

Artificial intelligence and robotics: some issues for the future labour market



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Conference**

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Kemmy Business School, UL.

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PRESENTATION OUTLINE

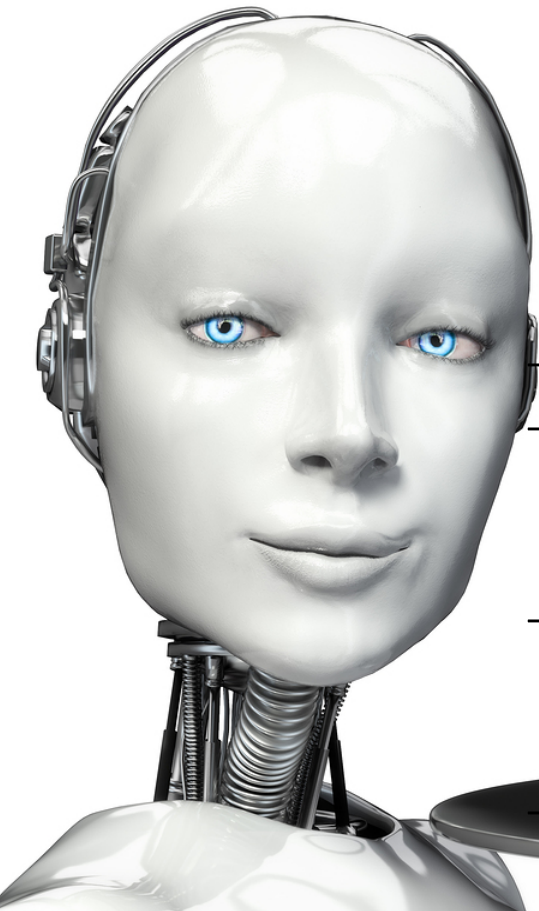
- The Big Macroeconomic and Societal Issues
 - Secular Stagnation-low growth and stagnant earnings for the middle classes
 - Income Inequality
 - The reinforcing combination of New Technologies and Globalisation
 - Growth of the “Sharing economy” and new forms of “self employment”
 - **Hollowing out of the Labour Market and evidence of “a talent mismatch” in many countries.**

Technological Change and Technological Anxiety

Can previous periods of industrial change help us to understand the evolving process?

- The Second Machine Age
- Policy issues?

- Conclusion



The Reinforcing Forces Of Technology and Globalisation: Some Long Run Forces May be Gathering Pace

- Hollowing Out Of the Labour Market.

Technological Change and Technological Anxiety



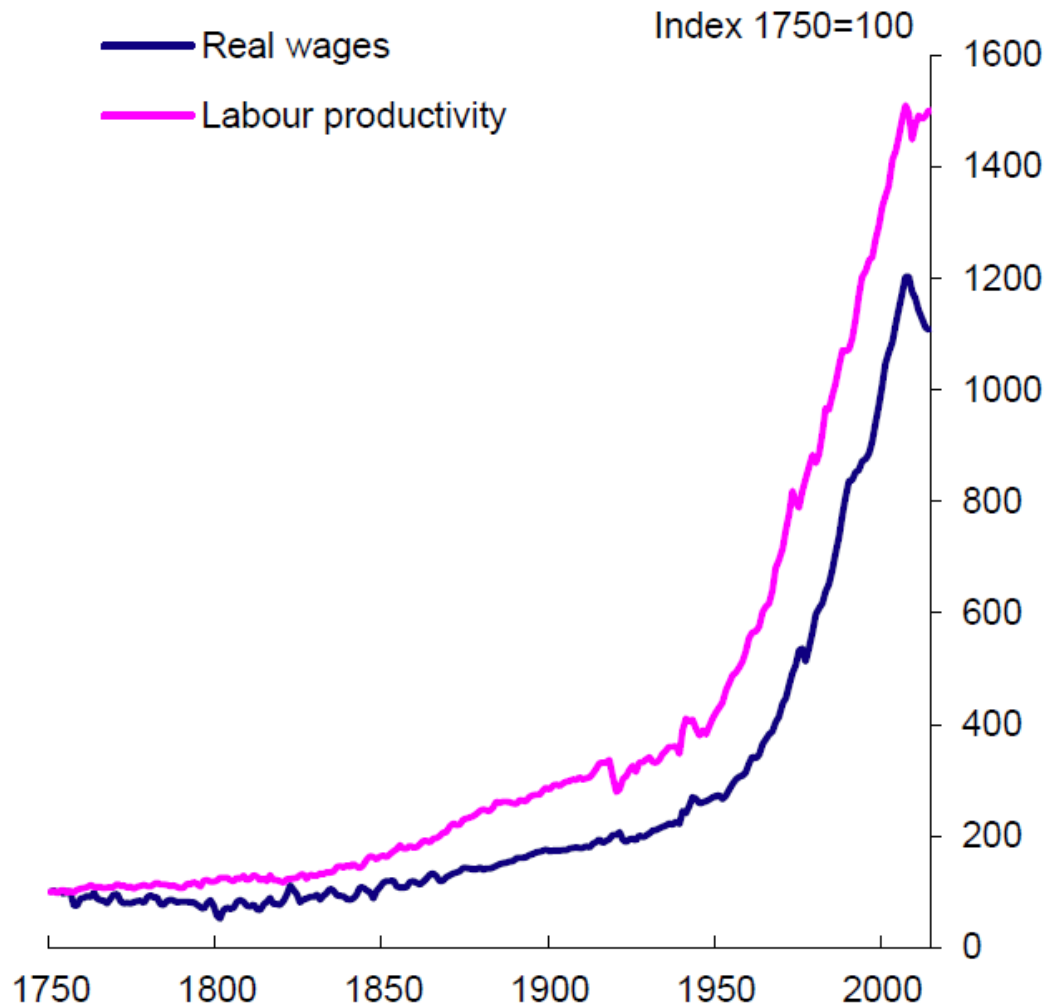
The Traditional View of Economists On The Relationship Between Technology and the Labour Market

