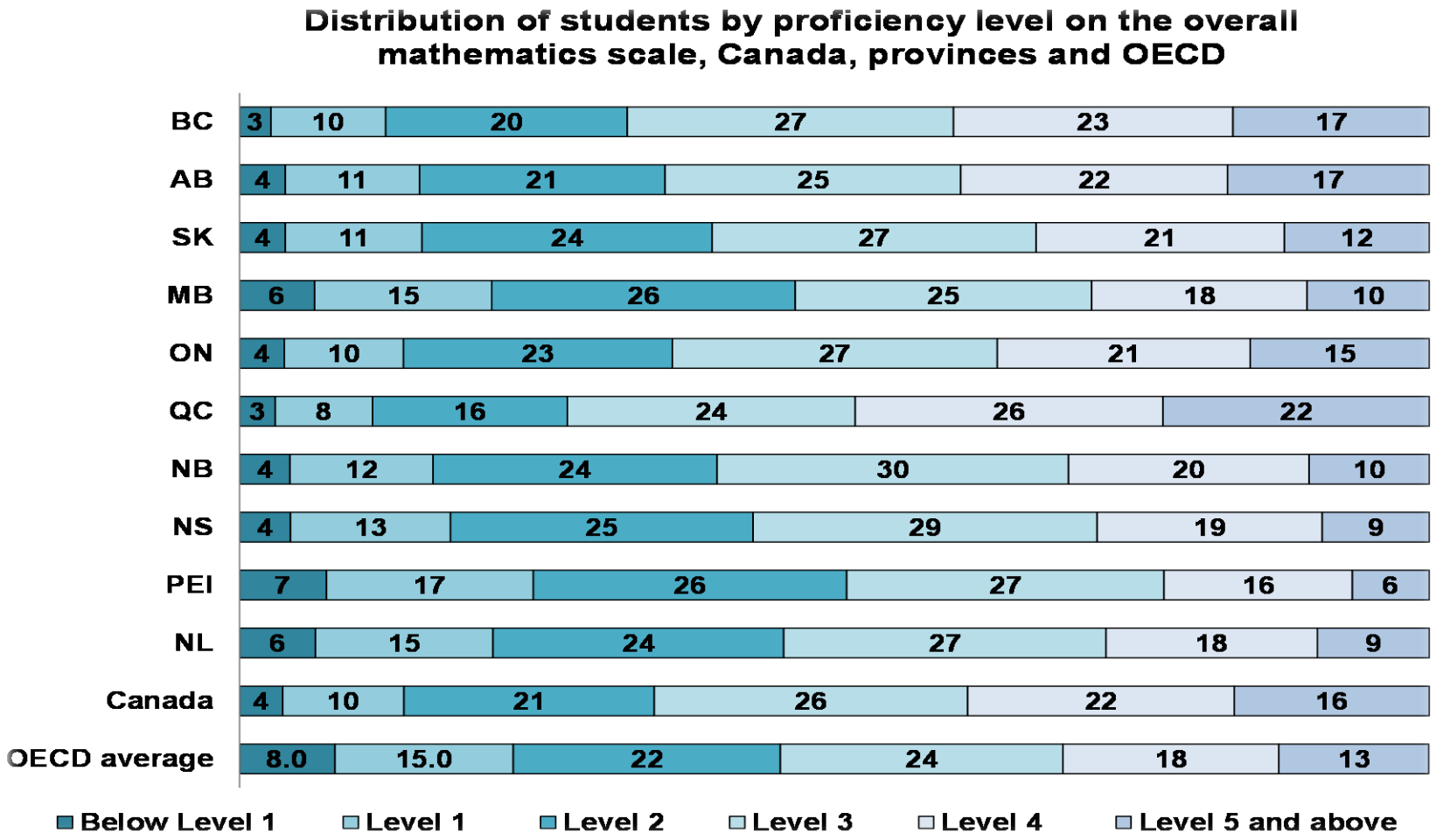
…and on the computer-based assessment.

