STEM competence development at EU level

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Outline:

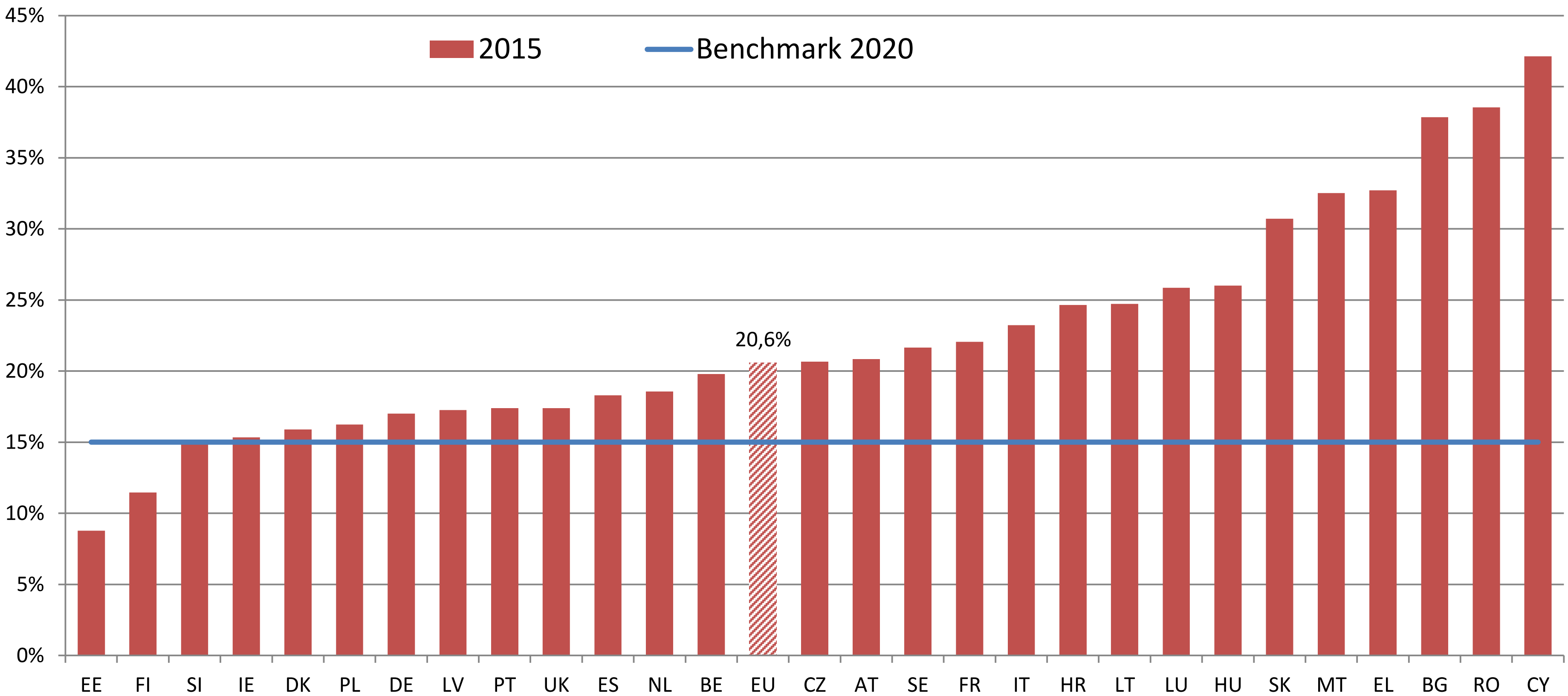
1. Evidence for the outcomes of STEM education

