

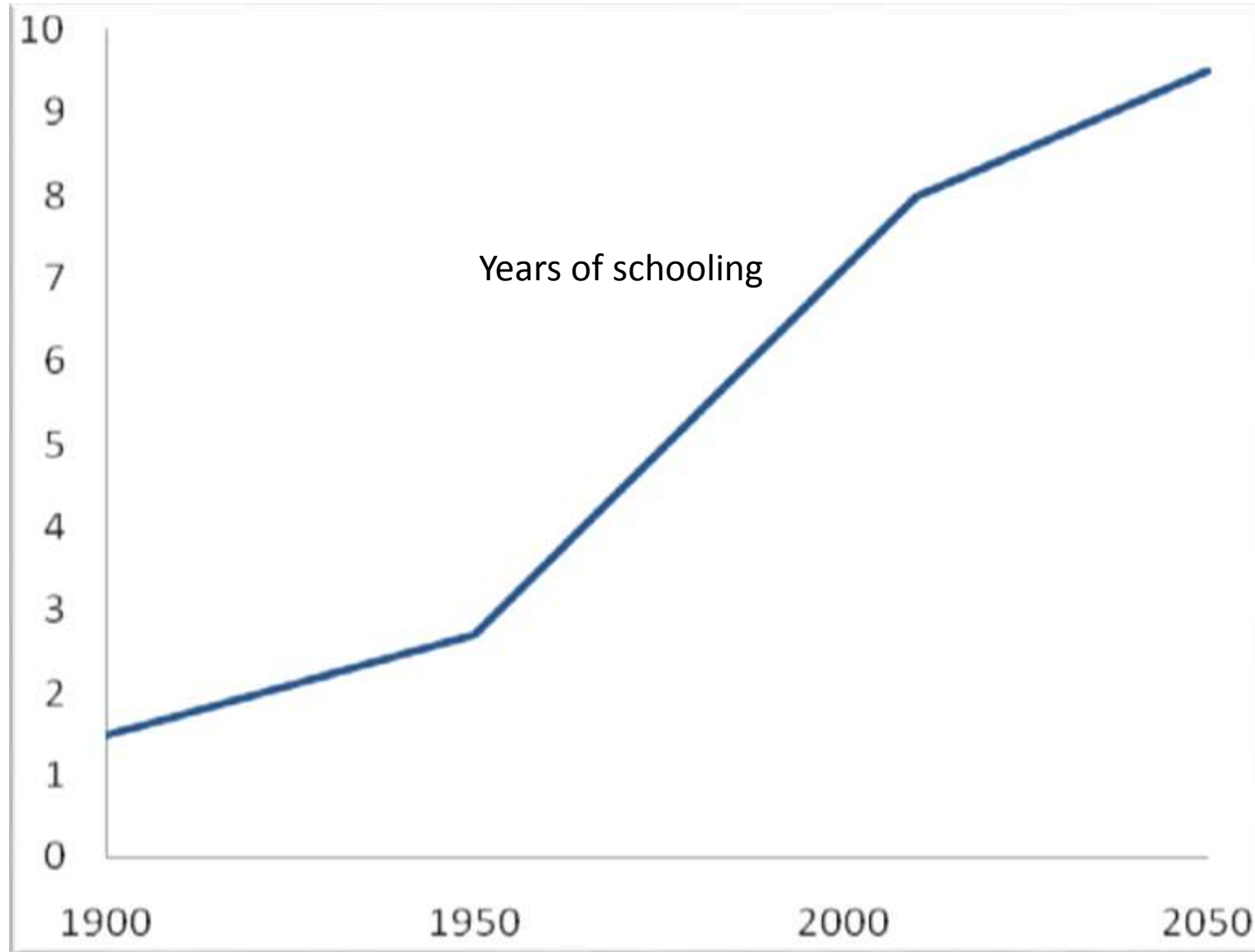
The Future of Automation and Implications for Education Systems

