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EXCELLENCE IN  
**POPULATION  
AGEING  
RESEARCH**

# Demographic and technological change: Two megatrends shaping the labour market in Asia

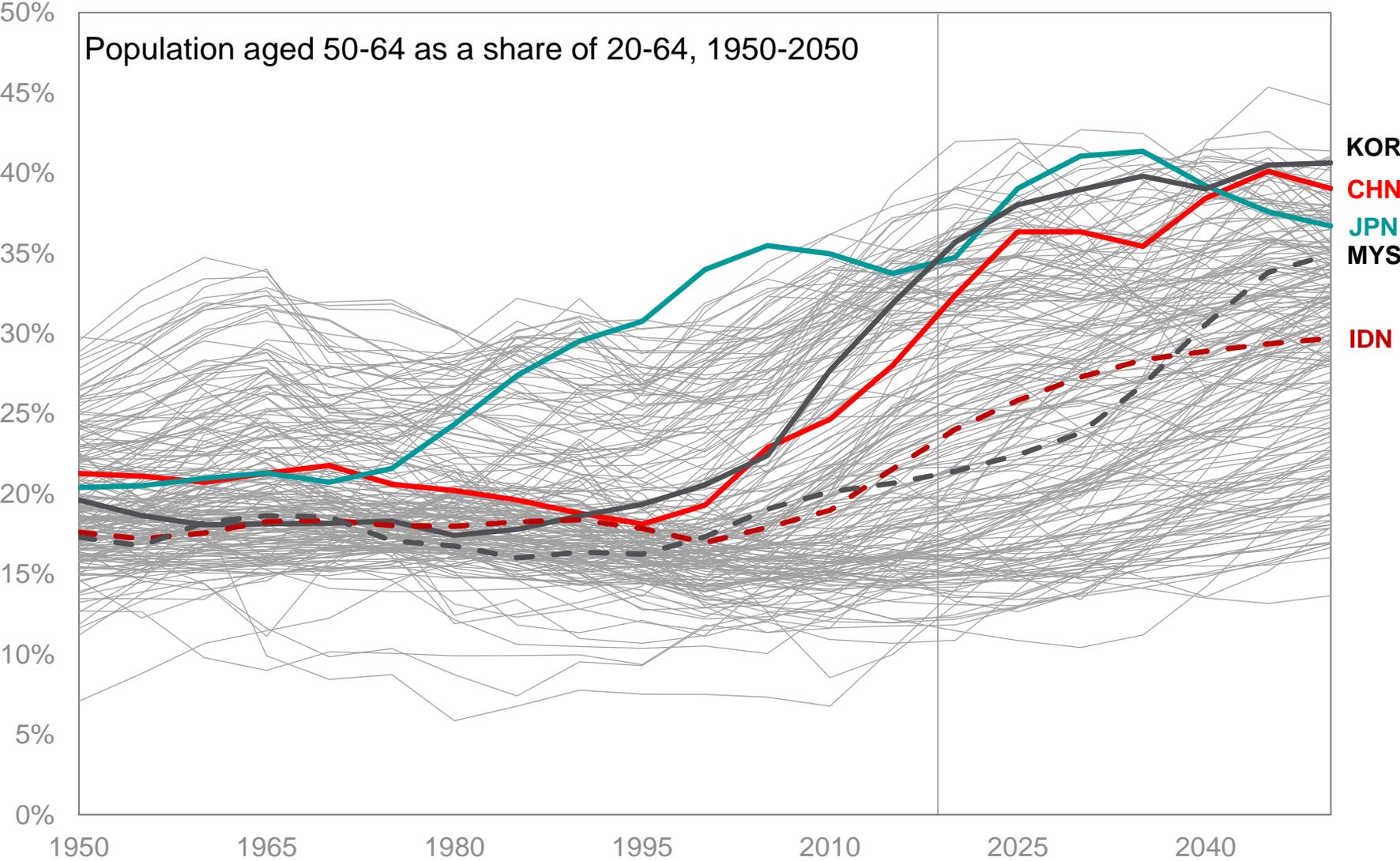
Rafal Chomik  
John Piggott



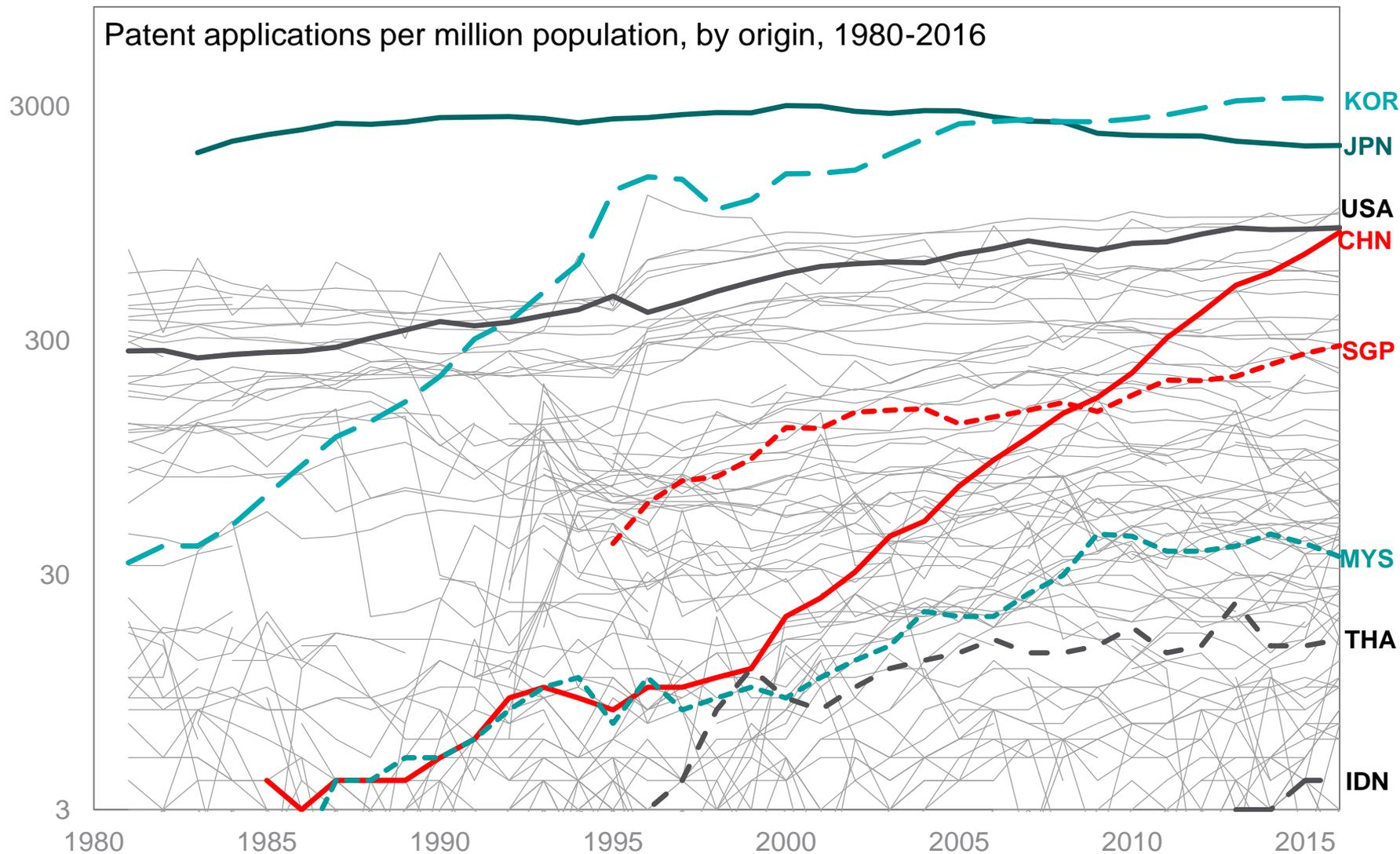
