



"Science, Research and Innovation Performance of the EU 2018"

Innovation, Productivity, Jobs and Inequality

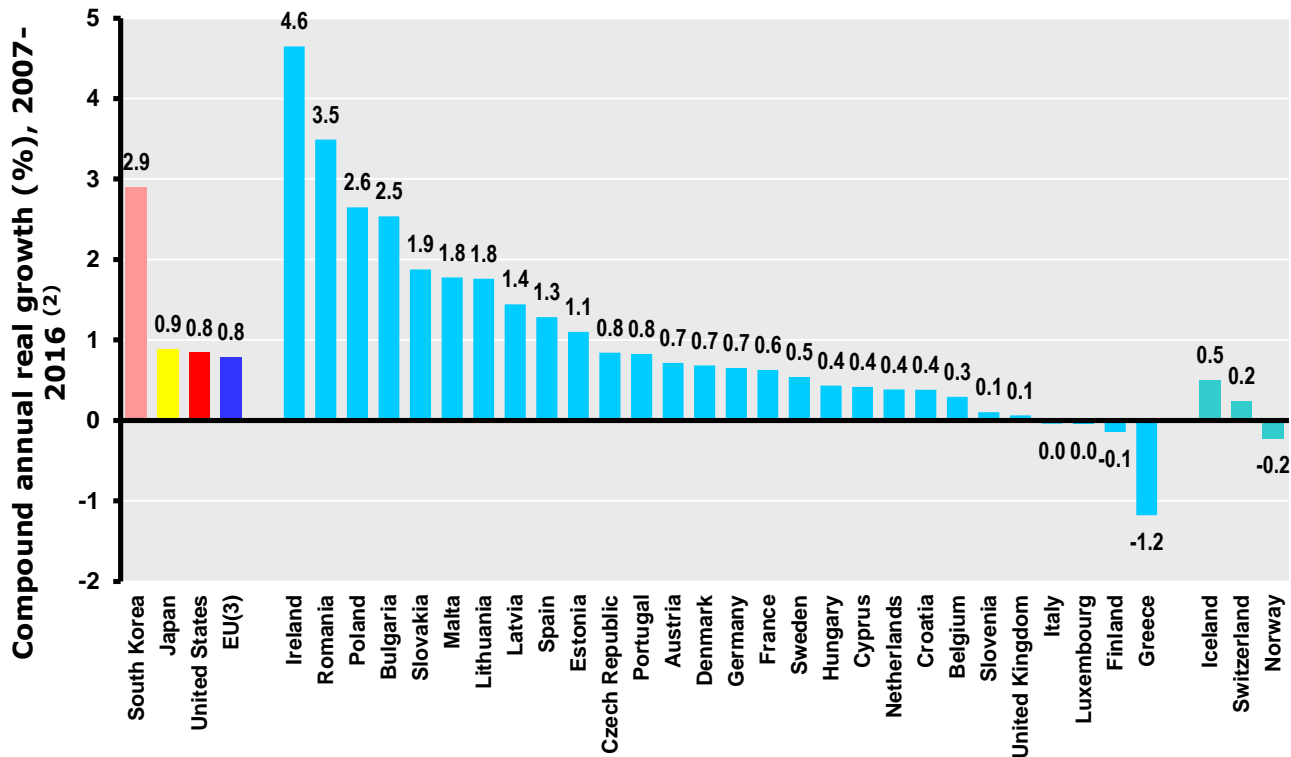
**ERAC Workshop
Brussels, 4 October 2017**

Key messages

- *More robust economic growth will require boosting productivity growth that relies on R&I*
- *Innovation acceleration and notably innovation diffusion are crucial to boost productivity growth*
- *Digitalisation and other long term socio-economic forces are changing the nature and impacts of innovation*
- *New digital technologies create new and better jobs, but also disrupt existing ones, creating opportunities and risks*
- *Ensuring a broad participation in innovation is key to avoid raising inequality*

Economic growth is back, but slow labour productivity dynamics hinder its robustness...

Labour productivity (GDP per hour worked⁽¹⁾) - compound annual real growth, 2007-2016



Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies

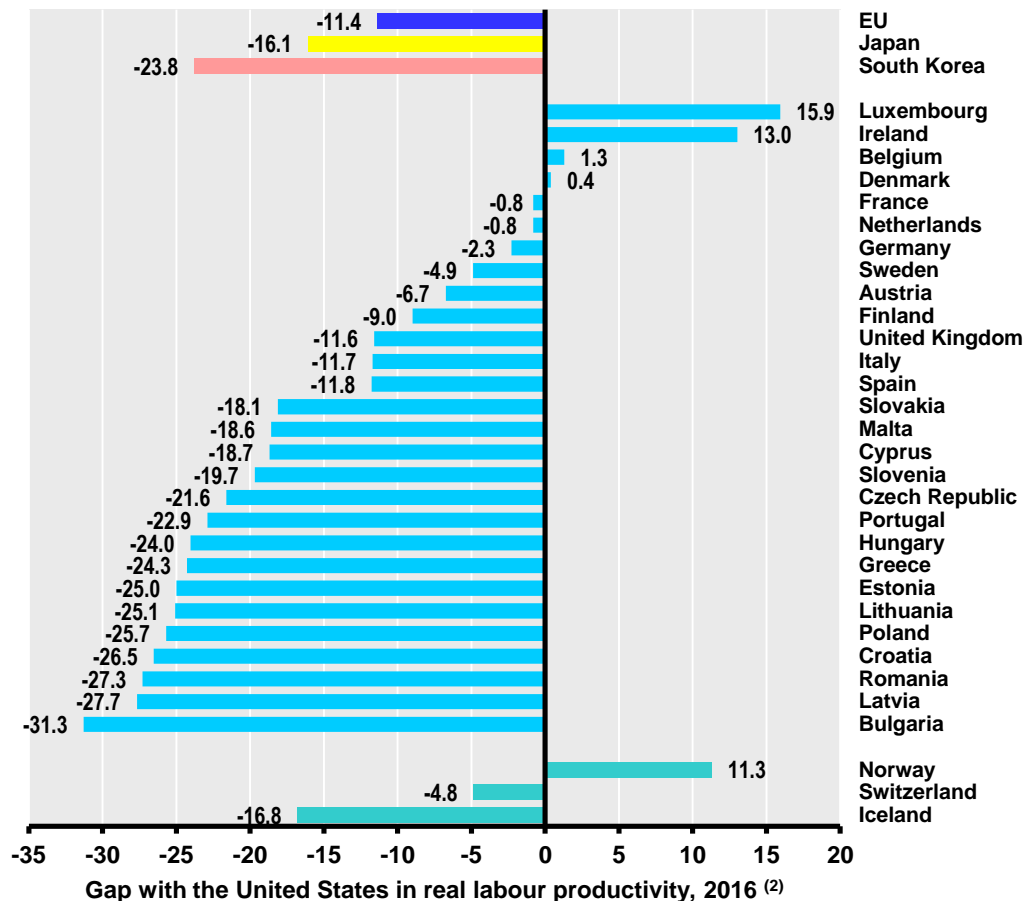
Data: Eurostat, DG Economic and Financial Affairs, OECD

