MEASURING GDP IN A DIGITALISED ECONOMY

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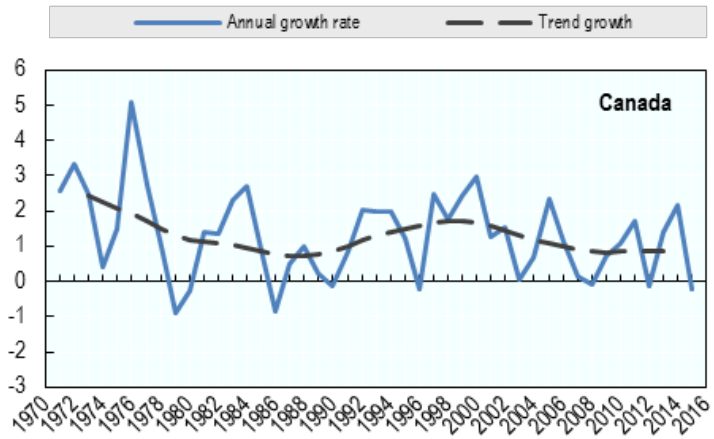
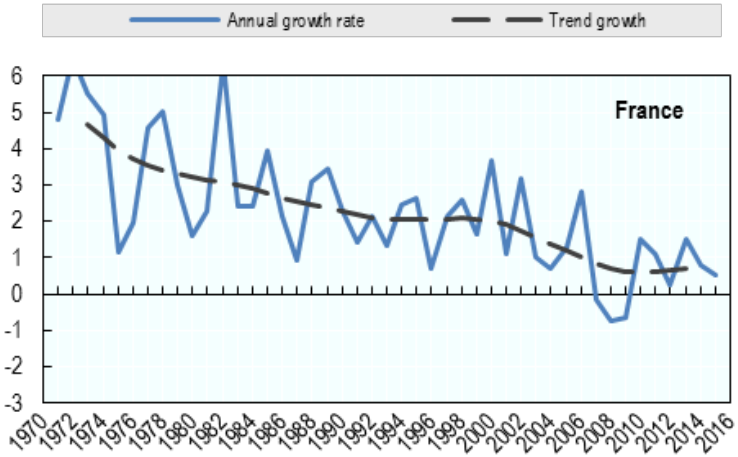
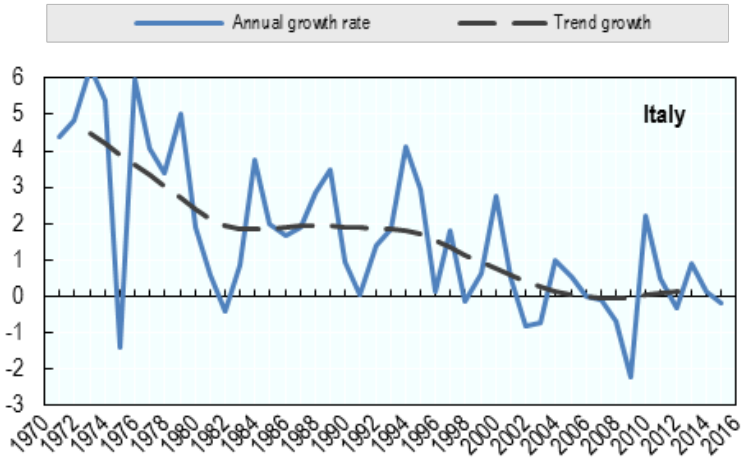
The debate...

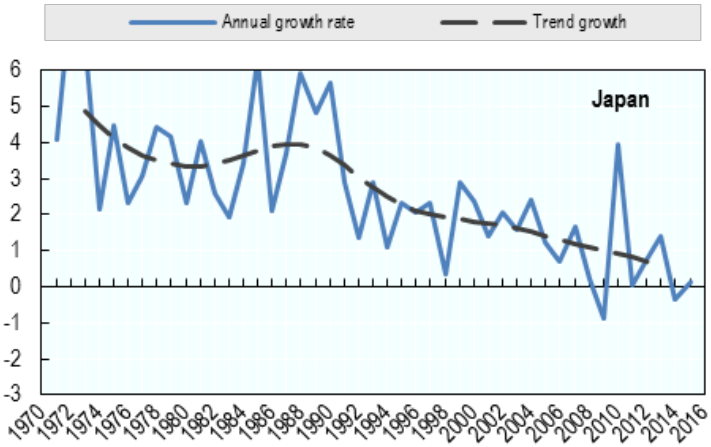
Pervasive long-term slowing of labour productivity growth