1. Will ageing inhibit productivity growth
2. Is technology change age-biased in labour markets?
3. How can technologies help with ageing pressures?
4. Which policy and research can help?

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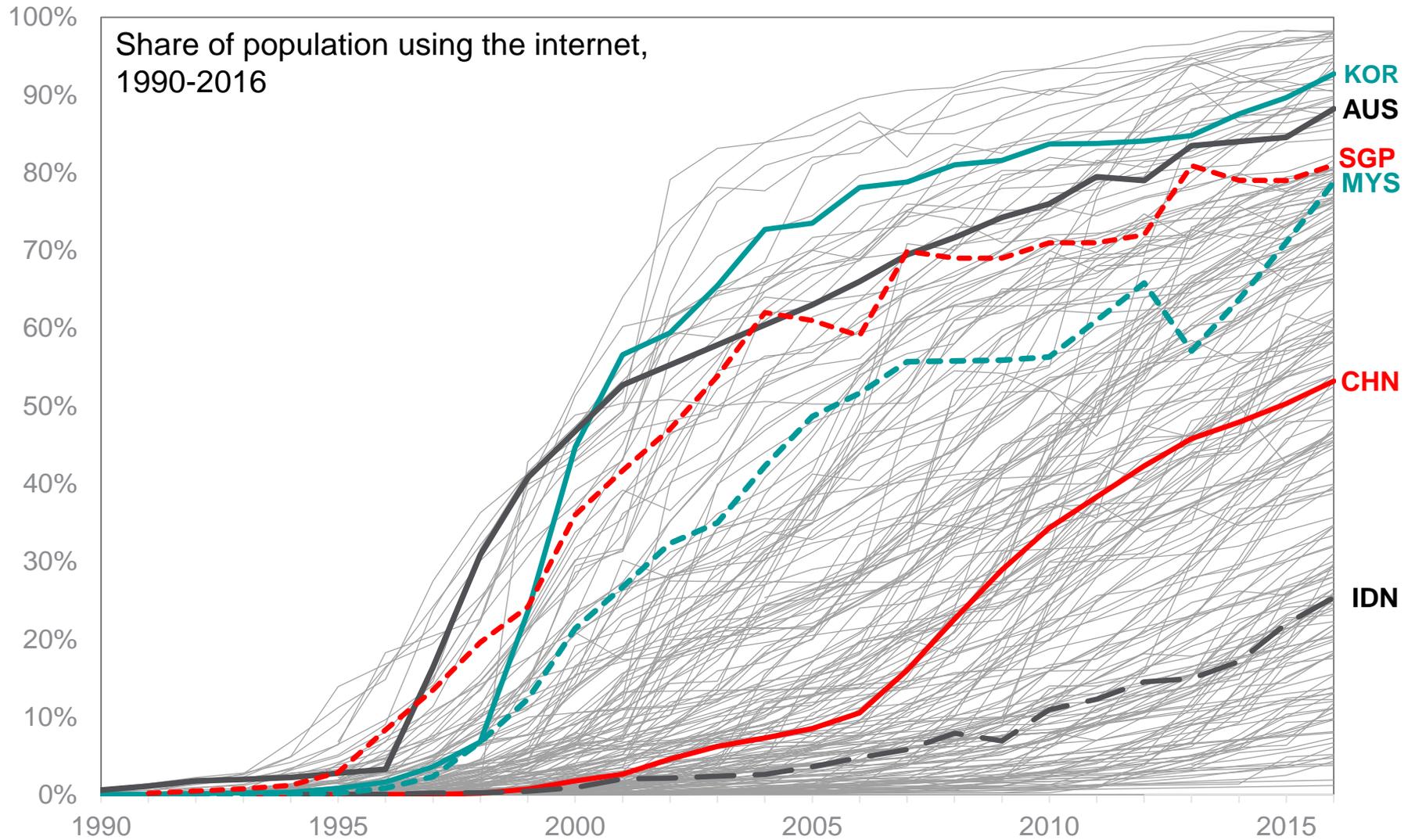
# Workforces are ageing