2 Effects

- 1. Substitution Effect
- 2. Compensation Effects

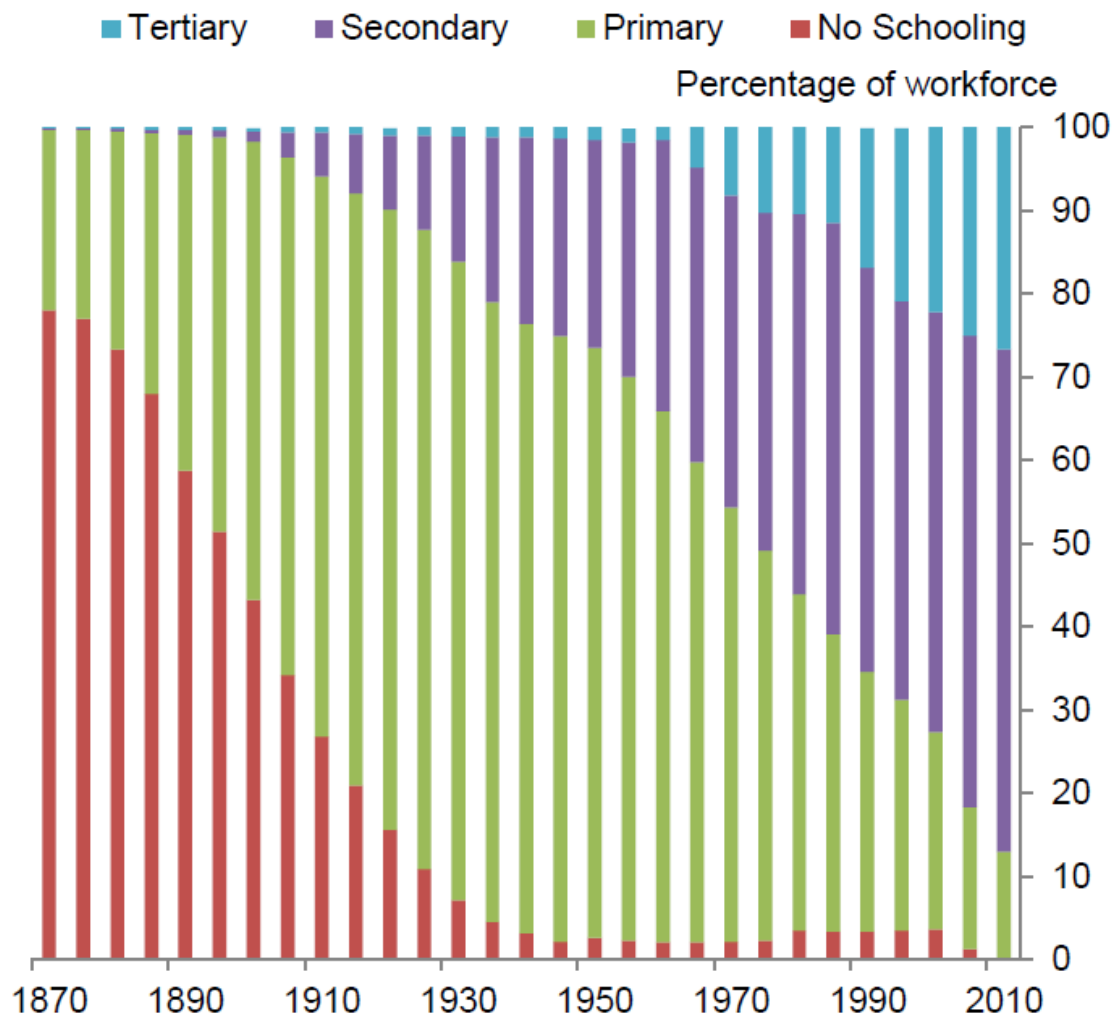
CAN PREVIOUS PERIODS OF
INDUSTRIAL CHANGE HELP US TO
UNDERSTAND THE EVOLVING
PROCESS?

