TIMSS Advanced 2015

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TIMSS Advanced 2015
Assesses final-year students with special preparation in

- Advanced mathematics
- Physics

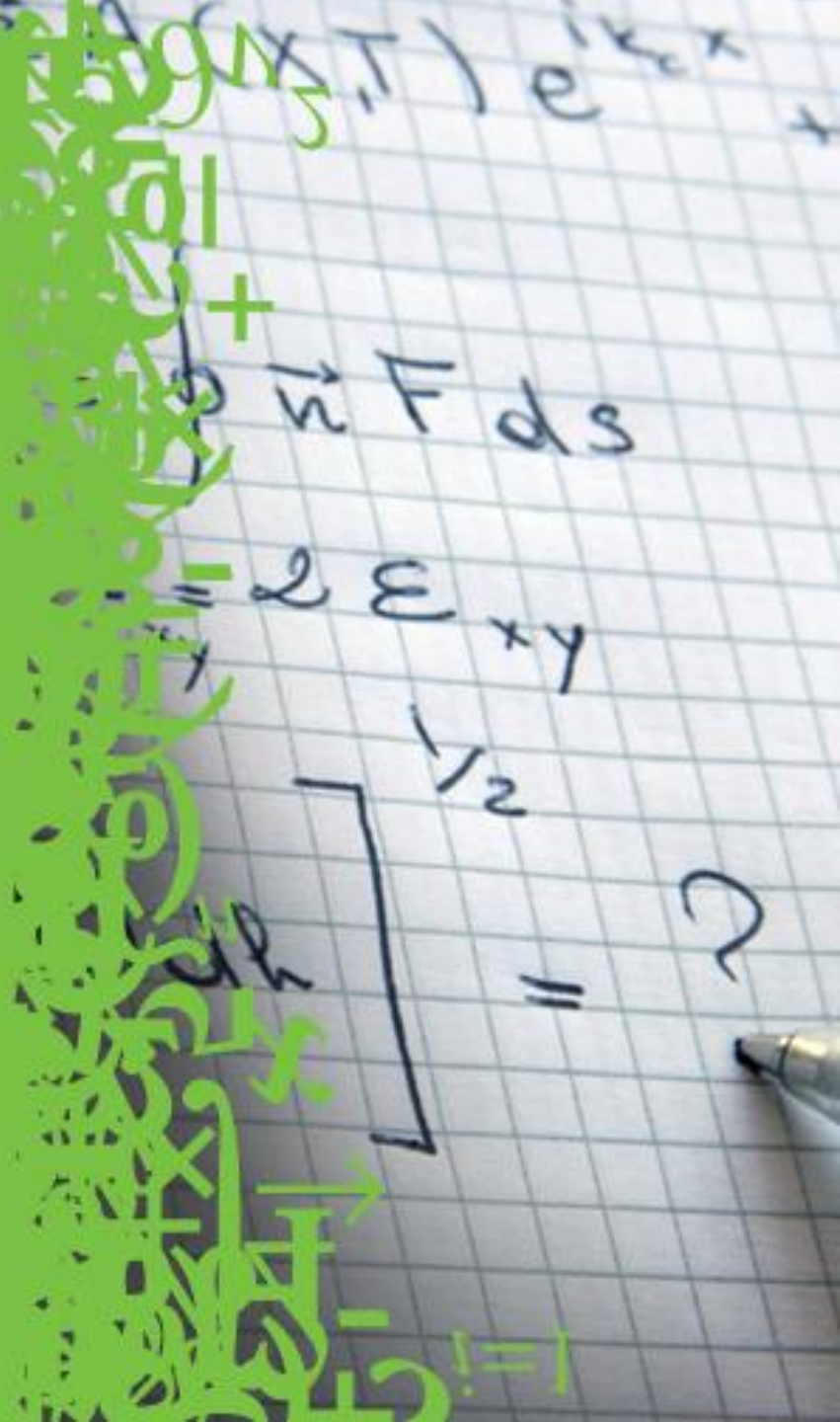
First administered as part of TIMSS in 1995, which included grades 3, 4, 7, 8, and final year

- Trends 1995, 2008, 2015
- 20 years of trends!

Key Policy Issue – "Yield"

How many can be educated to high level?

- "Mathematics for all"
- Practical considerations
- Strategic planning



Students surviving the pipeline

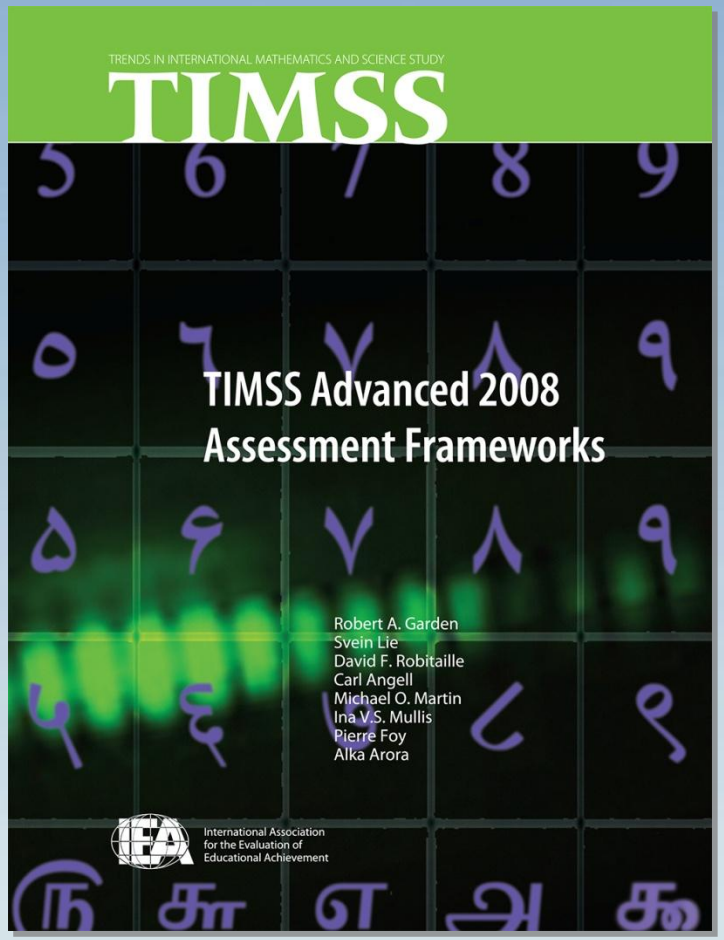
- Varies across countries
- Remained in school
- Studied at high level all through school careers
- Studied mathematics and science