# At the same time, Asia has more tech innovation...

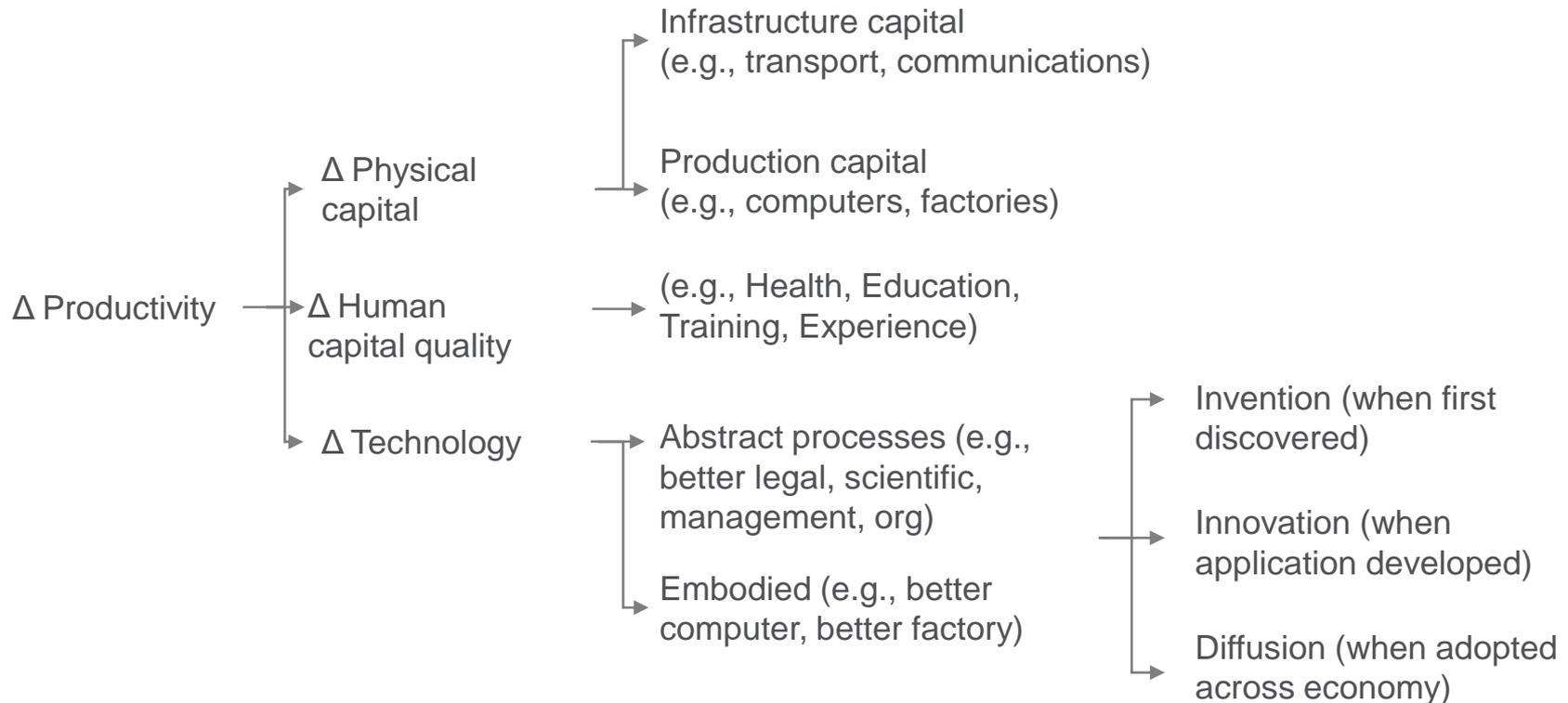


# ...and technology diffusion



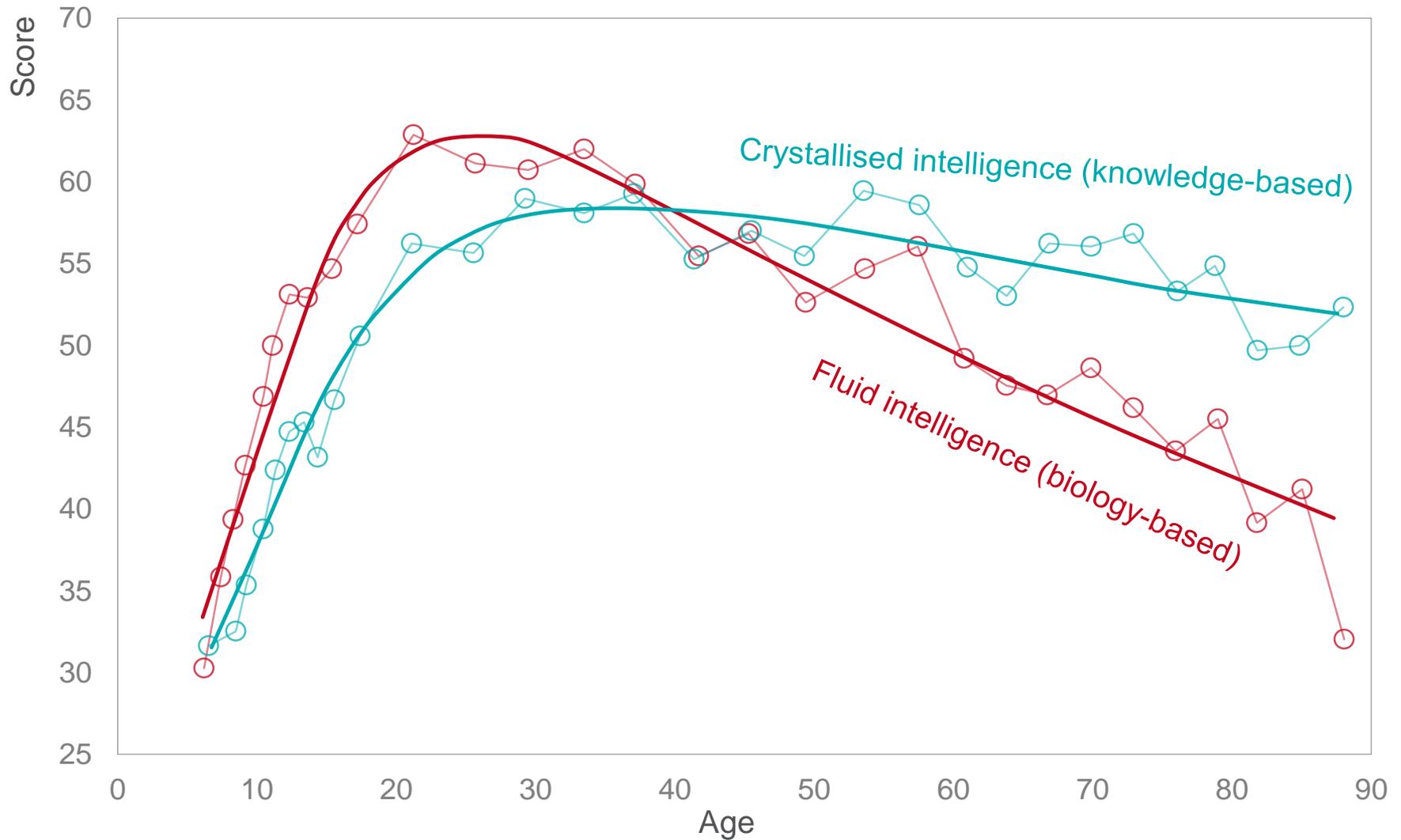
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# Productivity growth depends on several components