Notes: ⁽¹⁾GDP per hour worked in PPS€ at 2010 prices and exchange rates. ⁽²⁾NO, IS: 2007-2014; CH, JP, KR: 2007-2015; HR: 2008-2016.

⁽³⁾EU: Croatia is not included.

...and affects Europe's ability to bridge the productivity gap against the US

The gap in real labour productivity (GDP per hour worked⁽¹⁾) between each country and the United States, 2016



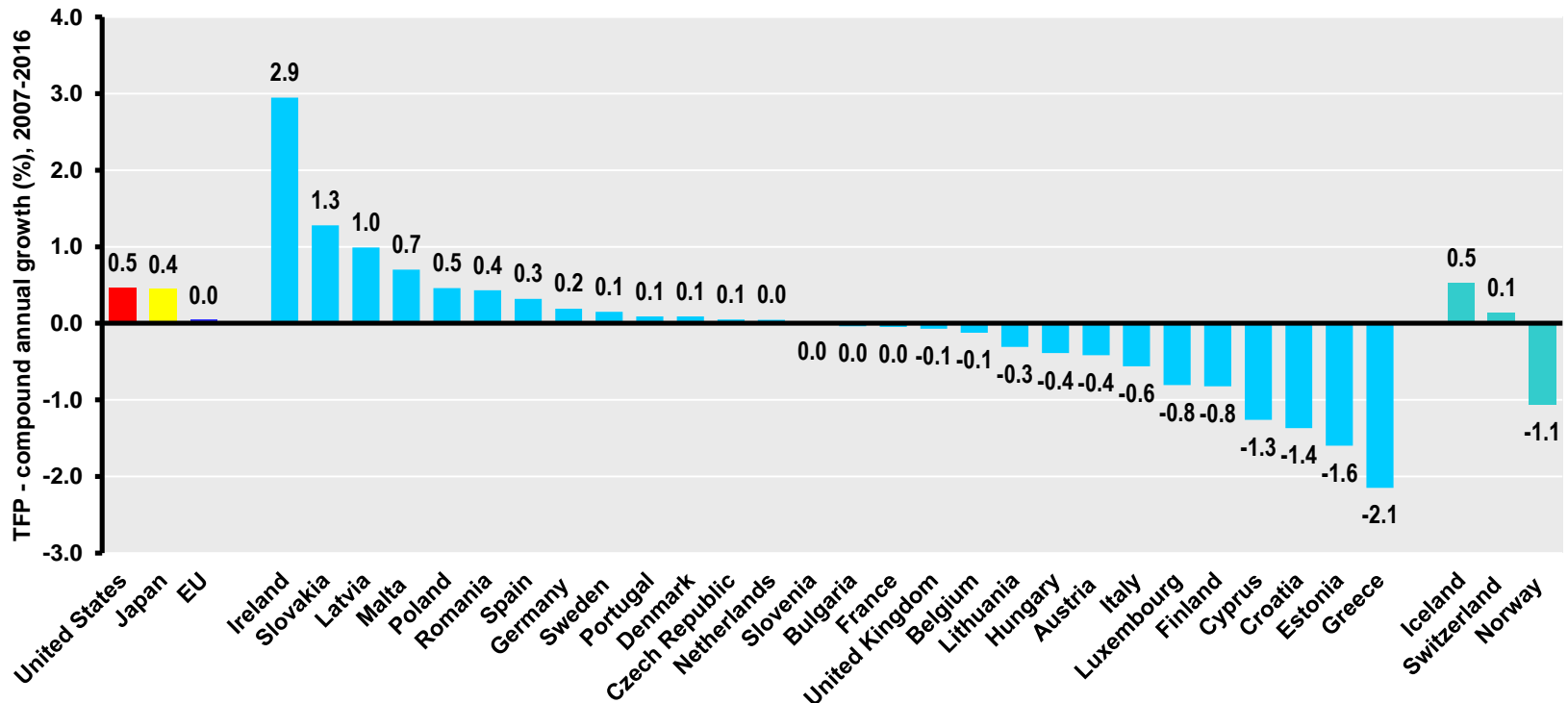
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Notes: ⁽¹⁾GDP per hour worked in PPS€ at 2010 prices and exchange rates. ⁽²⁾IS, NO: 2014; CH, JP, KR: 2015.

Low labour productivity growth is mainly driven by sluggish TFP growth...

