

The Digital Economy



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@haskelecon

OECD/Innovate UK/Catapult Digital meeting “THE IMPACTS OF DIGITAL TRANSFORMATION ON INNOVATION ACROSS SECTORS”, 21-22 September 2017, London, Digital Catapult Centre

Panel 4: What policy framework conditions and instruments are needed to develop vibrant innovative eco-systems?

Questions for this session

- What specific challenges should public policy address to enable the context of digital transformation?
- What are implications of different impacts across sectors, firms and geographic spaces on most suitable instruments at regional and national levels?
- What are business perspectives on the policy instruments needed in the context of digital transformation?

OECD framework cf. [Conference board](#) “install” and “implement”

Figure 2: Conceptual framework to compare business model changes and their implications on innovation



Source: background documents to conference

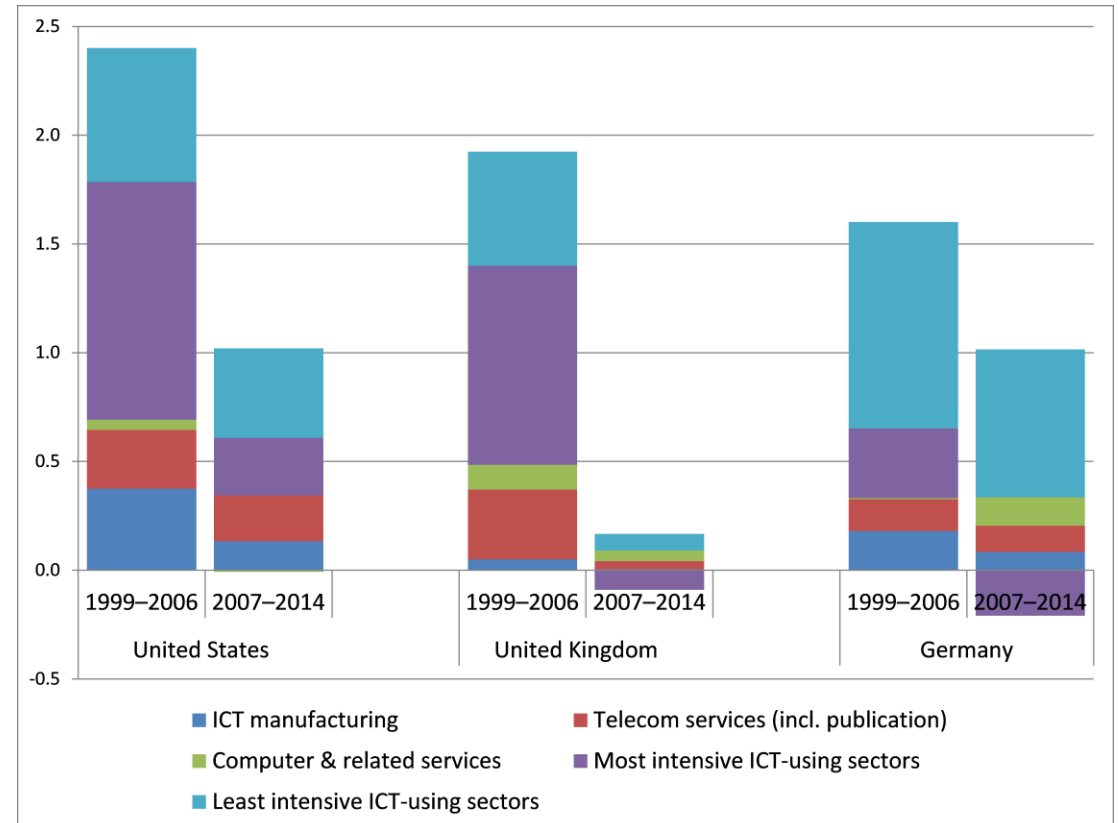
Some models of economy-wide and industry productivity

- Accounting: productivity growth = weighted sum across industries
 - Can break into contributions
 - ICT producing (e.g. semi-conductors)
 - ICT using (e.g. retailing)
- Behavioural: Industry Productivity due to
 - industry human capital (schooling, talent, experience)
 - industry tangible capital (IT and CT equipment, non-IT equipment, buildings, vehicles)
 - industry intangible capital (paid-for industry software/databases, R&D, design/artistic originals, training, branding, business processes)
 - cross-industry intangible capital (free knowledge applicable across industries: spillovers of ideas, publically-financed research)
- Role of digital?
 - In an accounting sense: productivity can grow due to ICT-producing and/or –using
 - In a behavioural sense: proximate causes
 - Failure to invest in tangible ICT assets: failure to “*install*”
 - Failure to invest in intangible assets complementary to ICT assets (e.g. changed business processes): failure to “*implement*”
 - Economy as a whole running out of innovative steam, so less free knowledge around
 - Ultimate causes
 - ICT prices stopped falling
 - Poor public policy: less public R&D investment, more uncertainty (Brexit), insufficient clusters, too little competition
 - Poor private policy: short-termism