Assess carefully defined populations

- Taking advanced courses in mathematics or physics
- Specialists in pre-university programs
- Programs lasting three to five years

TIMSS Advanced 2008 Frameworks

- **Advanced mathematics**
  - Algebra
  - Calculus
  - Geometry
- **Physics**
  - Mechanics
  - Electricity and magnetism
  - Heat and temperature
  - Atomic and nuclear physics



Countries Participating in 2008

- Armenia
- Italy
- Iran
- Lebanon
- Netherlands
- Norway
- Philippines
- Russian Federation
- Slovenia
- Sweden

- **Also participated in 1995**

Target Populations

- Two separate, but overlapping populations
- Students in the final year of secondary school having taken:
  - Advanced mathematics courses
  - Physics courses

EXHIBIT 4.1 – TIMSS Advanced 2008 Advanced Mathematics Populations

Country	Advanced Mathematics Population
Armenia*	Students in the 11th grade in "Physmat" schools
Iran, Islamic Rep. of	Students in the 12th grade in the advanced mathematics and physics track in the pre-university stage
Italy	Students in the 13th grade in an advanced mathematics program or an advanced mathematics and physics program, found in Liceo Scientifico (general schools with scientific focus), Liceo Scientifico Tecnologico (general schools with focus on technology) and Instituti Technici (vocational full time training)
Lebanon	Students in the 12th grade in the general science program
Netherlands	Students in the 12th grade who had taken the advanced mathematics course Math B2 in the pre-university track (VWO)
Norway**	Students in the 13th grade who had taken the 3MX advanced mathematics course in the natural science program of the academic track
Philippines	Students in the 10th grade who had taken advanced mathematics courses and attended either a "science and technology oriented" high school, a regional science high school, a university rural high school and laboratory school, or other public science high school
Russian Federation	Students in the 11th grade who had taken 6 hours or more per week of instruction in mathematics
Slovenia	Students in the 12th grade in general gymnasia programs
Sweden	Students in the 12th grade in the natural science program and the technology program who had taken the mathematics D course and may have taken the mathematics E course

Exhibit 4.2 TIMSS Advanced 2008 Physics Populations

Country	Physics Population
Armenia*	Students in the 11th grade in "Physmat" schools
Iran, Islamic Rep. of	Students in the 12th grade in the advanced mathematics and physics track in the pre-university stage
Italy	Students in the 13th grade in an advanced mathematics and physics program, found in Liceo Scientifico (general schools with scientific focus), Liceo Scientifico Tecnologico (general schools with focus on technology) and Instituti Technici (vocational full time training)
Lebanon	Students in the 12th grade in the general science program
Netherlands	Students in the 12th grade who had taken the Physics 2 course in the pre-university track (VWO)
Norway**	Students in the 13th grade who had taken the 3FY physics course in the natural science program of the academic track
Russian Federation	Students in the 11th grade who had taken 3 hours or more per week of instruction in physics
Slovenia	Students in the 12th grade in general gymnasia programs who chose to take an additional physics course in their final year
Sweden	Students in the 12th grade in the natural science program and the technology program who had taken the physics B course

Sample Design

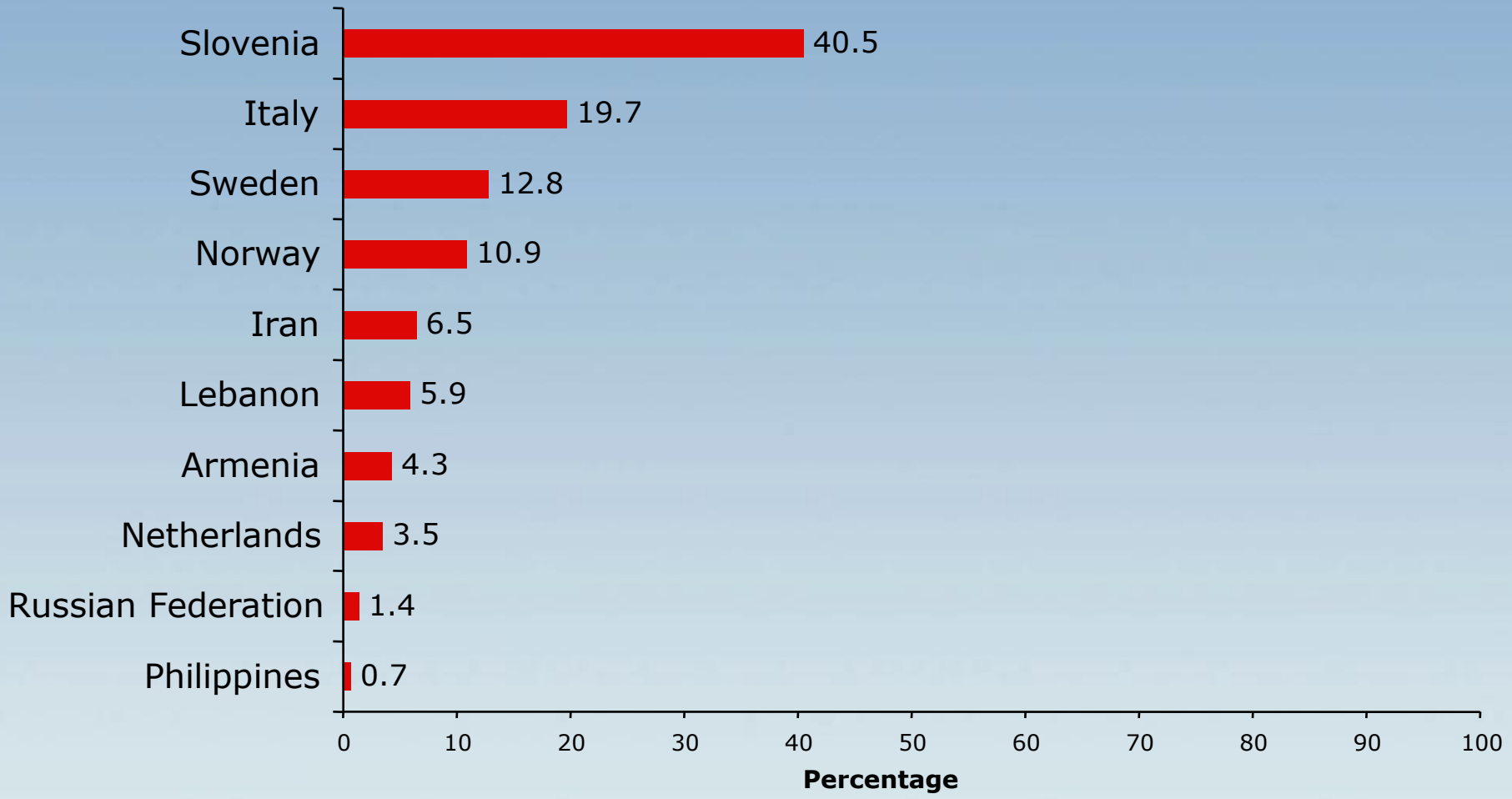
Basic two-stage sample design, schools (120) at the first stage and one or two intact classes at the second stage