Average mathematics scores, computer-based, OECD countries, Canadian provinces, and Chinese regions

OECD average: 497					
Above OECD average		**At OECD average**		**Below OECD average**	
Country	Score	Country	Score	Country	Score
Shanghai-China	562	**NOVA SCOTIA**	**503**	**PRINCE EDWARD ISLAND**	**491**
Korea	553	**SASKATCHEWAN**	**499**	Sweden	490
Hong Kong-China	550	Italy	499	Poland	489
Macao-China	543	United States	498	Portugal	489
Japan	539	Norway	498	Slovenia	487
Chinese Taipei	537	Slovak Republic	497	Spain	475
BRITISH COLUMBIA	532	**NEW BRUNSWICK**	**496**	Hungary	470
ONTARIO	**530**	Denmark	496	Israel	447
QUEBEC	**523**	**MANITOBA**	**493**	Chile	432
CANADA	**523**	Ireland	493		
ALBERTA	**516**				
Estonia	516				
Belgium	511				
NEWFOUNDLAND AND LABRADOR	**511**				
Germany	509				
France	508				
Australia	508				
Austria	507				

*Only 32 countries participated in this option.
Source: PISA 2012

Canada has a larger proportion of high achievers and a smaller proportion of low achievers than the OECD average.



Source: OECD PISA 2012

As well, Canadian students continue to perform well in reading

Average reading scores, paper-based, OECD countries, Canadian provinces, and Chinese regions

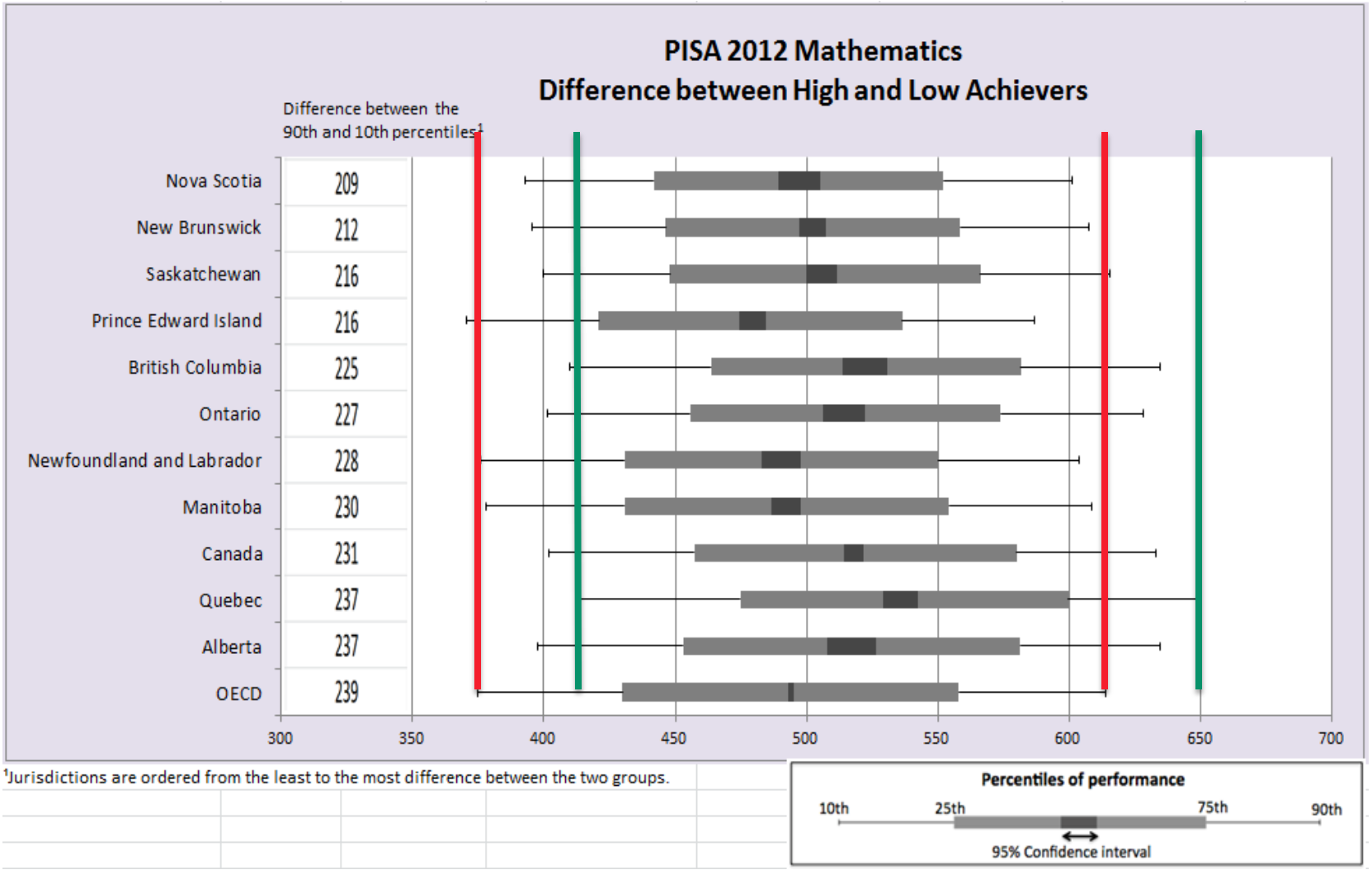
OECD average: 496					
Above OECD average		**At OECD average**		**Below OECD average**	
Country	Score	Country	Score	Country	Score
Shanghai-China	570	**NEWFOUNDLAND AND LABRADOR**	**503**	Italy	490
Hong Kong-China	545	United Kingdom	499	Austria	490
Japan	538	United States	498	**PRINCE EDWARD ISLAND**	**490**
Korea	536	**NEW BRUNSWICK**	**497**	Hungary	488
BRITISH COLUMBIA	**535**	Denmark	496	Spain	488
ONTARIO	**528**	**MANITOBA**	**495**	Luxembourg	488
ALBERTA	**525**	Czech Republic	493	Portugal	488
Finland	524			Israel	486
Ireland	523			Sweden	483
CANADA	**523**			Iceland	483
Chinese Taipei	523			Slovenia	481
QUEBEC	**520**			Greece	477
Poland	518			Turkey	475
Estonia	516			Slovak Republic	463
New Zealand	512			Chile	441
Australia	512			Mexico	424
Netherlands	511				
Belgium	509				
Switzerland	509				
Macao-China	509				
NOVA SCOTIA	**508**				
Germany	508				
France	505				
SASKATCHEWAN	**505**				
Norway	504				