2. Main challenges facing STEM education and policy directions for tackling them

3. Effect of ICT use on students’ achievement

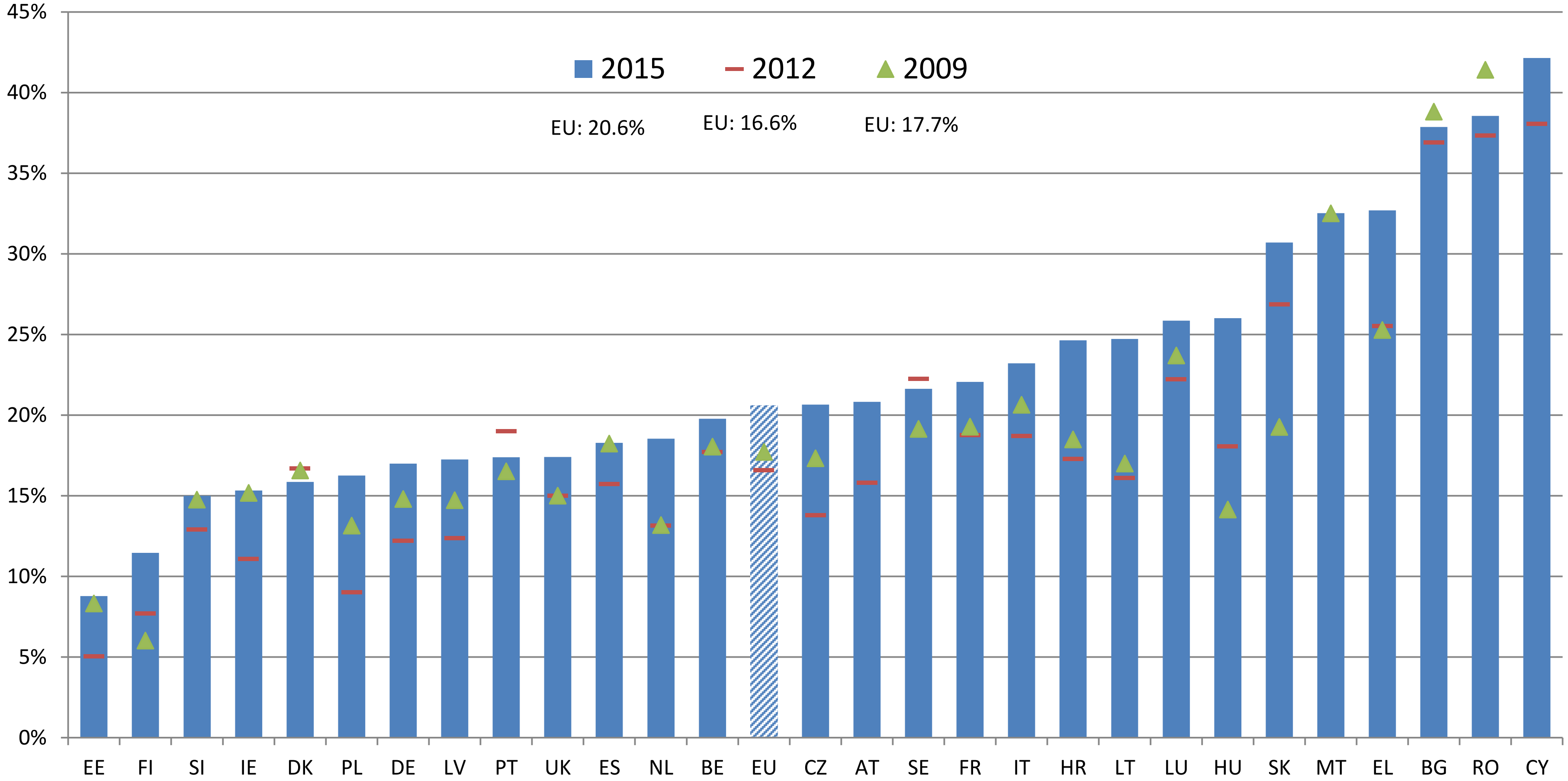
Shares of low achieving students in science