- Completely overlapping populations:
  - One school sample, one or two classes, mathematics and physics booklets rotated within each class
- Partially overlapping populations:
  - Separate school samples for mathematics and physics

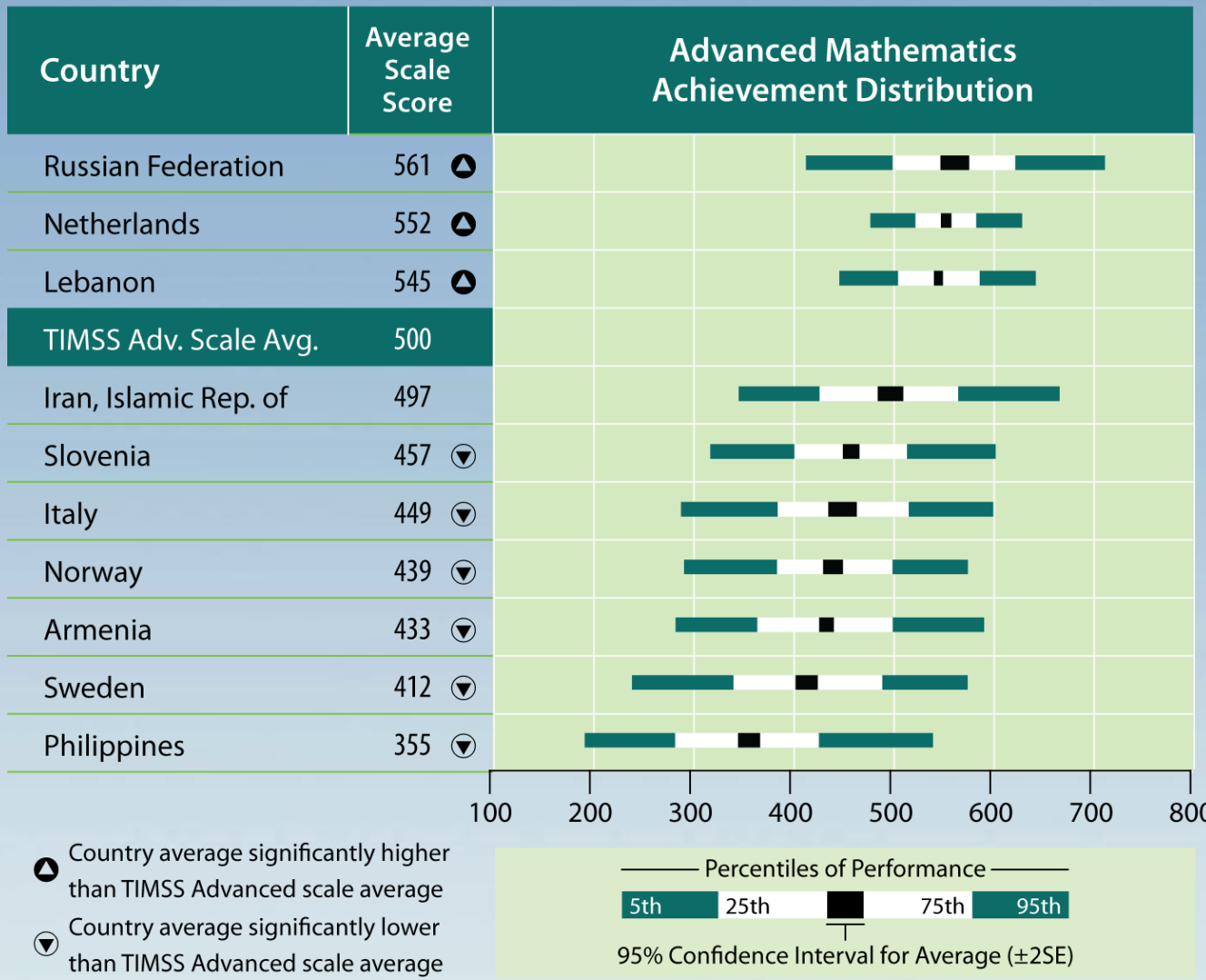
TIMSS Advanced Coverage Index

$$\frac{\text{Students Taking Advanced Courses}}{\text{Entire Age Cohort}} \times 100$$