Source: PISA 2012

Gender differences and performance by school language systems were observed in PISA

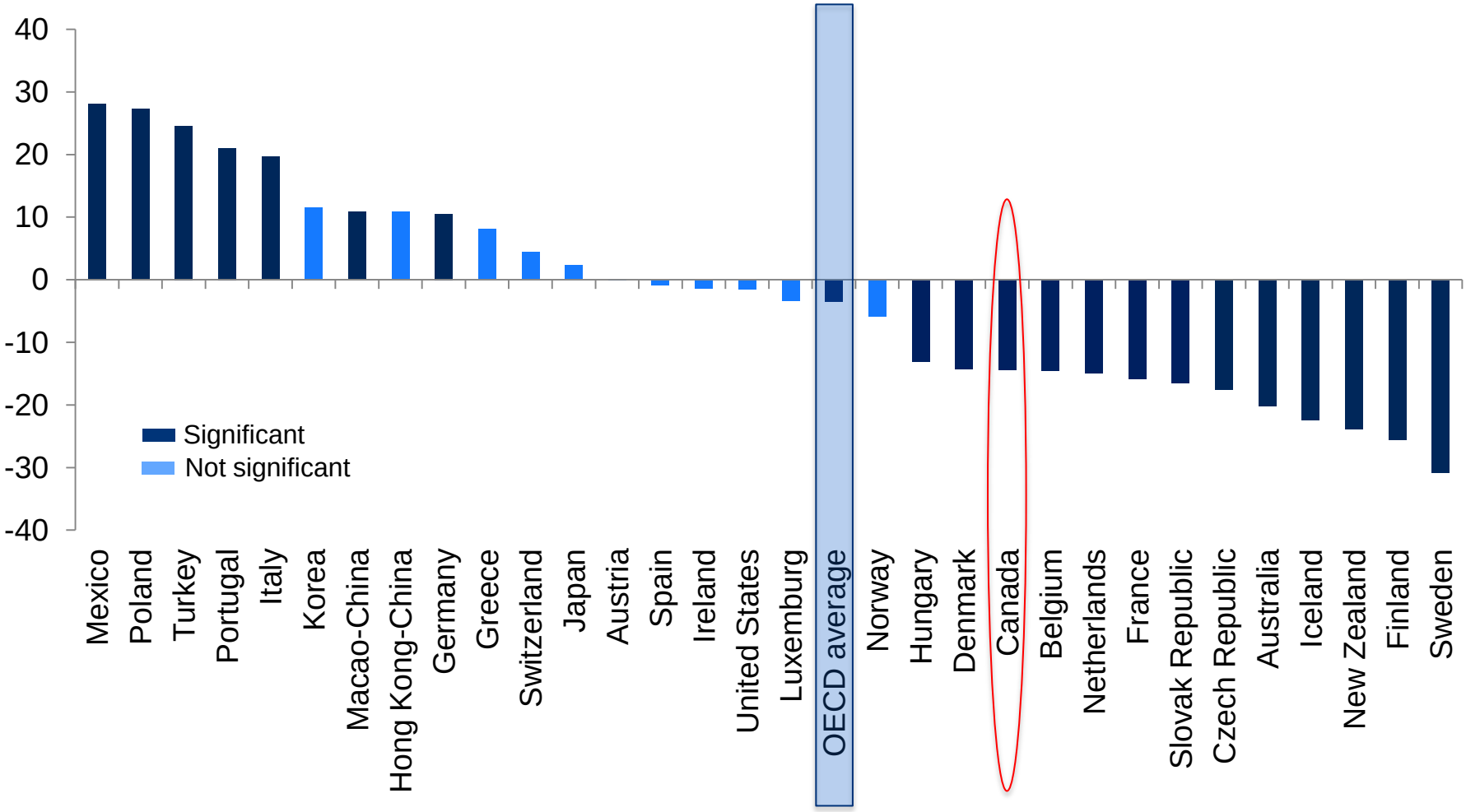
- Boys outperformed girls on both the paper (10 points) and computer-based (17 points) mathematics assessments.
- Girls outperformed boys on both the print (35 points) and digital (21 points) reading assessments.
- In seven Canadian provinces (NS, NB, QC, ON, MB, AB, and BC), the sample was sufficiently large to allow for separate reporting by school language.
- In QC and ON, students in the majority-language school system outperformed their peers in the minority-language school system in mathematics.
- In reading, students in the majority-language school system in NS, NB, ON and BC outperformed their counterparts in the minority-language school system.