PISA 2015

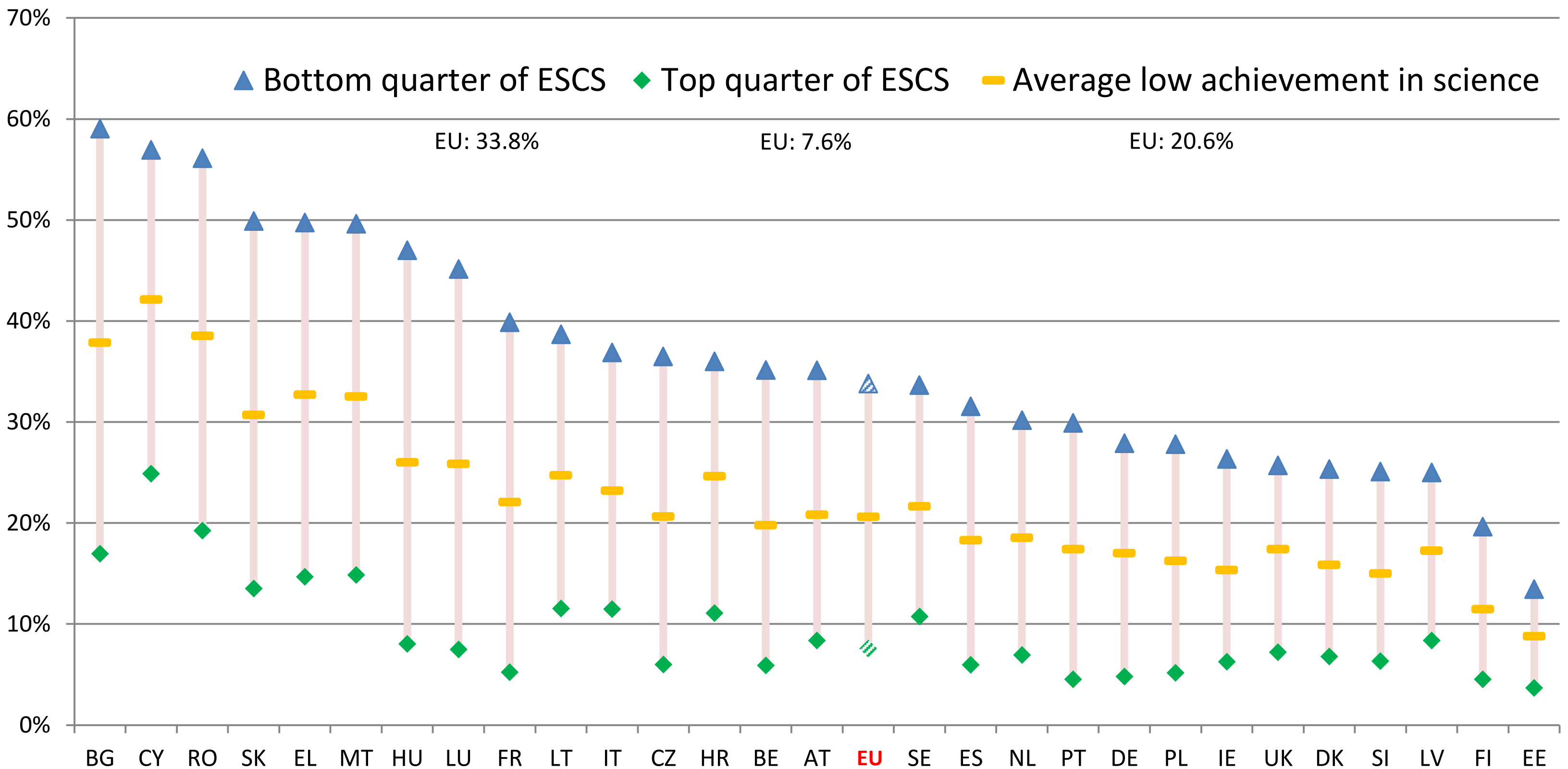


Progress towards meeting the Benchmark in science, 2009-2015

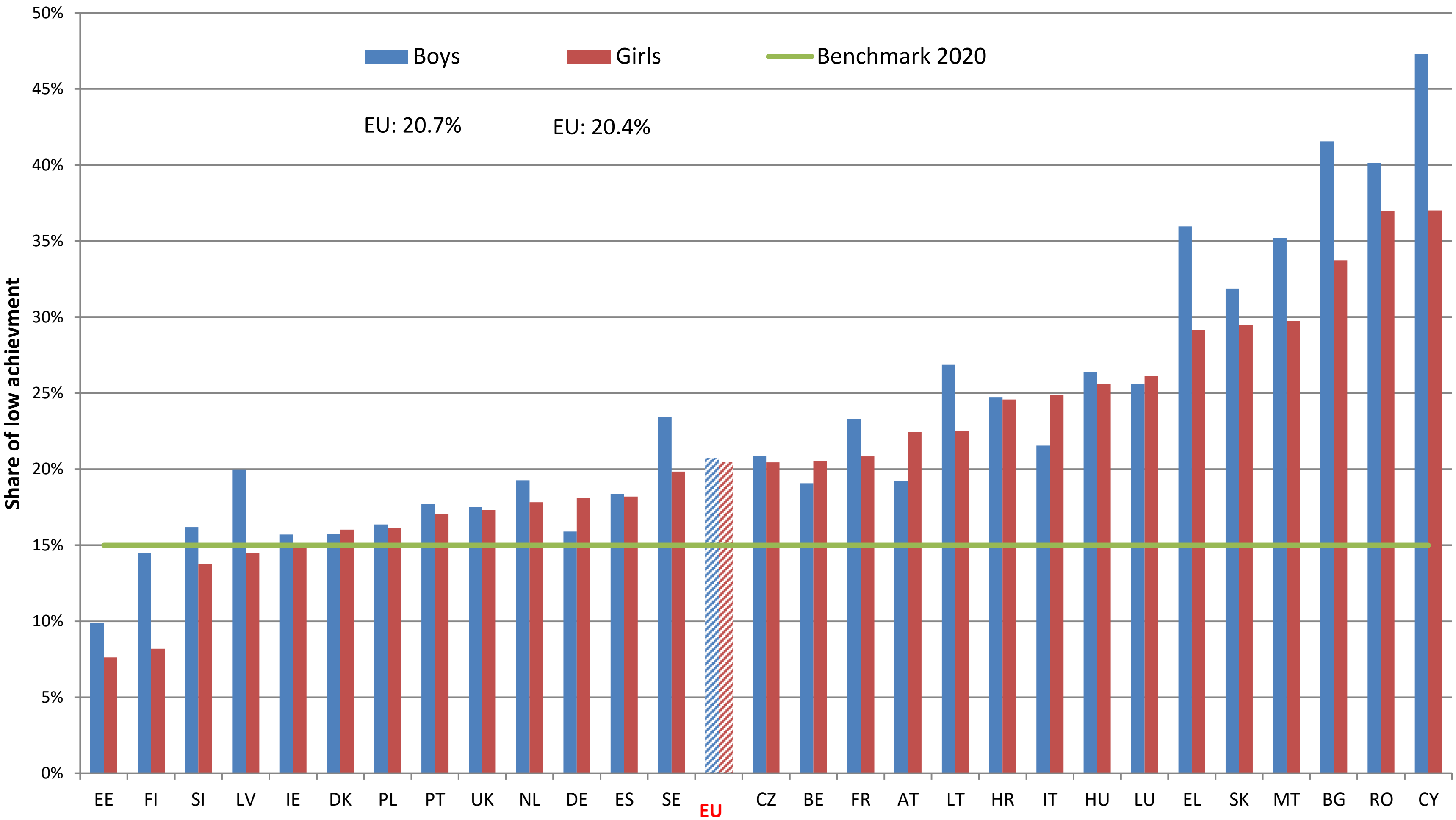
European Commission