Harry Anthony Patrinos

 @hpatrinos

November 2018

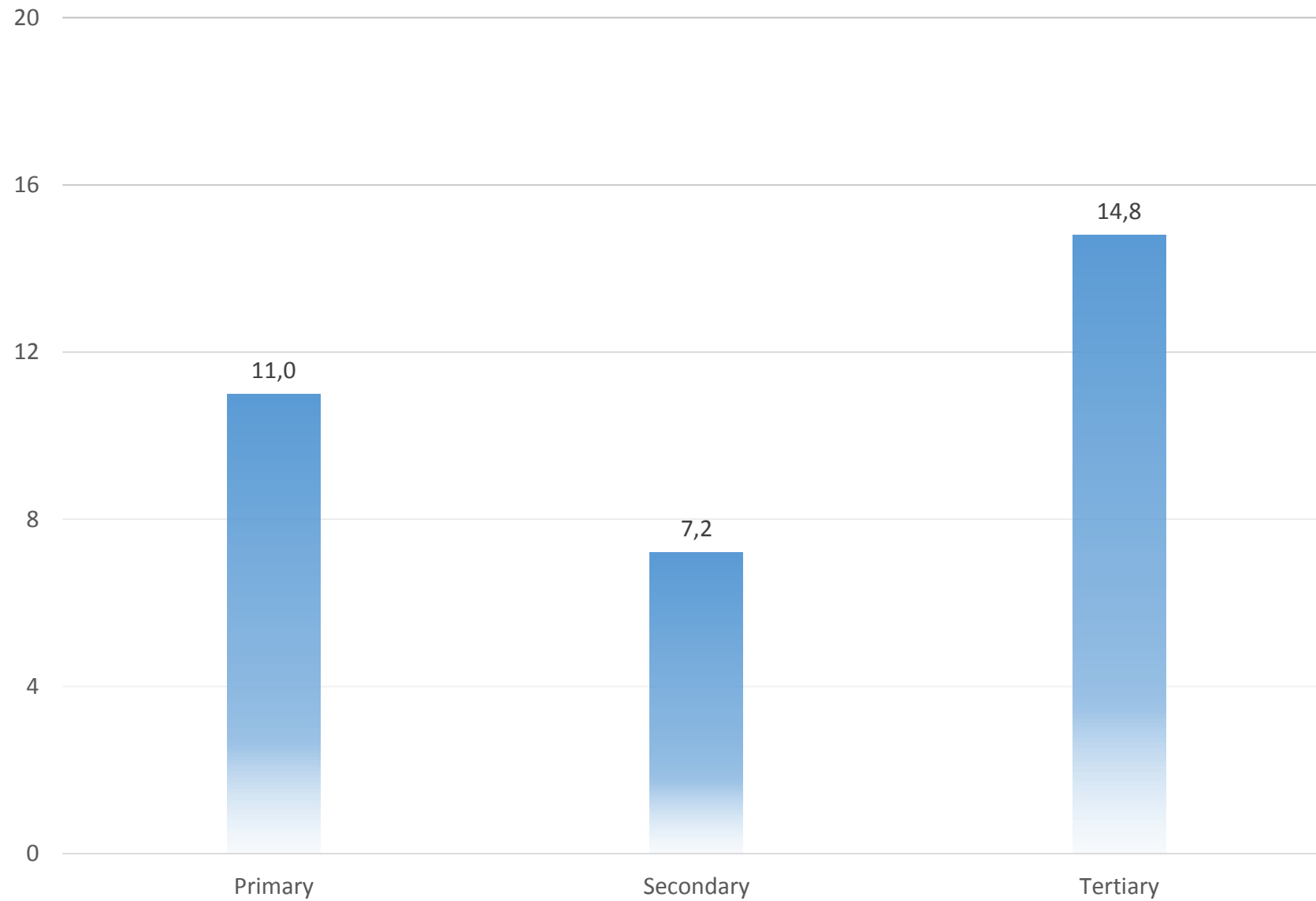
The Schooling Revolution



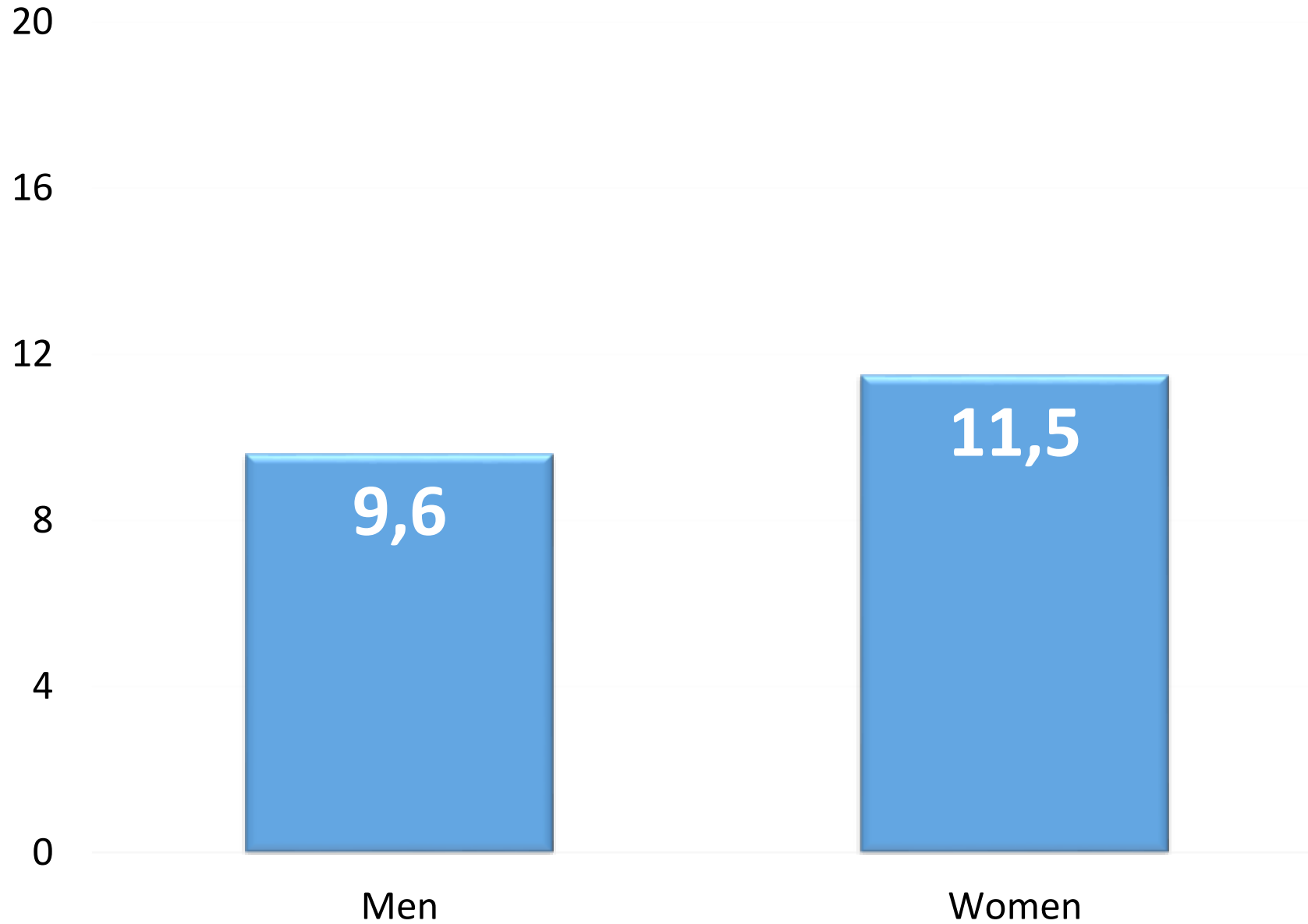
Every Year of Schooling Raises Earnings 9-10%



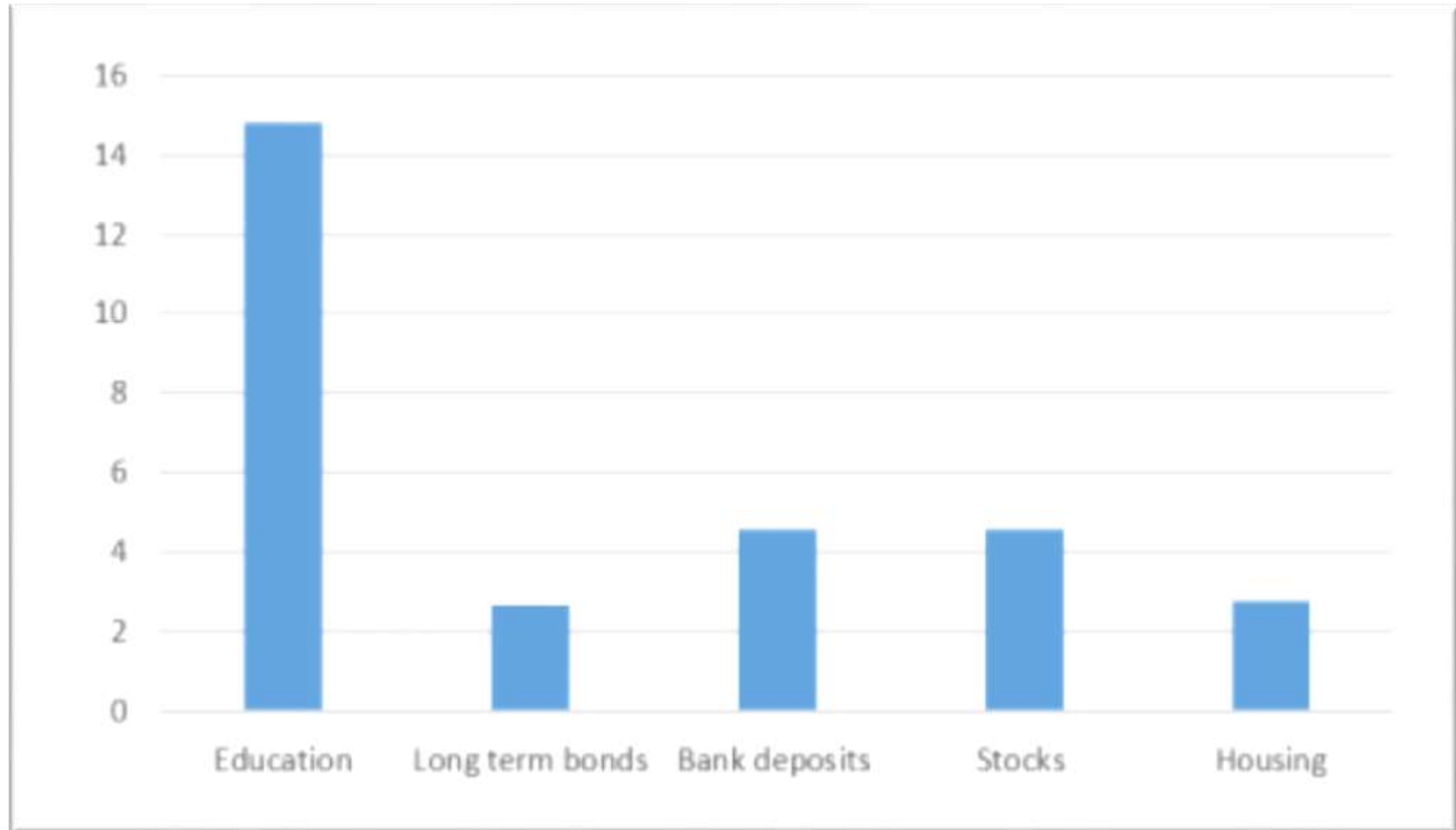
Private Returns to Schooling



Returns Higher for Women



Returns to Alternative Investments (%)