TIMSS Advanced 2008 Mathematics Coverage Index

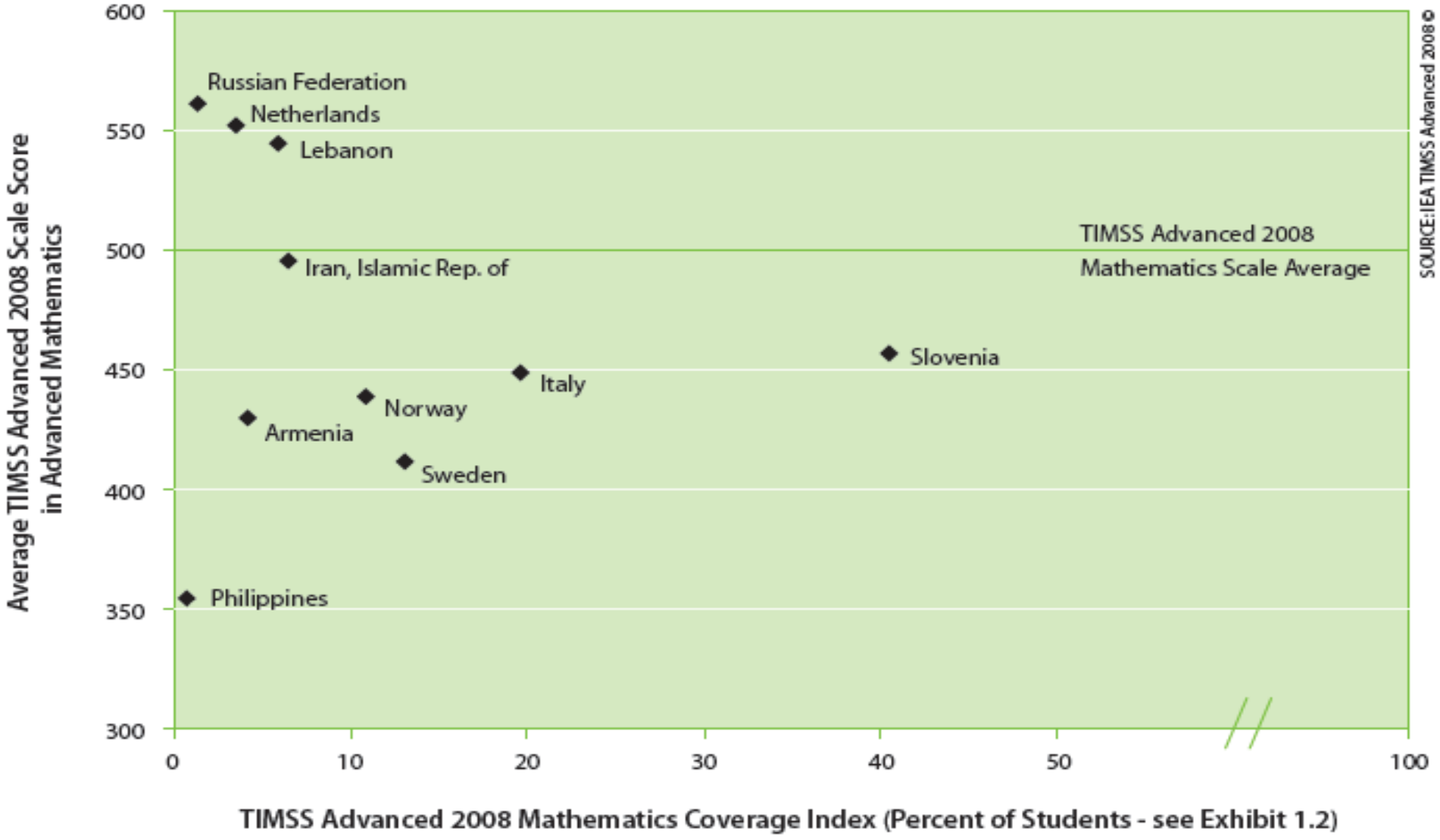


Achievement in Advanced Mathematics

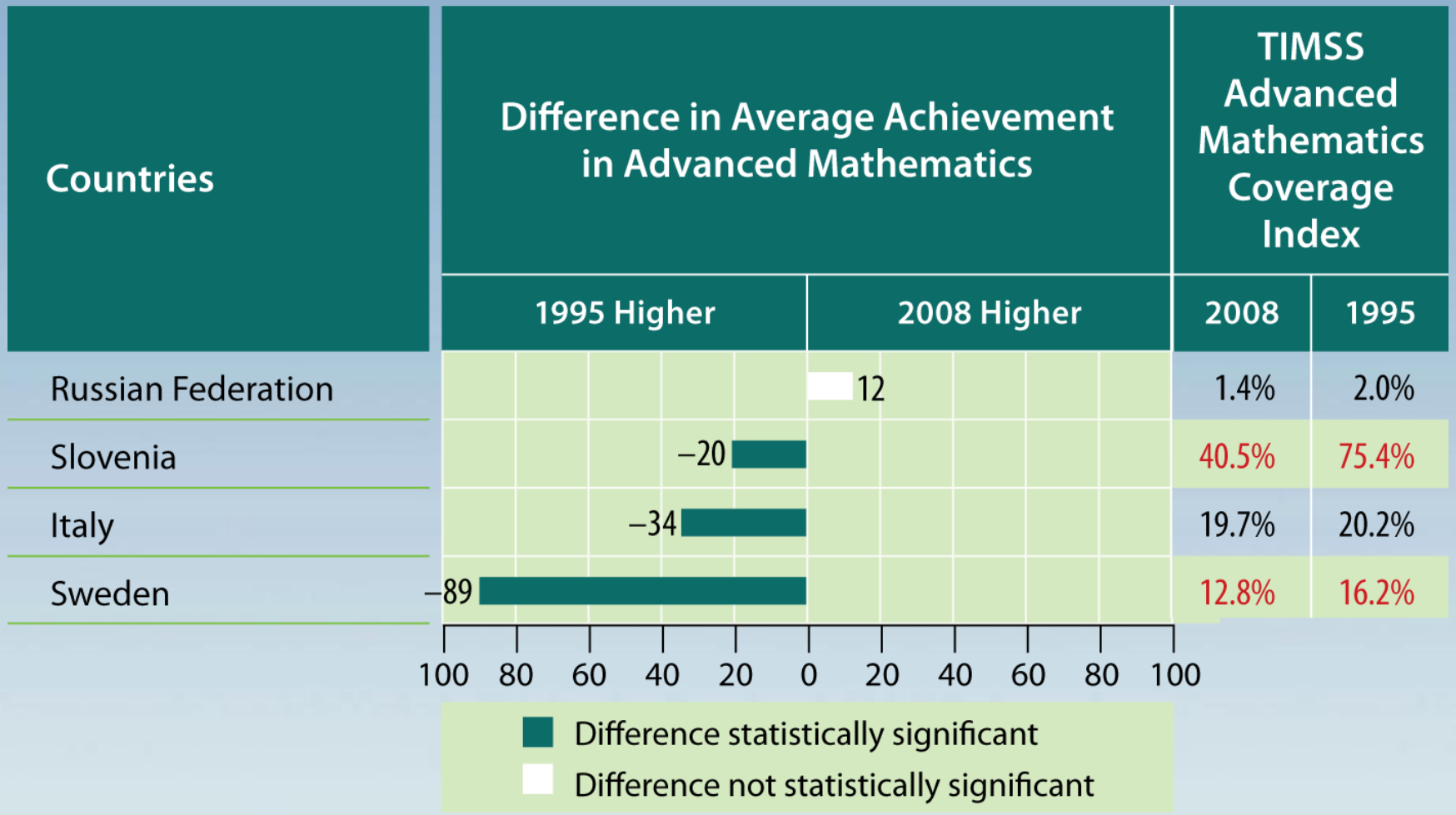


Average Achievement in Advanced Mathematics by TIMSS Advanced 2008 Coverage Index for Advanced Mathematics