Chart 1: Labour productivity and real wages, since 1750



Source: Hill, Thomas and Dimsdale (2015)

Chart 2: Global participation in education, since 1870



Source: Barro and Lee (2015)

Conclusion From The Broad Sweep Of History Seems to Suggest

- No evidence that technology damaged jobs and in fact plenty to suggest it actually boosted wages over time. Technology enriched labour rather than immiserated it.
- Why Mill was right and Ricardo was wrong and why Lump Of Labour Fallacy is just that-a fallacy. **Basic fact is that technology eliminates jobs but not work.**

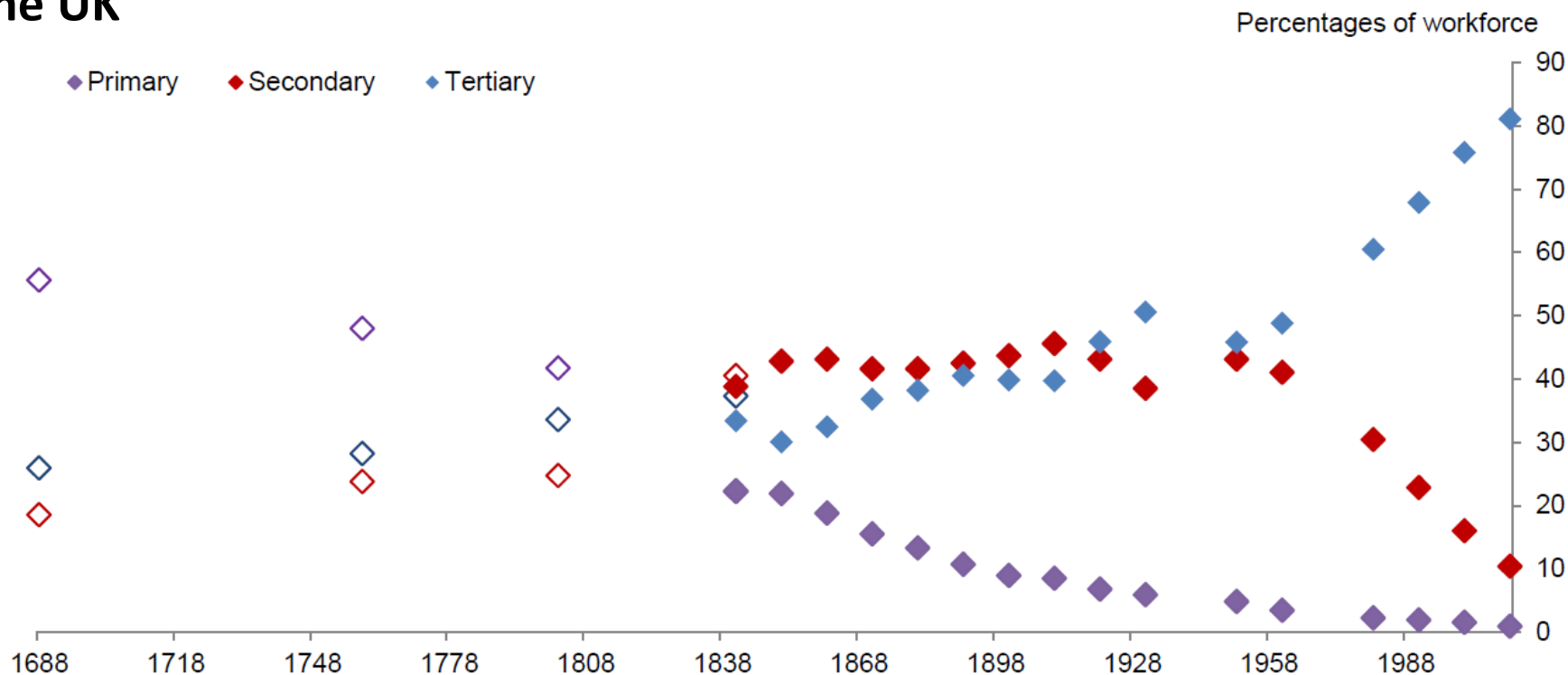
A More Nuanced View by Looking More Closely at the 3 Industrial Revolutions

Reveals that each phase has eventually resulted in a growing tree of rising skills, wages and productivity but also with a “hollowing out” of the tree. This “hollowing out” has widened and deepened with each new technological wave.