Access

Quality

Skill shift

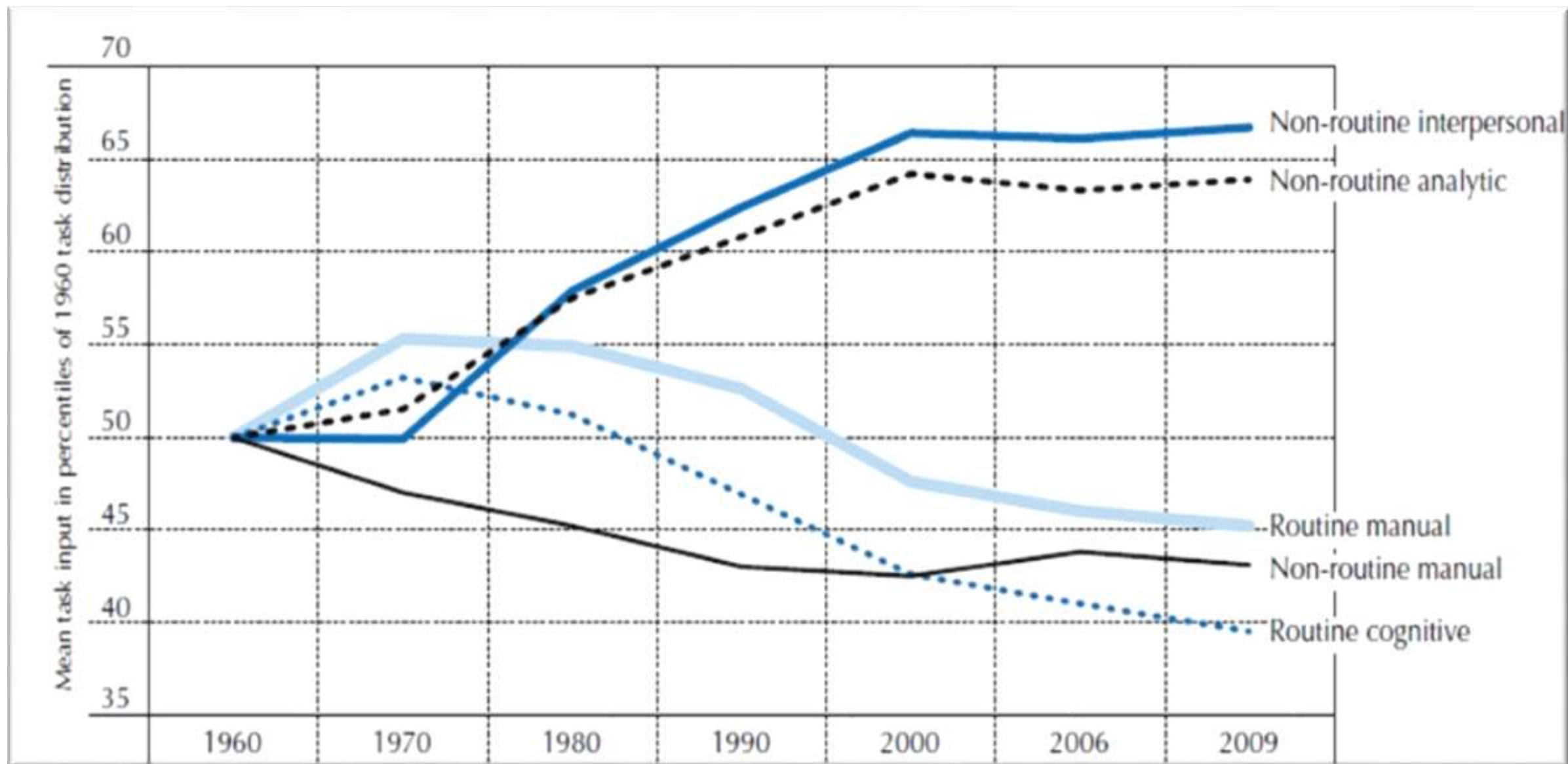
Access

- 264 million out of school
- 262 million in school but can't read
- One in Four Young People in Developing Countries Unable to Read

