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# AI, Jobs and Wages

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# Introduction

- Economic Theory: what is the impact of AI on jobs?
  - Traditionally: industrial machines substitute for humans in tasks that require physical effort -> workers moved to services sector
  - Now: AI substitutes for humans in basic & sophisticated tasks: visual recognition, translating, driving. Freeman (2017)
  - Future: will AI be capable of substituting for humans in complex decision making, learning, creativity? Write PhD thesis, teaching?
  - Will robots be chiefs? They work more hours, will be more intelligent, have more information, connected through the cloud
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# Introduction

- **Comparative Advantage:** even if a robot is better than humans in everything: what matters is the relative comparison -> robots may specialize in complex tasks
  - Which type of jobs will remain for humans? Demand expansion through lower prices - new tasks - socioemotional abilities?  
Acemoglu & Restrepo (2018)
  - Wages in all tasks will have to be lower than cost of producing robots -> wage share is falling over time
  - Owners of robots win -> inequality increasing -- Freeman (2017)
  - What to do? Minimum income programs? Workers own firms?
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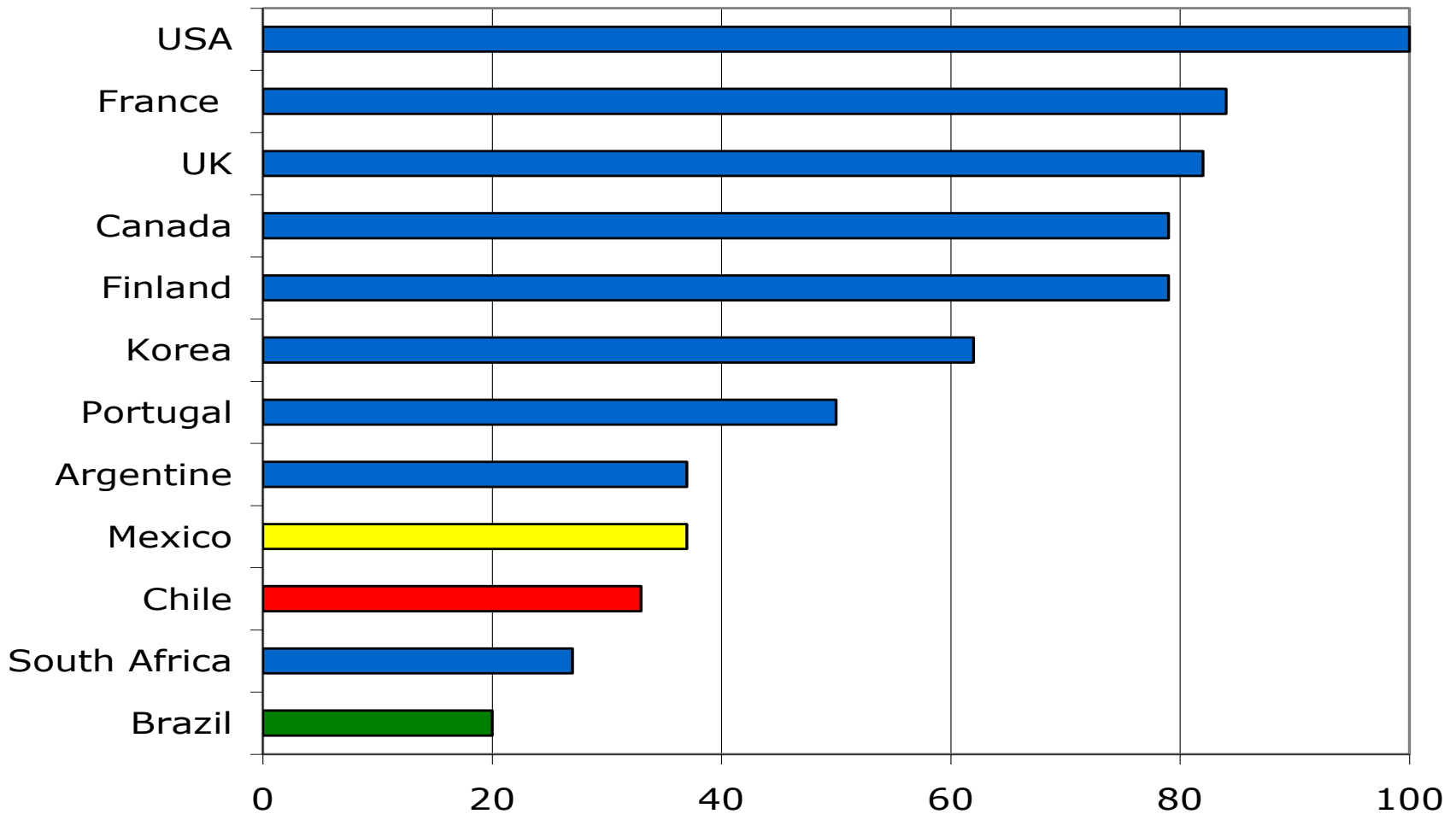
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# Brazil