Diagnosing the productivity slowdown and the digital economy

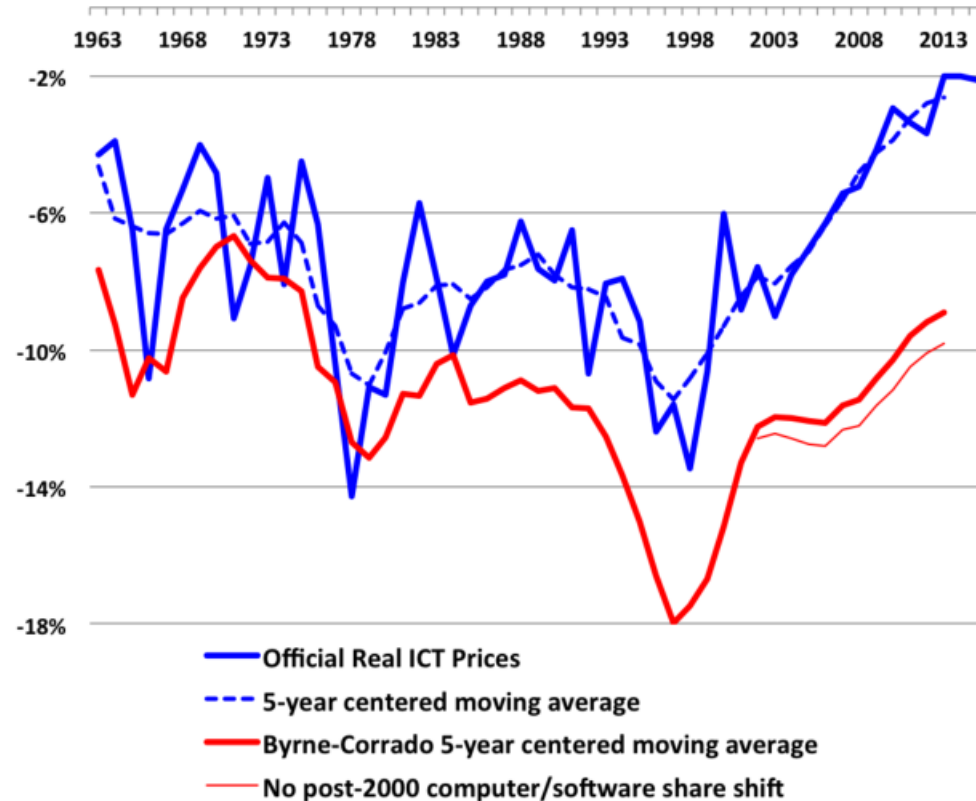
- Slowdown in contribution of ICT-using sector accounts for much of the slowdown
 - 60% in US
 - 66% in Germany
 - 54% in UK
- So what's going on?
 - ICT prices have stopped falling, so digital investment has fallen
 - Intangible investment has fallen

Contribution of ICT-Producing and using industries to Labour Productivity Growth 1996-06, 07-14



Source: [van Ark](#) (2016) and [Conference board](#)

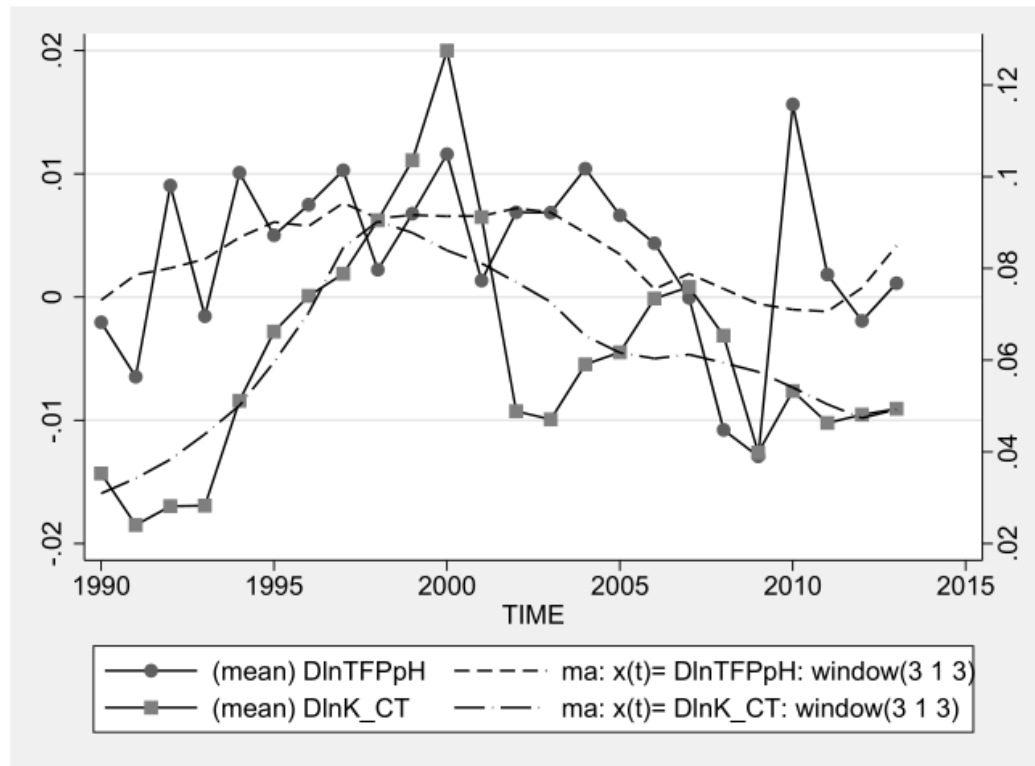
The ICT price decline is not over



Source: [Byrne/Corrado](#) (2016)