Total factor productivity - compound annual growth, 2007-2016

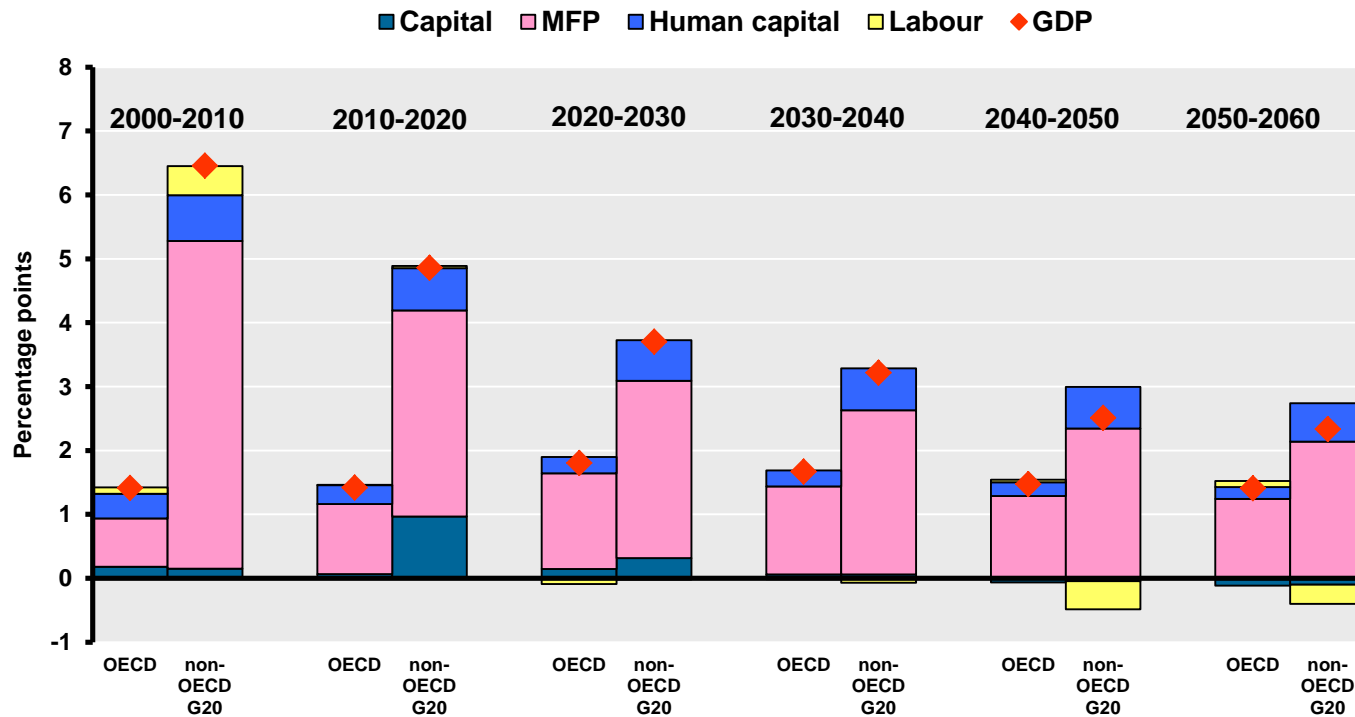


Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies

Data: European Commission - DG Economic and Financial Affairs

...even if TFP is the main source of future economic growth for advanced economies

Contribution to growth in GDP per capita, 2000-2060 (annual average)



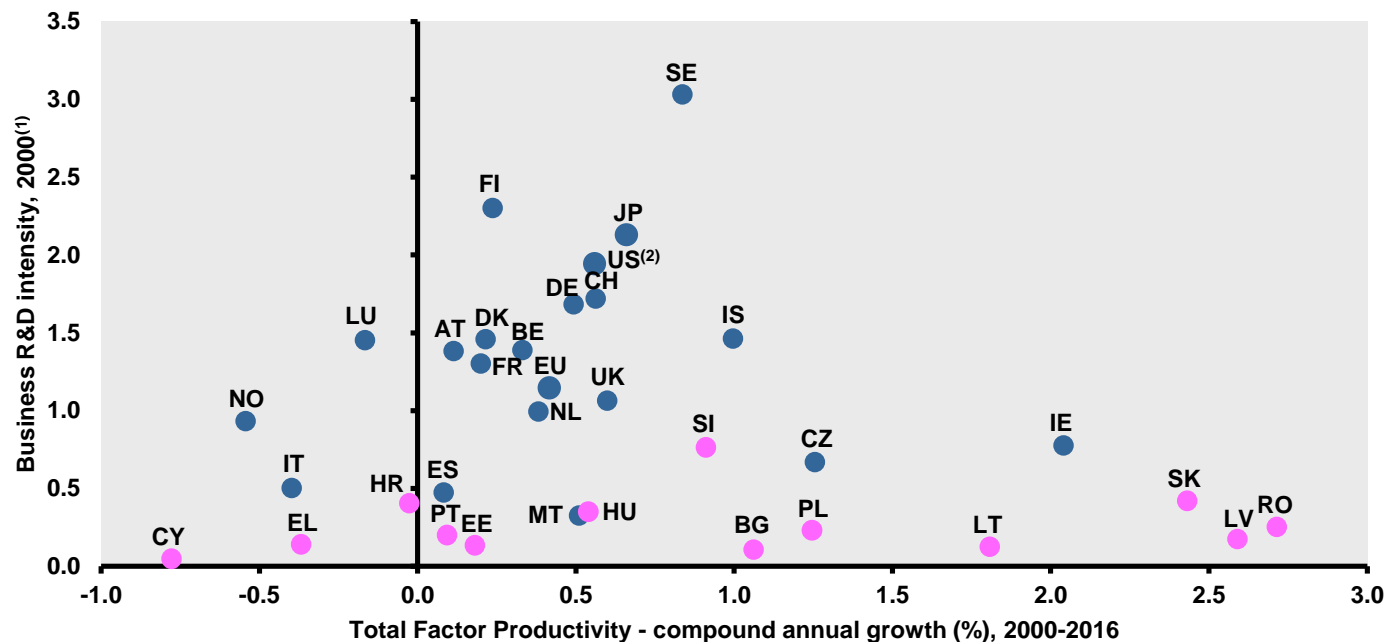
Source: Braconier H, Nicoletti G and Westmore B, (2014), OECD

Note: ⁽¹⁾ The non-OECD G20 countries are Argentina, Brazil, China, India, Indonesia, Russian Federation, Saudi Arabia and South Africa.