3 Timelines Used By Economic Historians

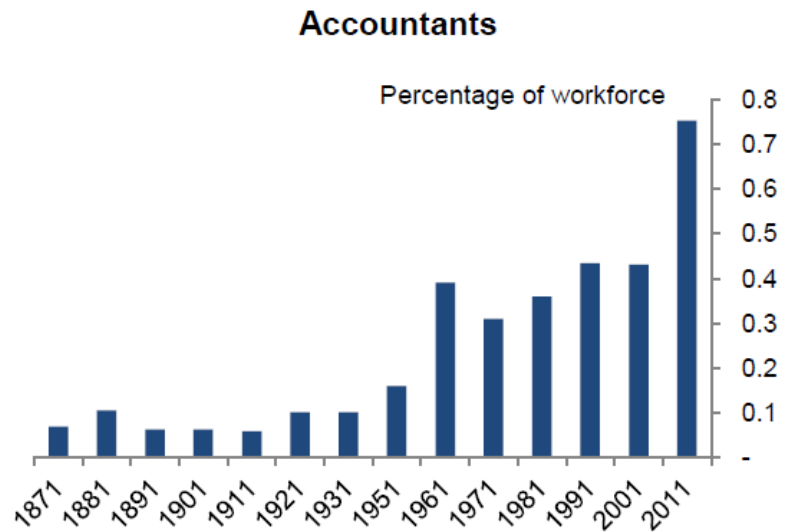
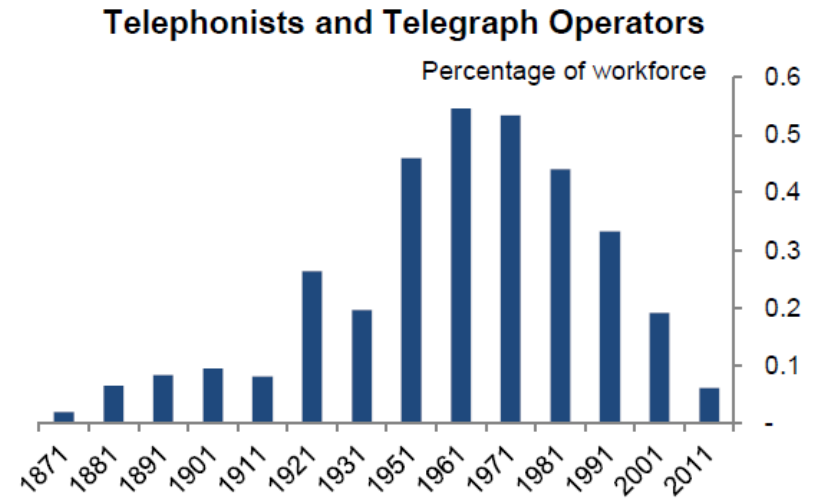
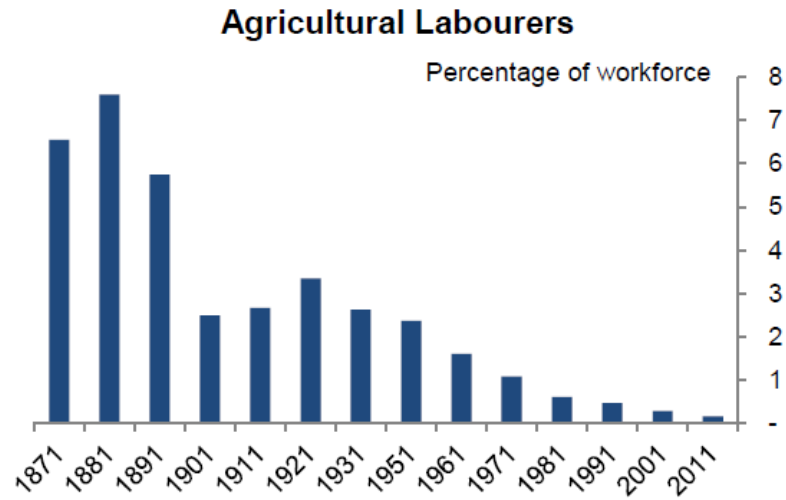
These Industrial Revolutions
significantly changed the jobs
landscape.

Chart 3: Share of employment by sector, since 1688 in the UK



Source: Shaw-Taylor and Wrigley (2013); ONS; Bank calculations.

Chart 4: Percentage of workforce by job type



Source: Deloitte (2015)