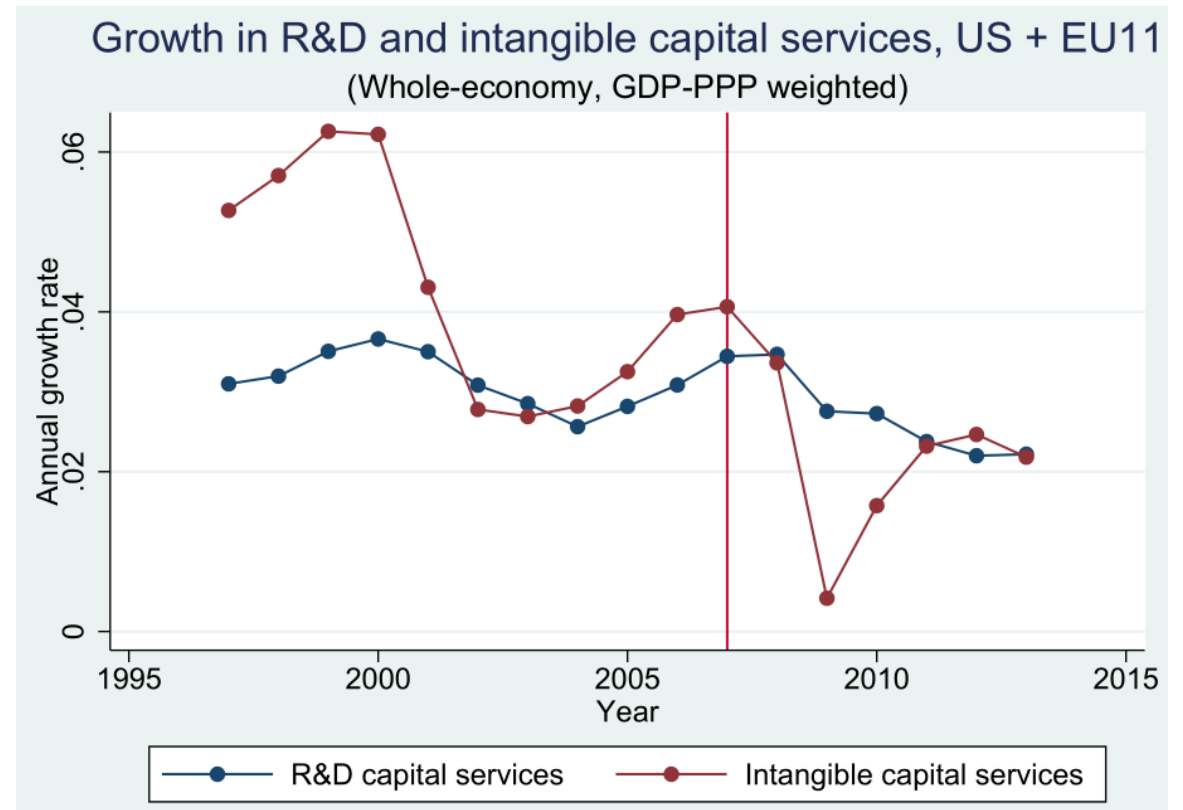
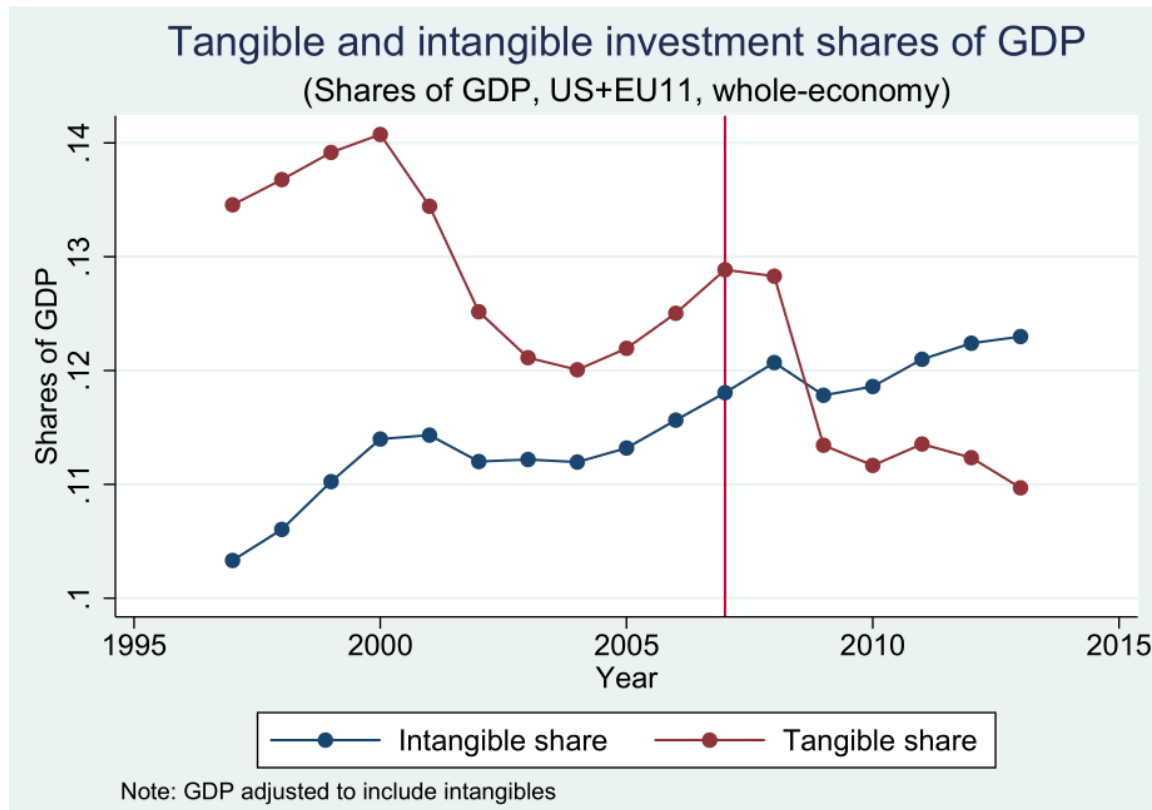
But falloff in CT investment...