Low achievement in science by socio-economic status 2015



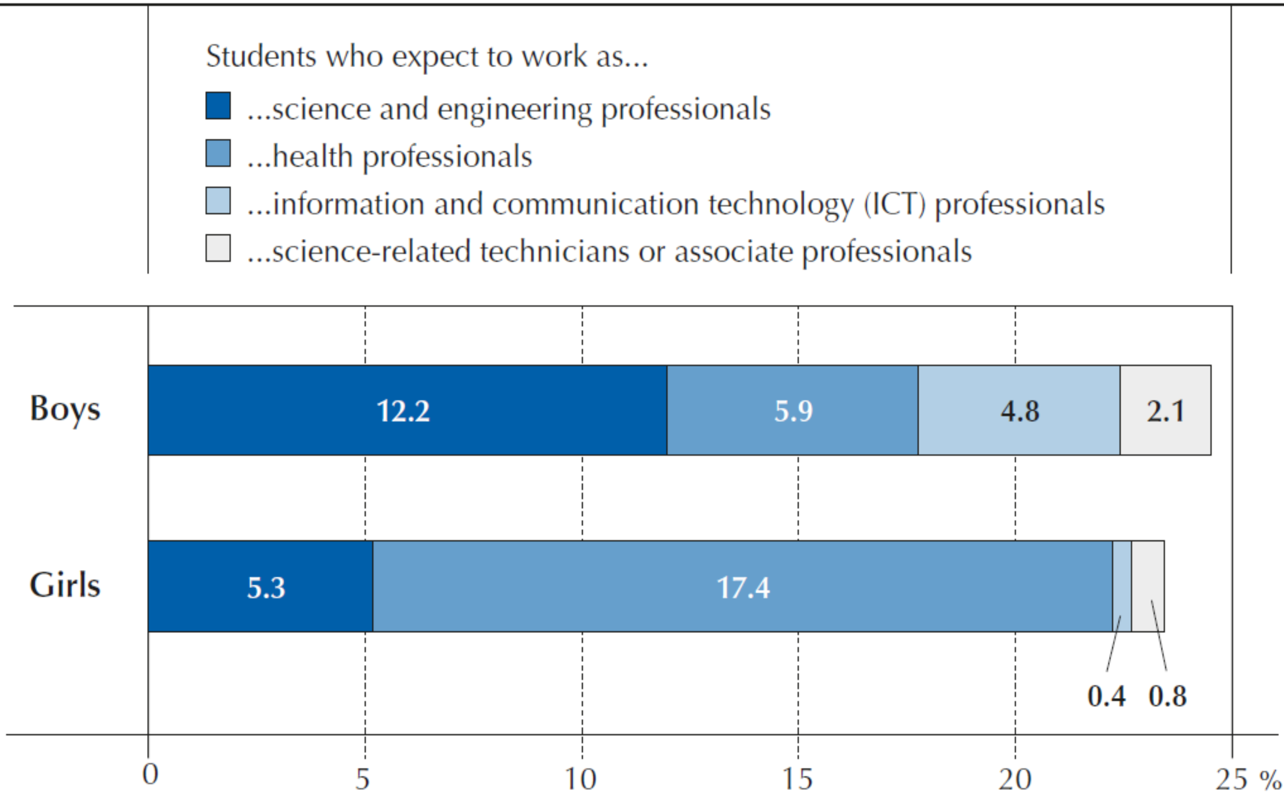
Share of low achieving boys and girls in science 2015