Polarisation of the Labour Market

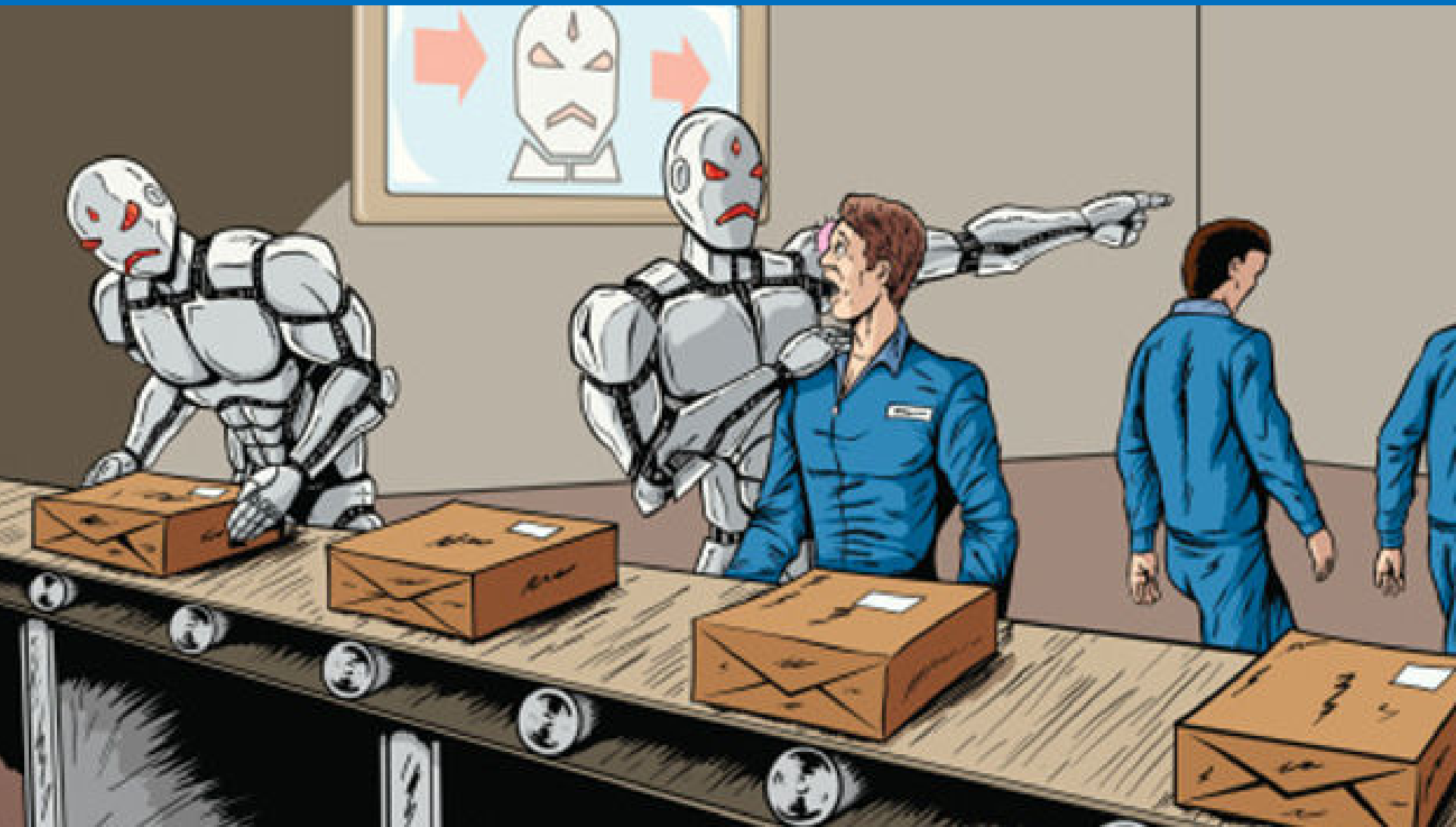