Figure 1: $\Delta \ln TFP_{c,t}$ vs $\Delta \ln K_{c,t}^{CT}$, 14-country aggregate (US & EU-13)



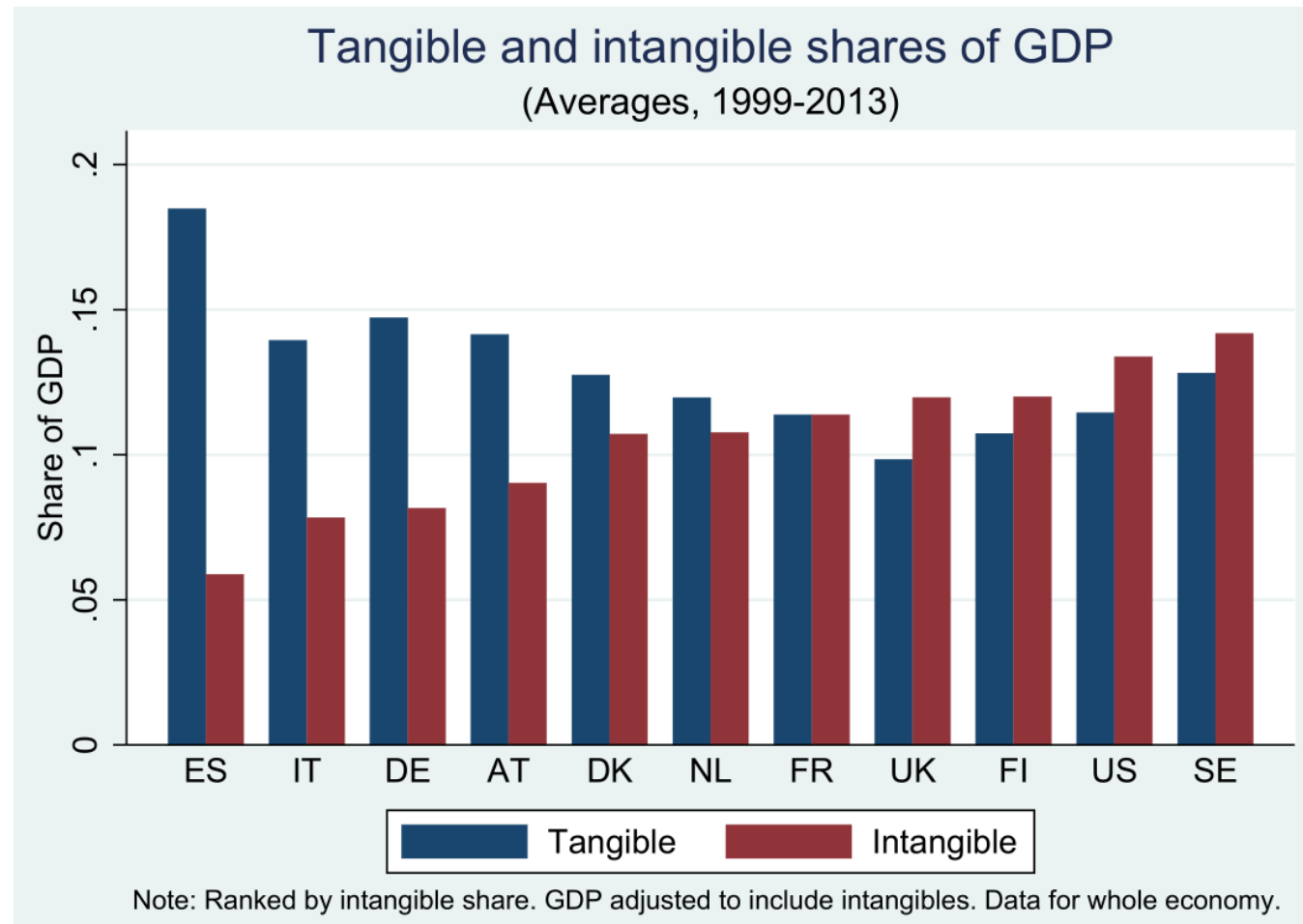
Source: Edquist, Goodridge, Haskel (2017)