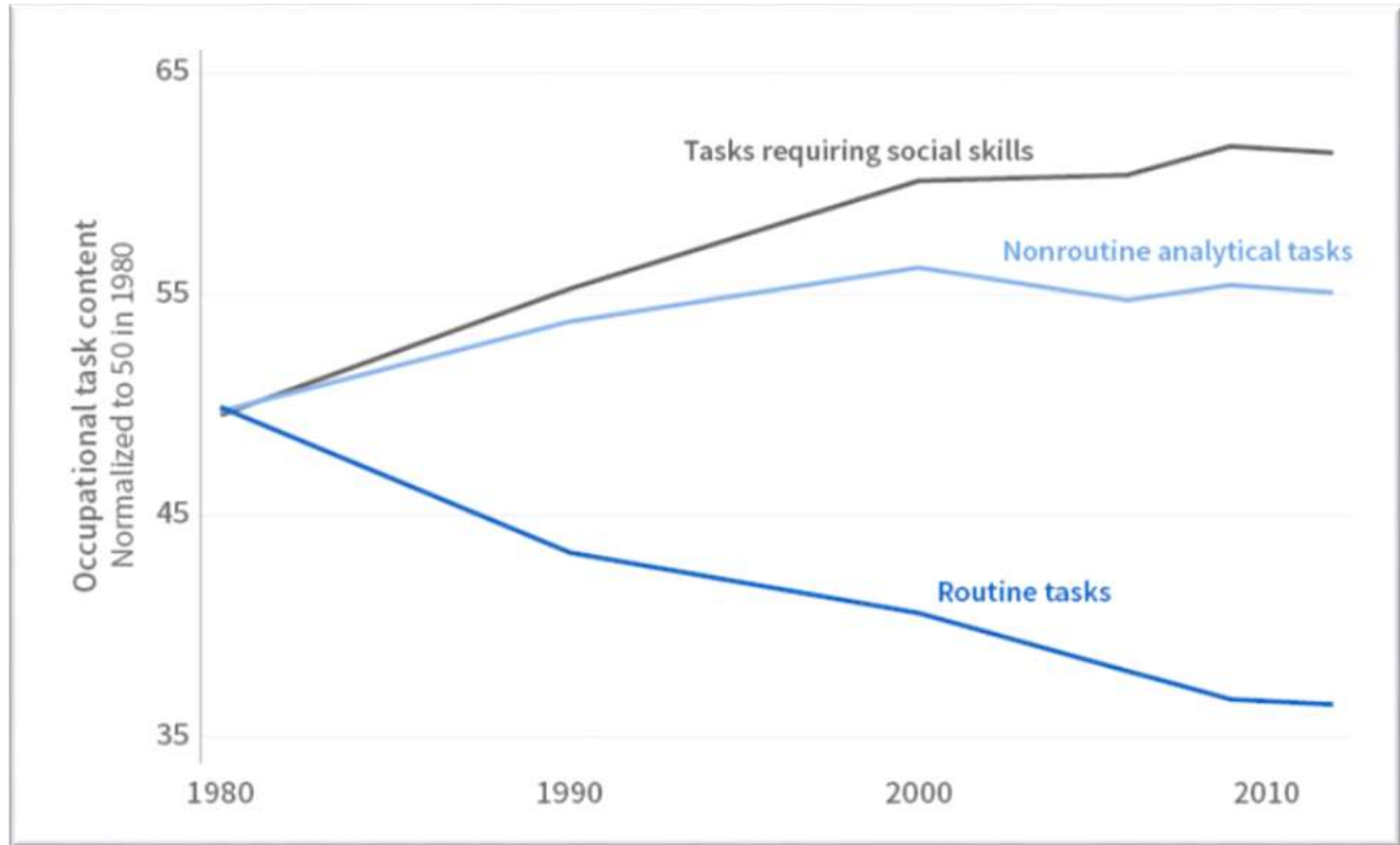


Skills Demanded by Labor Market Changing

Skills Demanded by Labor Market Changing



Growing Importance of Social Skills at Work





Automation is Coming

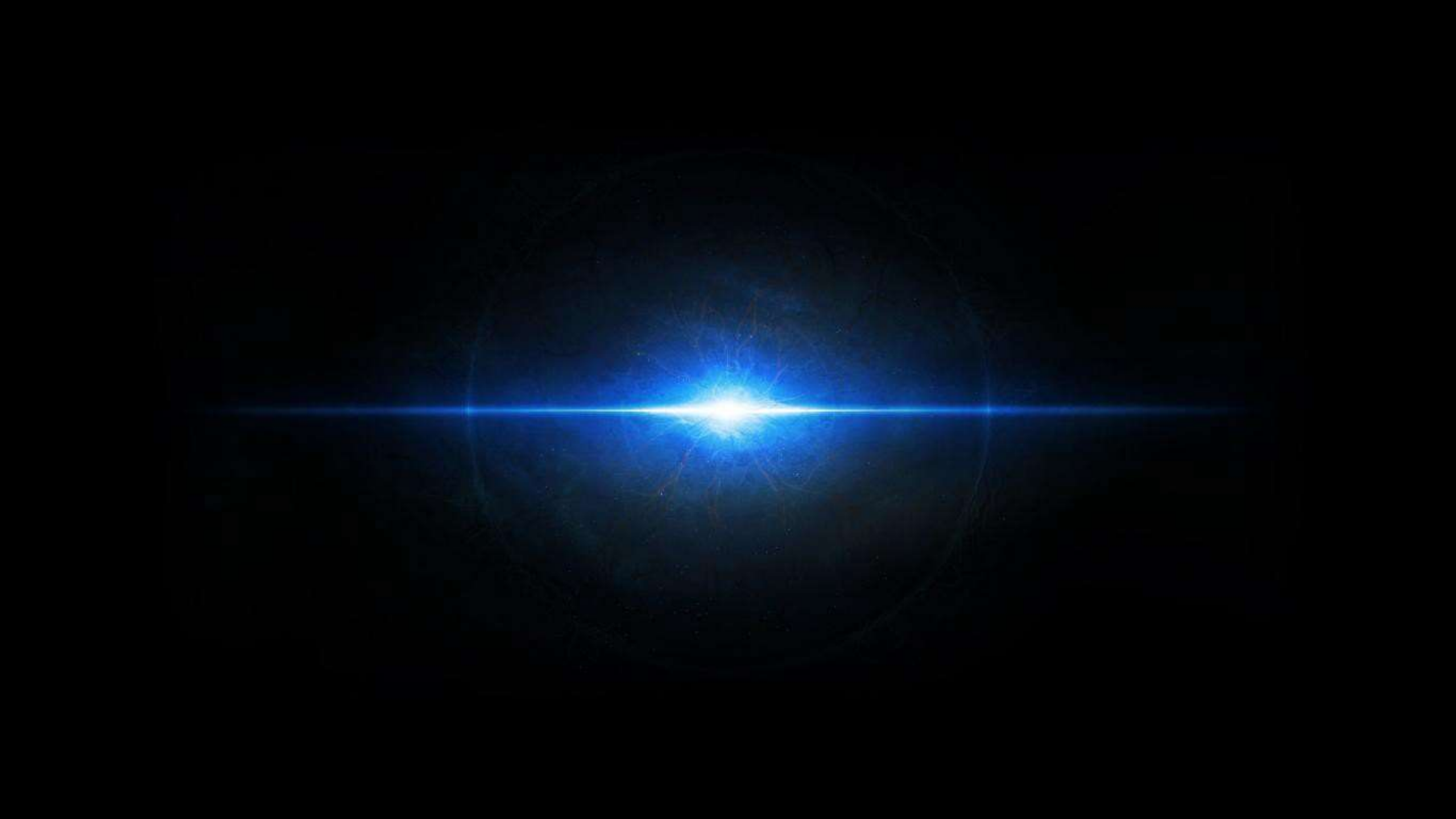
Keynes

Economic Possibilities for our Grandchildren (1930)

- End of poverty
- Advances in technology to propel growth
- 15 hour work week

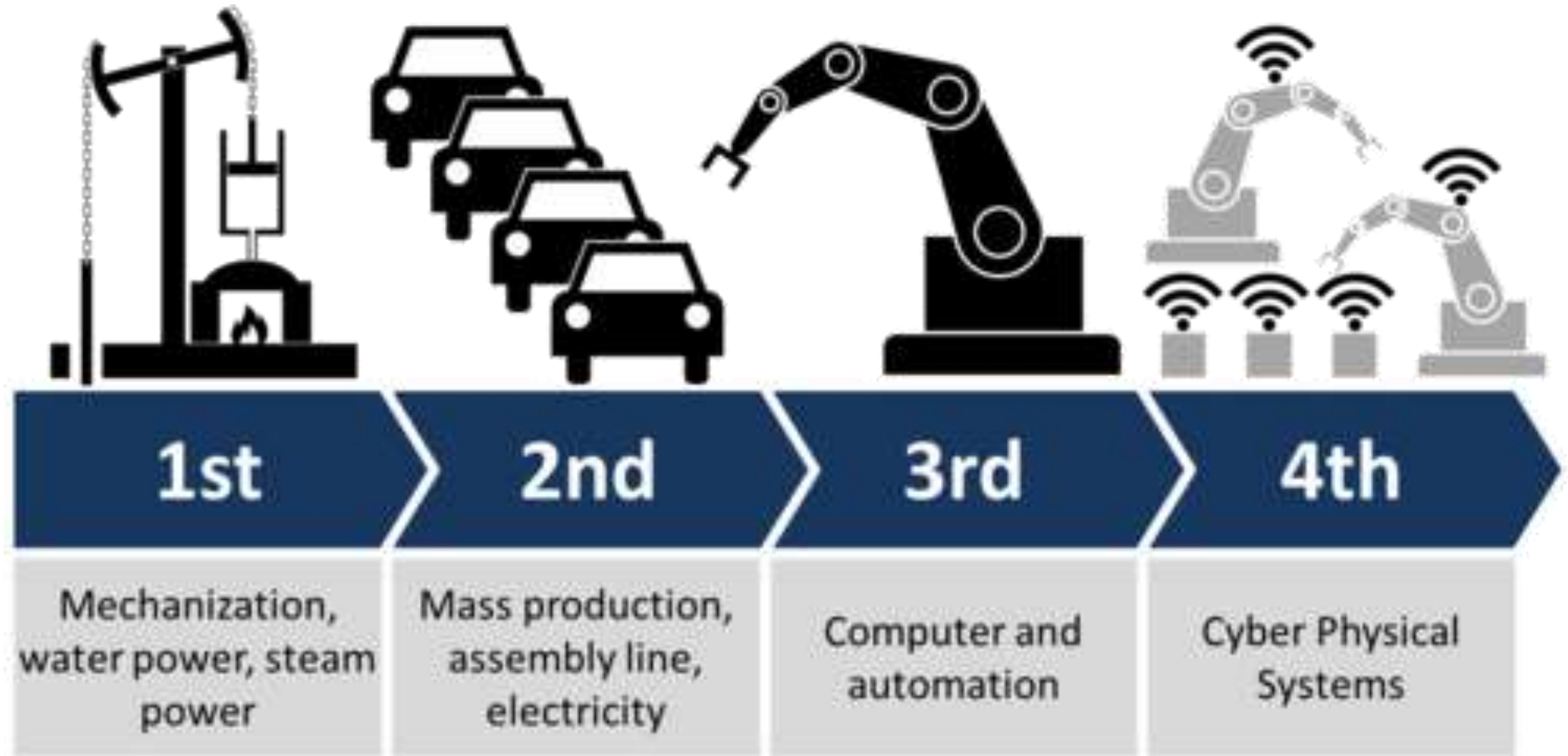









4th Industrial Revolution



47% of Total US Employment at Risk



12 jobs with
the largest
total
declines

- Bookkeeping
- Cooks
- Postal service mail carriers
- Executive secretaries
- Farmworkers
- Sewing machine operators
- Tellers
- Postal service mail sorters...
- Cutting, punching, machine setters
- Switchboard operators
- Molding
- Computer programmers

Japanese company replaces workers with AI



THE WALL STREET JOURNAL.
U.S. Edition | November 11, 2018 | Today's Paper | Video

Home World U.S. Politics Economy **Business** Tech Markets Opinion Life & Arts Real Estate WSJ Magazine

BUSINESS | ON BUSINESS

Humans Are Winning the Battle With Robots

Companies like Airstream, the maker of retro-cool, high-end trailers, find it more efficient to use a workforce of people, rather than make sizable investments in automation that risks being wasted if the economy slows.