Canada continues to demonstrate strong performance and high equity in mathematics performance.



Since 2003, Canada's average mathematics performance declined.

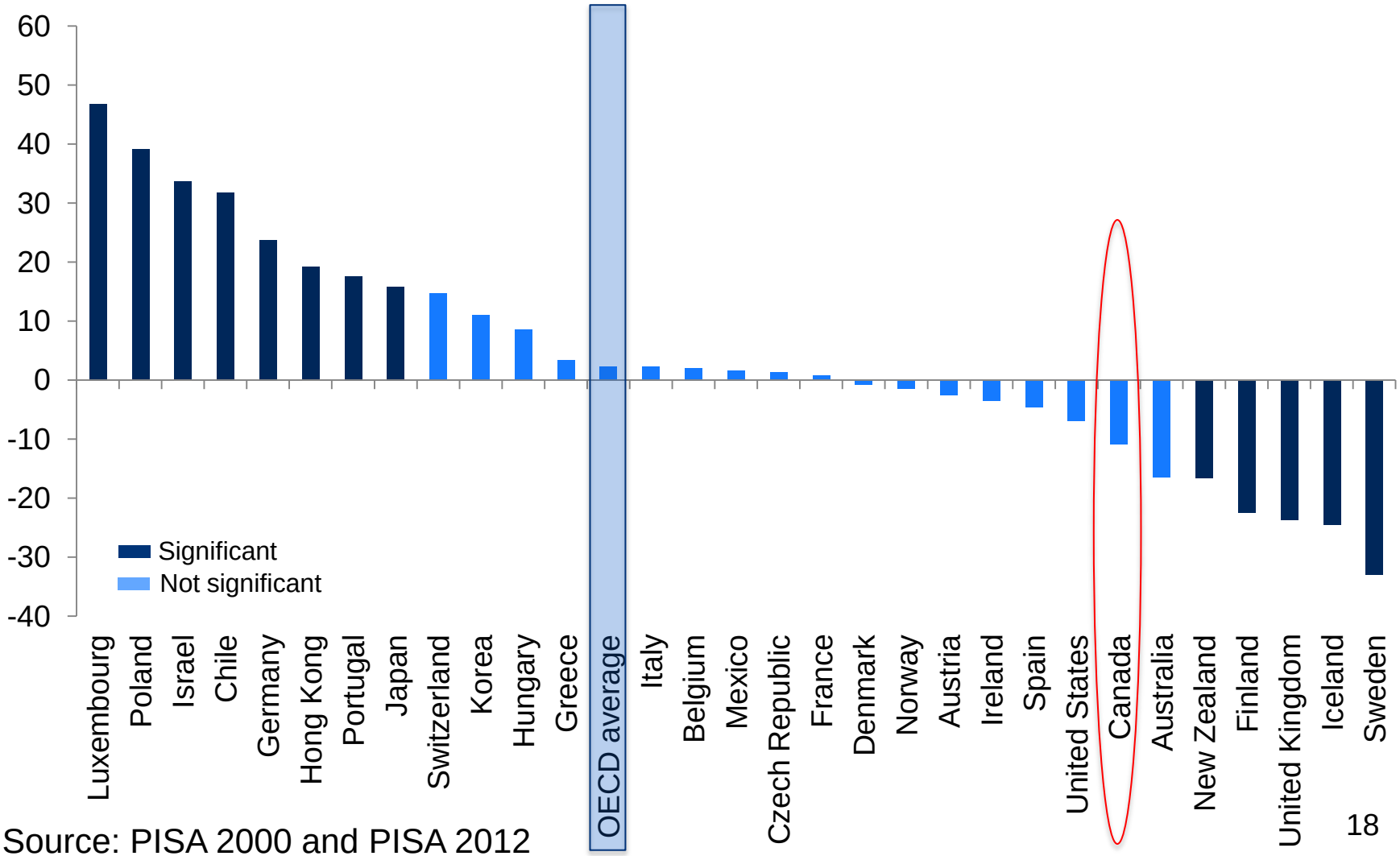
Change in mathematics performance between 2003 and 2012, OECD countries, and Chinese regions