For highly prosperous economies, R&I is the key factor behind TFP growth...

Business R&D intensity, 2000 versus compound annual growth of total factor productivity, 2000-2016

Countries in pink had a GDP per head of population of less than 25000 PPS€ (current) in 2016

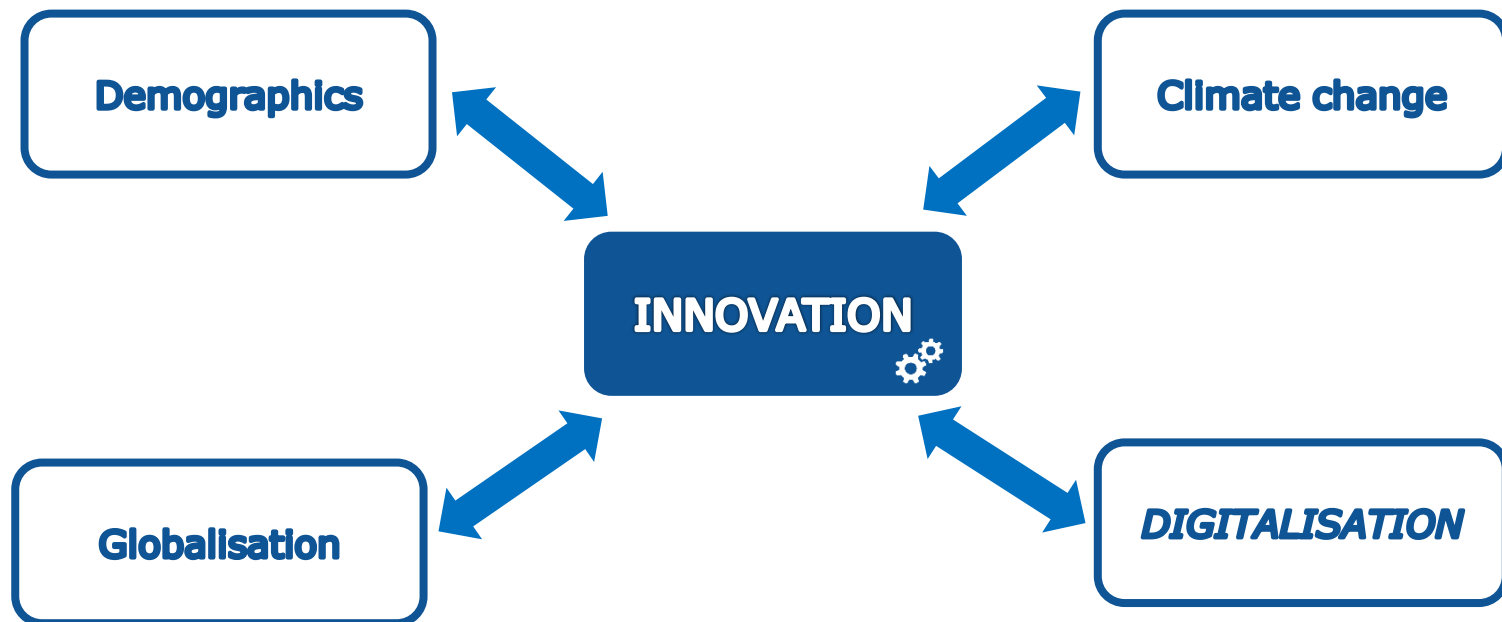


Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies

Data: European Commission - DG Economic and Financial Affairs

Notes: ⁽¹⁾SE, NO: 2001; HR, AT: 2002; MT: 2004. ⁽²⁾US: Business expenditure on R&D (BERD) does not include most or all capital expenditure.

... but long-term socio-economic forces are changing the nature of innovation...

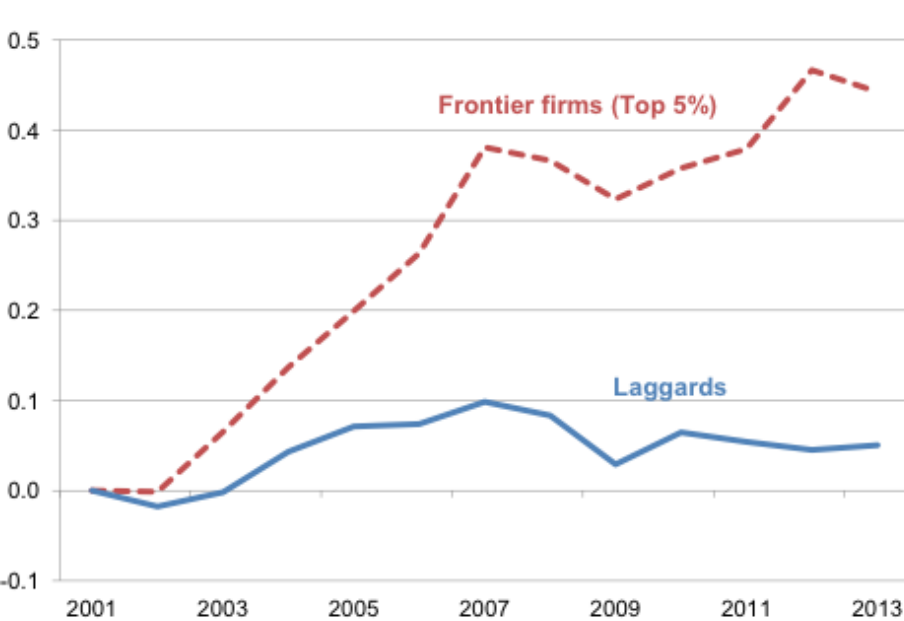


... in terms of pace, complexity and impacts...