TIMSSAdvanced2008
Advanced Mathematics

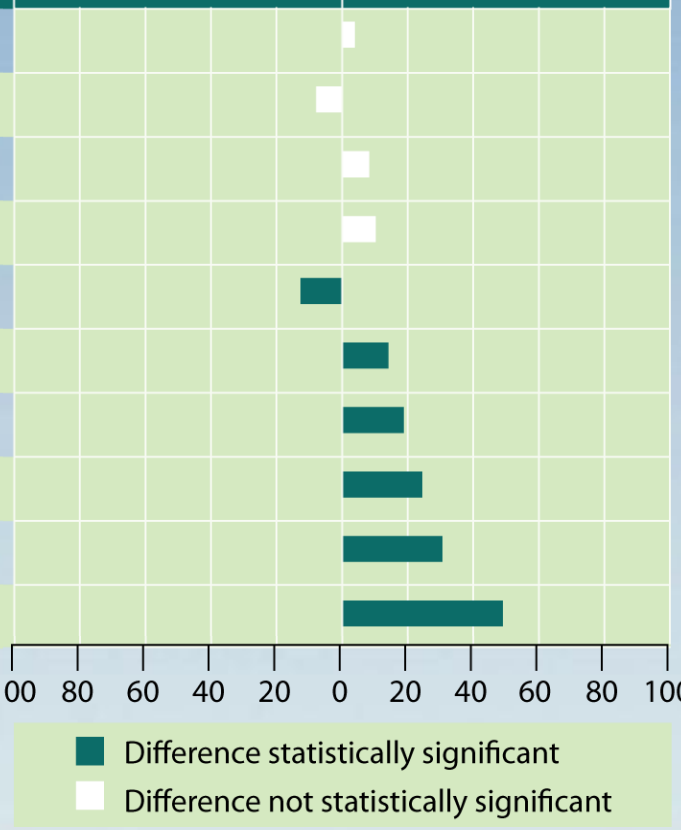


Trends in Achievement in Advanced Mathematics

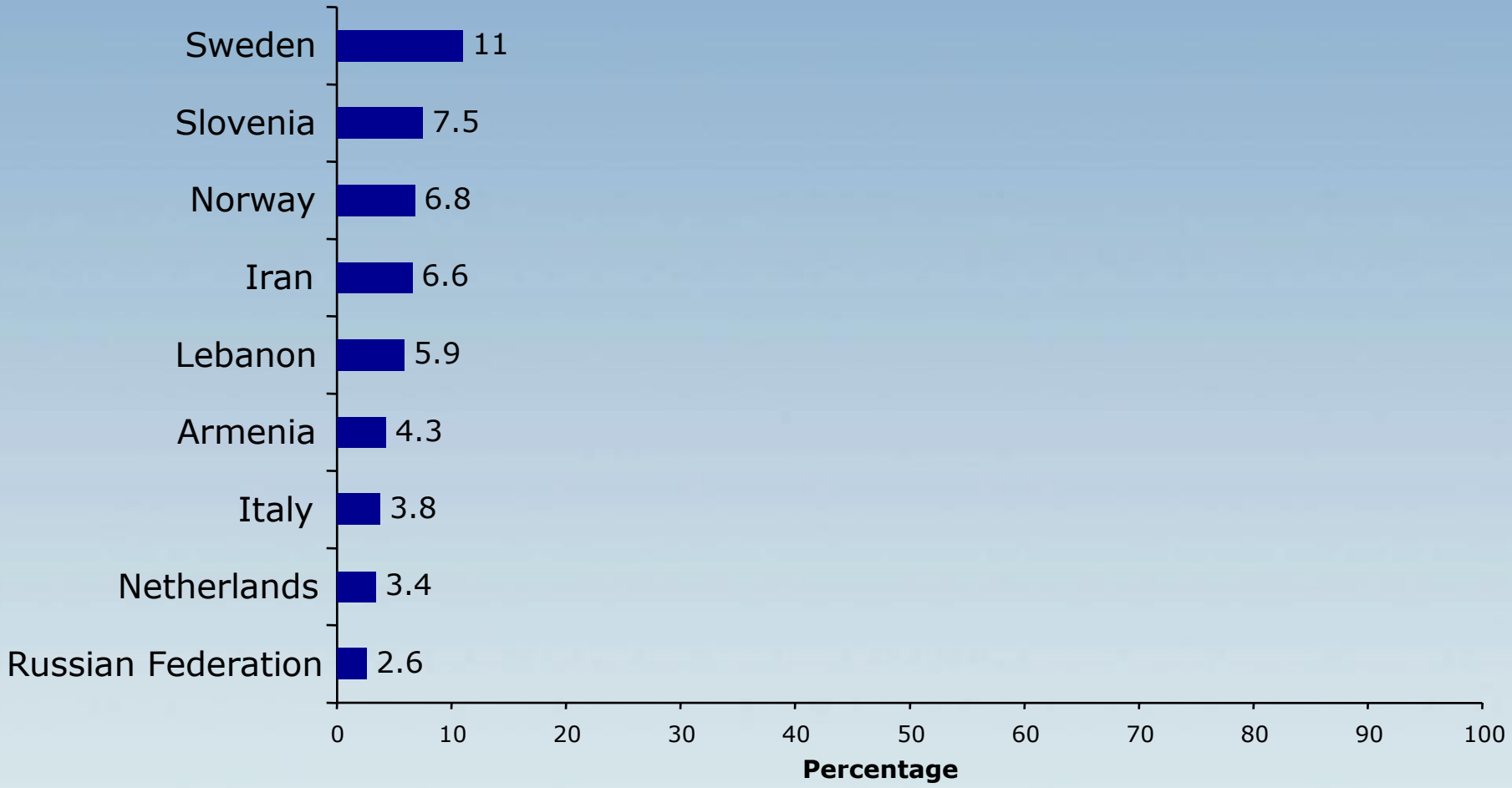


Advanced Mathematics Results by Gender

Country	Percent of Students	
	Females	Males
Netherlands	23	77
Italy	34	66
Norway	38	62
Armenia	52	48
Lebanon	29	71
Sweden	40	60
Russian Federation	45	55
Slovenia	60	40
Iran, Islamic Rep. of	44	56
Philippines	63	37