Source: PISA 2003 and PISA 2012

Canada's average reading performance has remained relatively stable since 2000.

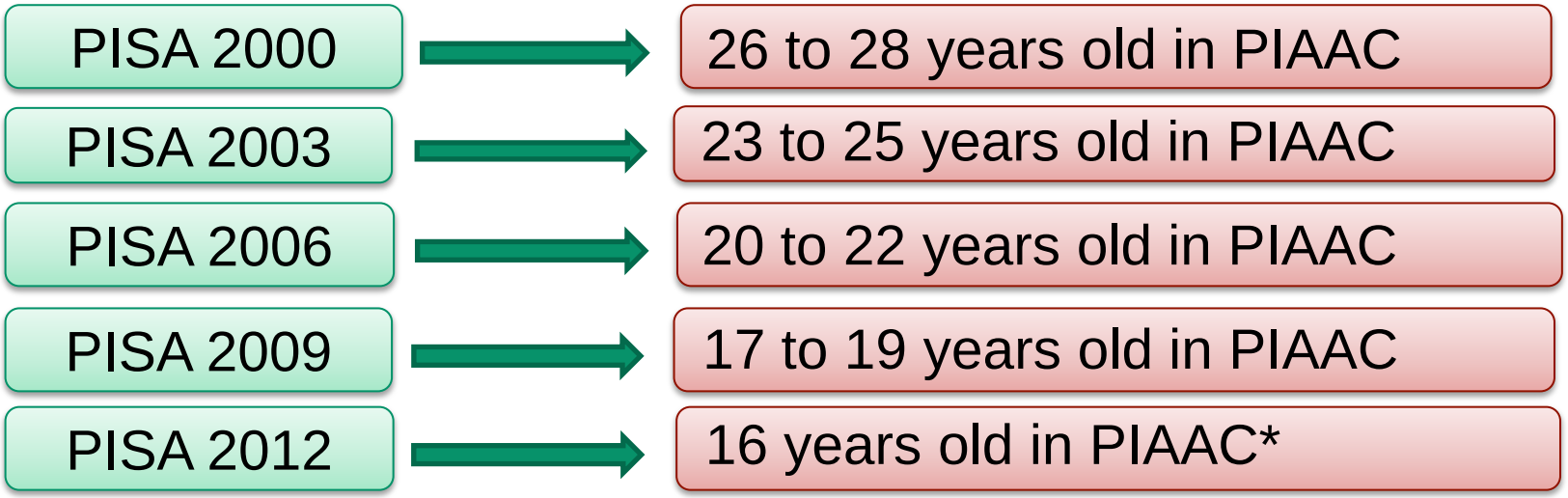
Change in reading performance between 2000 and 2012, OECD countries, and Chinese region



Source: PISA 2000 and PISA 2012

Linking PISA to PIAAC

- In PIACC, most adults aged 27 and under were members of the cohorts assessed in PISA 2000, 2003, 2006 and 2009, when they were 15 years old.