Slowdown in intangible capital services growth since 2008



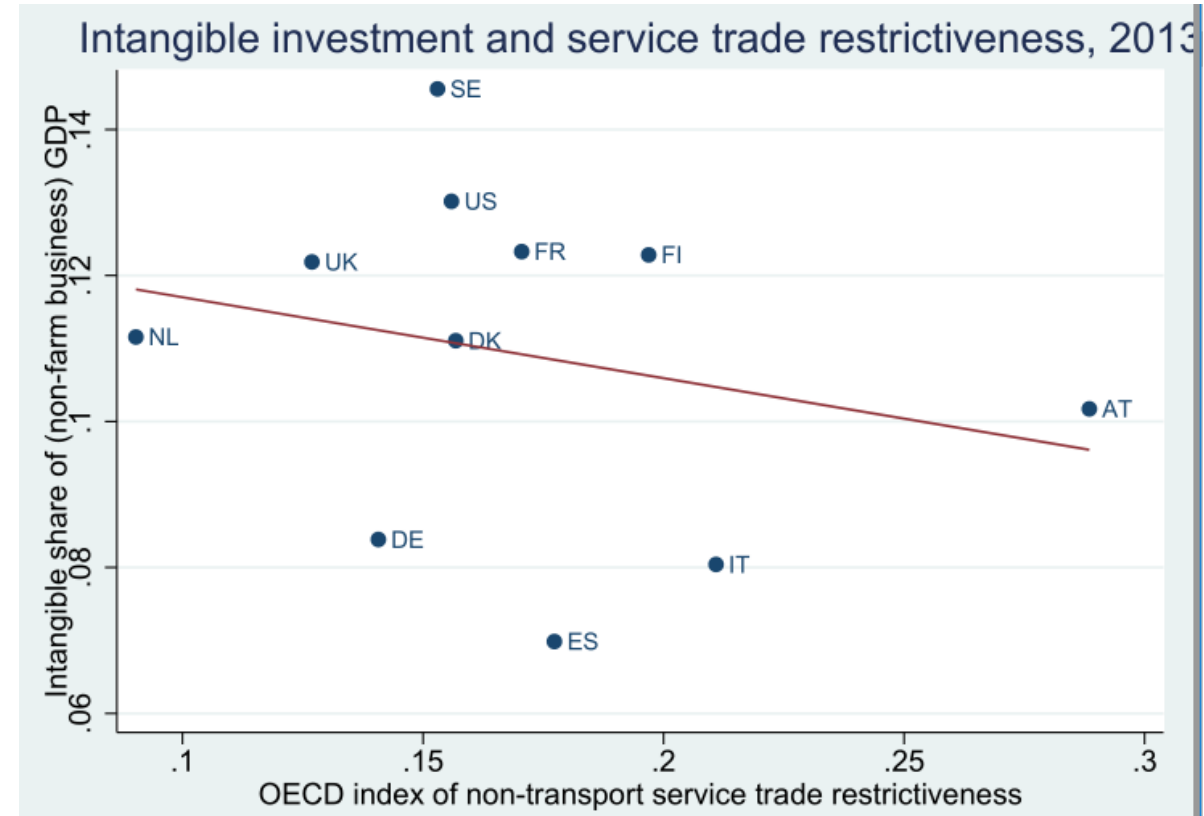
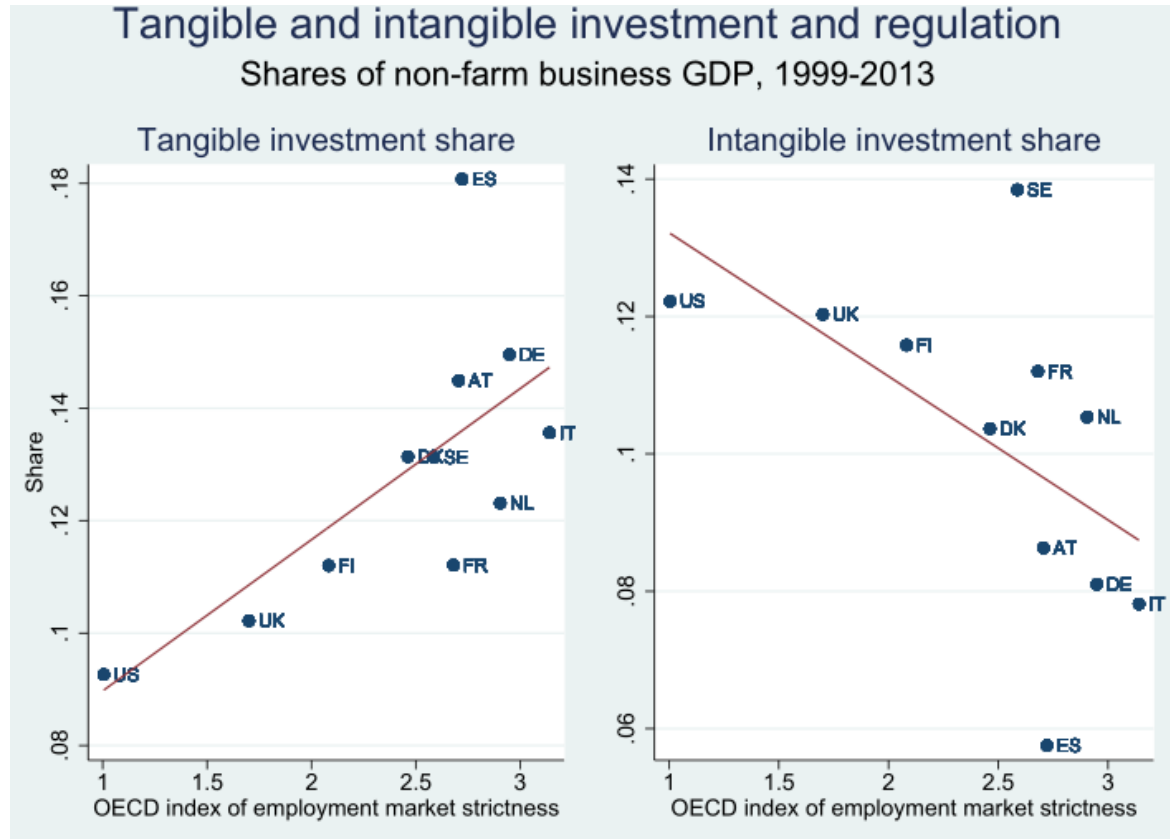
Source: calculations from SPINTAN database

Variation over countries...