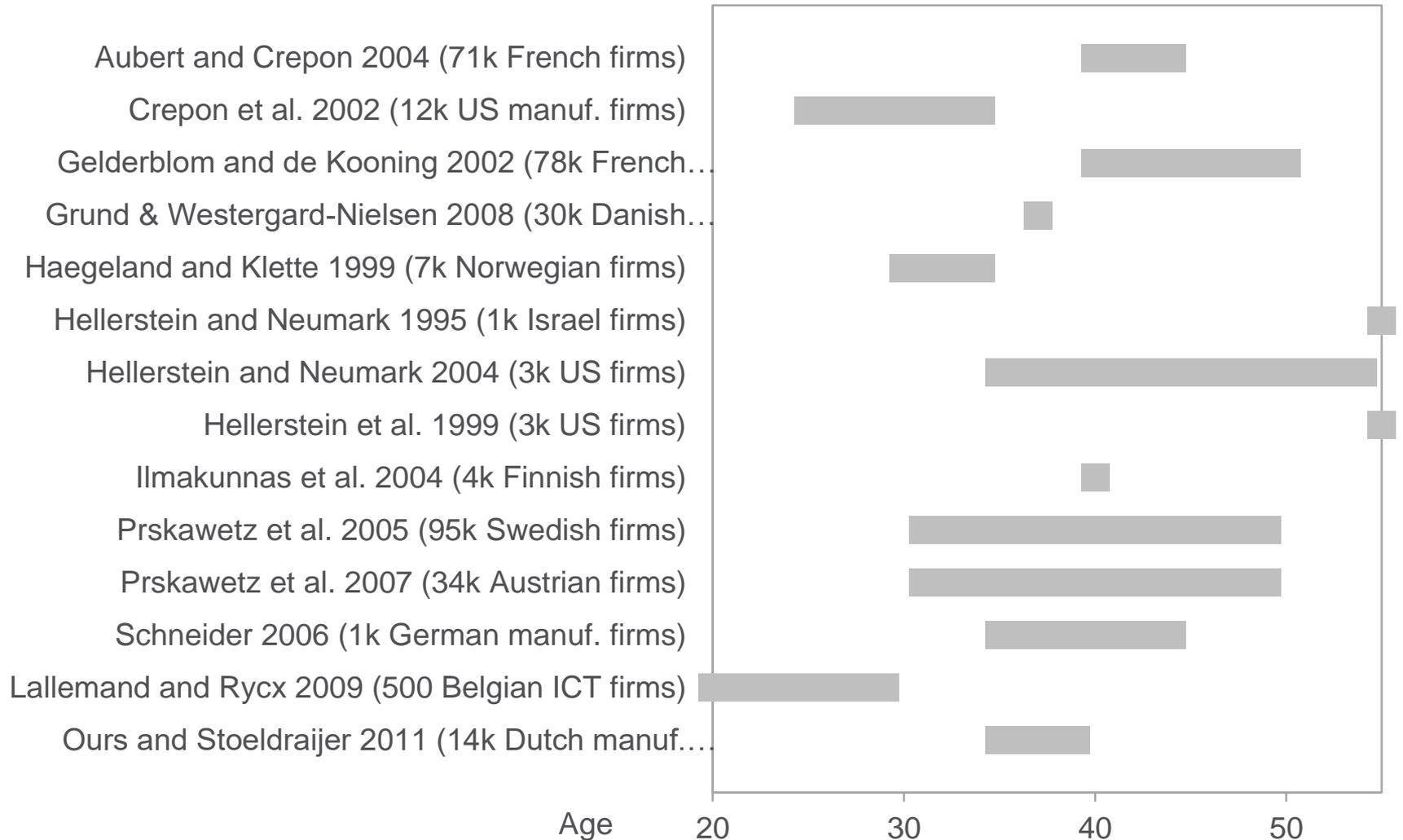
**So, what does the empirical literature say?**