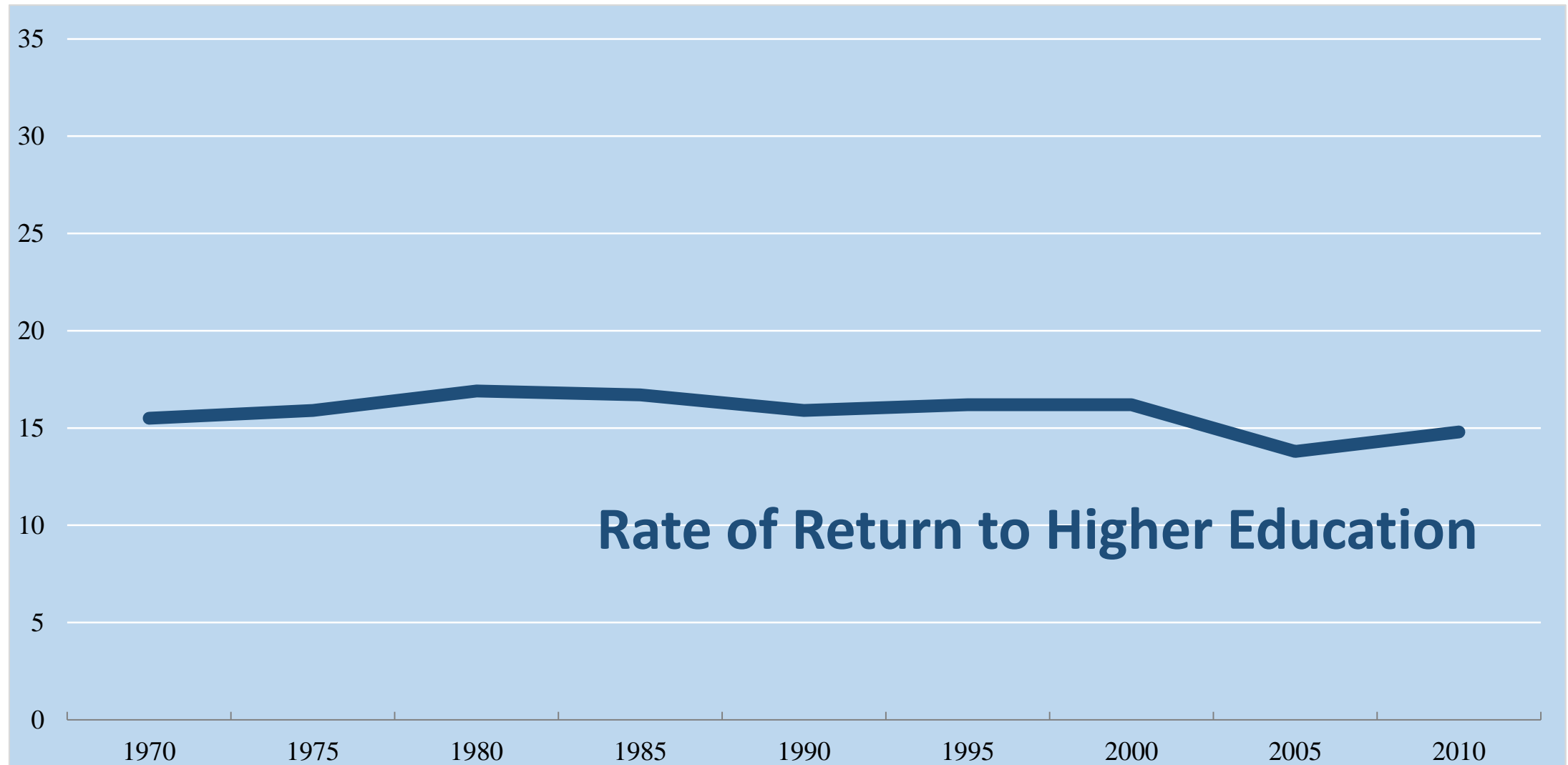
US edition

The Guardian

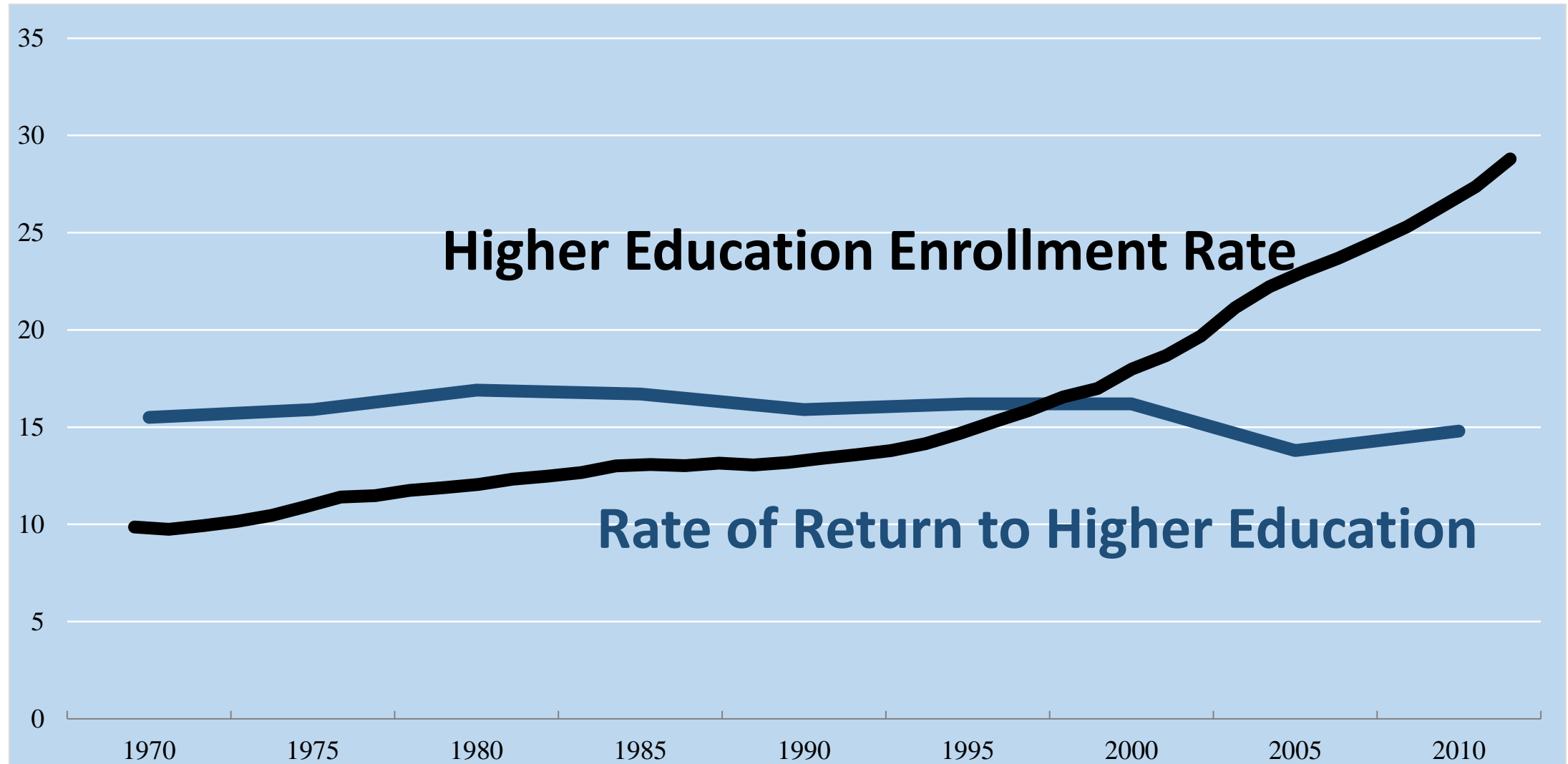
Don't believe the World Bank - robots will steal our wages