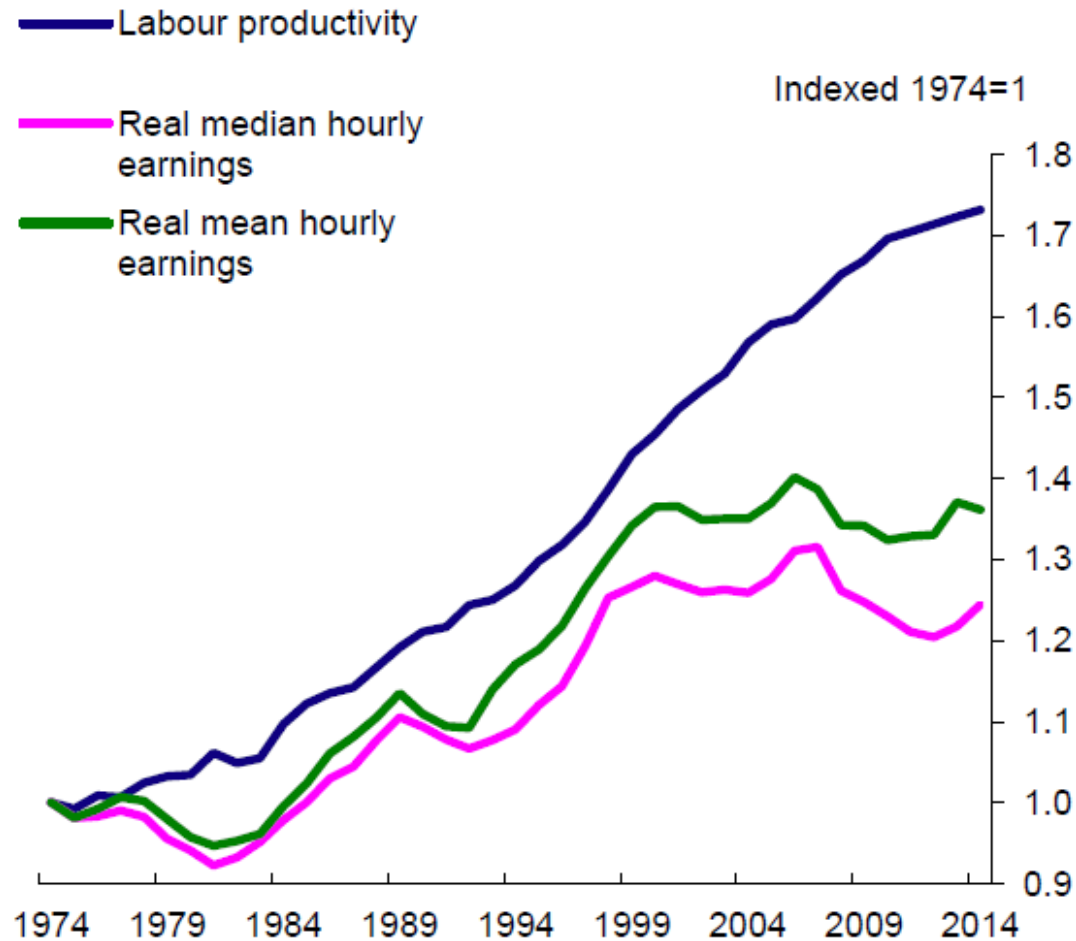
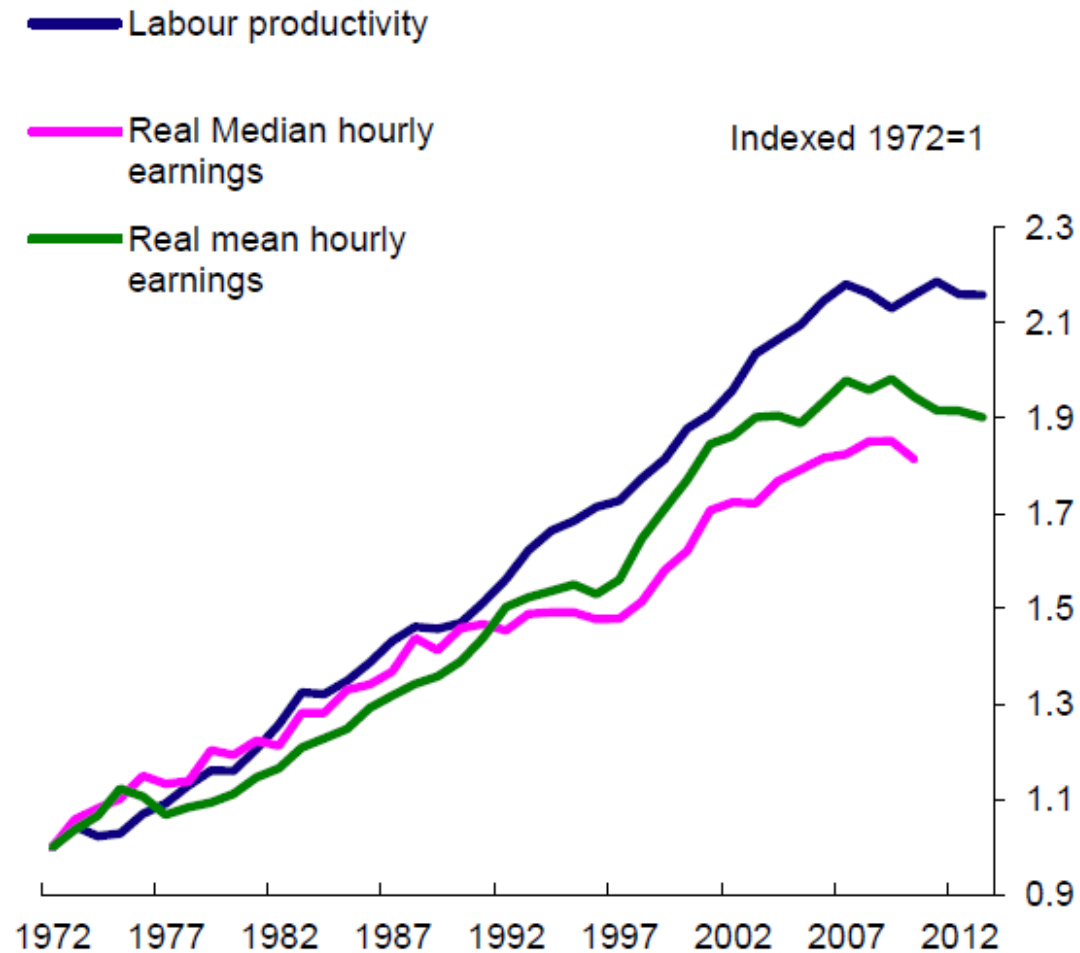