Total economy, average annual rates of change in %









Source: OECD Productivity Compendium 2017

Pervasive long-term slowing of labour productivity growth

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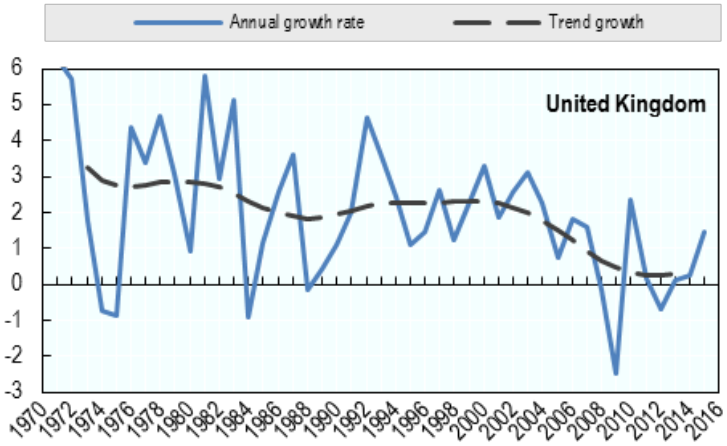
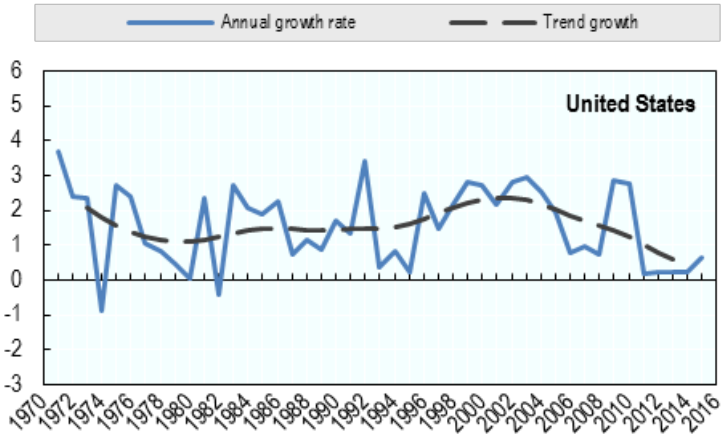
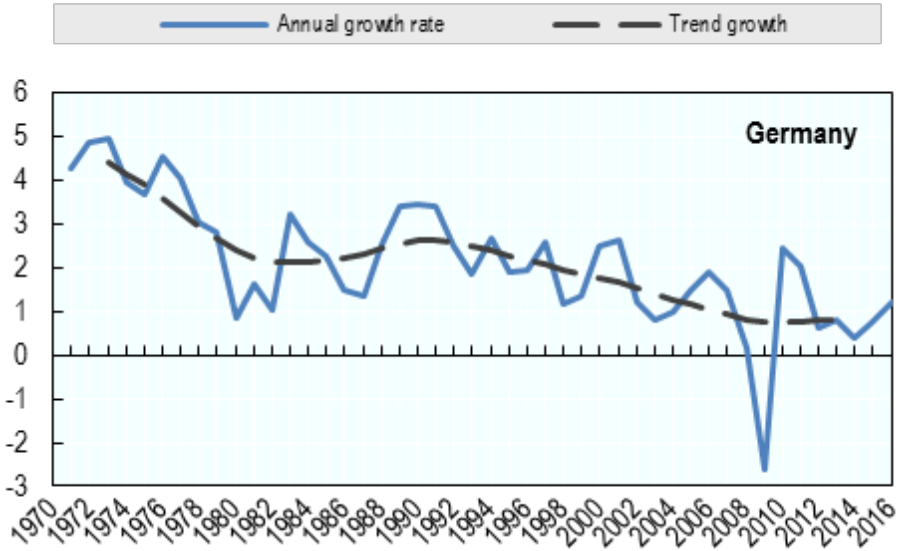






Source: OECD Productivity Compendium 2017

Some explanations

- Shortage of ideas (Gordon)
- Break-down of the diffusion machine and inequality (OECD)
- A business cycle effect
- A great deal is happening in the digital economy (Brynjolfsson/McAffee) but not picked up by GDP and productivity figures:

➢ **The Mis-measurement Hypothesis**

The Mis-Measurement Hypothesis (MMH)

…Presence in the public debate

Charles Hulten: Valuing the Net and the wide range of applications… is challenging…. and their omission or undervaluation surely affects GDP."