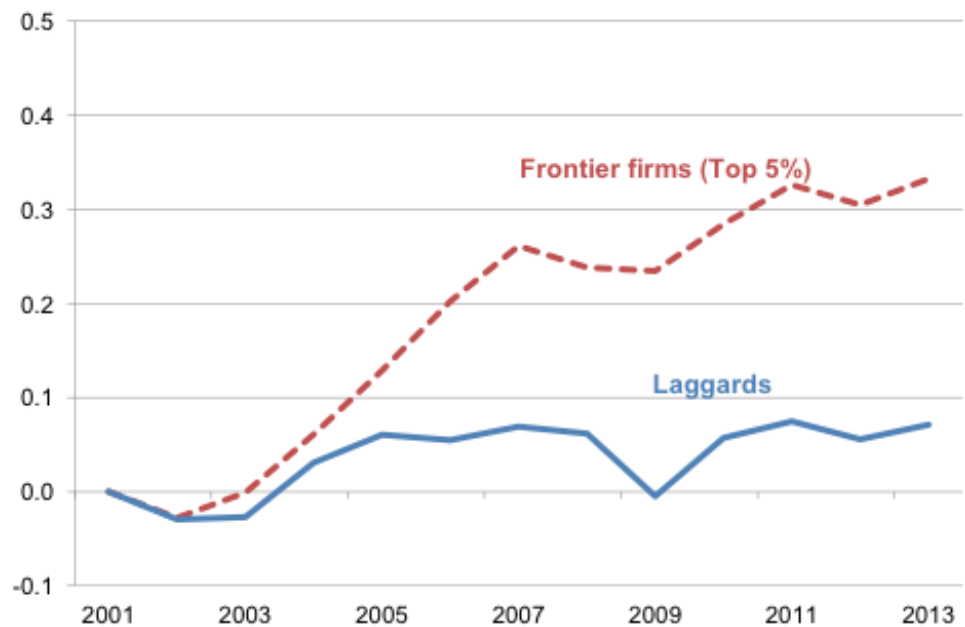
- *Increased complexity of the innovation process*
 - **Increasingly converging technologies and sectors**
 - **Role for off-the-shelf technologies**
- *Concentration of benefits in superstar firms*
 - **"Winner takes most" strategies**
 - **Increased concentration in industries**
- *Very rapid innovation pace change*
 - **In a decade, only 3 companies remain in top-10 by market capitalisation**
 - **Top-4 most capitalised companies: 1-Apple (33) 2-Alphabet (22); 3- Microsoft (6); 4- Amazon (NA)**

... that result in innovation divergence across firms, affecting the innovation diffusion

Non-financial business services



Manufacturing



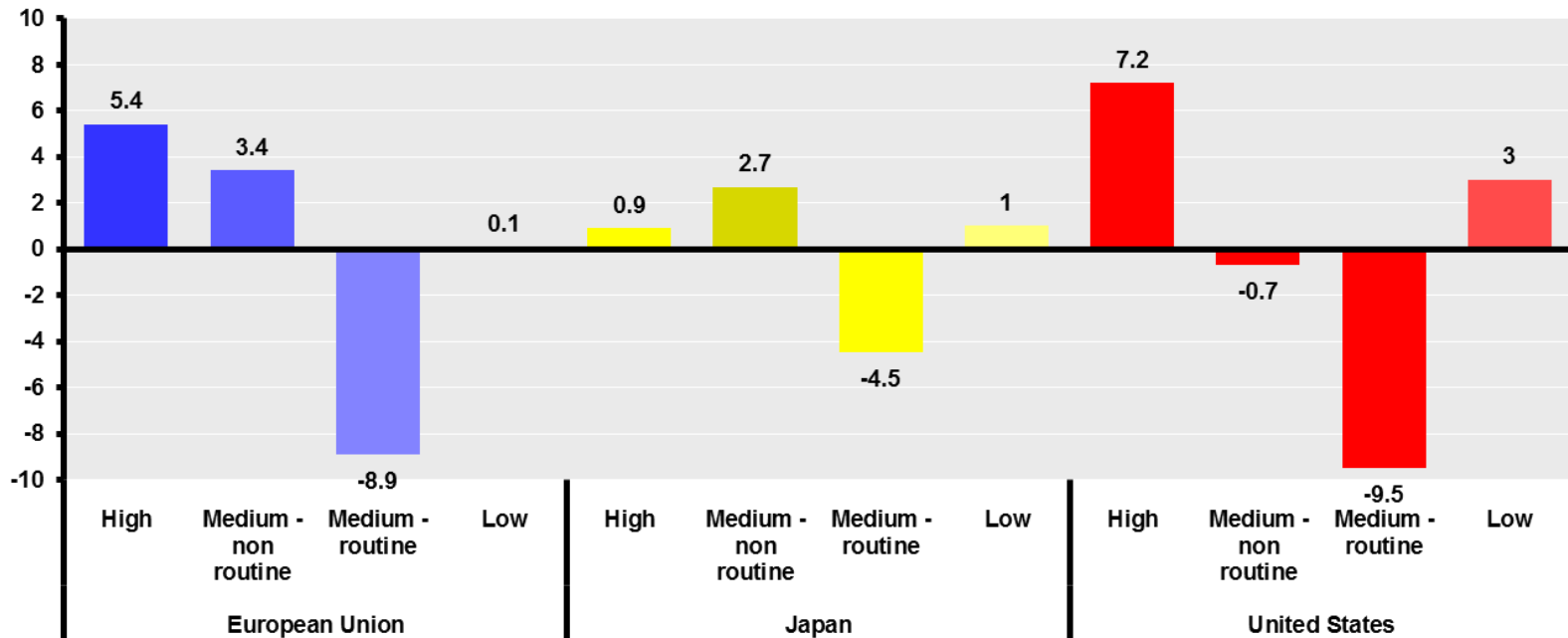
Notes: The global frontier is measured by the average of log labour productivity for the top 5% of companies with the highest productivity levels within each 2-digit industry. Laggards capture the average log productivity of all the other firms. Unweighted averages across 2-digit industries are shown for manufacturing and services, normalised to 0 in the starting year. The vertical axes represent log differences from the starting year: for instance, the frontier in manufacturing has a value of about 0.3 in the final year, which corresponds to approximately 30% higher in productivity in 2013 compared to 2001.