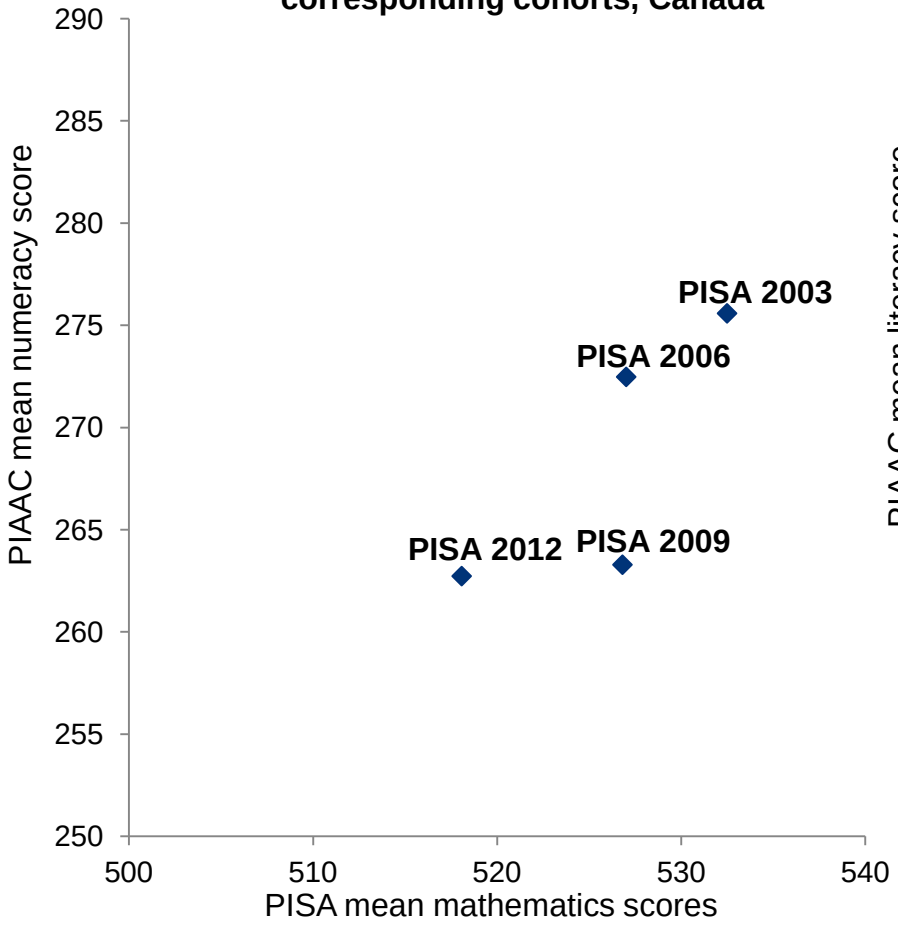


*The cohort is not the same, but is used as an approximation

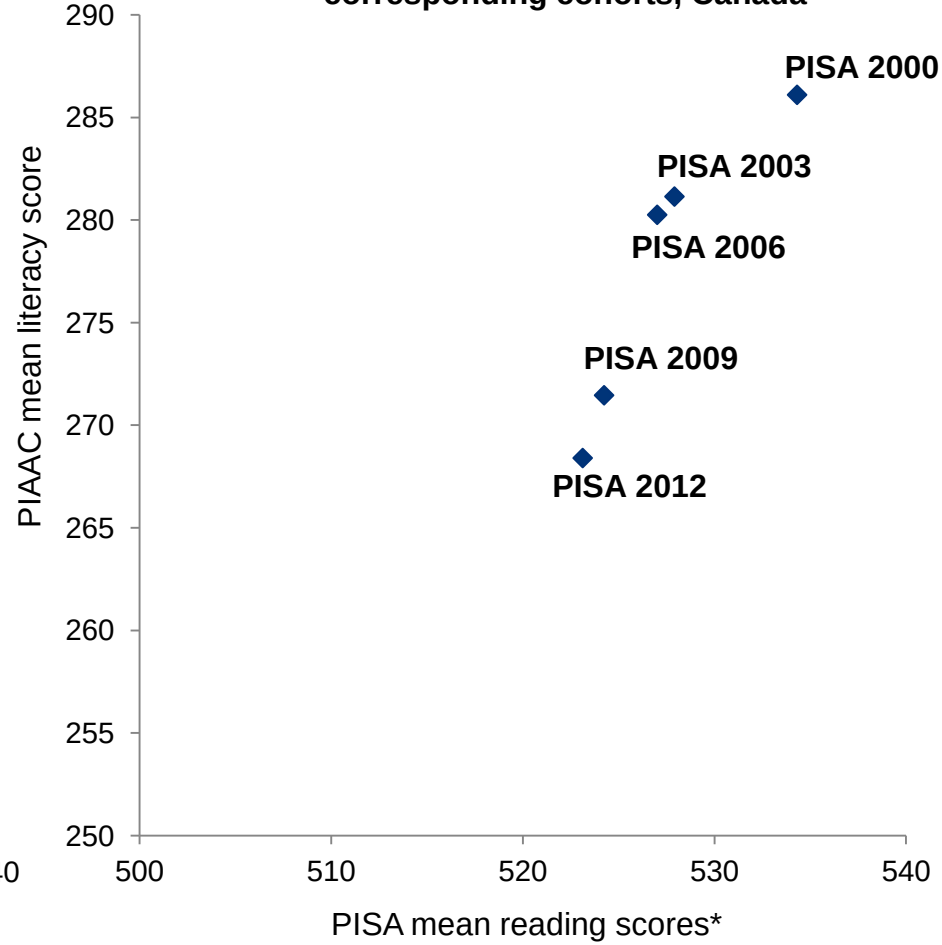
- The next slide provides a quick look at the PIAAC results for PISA students of the various cohorts.

