



INNOVATION AND JOB CREATION - AN OECD PERSPECTIVE

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Structure of the presentation

- What is the question?
- Evidence from the past – econometric studies
- Evidence from the future – evidence on occupations
- Another question



Policy concerns

The twin concerns of policy makers:

- There is not enough productivity
- There are not enough jobs

New technology has not brought (yet?) a surge in productivity, but it might threaten many jobs in the future.





Policy concerns

Not new: luddites etc.

But: « this time might be different », IT might have stronger effects, it might threaten all jobs except the most highly skilled. “End of work”, “Scale without mass”, “Second machine age” etc.

Since the period of manual computing, the cost of computer calculation has fallen by 1.6 – 76 trillion-fold (Nordhaus) . IT now applies to most human activities.





Innovation and job destruction/ creation

Link between innovation and employment is complex:

Direct effect might of innovation is to increase productivity, which might kill jobs locally

BUT

higher productivity increases income: Lower output prices; higher wages; higher profits => increases demand.



Quantitative Studies

Two main types of quantitative studies:

- Impact of IT on labour demand – econometric studies looking back to the past
- Expected impact of IT on specific occupations – calibration based on experts views



Labour demand

Method: estimating labour demand equations, introducing variables reflecting the use of IT => IT capital stock, user price of IT capital.

OECD 2014 (V. Spiezia):

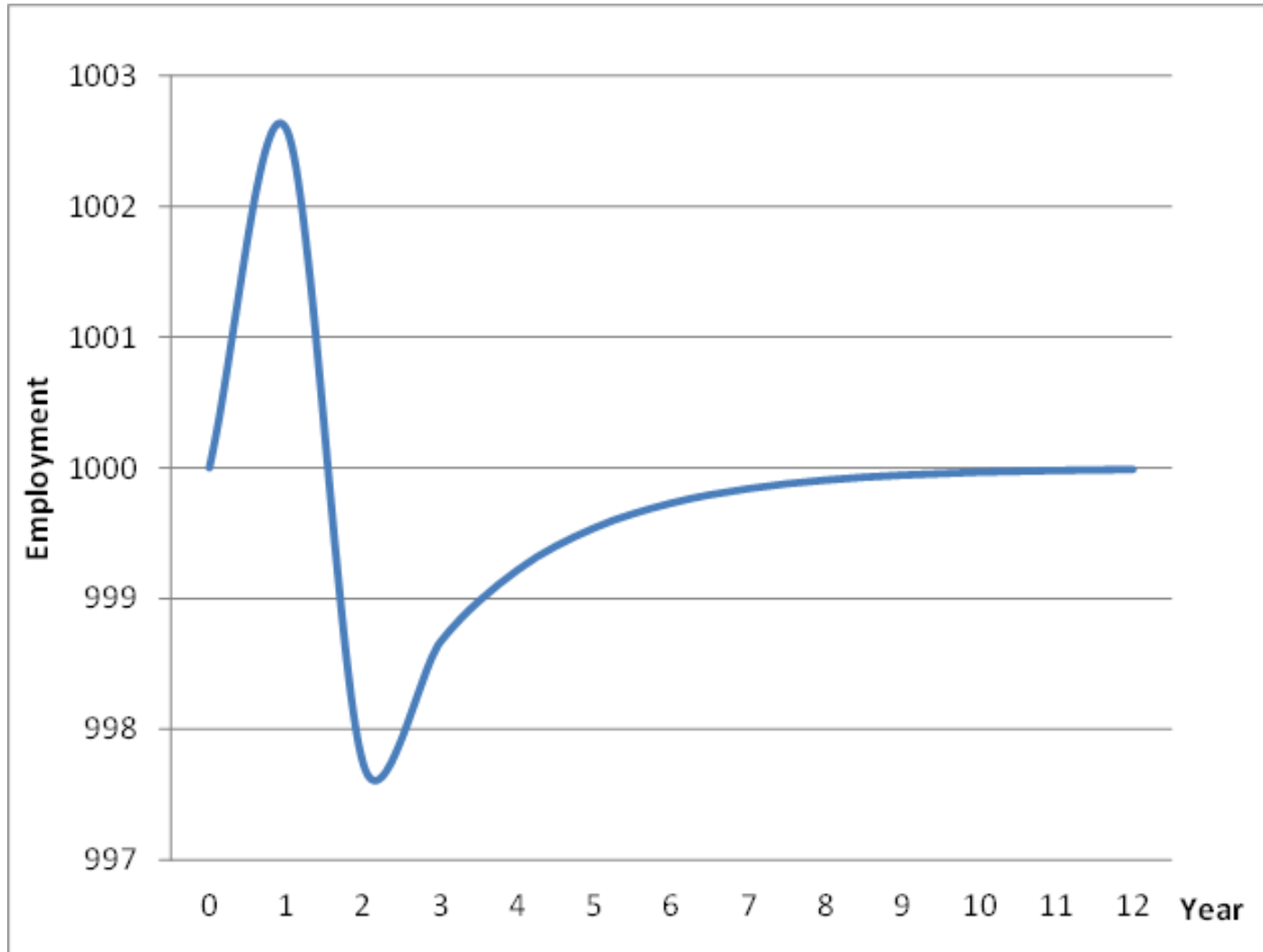
Labour demand equation, aggregate level (total economy), a panel of 19 countries, 1990-2012, with the user cost of ICT capital as a regressor.



Simulated Changes in Labour Demand Following a Permanent 5% decrease in the user cost of ICT

(with initial labour cost share of 0.775)

(Source: Spiezia, OECD 2016)





Why this dynamics?