Source: Andrews et al. (2016).

R&I creates new and better jobs but can affect existing ones...

There is no overall job destruction in Europe, but labour markets are becoming polarised, putting pressure on wages and on inequality

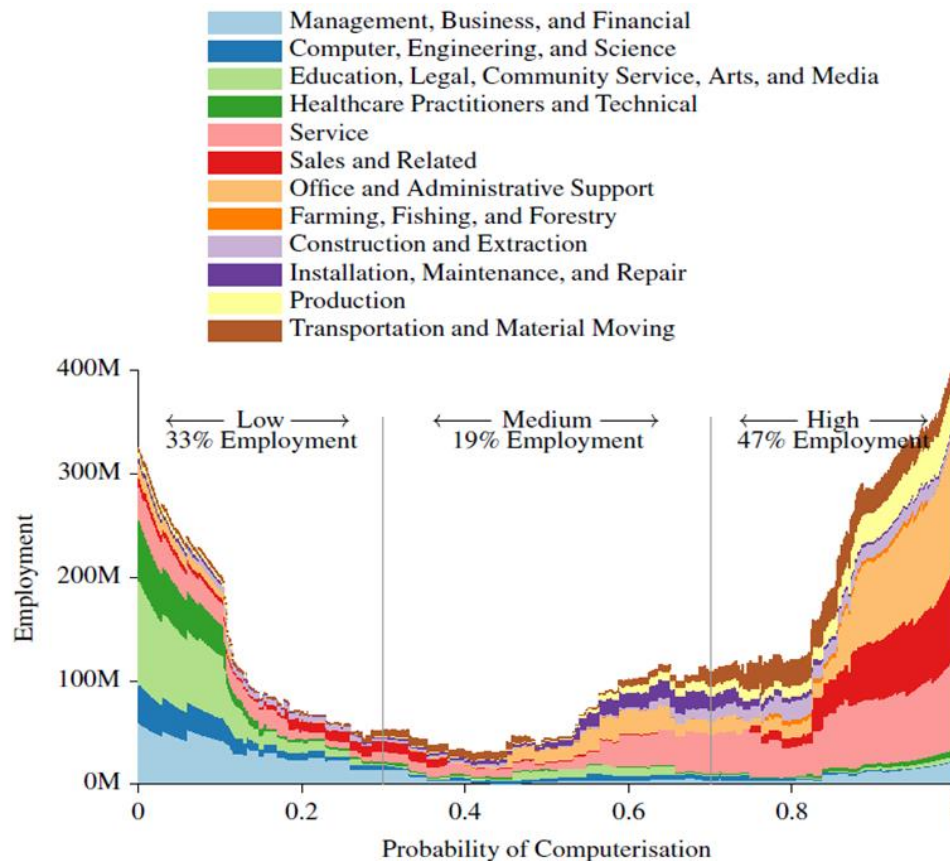
Job polarisation in major OECD economies, 2012-2014
percentage point change in employment shares, by occupation



Source: European Commission- EPSC

Data: OECD estimates based on EU-LFS, Japanese Labour Force Survey, BLS Current Population Survey

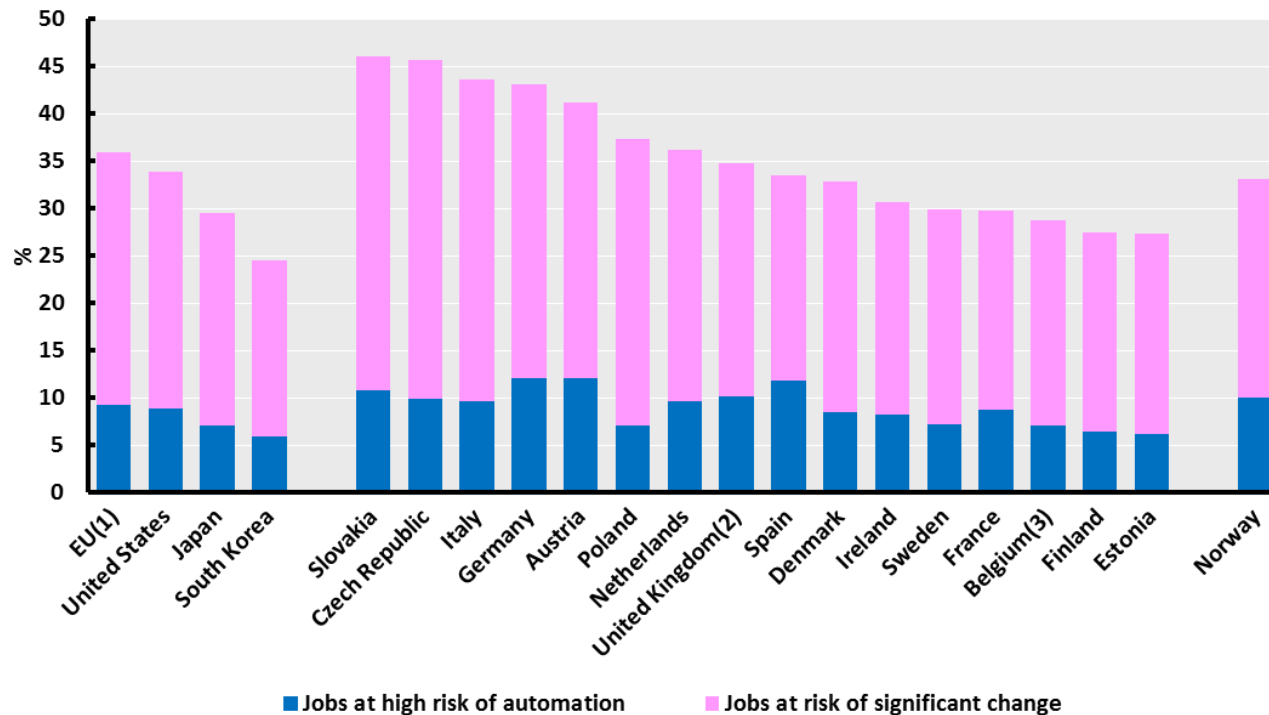
...such as medium skill jobs which are at high risk of automation ...