# Productivity by age at individual level: Psychometric tests



# Productivity by age at team, plant, and firm level

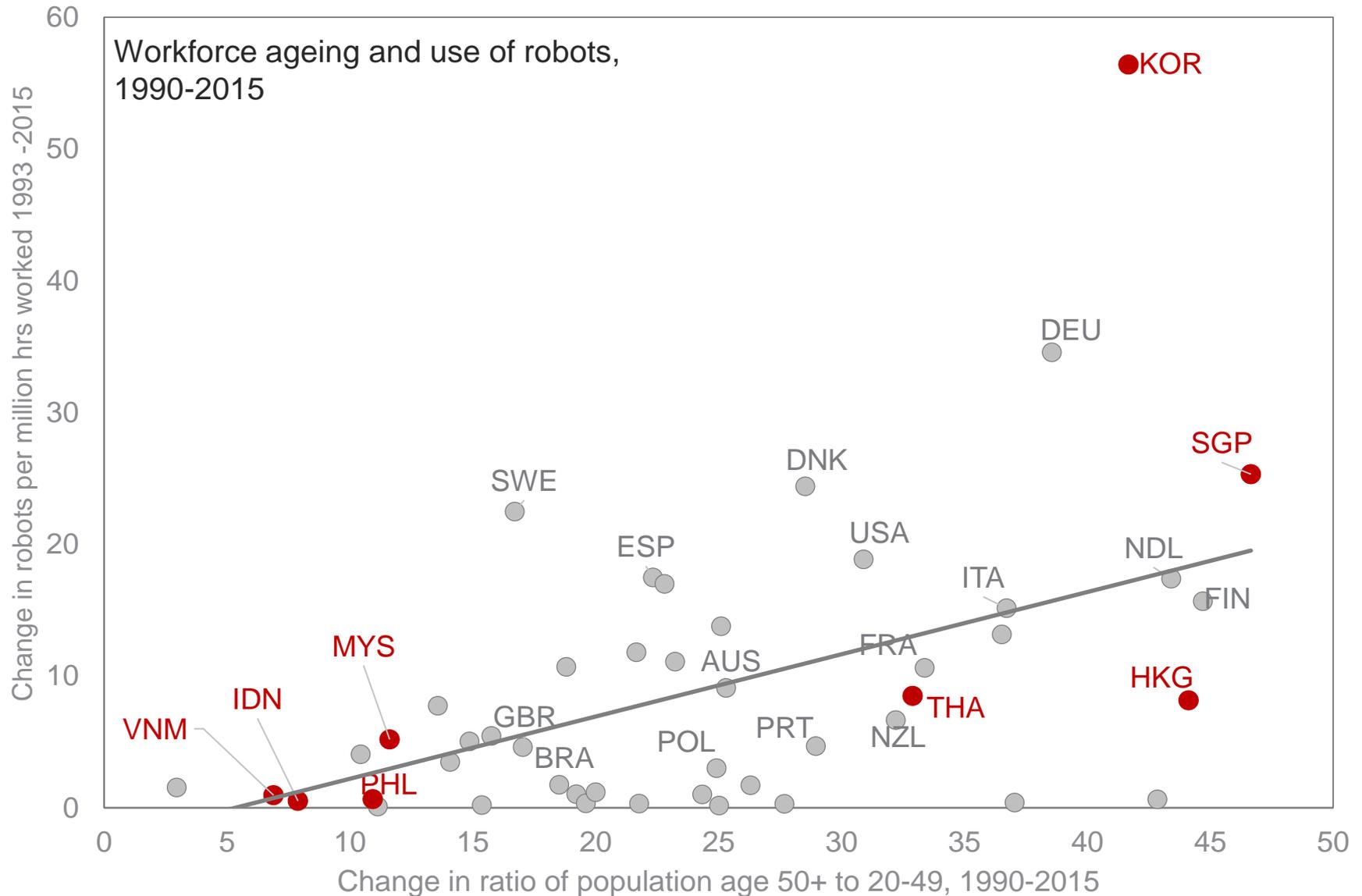
Peak productivity age, by study



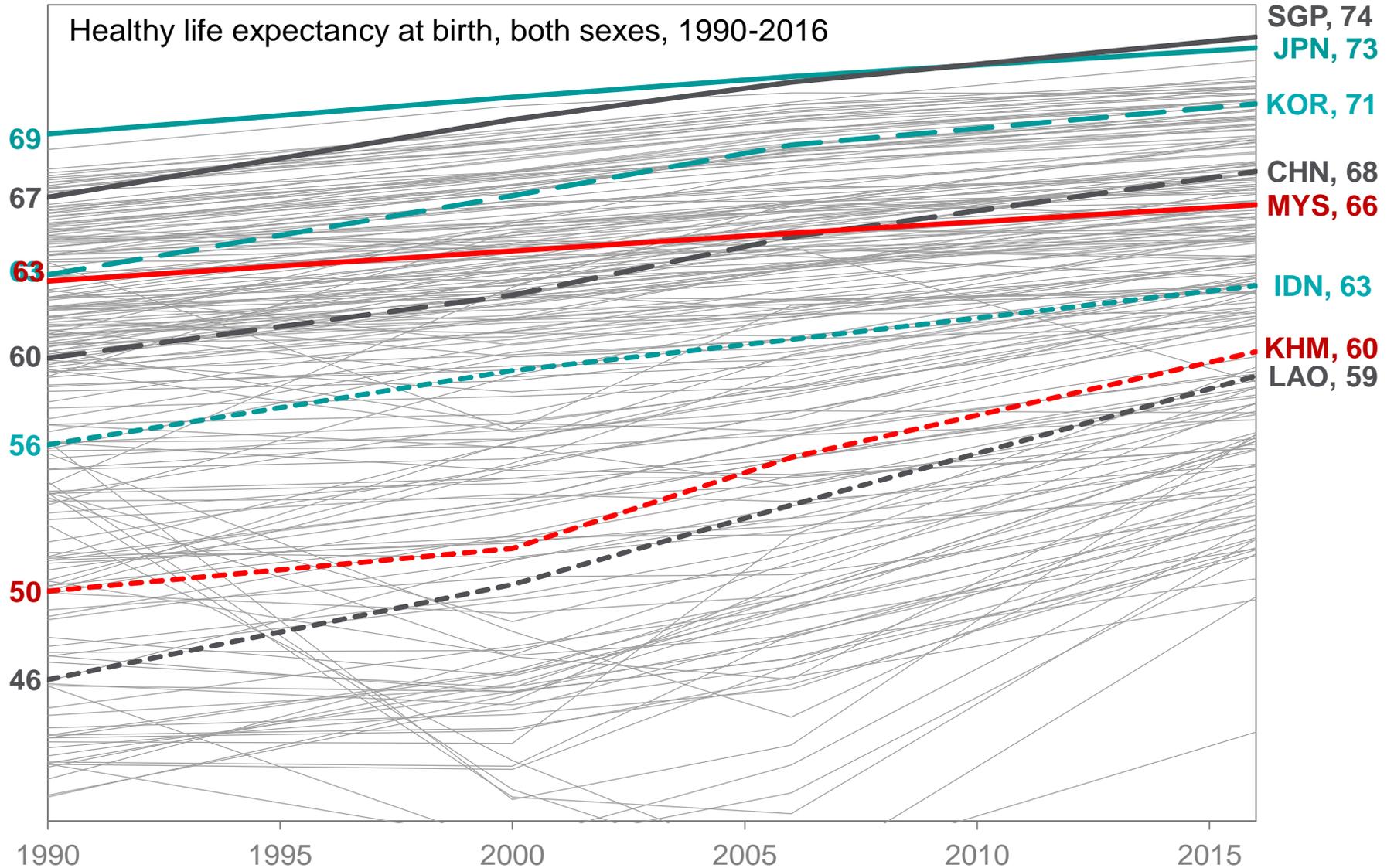
# Productivity by age at the aggregate level