- Brazil has a long run productivity crisis
  - Brazilian firms innovate too little, despite many incentives & subsidies to R&D and innovation
  - Firms face little competition: closed economy (24%)
  - Extractive institutions – inequality of opportunities  
Acemoglu and Robinson (2015)
  - Resistance to robots – doctors and lawyers
  - No big threat of vast employment reductions in Brazil in all areas
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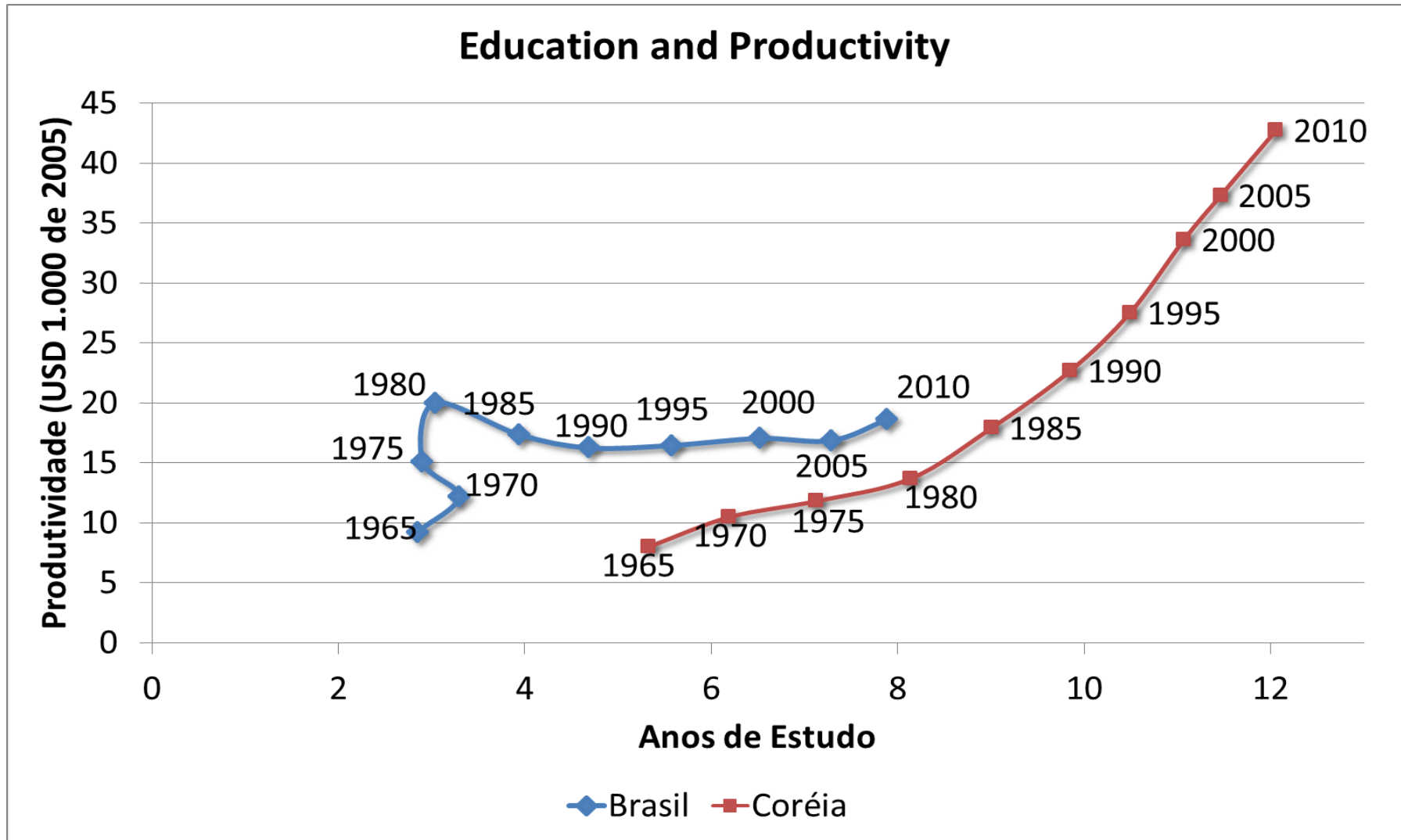
# Productivity in Brazil