Source: C. Frey, M. Osborne / Technological Forecasting & Social Change 114 (2017) 254–280.^[9]

...with a different distribution of job at risk across countries

The digital economy - % of workers in jobs at high risk of automation or in jobs facing significant change, 2016



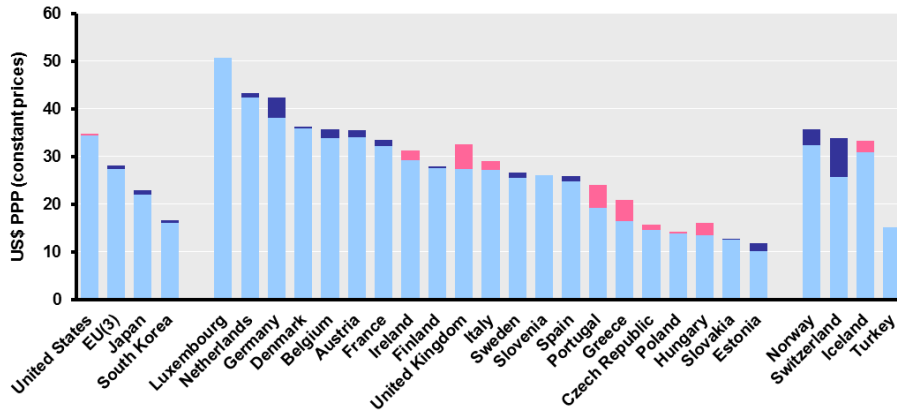
Source: OECD (Employment Outlook 2016 - © OECD 2016)

...changing the nature of jobs and related skill segments, increasing wage polarisation

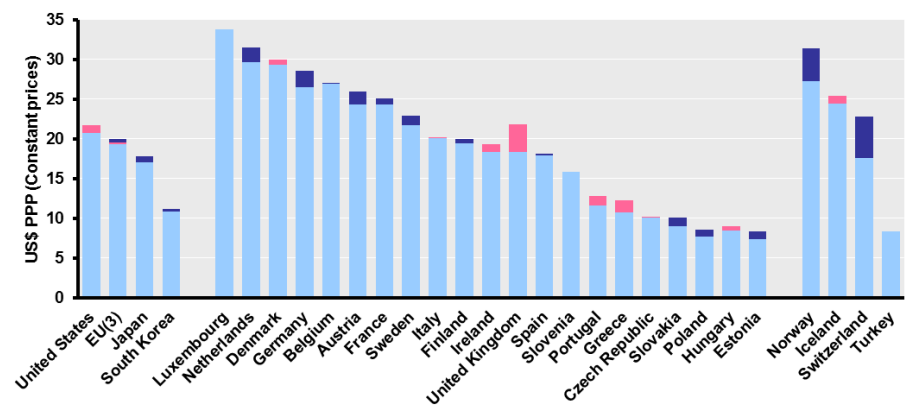
Wage premium for high skilled large in Germany, Belgium and Austria...

...more pronounced wage decrease for the medium than high skilled in US and UK

High skilled workers - average hourly earnings (US\$ PPP constant prices), 2013 compared to 2007



Medium skilled workers - average hourly earnings (US\$ PPP constant prices), 2013 compared to 2007