Chart 5: Labour productivity, mean and median real wages in the US, since 1974



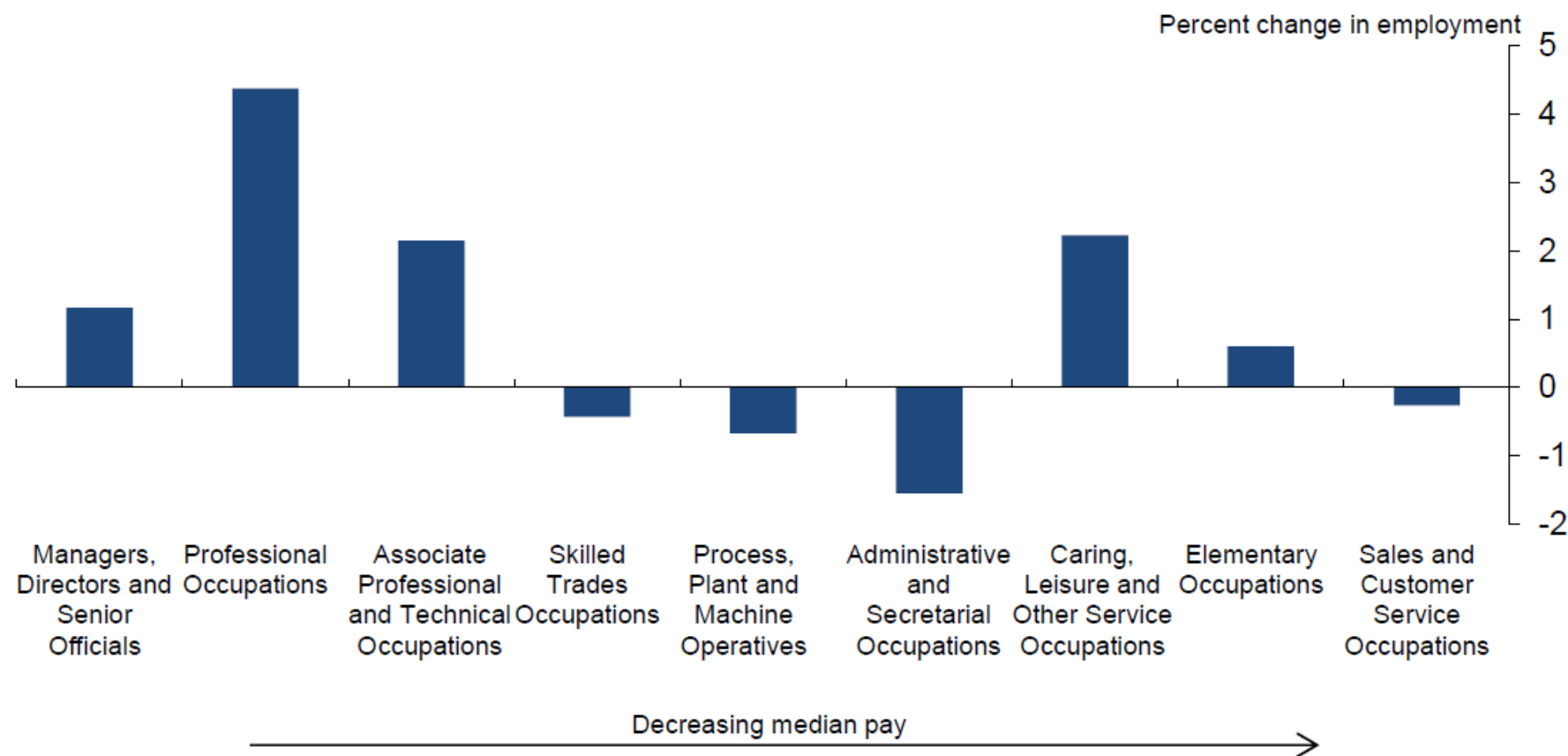
Source: Pessoa and Van Reenen (2013); St. Louis FED; Bank calculations

Chart 6: Labour productivity, mean and median real wages in the UK, since 1972



Source: Pessoa and Van Reenen (2013); Bank calculations

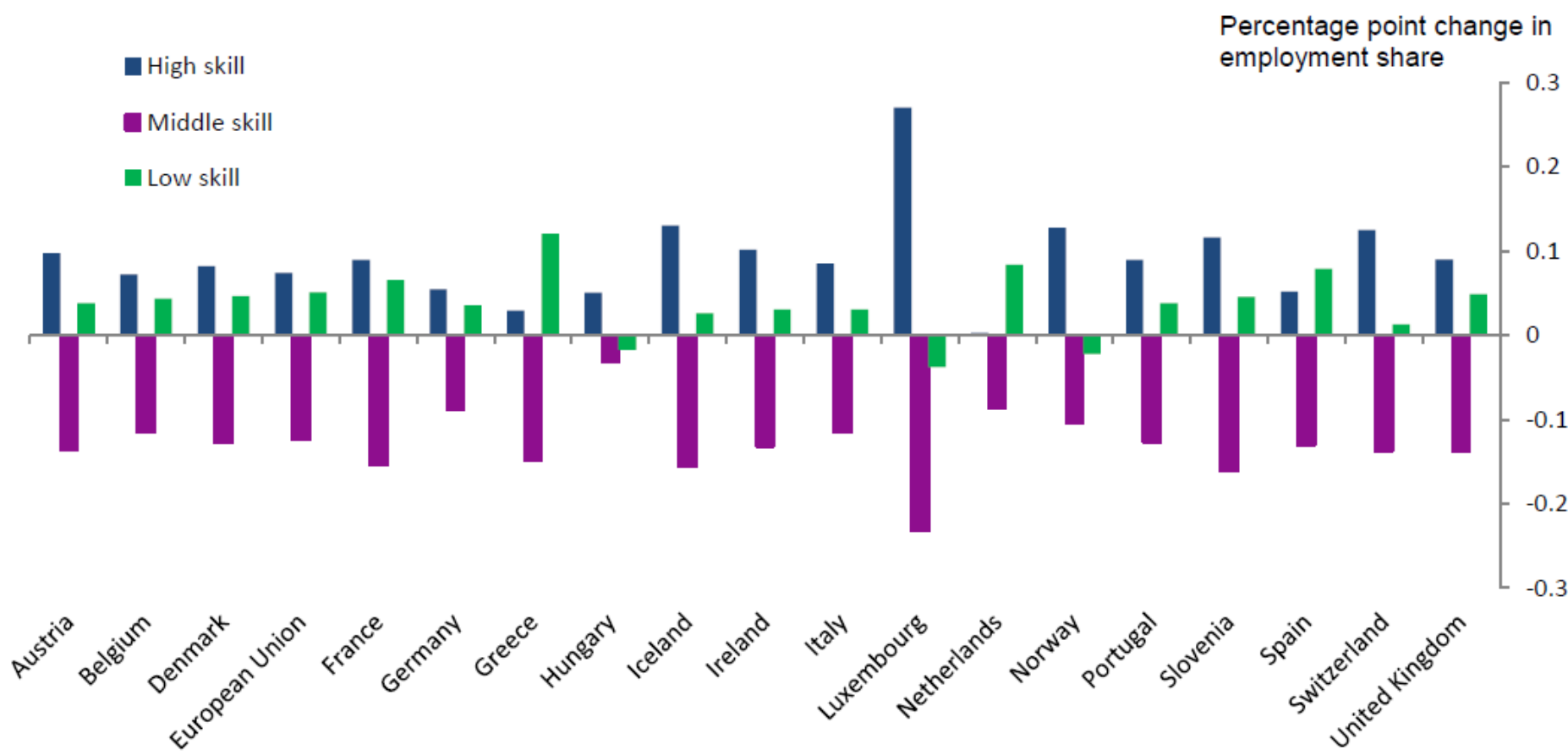
Chart 7: Change in employment shares UK, 2004-2014