Study	Coverage	Result
Lindh and Malmberg (1999)	OECD 1950-1990	50-64 age group affects labour productivity positively
Feyrer (2007, 2008)	87 countries 1960-1990	40-49 age group affects TFP positively
Liu and Westlius (2016)	Japanese prefectures 1990-2007	40-49 age group affects TFP positively
Maestas et al (2016)	US states 1980-2010	60+ age group affects labour productivity negatively
Ozimek et al (2017)	US states-industries, 2000-2015 Teams in HR company, 2013-2016	Share of 65+ affects productivity of state-ind negatively Share of 65+ affects wage of team negatively
Acemoglu & Restrepo (2017)	169 countries 1990-2015	Ageing (ratio of 50+/20-49) affects GDP per capita growth positively

# In fact, we may be seeing induced technological change



# And we've seen health (education & IQ) improvements

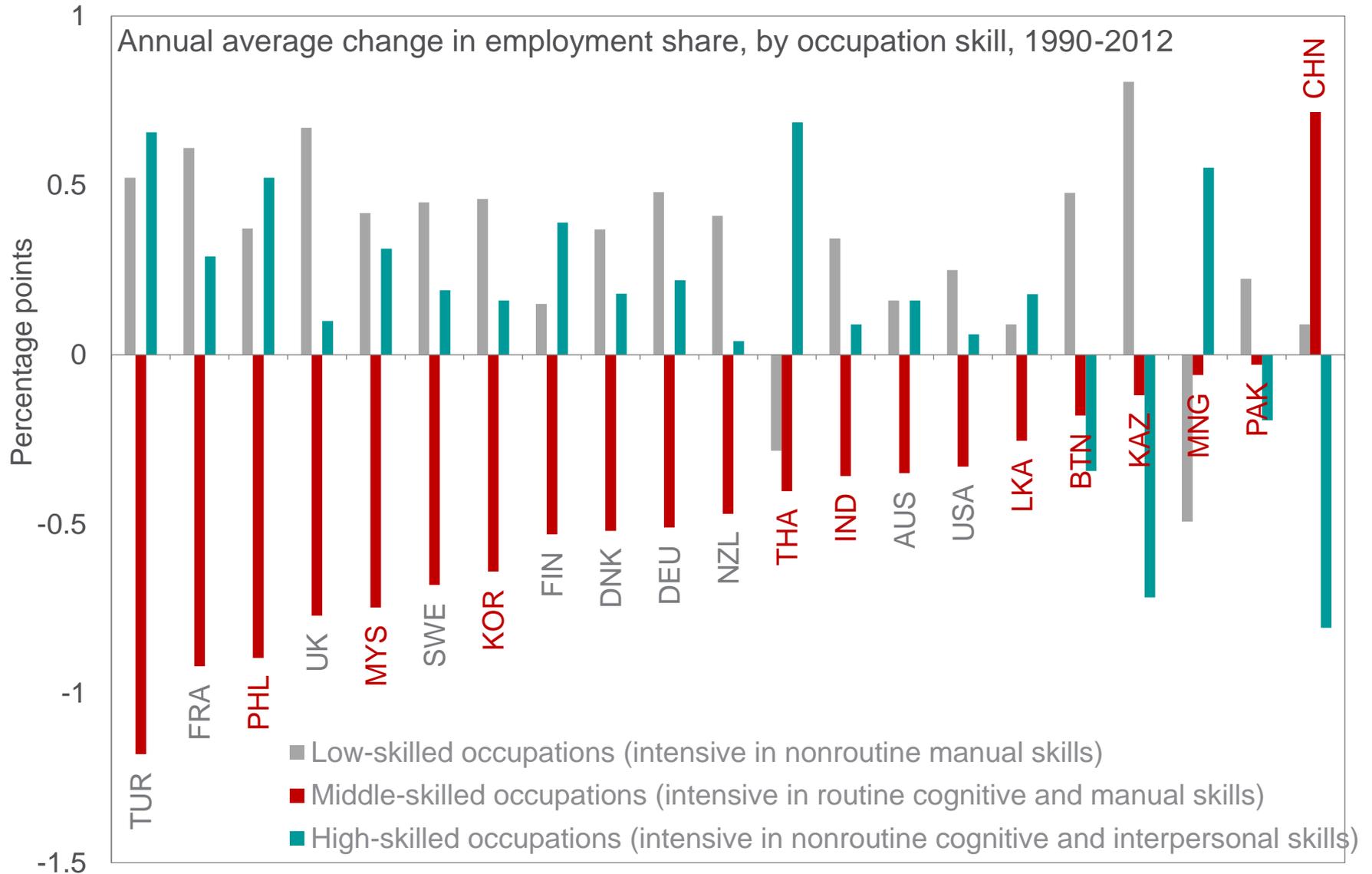


## Interim conclusions

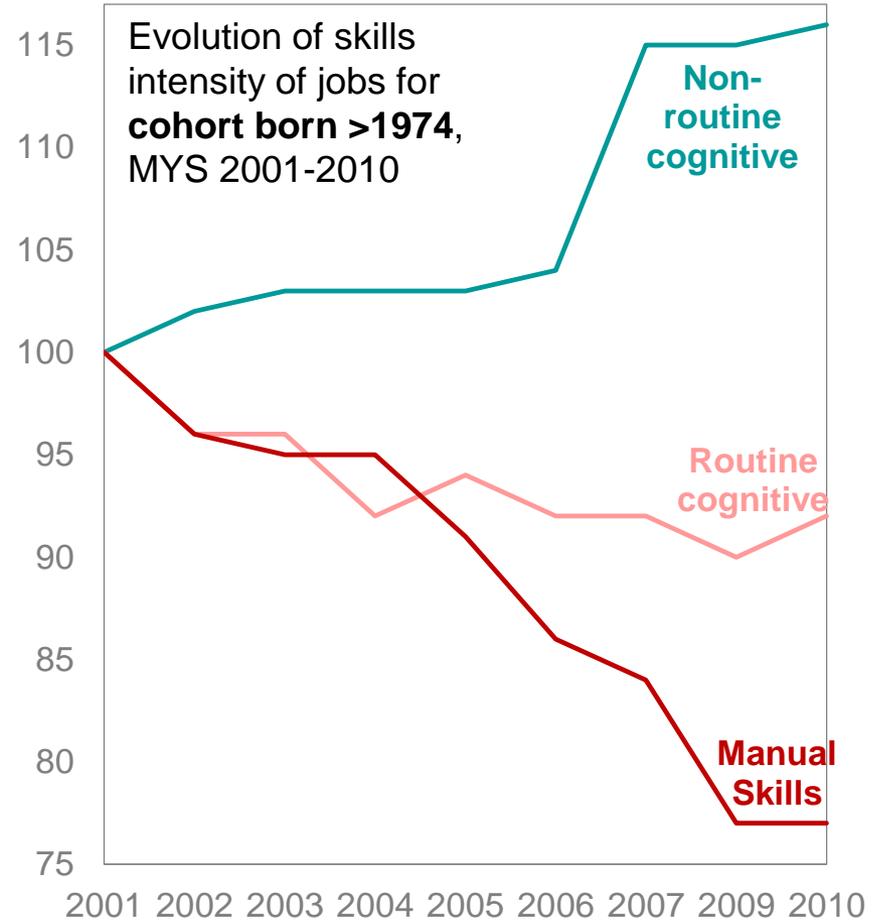
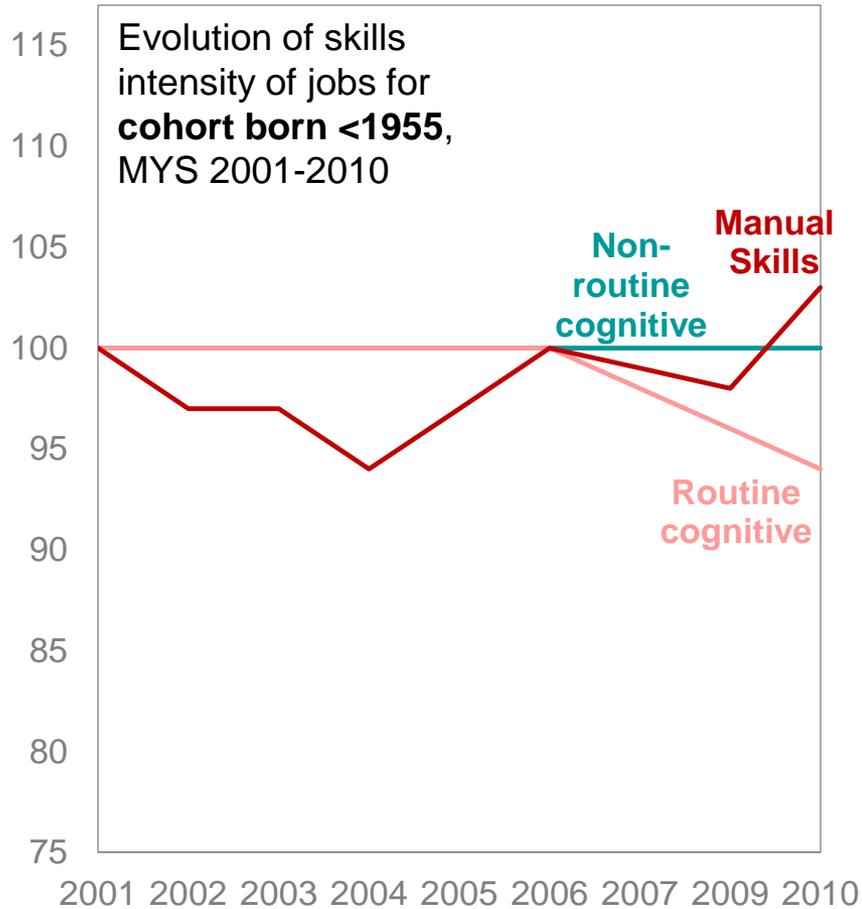
1. Asia is experiencing rapid ageing and technological change
2. These can affect productivity growth via physical and human capital and technological change
3. Evidence of productivity by age is mixed and confounded by changes in cohorts and selection

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# Skill-biased technological change