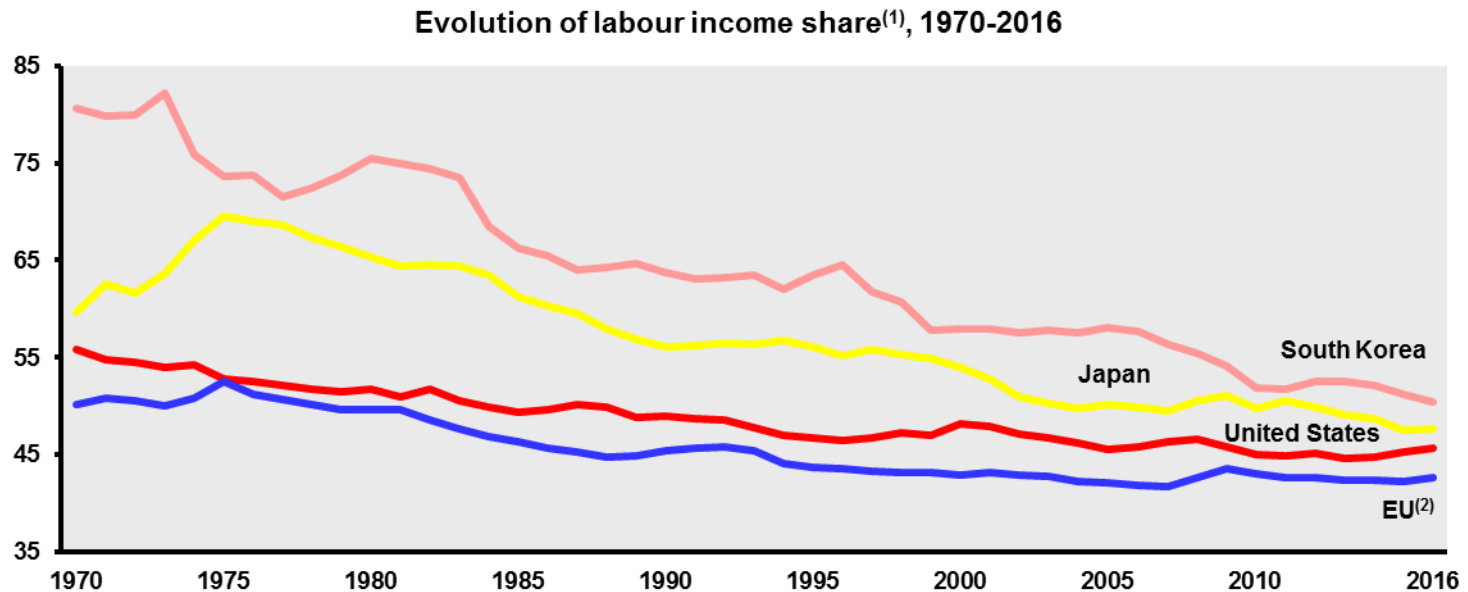


■ High skilled: 2013 ■ Decrease in average hourly earnings between 2007 (1) and 2013 (2)

■ Medium skilled: 2013 ■ Decrease in average hourly earnings between 2007 (1) and 2013 (2)

Declining labour shares observed, with stark differences across Member States,...

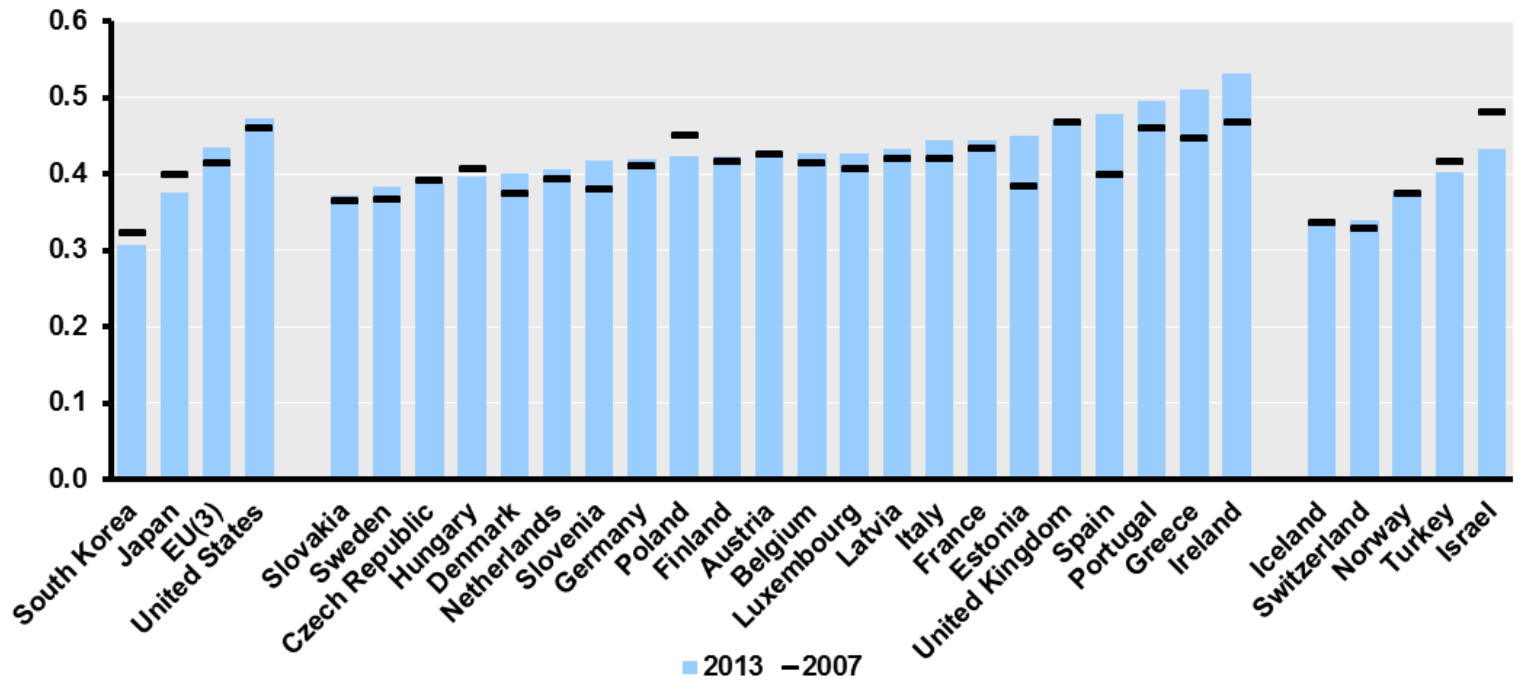
Reflection of different market conditions and institutional set ups, bargaining structures and/or effects of technological change given the economic structure of a country



Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies

...leading to rising income inequality in the United States and the European Union

Market income⁽¹⁾ inequality (Gini coefficient)⁽²⁾, 2007 and 2013



Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies
 Data: OECD Income Distribution Database