Source: ONS

Notes: This chart shows the percentage point change in employment as a share of total employment. Occupations are ordered according to decreasing gross weekly median pay in 2004.

Chart 8: Change in employment share of different occupational groups, 1996-2014



Source: Eurostat

Some Generic Evidence

- Autor(2010)-finds major declines in either wages or employment growth (or both) in the middle of the of job market since the 1980s and Goos and Manning find similar for the UK and some EU countries
- Also since 2000 and especially during the recession the wage gaps between the very top of the earnings distribution and the rest have continued to grow.

Why?

Routine skill jobs like assembly line work or typing manuscripts being performed by various form of digital technology or robots

Jobs that still pay well require more complex reasoning or communication skills or low paying service jobs that require personal interaction with customers.

OUTCOME OF THE THIRD INDUSTRIAL AGE TO DATE

- An intensification of trends already at play in the first two...a hollowing out of employment, a widening distribution of wages and a fall in labour's share of national income.
- Goos and Manning-"Lousy and Lovely Jobs(2007).
- The pace of change appears to be accelerating and the scope of technological change is increasing-not just physical jobs being replaced this time and
- Unlike innovation in the past the benefits of technological change are not being widely shared-real median wages have fallen behind the growth of productivity and inequality has increased.

The Second Machine Age

Techno Optimists and Pessimists



GENERAL OCCUPATIONS:

Probabilities Jobs can be replaced by Automation: Frey and Osborne, 2013.

PROBABILITY	OCCUPATIONS
0.0042	Physicians and Surgeons
0.0044	Dentists, General
0.0055	Human Resources Managers
0.0077	Special Education Teachers, Secondary School
0.009	Registered Nurses
0.015	Chief Executives
0.021	Photographers
0.035	Lawyers
0.047	Mathematicians
0.084	Childcare Workers
0.17	Firefighters
0.43	Economists
0.72	Carpenters
0.94	Accountants & Auditors
0.99	Telemarketers

TOURISM RELATED OCCUPATIONS

PROBABILITY	OCCUPATIONS
0.014	Training & Development Specialists
0.037	Meeting, Convention and Event Planner
0.057	Travel Guides
0.083	Food Service Managers
0.099	Travel Agents
0.1	Chefs & Head Cooks
0.55	Commercial Pilots
0.69	Maids & Housekeeping Cleaners
0.77	Bartenders
0.87	Food Preparation Workers
0.94	Waiters & Waitresses
0.96	Receptionists & Information Clerks
0.96	Ushers, Lobby Attendants & Ticket Takers

The Labour Market to 2025: A New Division of Labour



Some Trends To Date

- New technology industries from the computer revolution of the 1980s have created jobs but there has been a declining trend in this area: yes we have new jobs but the pace of increase is declining;
- Increased pressure on “routine” and some low end jobs from improved robotics and Machine Learning and this is often impacted further through globalisation impacts.
- Increased use of robotics in less developed countries and worries over “de-industrialisation” (Rodrik,)
- Growth of self employment in the sharing economy- Airbnb, Taskrabbt etc.
- Moravec’s Paradox still at work even if Robots have improved.

STEM+

Three Vital Trends

1. Increasing Use Of Artificial Intelligence & Robots
2. A Changing Role For How Customers Will Interact With Businesses: Self Service.
3. Humans Will Focus On Higher Order Tasks-Delivered On Demand

But What New Job Growth Sectors and Jobs?

- Health
- Education
- Environment
- Robotics
- The European Centre for the Development of Training and Education (CEDEFOP) estimated that in the EU nearly half of the new job opportunities will require highly skilled workers. Today's technology sectors have not provided the same opportunities , particularly for less educated workers, as the industries that preceded them.

A Big Role For Active Labour Market Policies To Help People Find Jobs

- Need to keep emphasising STEM but also a need to emphasise skills of creativity and emotional intelligence.
- Important to get the level of education and training correct-do we need so many doing 4 year degrees?
- Need to retrain those who have been displaced.
- Labour market economists in the US have emphasised the role of “earned income tax credits” or lowering tax wedges to incentivise and support self employment while a debate continues over minimum wage increases.
- More aggressive suggestions are made for a “basic income” and a shorter working week.

Conclusion