Source: calculations from SPINTAN database

...correlated with policy-relevant variables...



Source: calculations from SPINTAN database

What if we have less intangibles around?

- Economic properties of intangibles- the four “S”s ([Haskel/Westlake](#))
 - Sunk - investment cannot be recovered
 - Scalable – fixed investment e.g. in Uber software, can be scaled
 - Spillovers – knowledge investment can be used by others
 - Synergies – investment synergies with other intangible capital and human capital
- Implications:
 - *Sunk: financing difficulties*
 - *Spillovers: demand for living in cities rises*
 - *Scalable: intangible-intensive companies get relatively larger => frontier gap gets bigger*
 - *Synergies: potentially large wage gains for intangible capital owners*

Implications

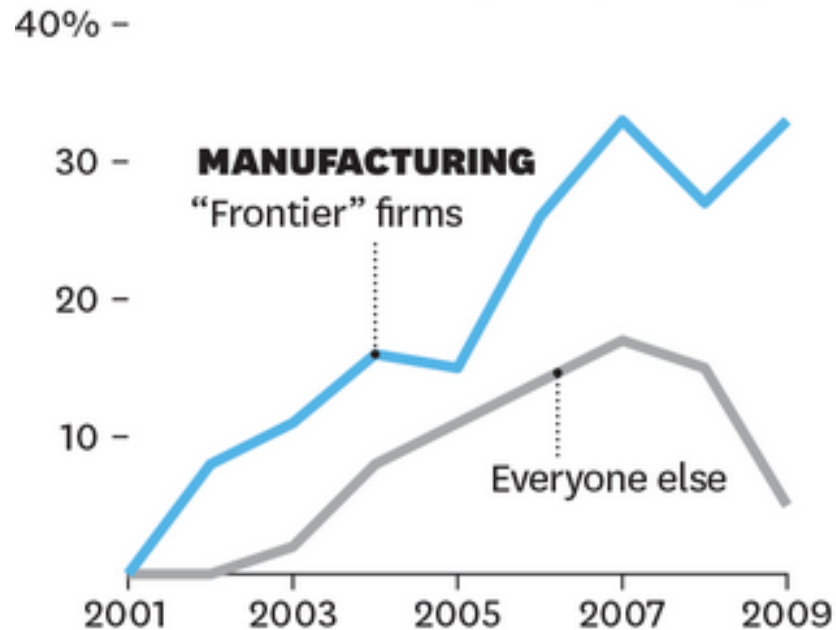
- Scalable: widening gap between frontier and laggard
- Spillovers: slowing TFP growth

The widening productivity gap

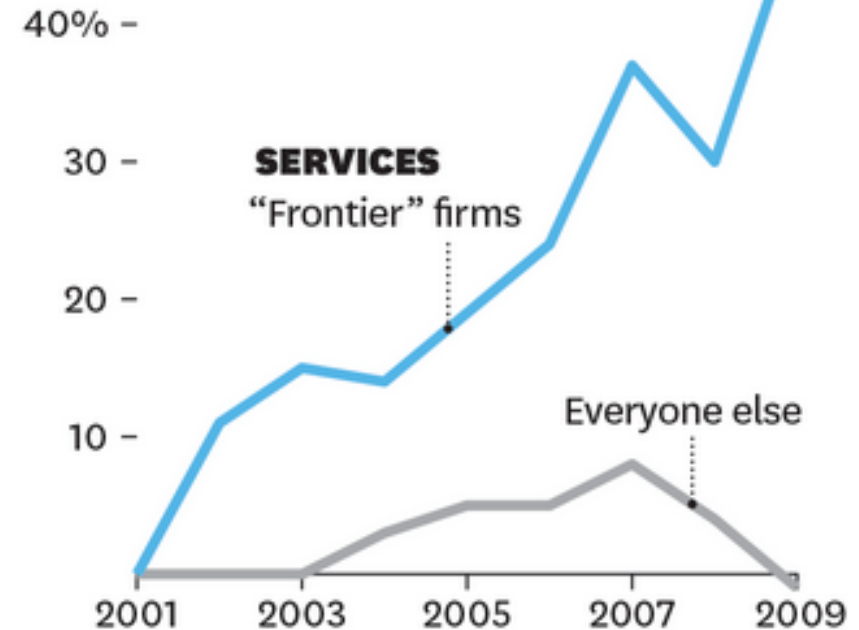
The Gap Between the Most Productive Firms and the Rest Is Growing

A look at labor productivity in manufacturing and services.