TIMSS Advanced 2008 Physics Coverage Index



Achievement in Physics

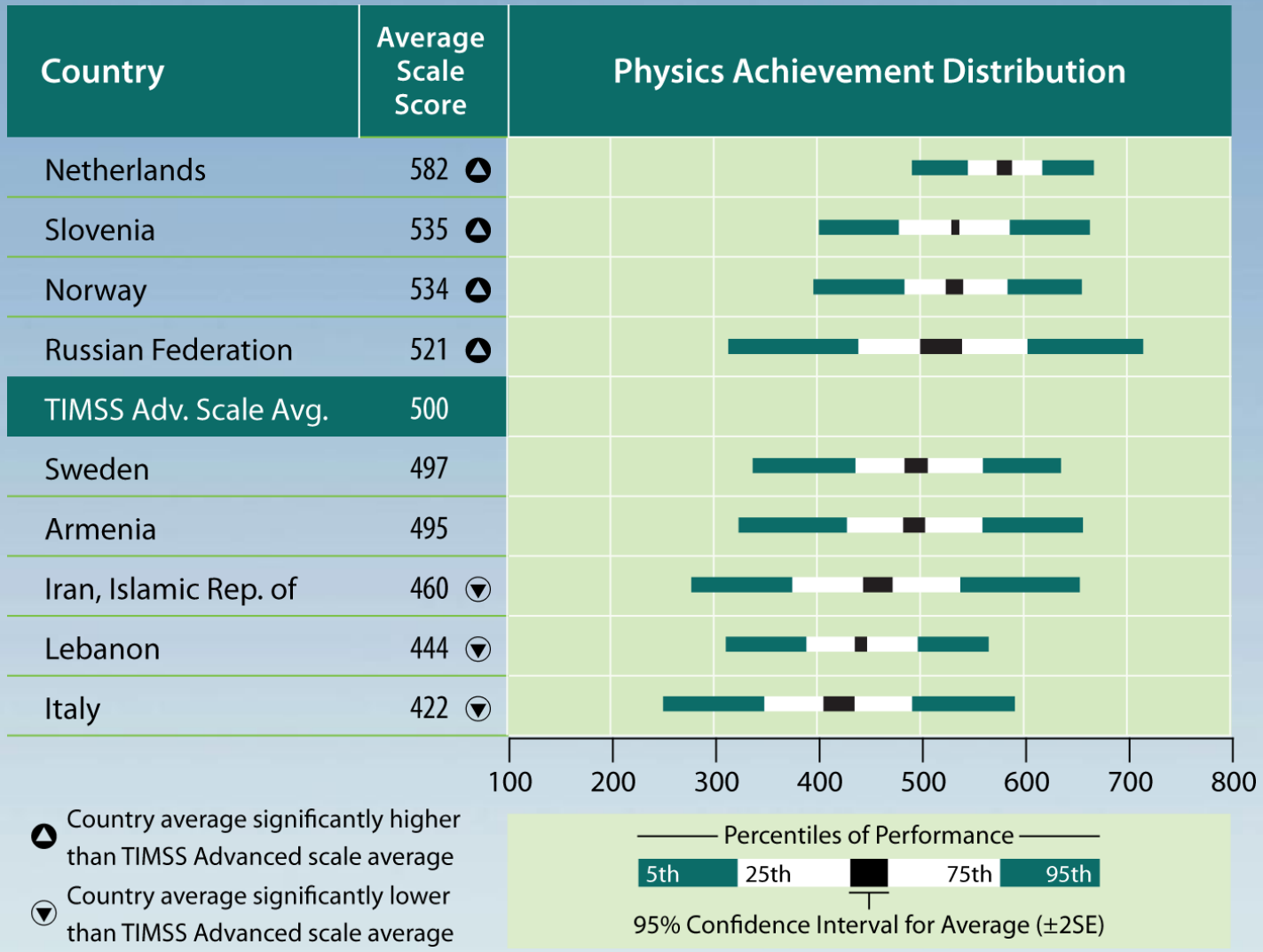