Charlie Bean: "statistics have failed to keep pace with the impact of digital technology"

Diane Coyle: The pace of change in OECD countries is making the existing statistical framework decreasingly appropriate for measuring the economy

THE WALL STREET JOURNAL.

Silicon Valley Doesn't Believe U.S. Productivity

The U.S. Underestimates Growth

FINANCIAL TIMES

The internet and the productivity slump

ComputerWeekly.com

Why we're measuring the digital economy in the wrong way

The Economist

Some optimists argue instead that the problem is one of measurement. Technological progress often raises productivity in ways that statistical agencies struggle to detect

A representative statement…

« I dont believe for a second the idea by economists who say that productivity does not grow any more. It is just badly measured! We are witnessing a tremendous increase in the quality of services at decreasing costs. A Google search that costs nothing would have been invoiced dearly twenty five years ago. If that is not productivity, what is? «

Henri de Castries, Chief Executive AXA Assurance, *Les Echos*
31 August 2015

…but systematic work to assess the MMH is scarce and despite some notable responses…

Challenges to Mismeasurement Explanations for the U.S. Productivity Slowdown, *Chad Syverson:* NBER Working Paper No. 21974, February 2016

Does the United States have a productivity slowdown or a measurement problem? Byrne, D., J.Fernald and M. Reinsdorf; Brookings Papers on Economic Activity, Spring 2016.

Measuring GDP in a Digital Economy, Ahmad N, P. Schreyer: OECD Statistics Working Paper 2016/7

How Government Statistics Adjust for Potential Biases from Quality Change and New Goods in an Age of Digital Technologies: A View from the Trenches, E.L. Groshen, B.C. Moyer, A.M. Aizcorbe, R. Bradley, D.M. Friedman: Journal of Economic Perspectives Spring 2017

There remain many questions and calls for action…

"I have concluded that, despite the various improvements to statistical methods that have been made through the years, the official data understate the changes of real output and productivity."

Underestimating the Real Growth of GDP, Personal Income, and Productivity, Marty Feldstein, Journal of Economic Perspectives, Spring 2017

…the ill-defined nature of the issue has not helped

In the debate, there is often confusion between:

- Conceptual vs. Empirical issues
- Production vs. Consumer Surplus vs. Welfare
- Volumes vs. prices

Recent and ongoing work by the OECD and the IMF reviews these issues more systematically

Our take on the MMH in 5 domains

Domain 1: New forms of intermediation services

New forms of intermediation of peer-to-peer services

- Digital platforms provide intermediation services for supply and demand on product markets
- Intermediation services not new, but more pervasive and provided differently:
  - *Taxi reservation service* -> *Uber*
  - Travel agent -> *Booking.com*
  - Hilton online reservations -> *AirBnB*
- Production = commissions and fees
- Conceptually and in practice captured in GDP

Example 1: dwelling services by households

- Long-term rentals – not worse covered than in the past

- Short-term rentals – likely increased significantly:
  - Often undeclared by the 'occasion self-employed'
  - But existing imputation for OOH
  - No measured labour input

Example 2: Business and transportation services

- Again: emergence of the 'occasionally self-employed'
- Some activity may be captured through LFS
- But not cash transactions if revenues undeclared
- New approaches to measurement needed, e.g., directly from intermediaries

Example 3: Distribution services

- Note: production = **distribution margin,** not turnover
- Sale of **second hand goods** between households, distribution margin = zero by assumption

- Sale of **new goods**: recording of value-added unlikely but **small scale in OECD countries**
- Where **informal economy** is large (e.g. street vendors), this is not typically a phenomenon of digitalisation