Robot automation will 'take 800 million jobs by 2030' - report

The Race Between Education & Technology



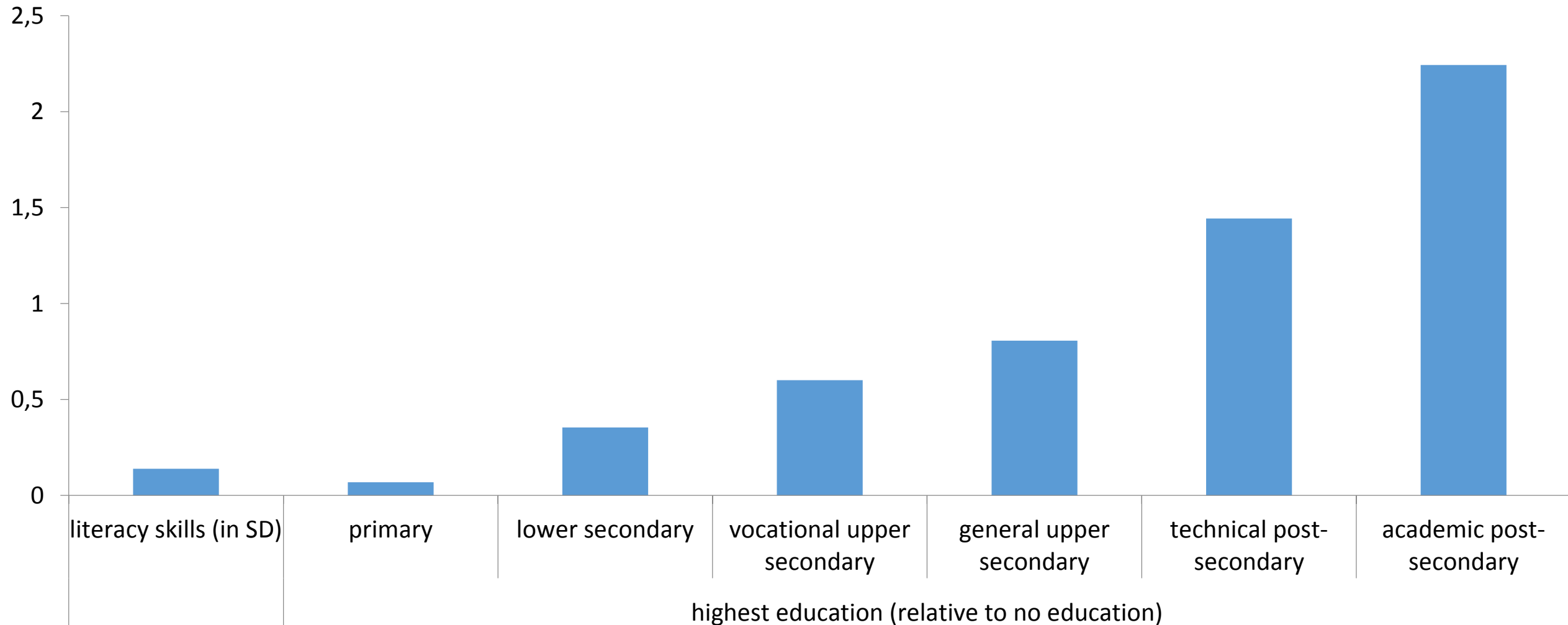
The Race Between Education & Technology



Who are most at risk
to automation?

Education associated with automation-safe occupations

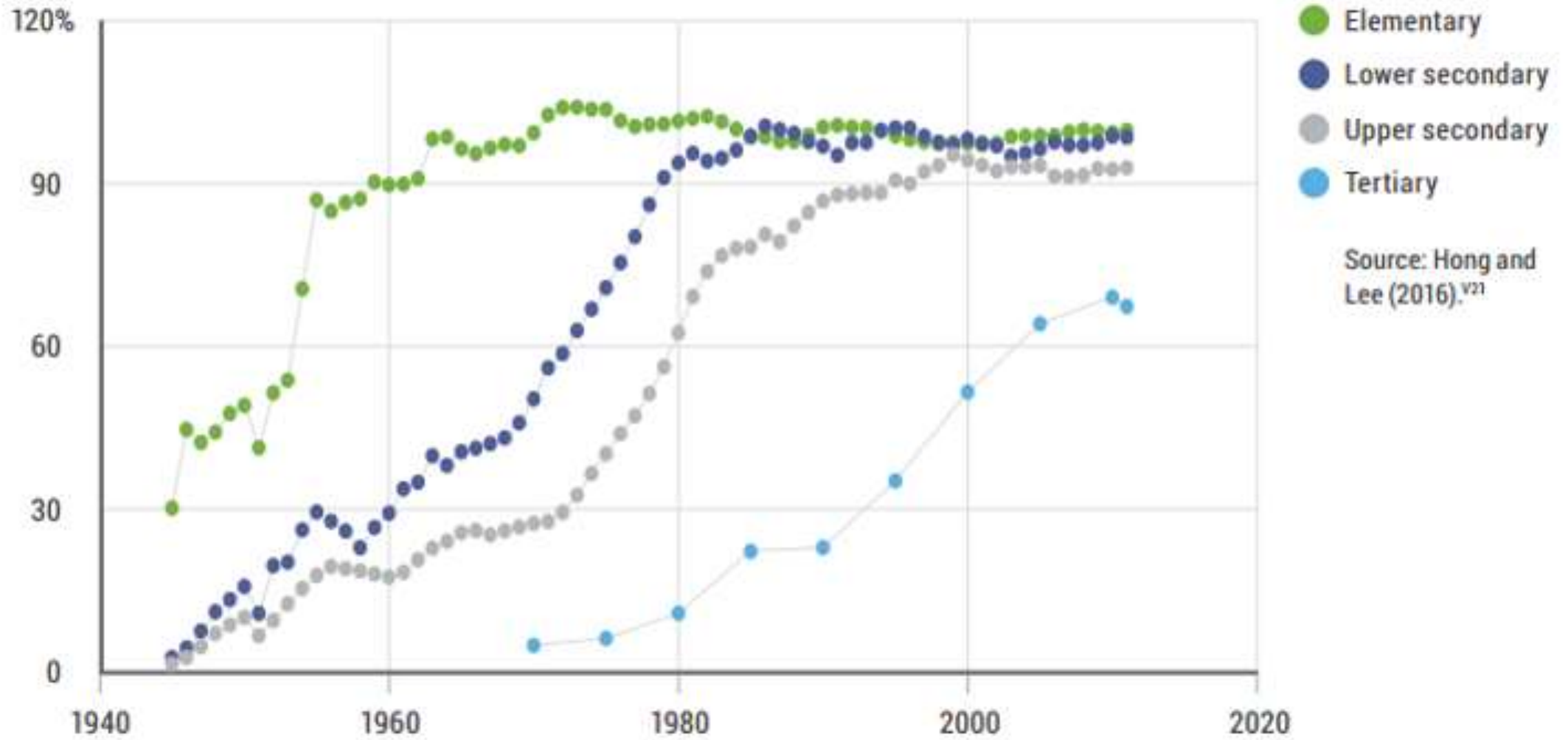
Probability of being in a automation-safe occupation



What can we do?