Interest in STEM professions

Figure I.3.5 ■ **Expectations of a science career, by gender**

OECD average



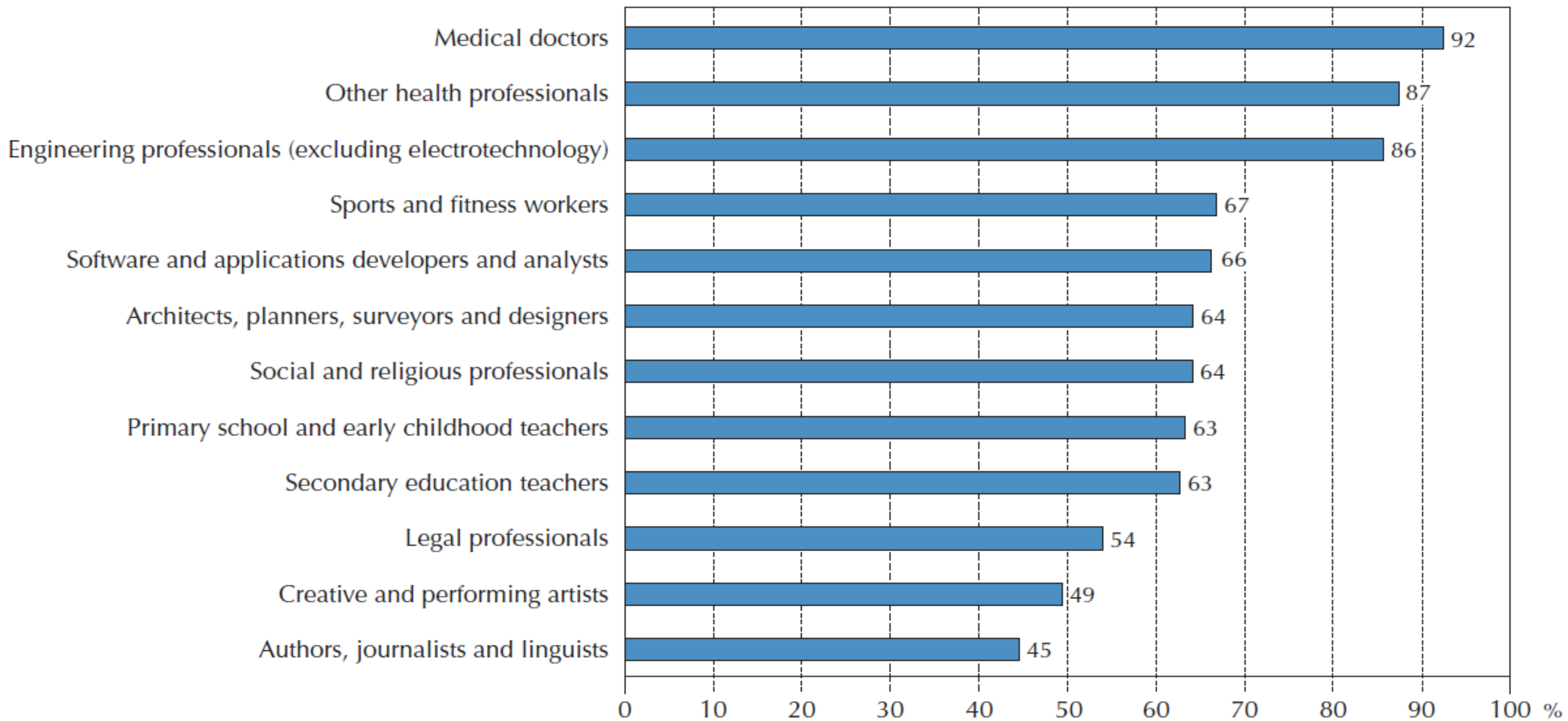
Source: OECD, PISA 2015 Database, Tables I.3.11a-d.

Science learning and the future careers

European Commission

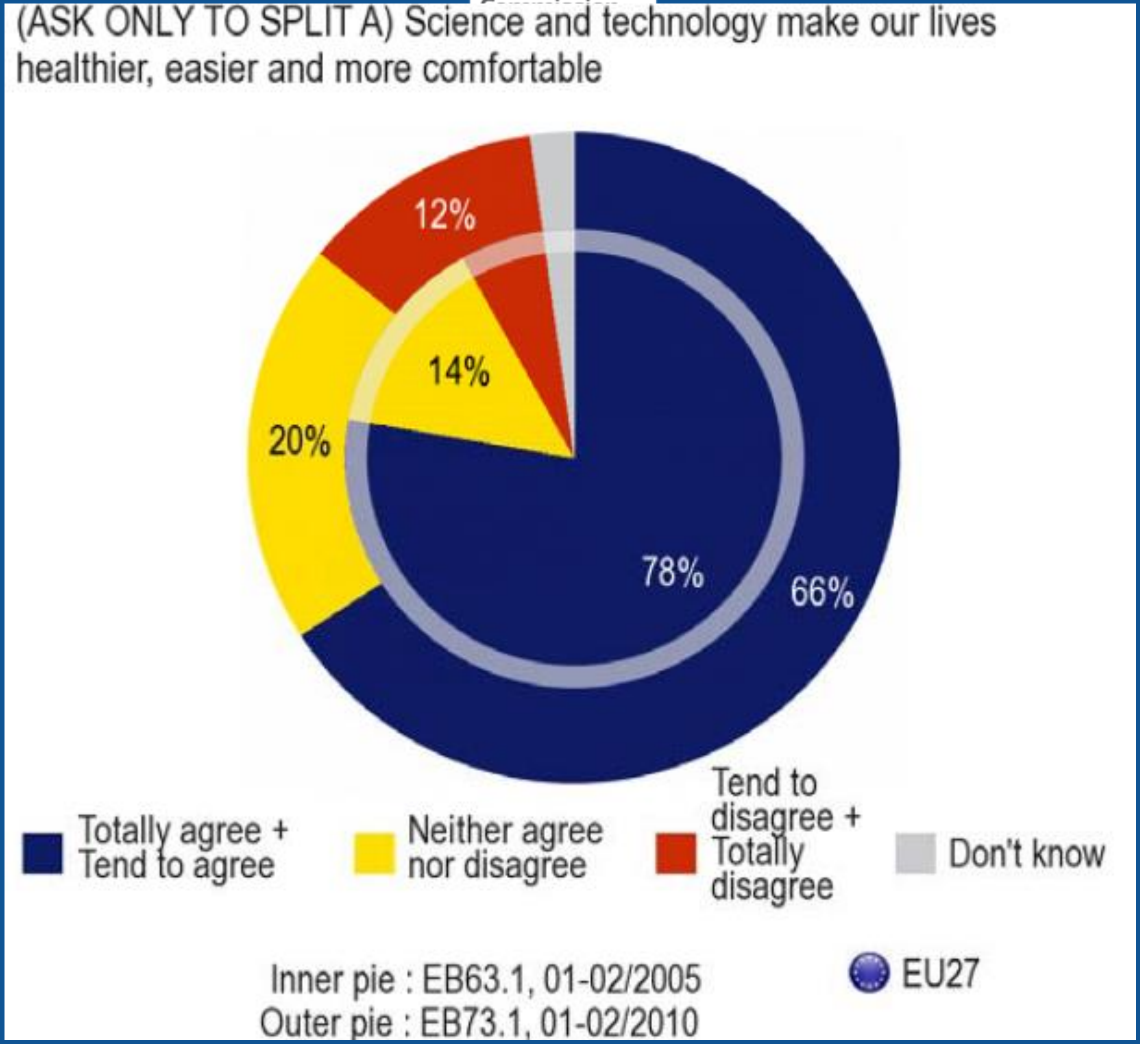
Figure I.3.16 ▪ **Students' expectations of future careers and instrumental motivation to learn science**