Long term elasticity of substitution between IT capital and labour is 1:

a permanent fall in the cost of IT capital reduced labour demand per unit of output but increased output in the same proportion.

Why this non linear dynamics?

- Initial increase in jobs due to set up costs (new processes)
- Then reduction as productivity increases
- Progressively production increases: demand catches up as prices decline and jobs are created again.



Reallocation effect

ICT generates a reallocation across sectors:

A decrease in the user cost of IT capital generates

- a decline in jobs in manufacturing, business services, trade and agriculture; and
- an increase in jobs in construction, care and culture/recreation/other services.



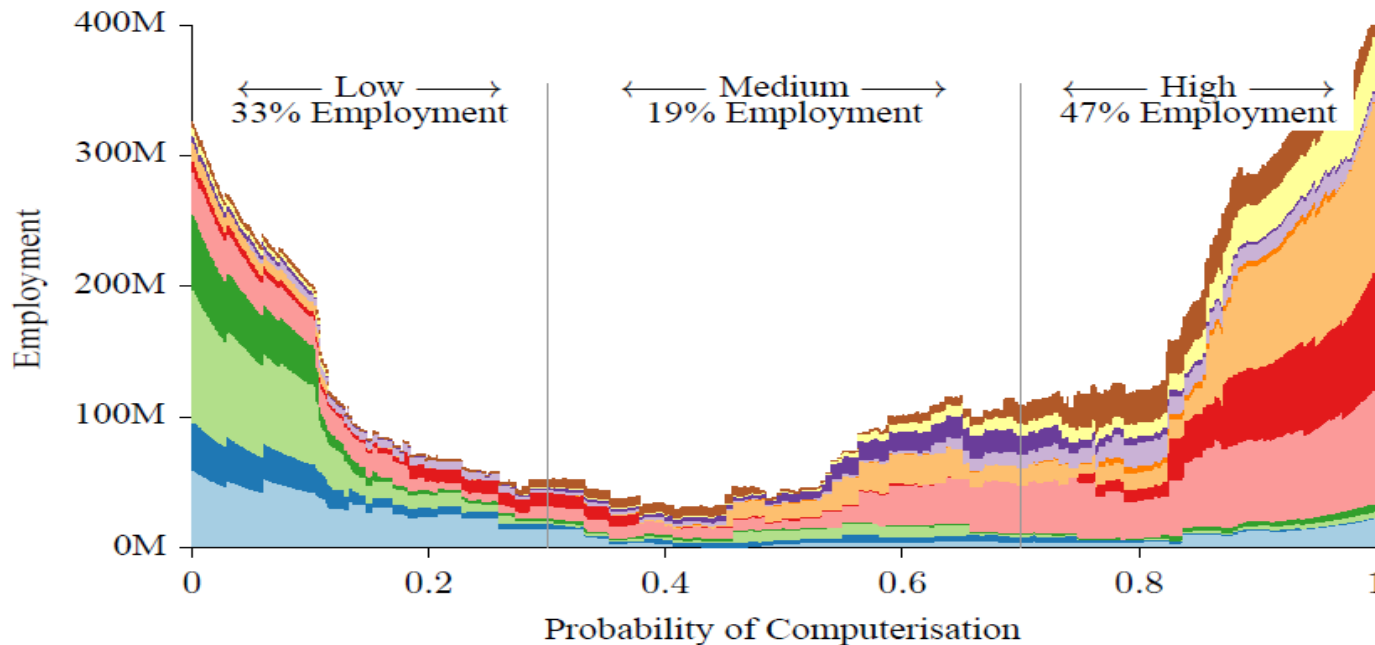
Studies of Occupations

Frey & Osborne (2013), classify 702 occupations according to the risk of automatisisation they present, based on experts opinion.

According to experts, thanks to machine learning, most tasks could be automated in 1-2 decades except those involving manual dexterity, originality or social perspectiveness

US Employment by Risk Category (Frey-Osborne)

- Management, Business, and Financial
- Computer, Engineering, and Science
- Education, Legal, Community Service, Arts, and Media
- Healthcare Practitioners and Technical
- Service
- Sales and Related
- Office and Administrative Support
- Farming, Fishing, and Forestry
- Construction and Extraction
- Installation, Maintenance, and Repair
- Production
- Transportation and Material Moving





Studies of Occupations

Frey & Osborne (2013):

47% of jobs in the US are at high risk! (notably low skill jobs in the services)

BUT:

⇒ Consider only technical, no economic criteria

⇒ Consider an occupation to be at risk if any of the (multiple) tasks it consists in can be automatised



Studies of occupations

Arntz et al. – OECD 2016

- ⇒ Use PIAAC data to get a more precise view of the skills content of tasks within occupations
- ⇒ Suppose that jobs which are only partially automatised won't fully disappear

Conclusion: 9% of jobs in OECD are automatable, from 6% in Korea to 12% in Austria.



Share of Workers with High Automatability

(Arntz et al., OECD 2016)





Further Caveat

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- Change will take time: AI is still in early stages, autonomous car needs to improve before it actually threatens jobs etc.
- New technology will create jobs (although we don't know which ones yet)





The other question

The conclusion from these studies is that automation and digitalisation are unlikely to destroy large numbers of jobs.

However low skilled workers are likely to bear the brunt of the adjustment costs as the automatibility of their jobs is higher.

Therefore the likely challenge of the future lies in coping with rising income inequality.



THANK YOU!

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<https://www.innovationpolicyplatform.org/innovation-inclusive-growth-oecd-project>