Get the Basics Right

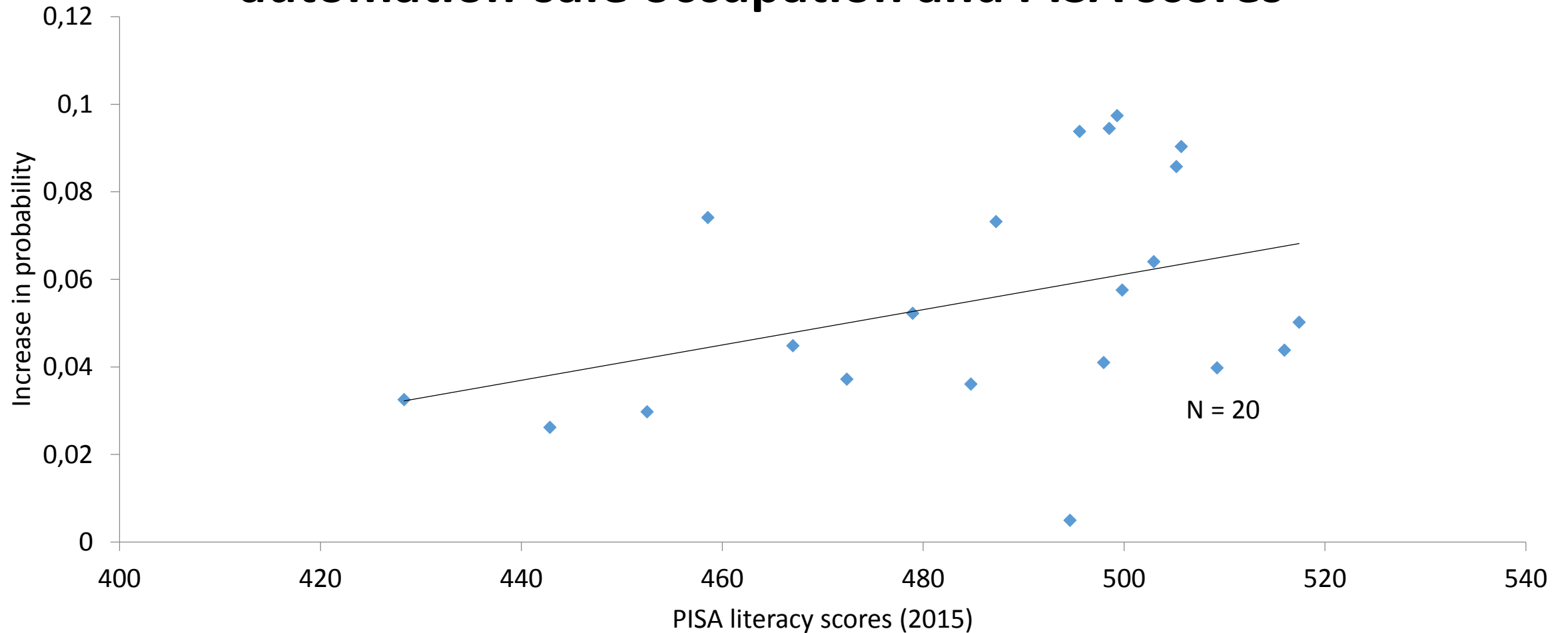
Percentage enrollment



Source: Hong and Lee (2016).^{v21}

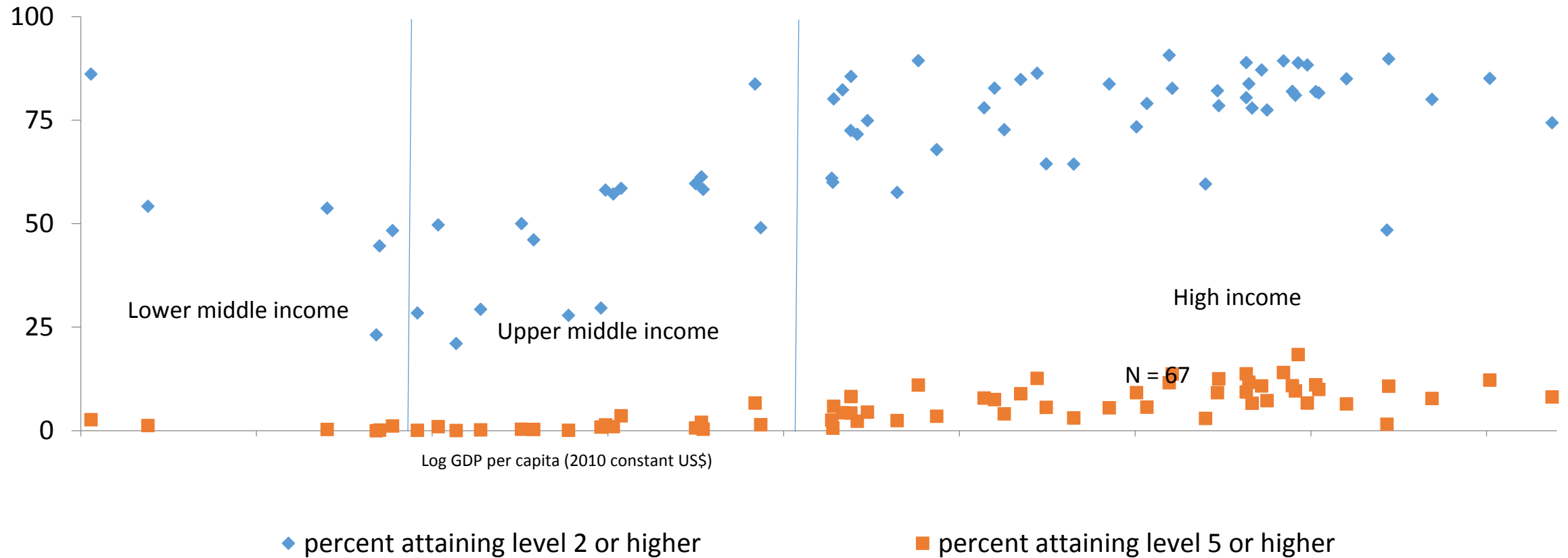
Implications for education systems

Effect of post-secondary education on probability of being in an automation-safe occupation and PISA scores



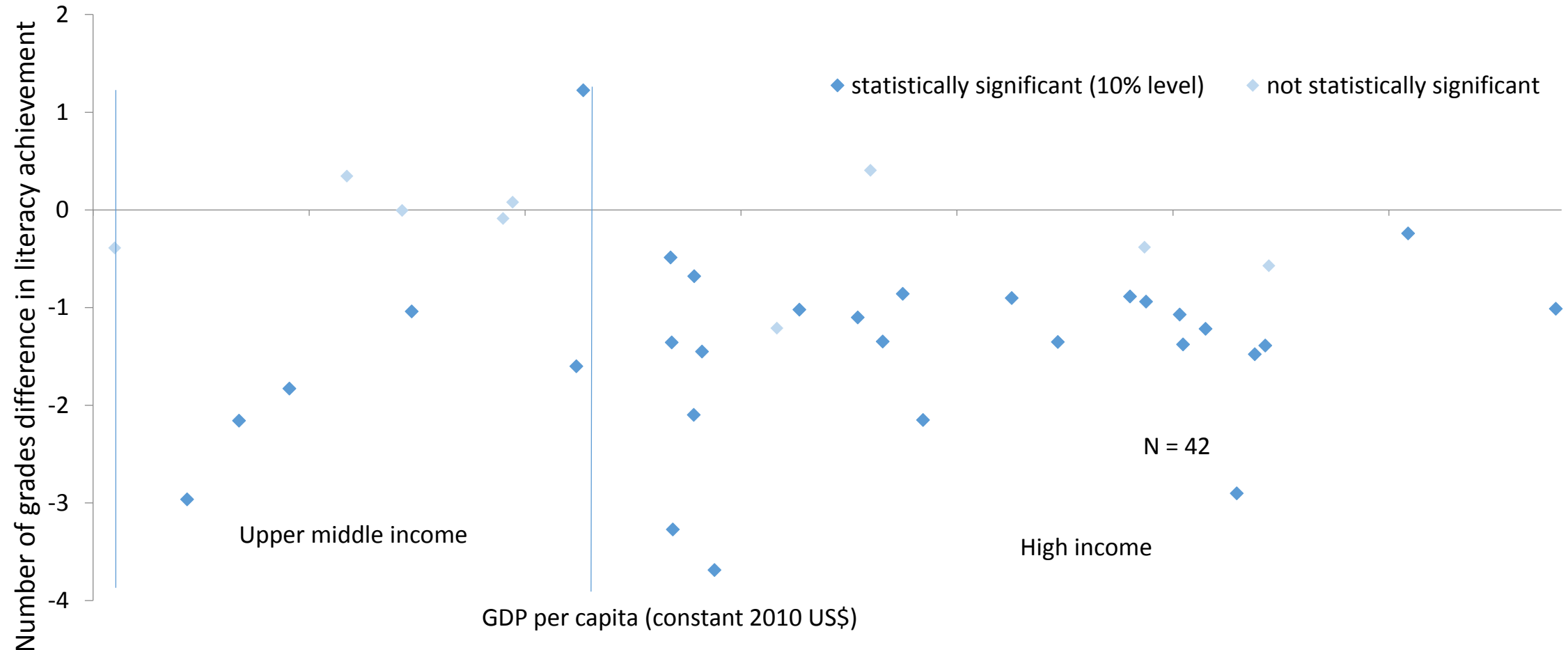
Increasing learning outcomes is a challenge