Percentage of students who "agree"or "strongly agree" that "making an effort in my <school science> subject(s) is worth it because this will help [them] in the work [they] want to do later on", by expected occupation



Source: OECD, PISA 2015 Database, Table I.3.11f.

Distrust of science increases over time



Main challenges in STEM education:

STEM key competence for all citizens

Achievement levels and interest in STEM

Shortage of STEM teachers

Competent STEM workforce

Policy support for STEM education development at EU level:

1. European education area
2. Renewed EU Agenda for Higher Education
3. Development of school education and excellent teaching
4. Focus on inclusion and the underachievers
5. Key competences framework

Key Competences for Life Long Learning

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Cultural

Citizenship

Entrepreneurship

Digital

Languages

Personal, Social, and Learning

STEM

Literacy

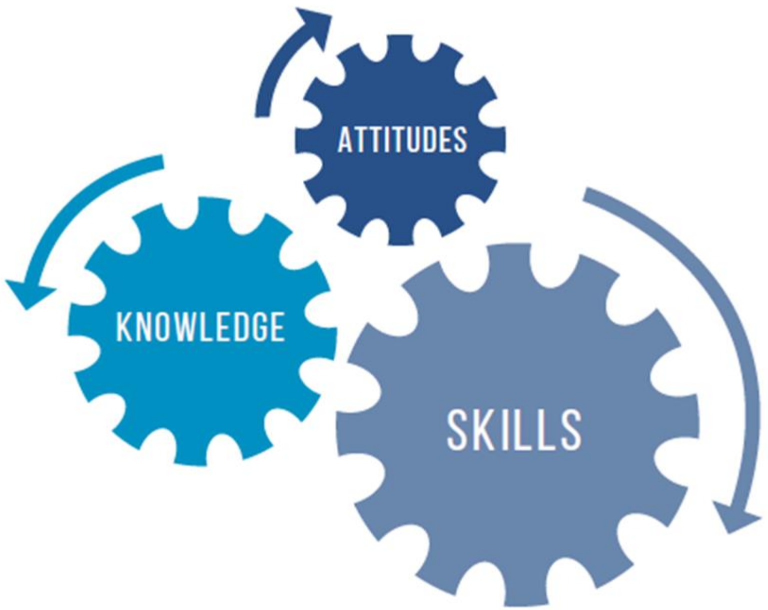
Digital vs. STEM competence

Competences

combination of knowledge, skills and attitudes.

Key competences are for **all individuals** to function successfully in the society

Broad preparation in **all areas**, not deep specialisation.



Examples of Actions

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STE(A)M approach

Scaling-up of good practices through Erasmus+

Cooperation between schools, governments, and the industry (e.g. EU STEM coalition, national STEM platforms)

Support for STEM teachers (e.g. Scientix)

Partnerships between schools (e.g. E-twinning)