Relative Labor Productivity (GDP per Worker) - 2010



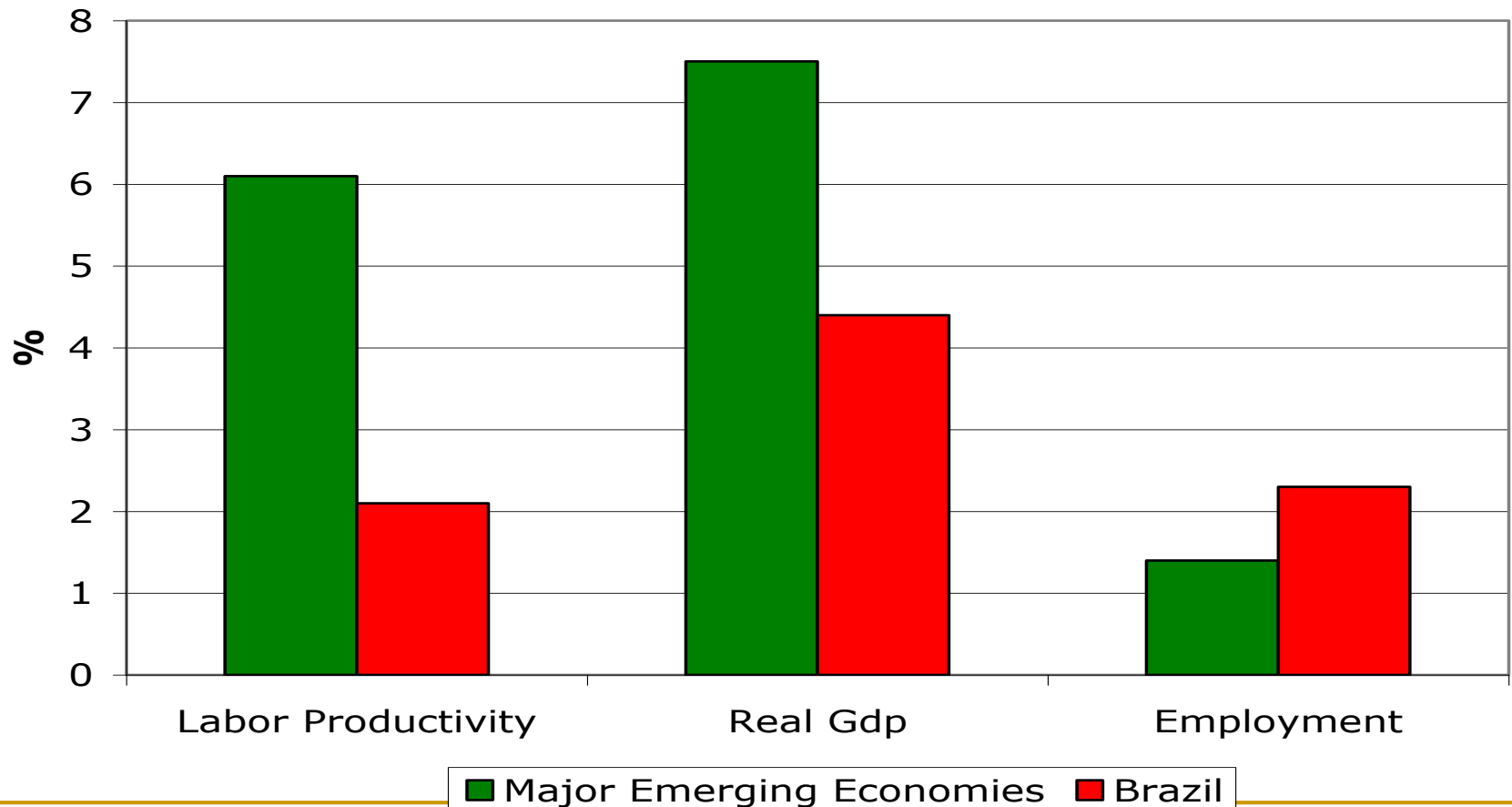
Source: Conference Board (2011)