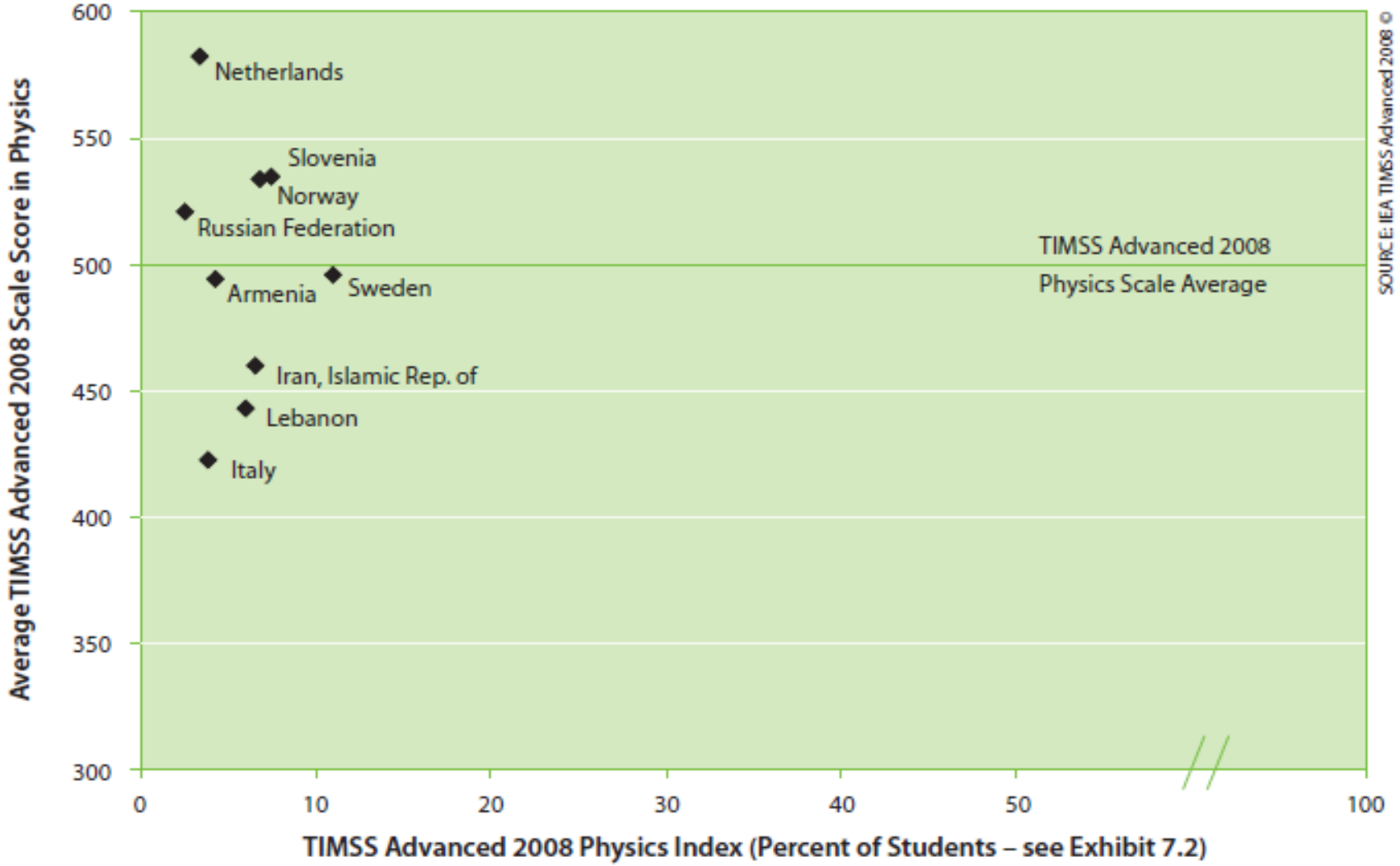
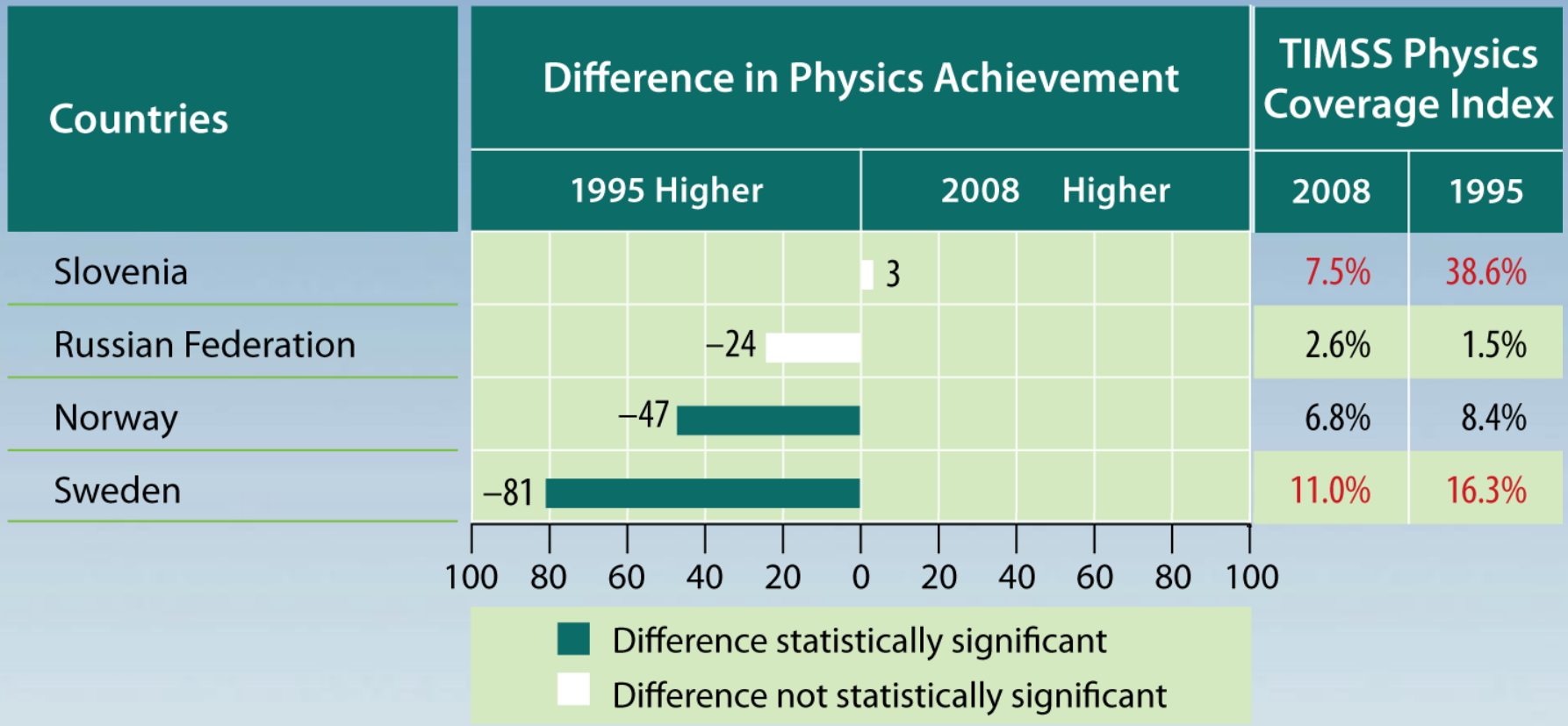