Percent of 15 year-olds attaining minimum and advanced proficiency



Vocational secondary deemphasizes cognitive skills for those who lack them

Effect of being in a vocational program by country



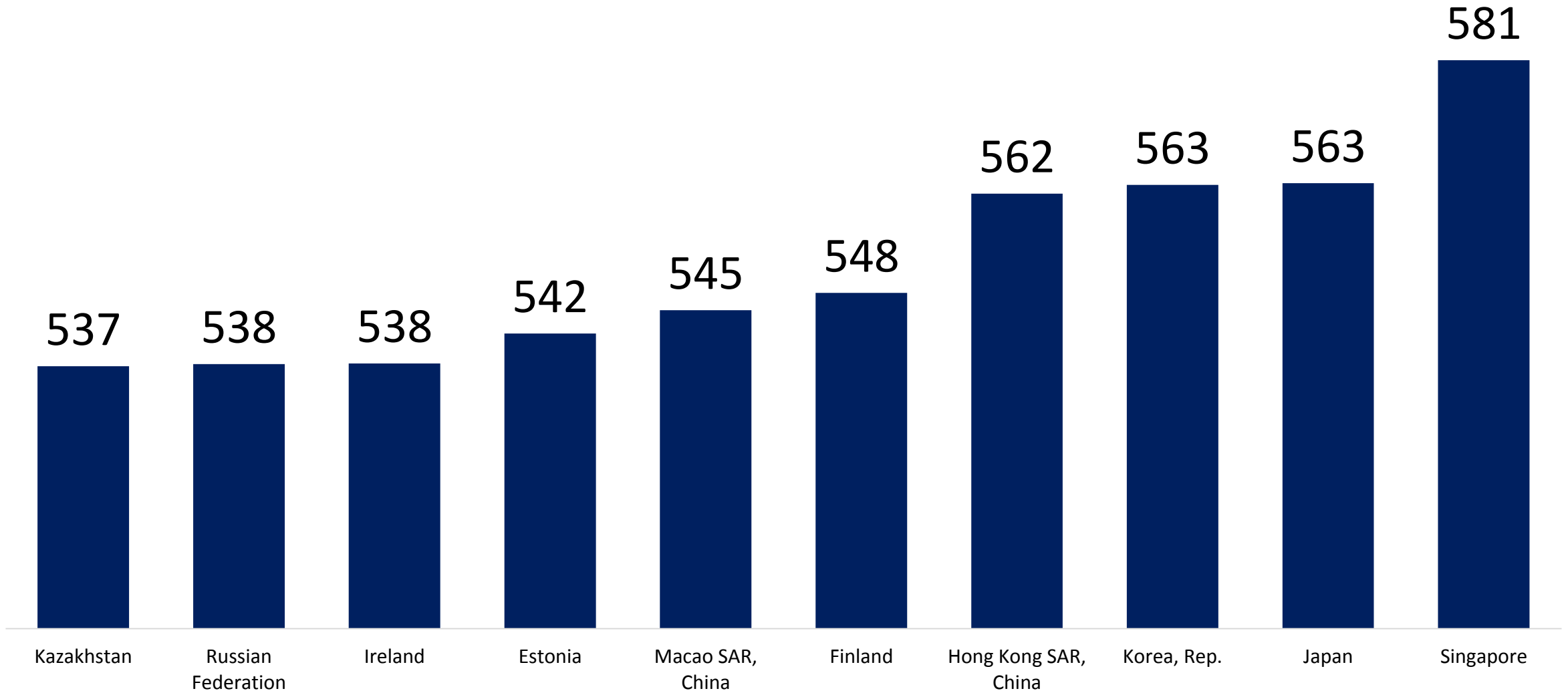
Source: authors' calculations using PISA 2015 data

Lessons



Focus on early reading

Top HLO performers



Czech Republic Harmonized Learning Outcomes



Invest in Relevant Skills

Problem-solving



Learning



Communication



Personal



Social



Education 4.0?



1st

Schoolhouse,
teacher,
students



2nd

Collaboration,
technology,
facilitator



3rd

Connected,
personalized,
open access

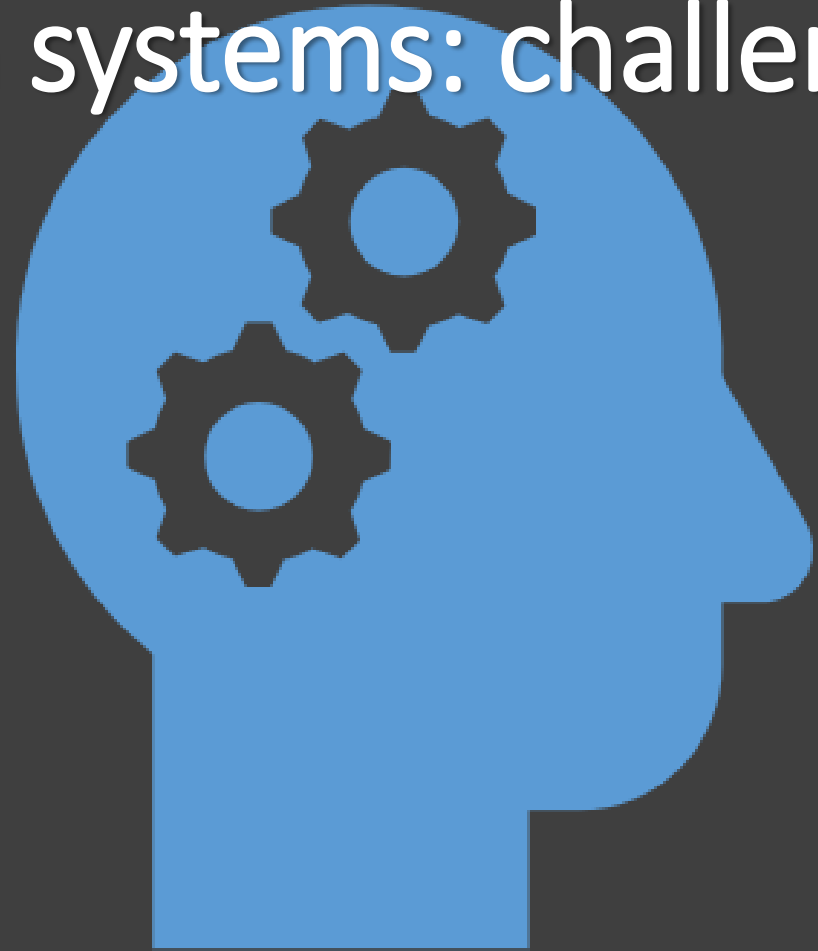


4th

Lifelong
learning
driven by
autonomy &
purpose

Implications for education systems: challenges

- Increasing educational attainment is expensive
- Increasing cognitive skills is difficult, developing countries lag far behind
- Evidence on how to improve non-cognitive skills is limited



Conclusions

1. Focus on basic skills first
2. Raise productivity of schooling
3. Teach relevant skills
4. Avoid early specialization
5. Finance higher education

Harry Anthony Patrinos

World Bank

 @hpatrinos