A decrease in mean PISA scores coincides with a decrease in mean PIAAC scores.

Mean mathematics scores in PISA (2003-12) and mean numeracy scores in PIAAC (2012) for corresponding cohorts, Canada



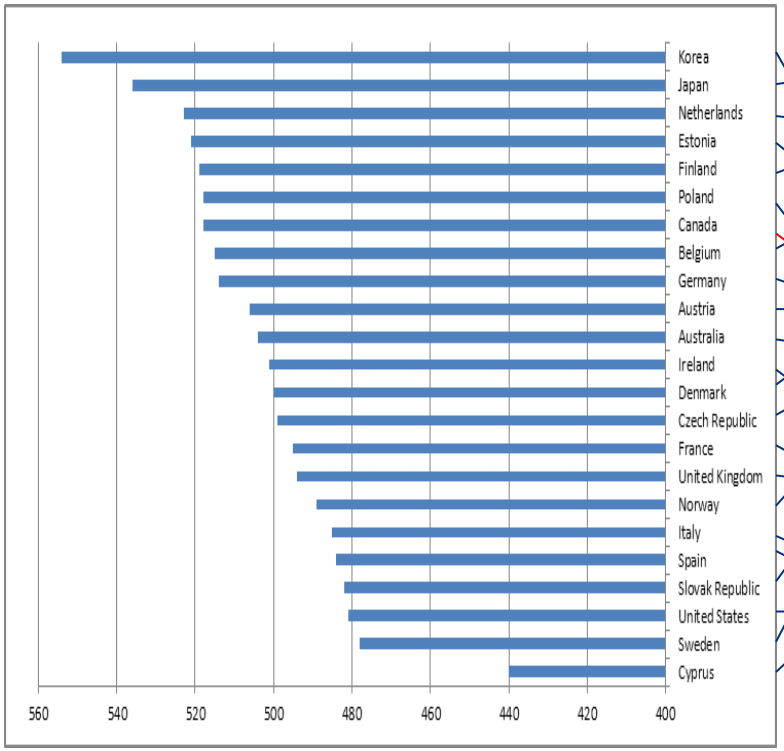
Mean reading scores in PISA (2003-12) and mean literacy scores in PIAAC (2012) for corresponding cohorts, Canada



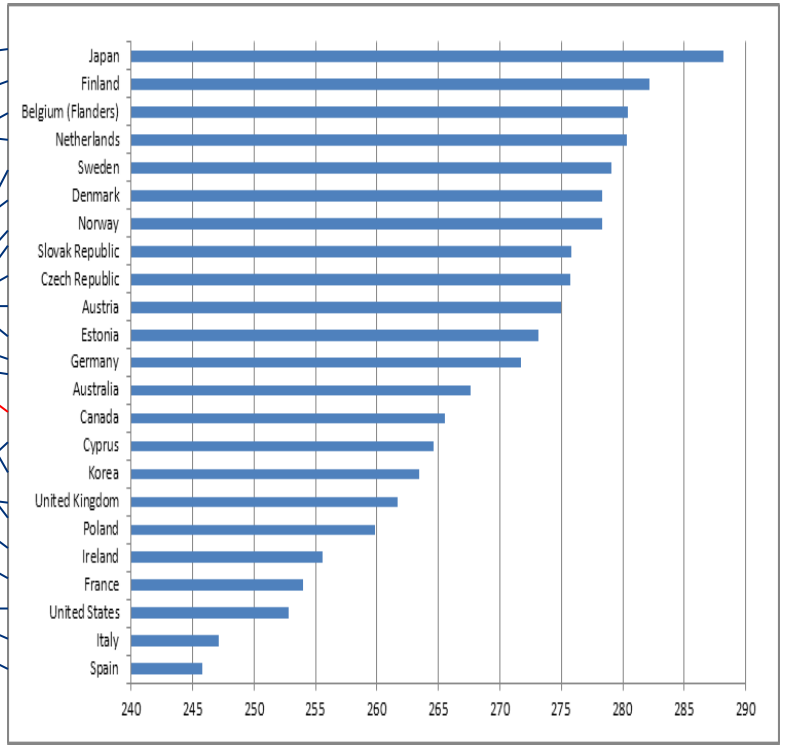
*No significant decrease in PISA reading scores was observed between 2000 and 2012