Exhibit 8.2 **Average Achievement in Physics by TIMSS Advanced 2008 Coverage Index for Physics**

TIMSS Advanced 2008 Physics

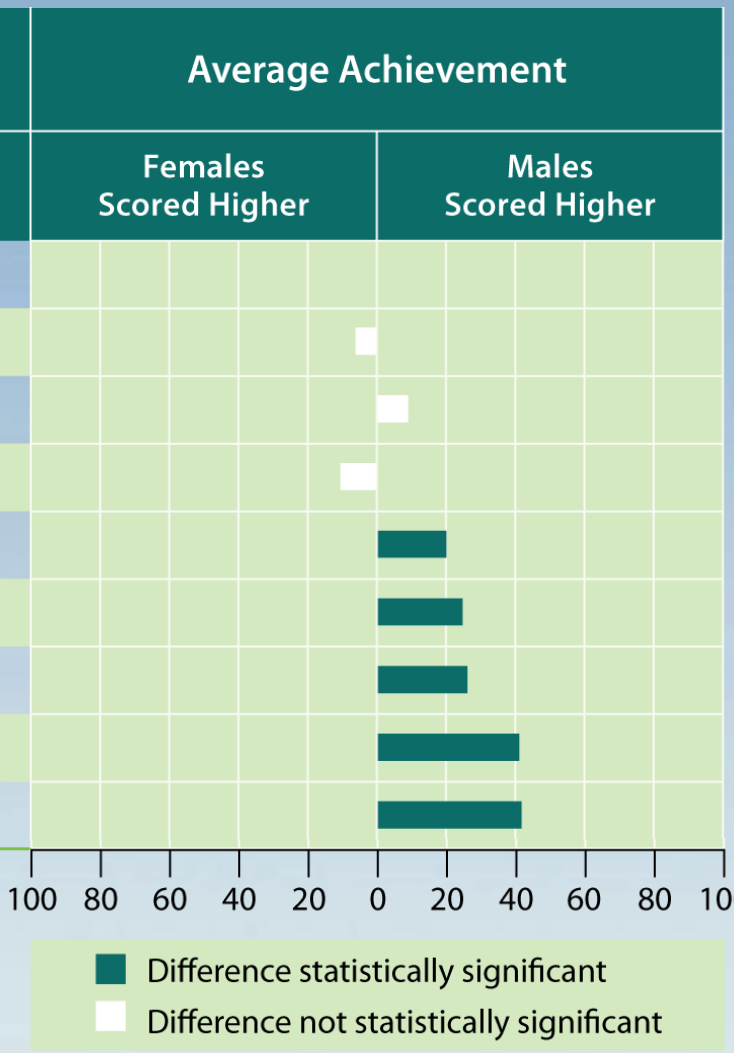


Trends in Achievement in Physics



Physics Results by Gender

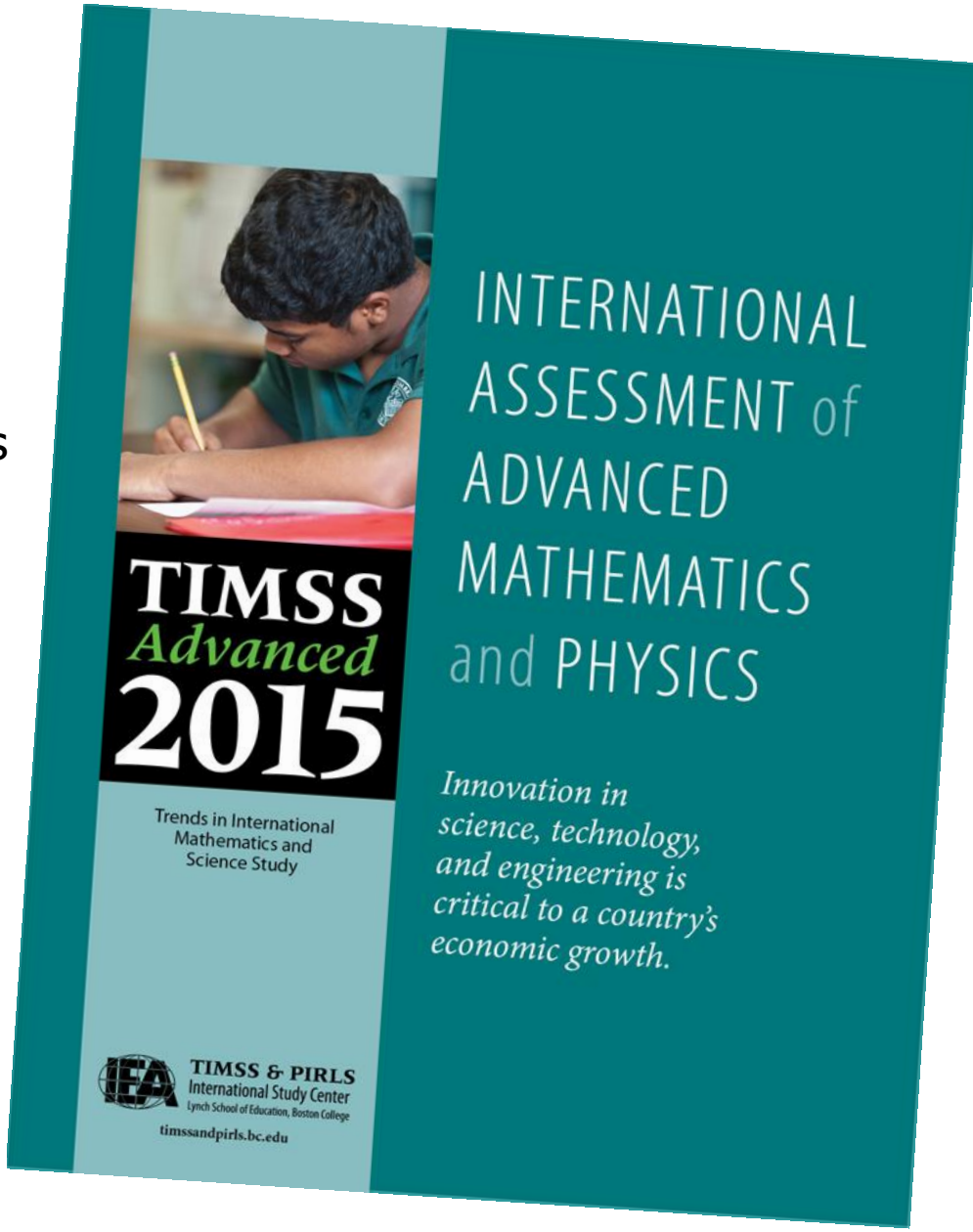
Country	Percent of Students	
	Females	Males
Slovenia	27	73
Armenia	53	47
Sweden	35	65
Lebanon	29	71
Netherlands	19	81
Norway	29	71
Italy	40	60
Iran, Islamic Rep. of	44	56
Russian Federation	45	55



TIMSS Advanced 2015

Preparing the next generation of scientists and engineers

- Quantity and quality of students prepared for university study in STEM fields at the end of secondary school
- Participation options
  - End of secondary school
  - Beginning of first year of tertiary education



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