PERCENTAGE DIFFERENCE IN LABOR PRODUCTIVITY LEVELS
FROM THEIR 2001 VALUES (INDEX, 2001=0)



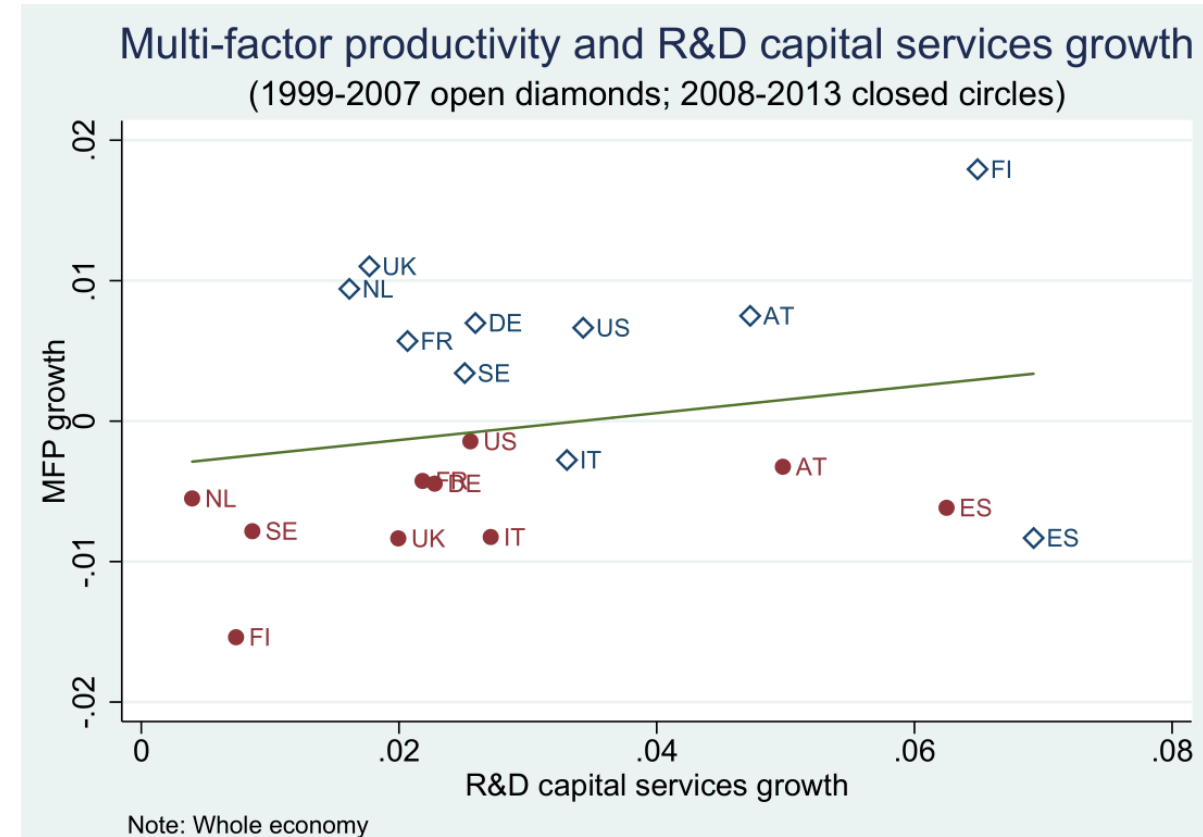
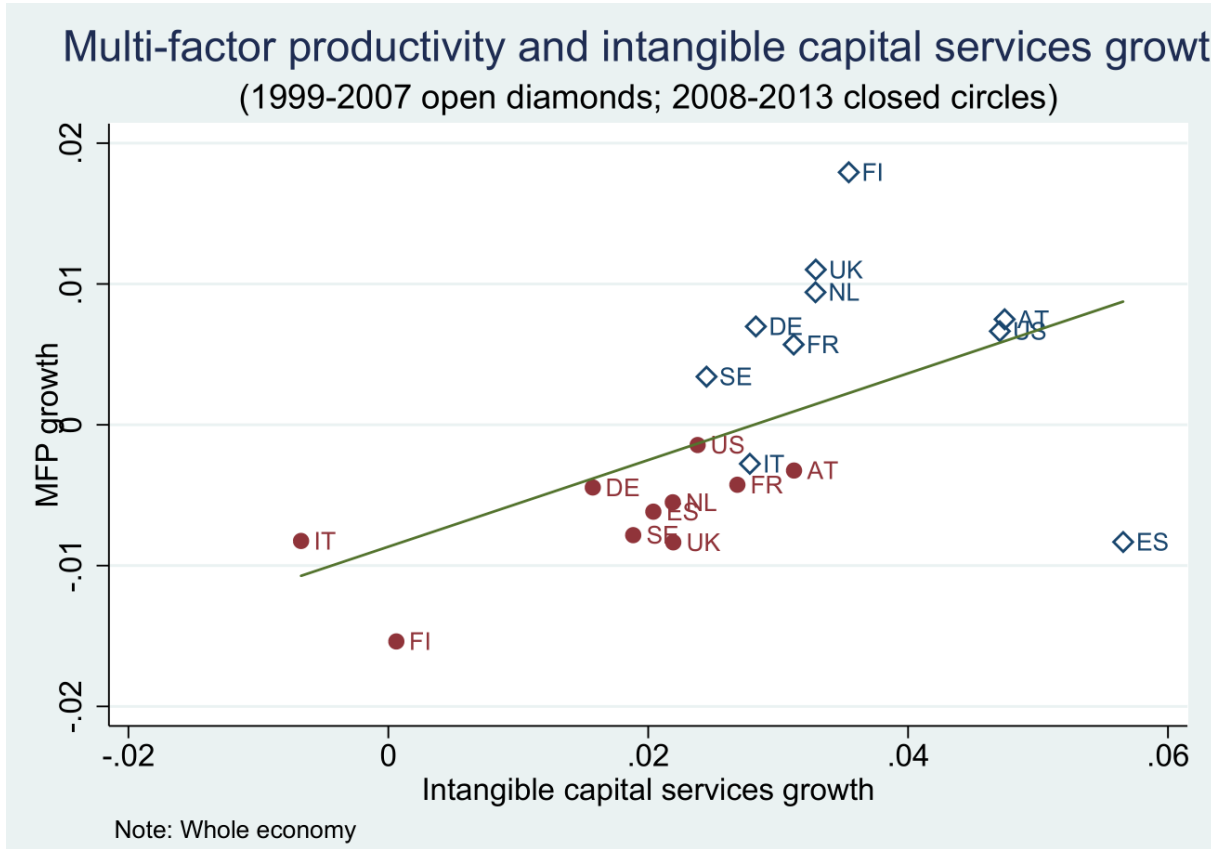
SOURCE "THE FUTURE OF PRODUCTIVITY," OECD, 2015