Involvement of the local community

European Commission

JRC SCIENCE FOR POLICY REPORT

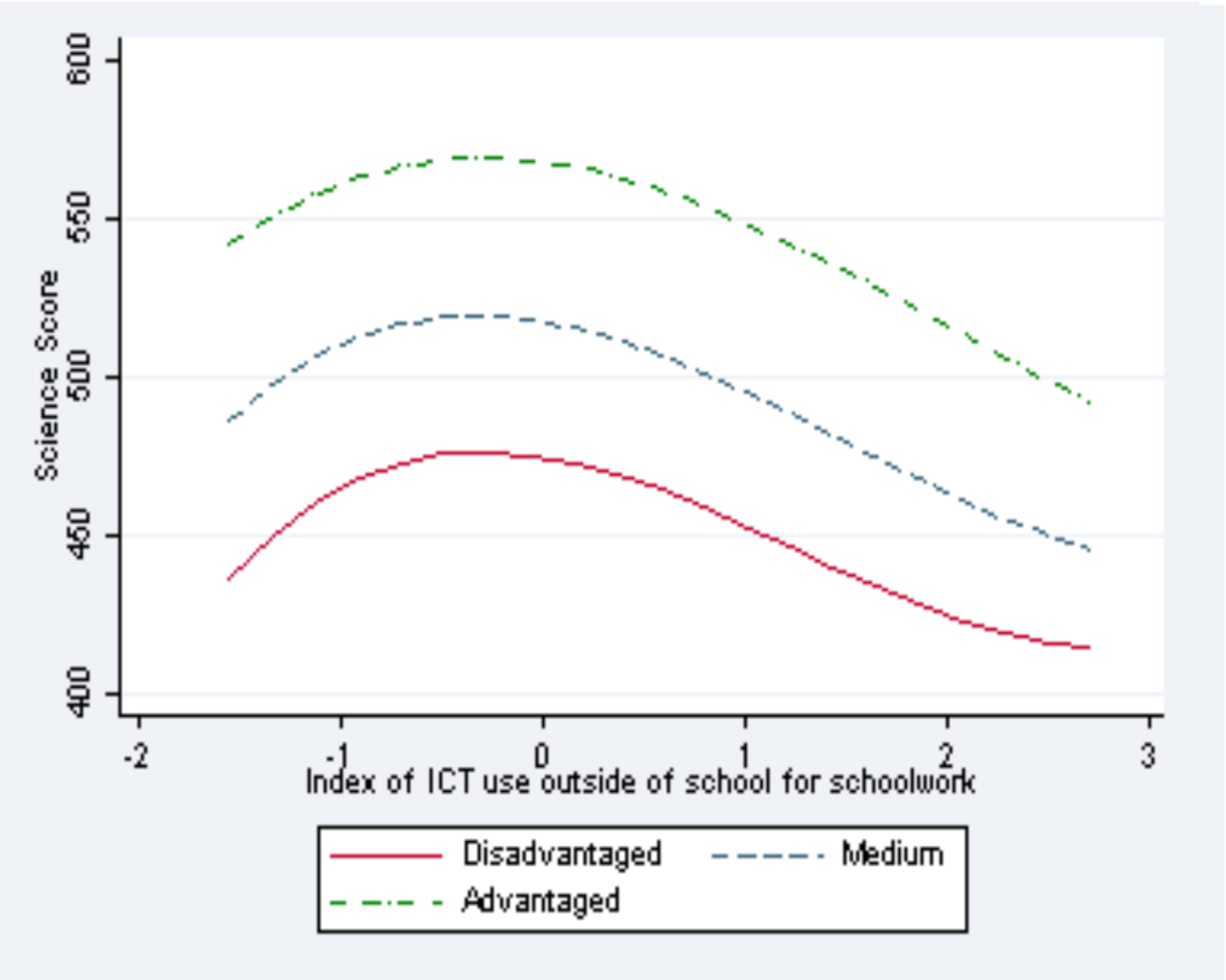
Digital technologies and learning outcomes of students from low socio-economic background: An Analysis of PISA 2015