# Skill intensity changes by cohort



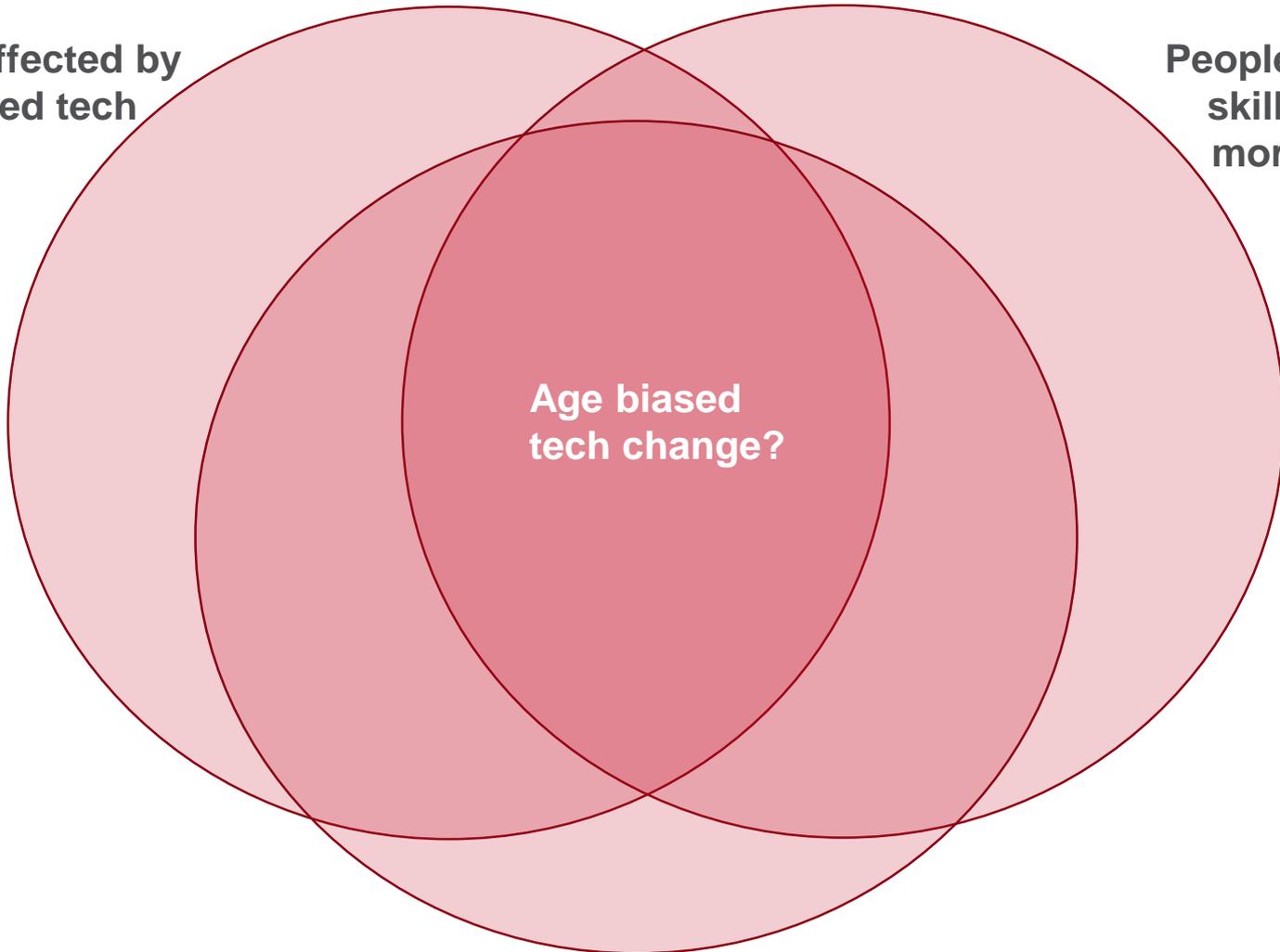
# Age-biased technological change: Empirical findings

Study	Coverage	Effect of technological change
Peng et al (2017)	Employee-employer data 8 EU countries 1970-2007	Older (and younger) high skill gain wage-share Older low skill gain empl-share Collective bargaining reduces age-bias of tech
Hujer and Radic (2005)	Employee-employer data West Germany mid-1990s	Older high skill lose employment share Older low skill gain employment share
Beckmann (2007)	Employee-employer data West Germany mid-1990s	Older lose empl-share
Aubert et al (2006)	Employee-employer data France mid-1990s	Older more likely to leave, less likely to be hired Older lose wage-share
Ahituv and Zeira (2010)	HRS individual data USA mid-1990s	Drives many older people to retire Drives those with wage gains to retire later

# Conceptualising age-biased technological change

People affected by  
skill biased tech  
change

People that find  
skill updating  
more difficult



Older people

# Interim conclusions

1. Technology often impacts the employment and wages of middle and lower skilled workers
2. The pattern of employment among older cohorts suggest that they will be disproportionately caught up in this impact
3. Non-adaptability of a relatively aged workforce may slow growth and lead to displacement

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# Specific technologies and ageing pressures

## Long Term Care

- Increasing demand, highly labour intensive
- Tech could free up formal & informal labour
- Examples include AT, ICT, Robots
- Functions include Monitoring, Connectivity, Perform tasks
- Tech inducement externalities to contribute to productivity growth

## Healthcare

- Health tech and ageing intimately related
- Fiscal challenge
- Example includes Telehealth in NCD (chronic disease) management

## Digital Identification Technology

- Cheaper/easier/safer than traditional centralised record keeping
- Induced by social protection/insurance requirements
- Likely large externalities via formalisation

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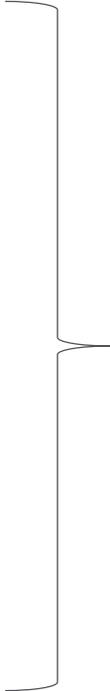
# Policy challenges

## Human resource policies

- Education, training, and lifelong learning
- Getting foundation right
- Targeting lifelong learning
- Migration policy

## Addressing inequality

- Life course approach to intervention
- Social protection



A new program:  
Technology  
Adjustment  
Assistance

# Research needs

## Data and modelling capability

- Asia lacks the data available in OECD
- Examples include employee-employer data, skills data by age
- New modelling needed on demog. effects on production, consumption, trade

## Workplace and job design

- Work-related factors promoting/inhibiting successful ageing
- Job/task design and cognitive ability

## Links between demography and productivity

- Strength of inducement effect
- Strength of consumption composition and endowment effect (eg. G-Cubed)
- Effectiveness of re-training programmes to offset age-biased tech change

## Cost and benefit analysis of specific tech

- Physical and tech infrastructure (e.g., DIT)



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