# Education and Productivity

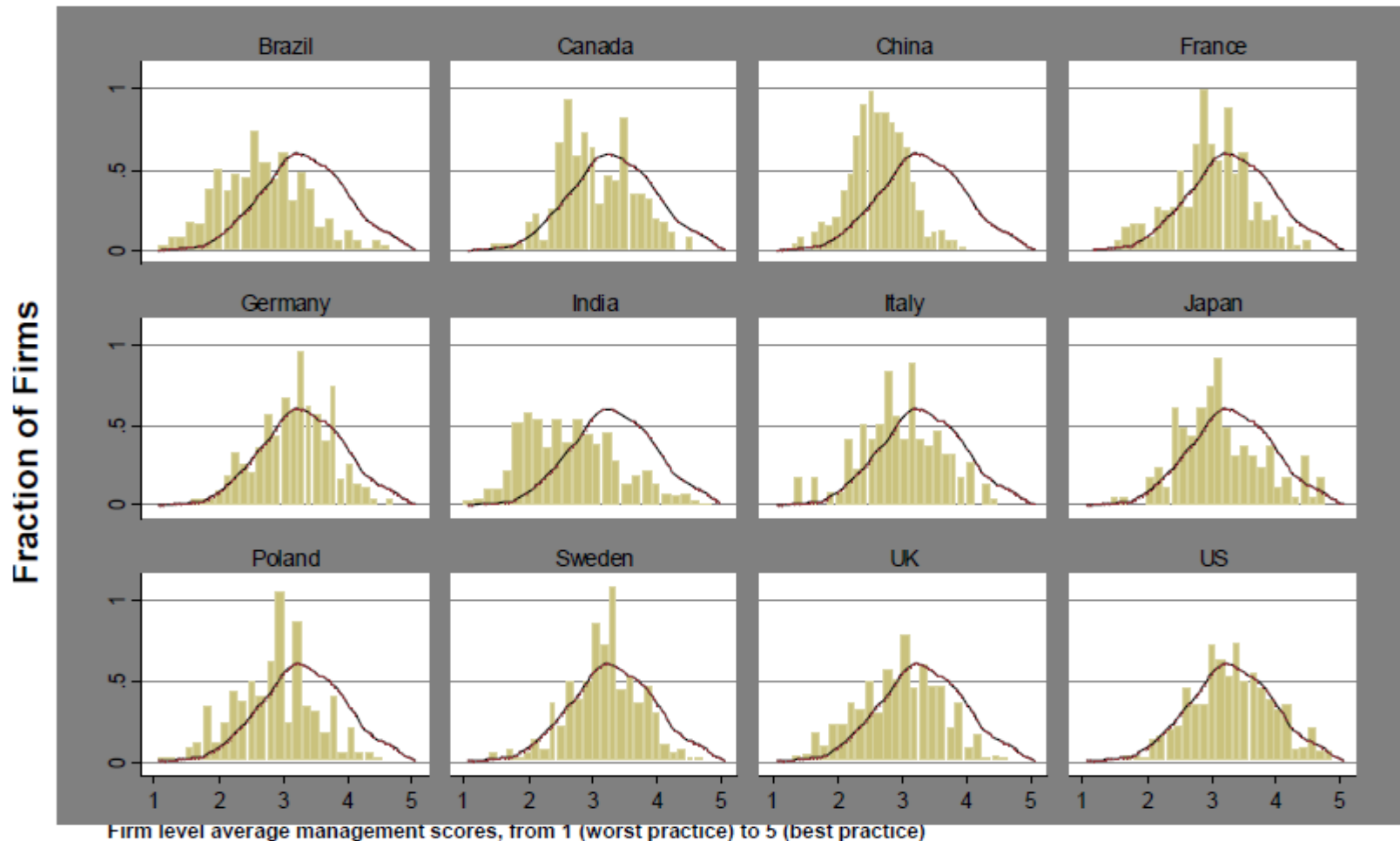


# Recent Growth – Low Skill-based

Productivity Growth - 2005/2010



# MANAGEMENT PRACTICE SCORES ACROSS FIRMS



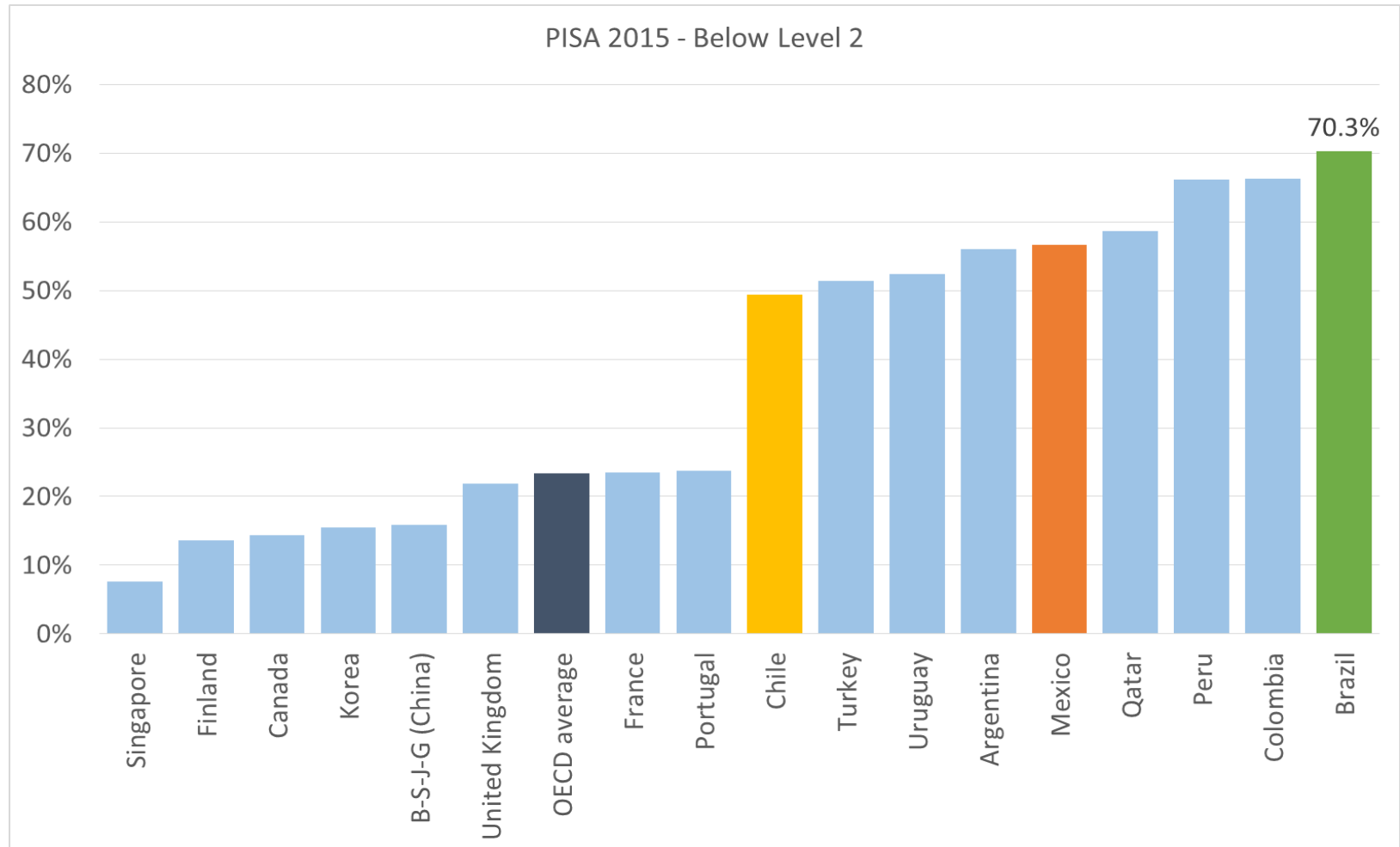
Note: The bars are the histogram of the actual density. The line is the kernel of the US density for comparison. Portugal, Ireland and Greece omitted for presentational reasons, <http://www.nber.org/reporter/2008number4/bloom.html>



# Number of Multipurpose Industrial Robots per 10,000 workers

Country	2015	2016	2017*	2018*	2019*	2020*	2017/ 2016	CAGR 2018 - 2020
America	38,134	41,295	48,000	50,900	58,200	73,300	16%	15%
North America	36,444	39,671	46,000	48,500	55,000	69,000	16%	14%
- United States	27,504	31,404	36,000	38,000	45,000	55,000	15%	15%
- Canada	3,474	2,334	3,500	4,500	3,000	5,000	50%	13%
- Mexico	5,466	5,933	6,500	6,000	7,000	9,000	10%	11%
Brazil	1,407	1,207	1,500	1,800	2,500	3,500	24%	33%
Rest of South America	283	417	500	600	700	800	20%	17%

# Low Quality of Education



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# Conclusions

- 1) Will AI displace sophisticated labor?
  - 2) Will humans specialize in low wage simple tasks?
  - 3) Or tasks that require socioemotional skills?
  - 4) Fall in the wage share: robot owners will gain -> inequality – Freeman (2017)
  - 5) Brazil: low productivity growth and innovations
  - 6) Because of lack of competition & subsidies
  - 7) Corporatism: low robot adoption in tasks
  - 8) Productivity distance to frontier will increase
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