Rodrigues, Margarida

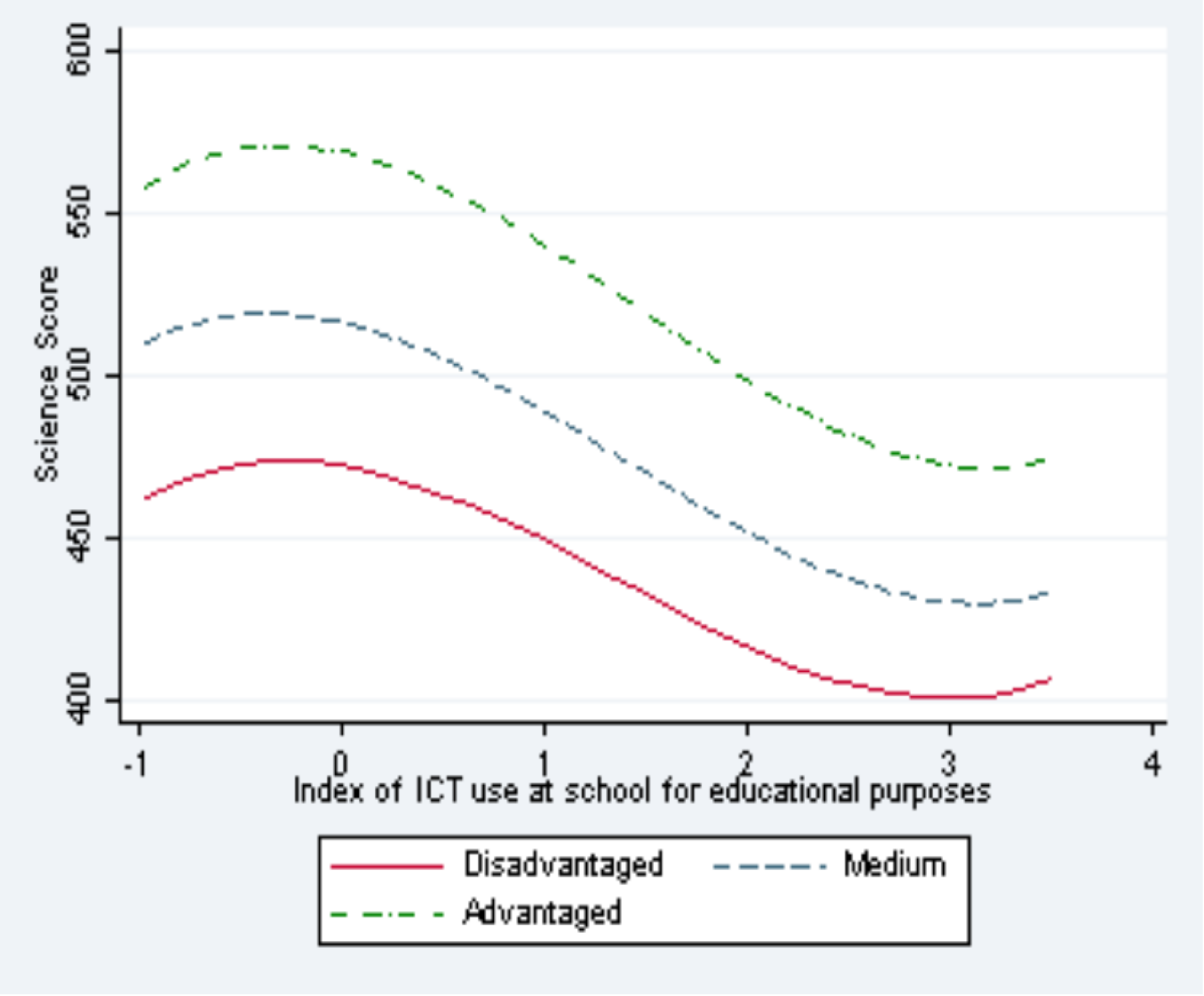
Biagi, Federico

Education and Training

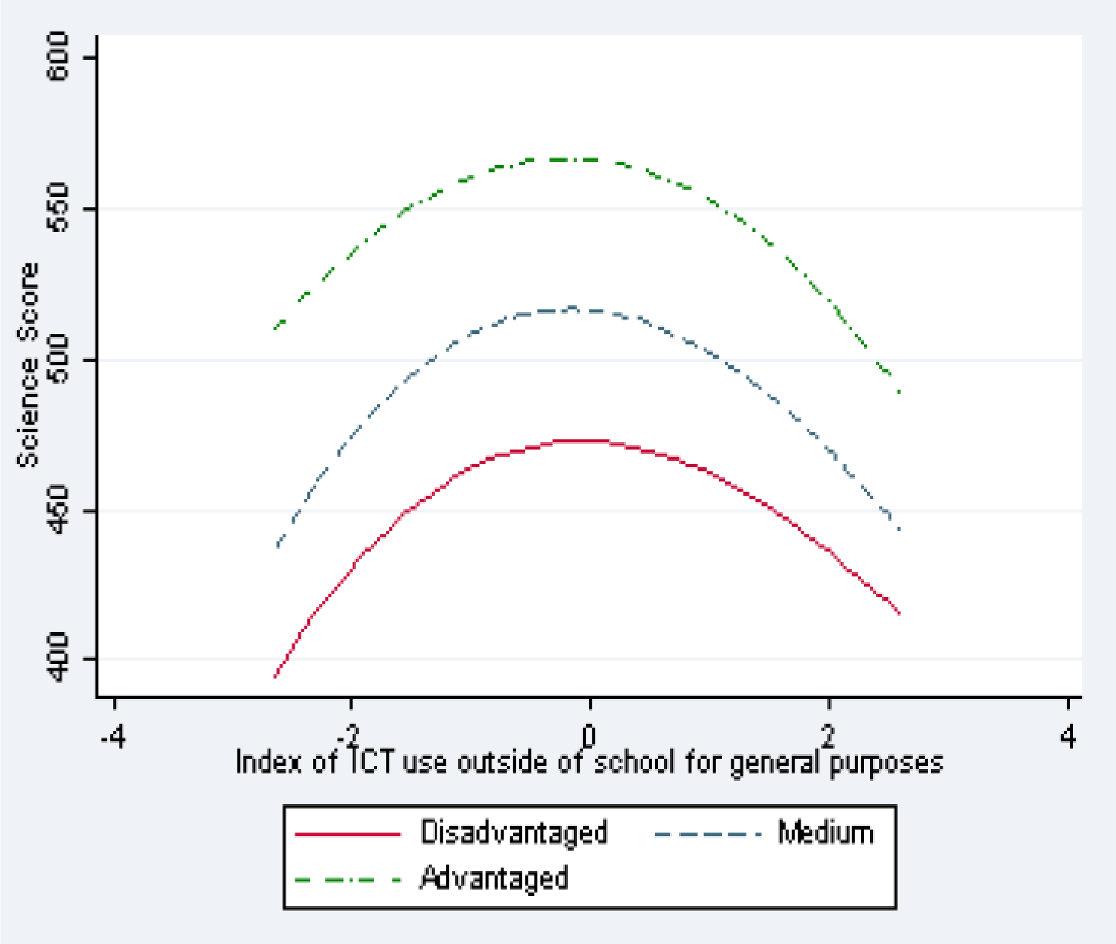
Effect of ICT use for schoolwork at home



Effect of ICT use for educational purposes at school



Effect of ICT use for **outside of school** for general purposes



Conclusions

ICT neither exacerbates nor alleviates the SES factor

Low-intensity users of ICT would benefit from ICT use

Intensive ICT use at school has a negative effect

Disadvantaged students would benefit from using ICT more intensively outside of school for general purposes

The use of ICT could improve learning outcomes

Conclusions

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It is crucial to use ICT in a <u>pedagogically meaningful</u> way in order to reap the benefits

Thank you

Questions?