Canada faces challenges in skills of its adult population

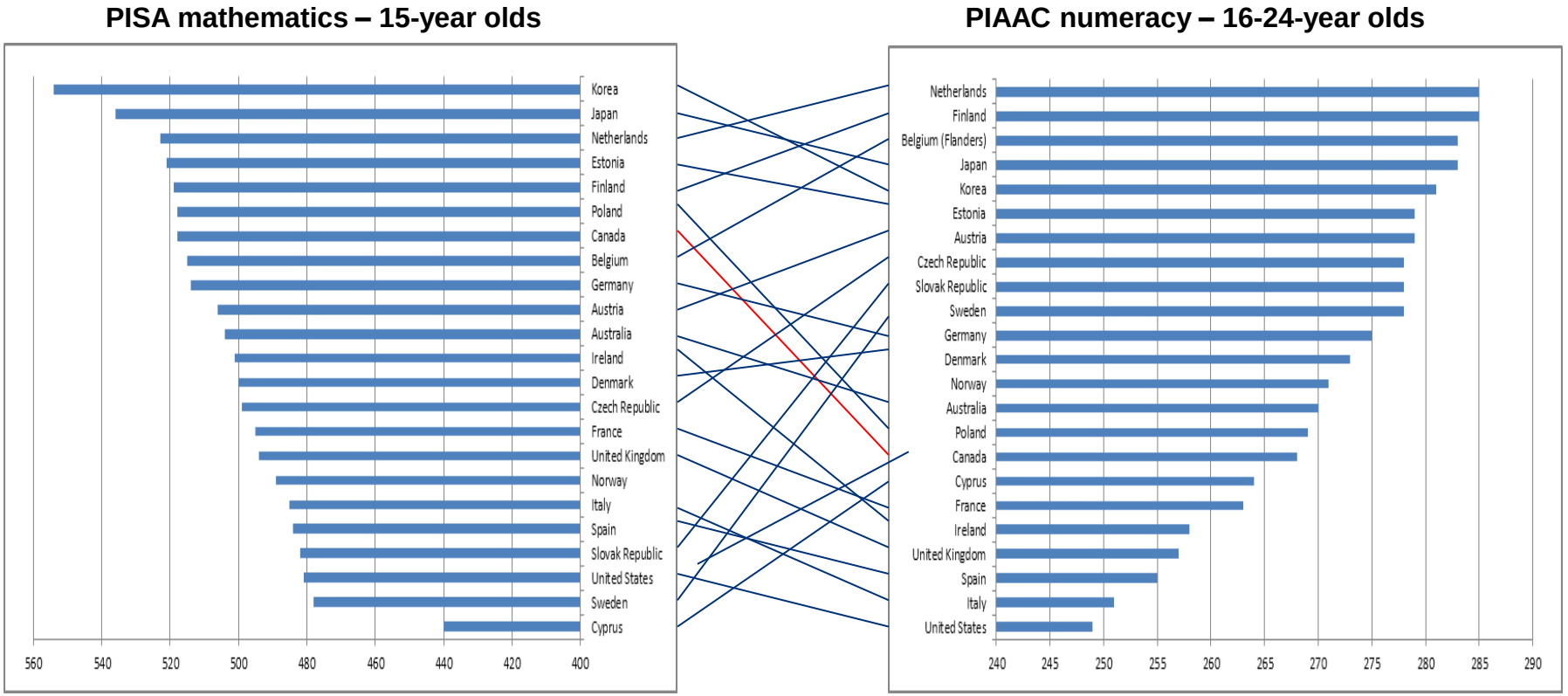
PISA mathematics – 15-year olds



PIAAC numeracy – 16-64-year olds



Time will not help, as the challenge is particularly evident among Canada's youth



Discussion

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