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Source: Andrews, D. C. Criscuolo and P. Gal (2015),

Slowdown in productivity growth



Source: calculations from SPINTAN database

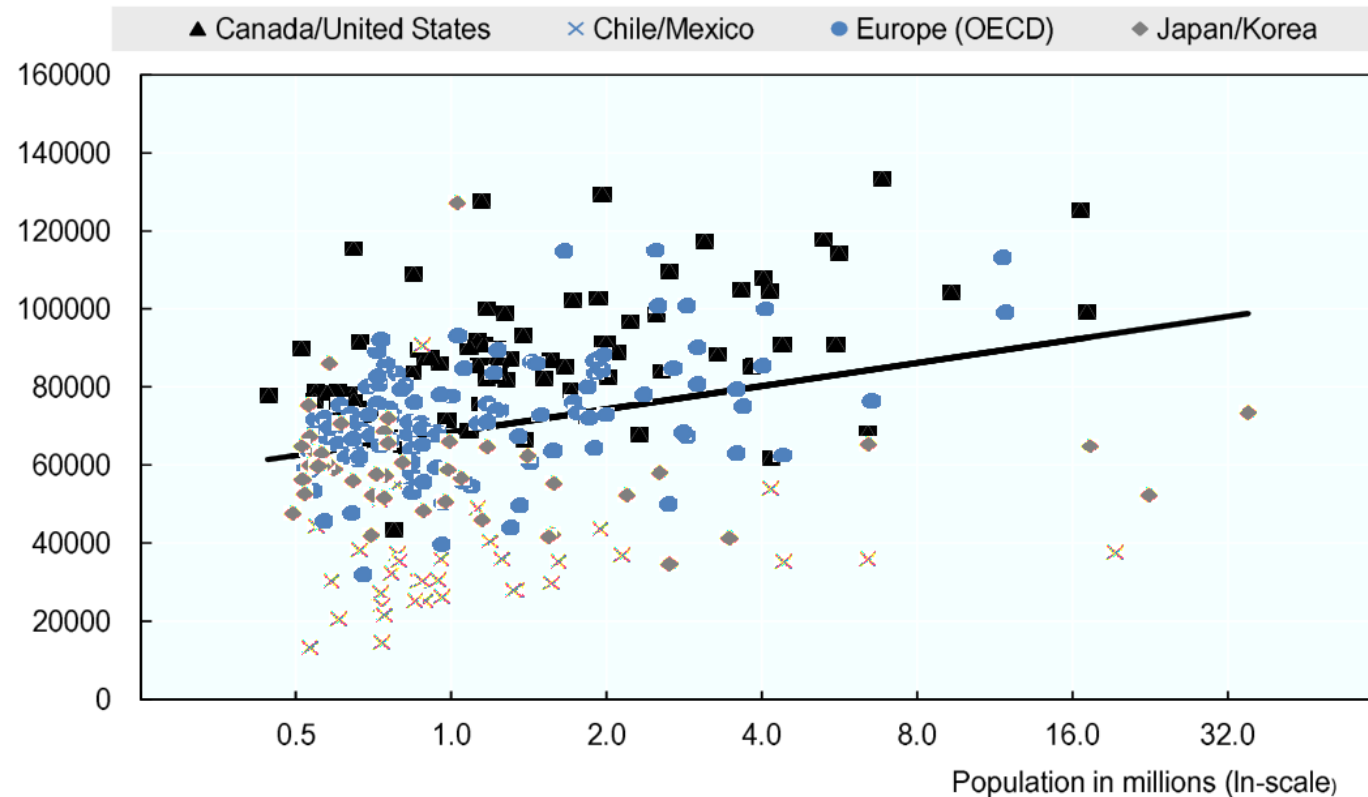
Conclusions

- Digital economy seems to be steaming ahead but productivity growth has fallen. Why?
 - Failure to install?
 - Failure to implement?
- Facts
 - ICT prices are still falling
 - Decline in contribution of ICT-using
 - Decline in pace of intangible investment
 - Some decline in CT investment
- Implies failure to implement
 - Productivity gap due to scale plus inability of laggards to take advantage of spillovers
 - Impact of policy even more important?
 - Slowdown in CT investment lowers productivity growth directly via network effects
- Some specific sectors
 - Retail
 - Cities
 - UK broadband case study

Spares

Cities are more productive

Chart 2: City Size and Labour Productivity, 2010



Notes: Labour Productivity is measured as GDP (USD in constant PPP and constant prices, reference year is 2005) divided by the total employment in a Functional Urban Area. Data refer to 2010 or the closest available year.

- Source: OECD calculations in [Ahrend, Lembcke and Schumann \(2017\)](#)