Domain 2: Consumers as producers

Consumers as producers: blurring the production boundary

- The pervasiveness of internet access by households has led to **blurring** between household production for market purposes, own account production, consumption, leisure
- **Examples**:
  - Own booking of hotels, flights by households
  - Self-check in at airports
  - Self-service at supermarkets
  - On-line banking
- In common: movement **from dedicated market producers out of market**

Consumers as producers: blurring the production boundary (ctd)

- Other area: households generate **free assets**: Wikipedia, Linux
- Clearly, element of production but also leisure
- Not captured in GDP, labor input or balance sheets

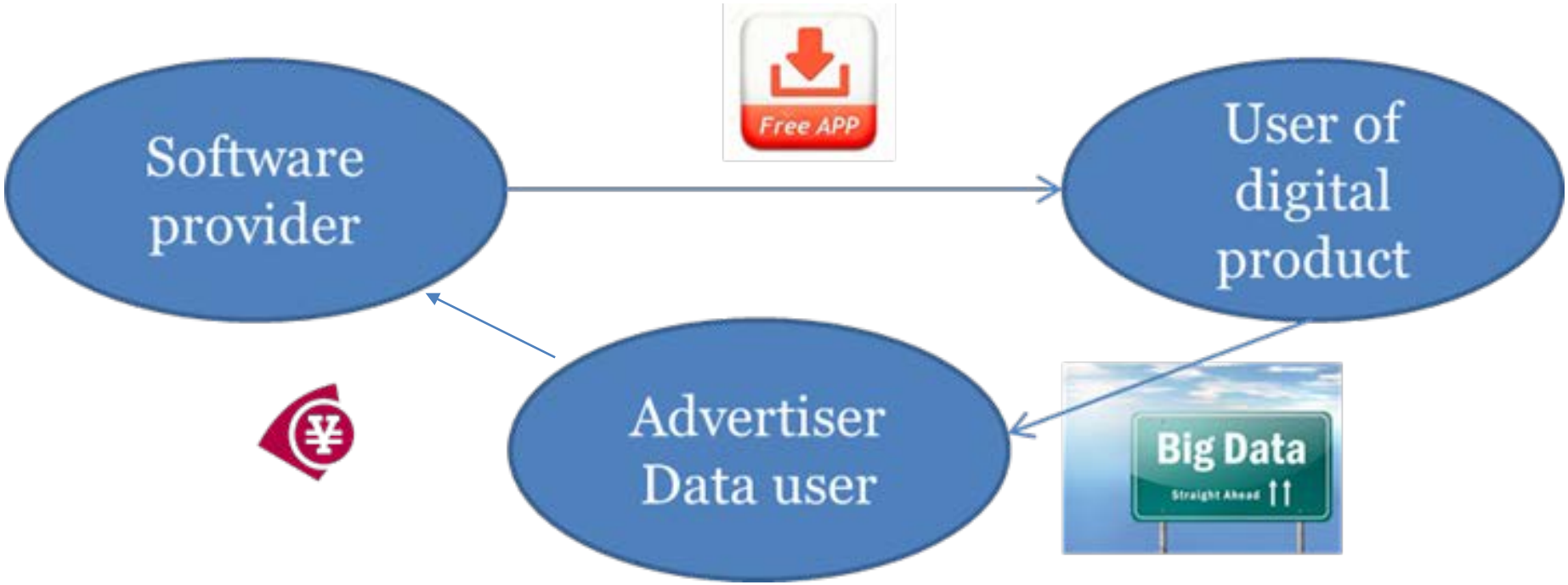
- **Is there a problem?** Joins traditional discussion about own-account production of households. Imputations for:
  - Childcare
  - Cooking
  - Caretaking, ...?
- And unlikely to resolve productivity puzzle

Domain 3:
Free and subsidised consumer products

Free and subsidised consumer products

- Frequently put forward as examples of output (or consumer welfare?) that goes unnoticed in GDP.
- Free apps for smartphones, search capacity provided by Google, social networking capabilities through Facebook...
- Financing via triangular transaction

Triangular transactions: payment through advertising or data sales



Free and subsidised consumer products – advertisement financing

- Value of advertising is reflected in final product
- But implicit transaction between consumer and software provider not reflected in GDP
- Should there be imputation?
- **Yes**:
- People are ready to *pay for not receiving* ads
- *Consumption in real terms* is higher with free services than without

Free and subsidised consumer products – advertisement financing (ctd)

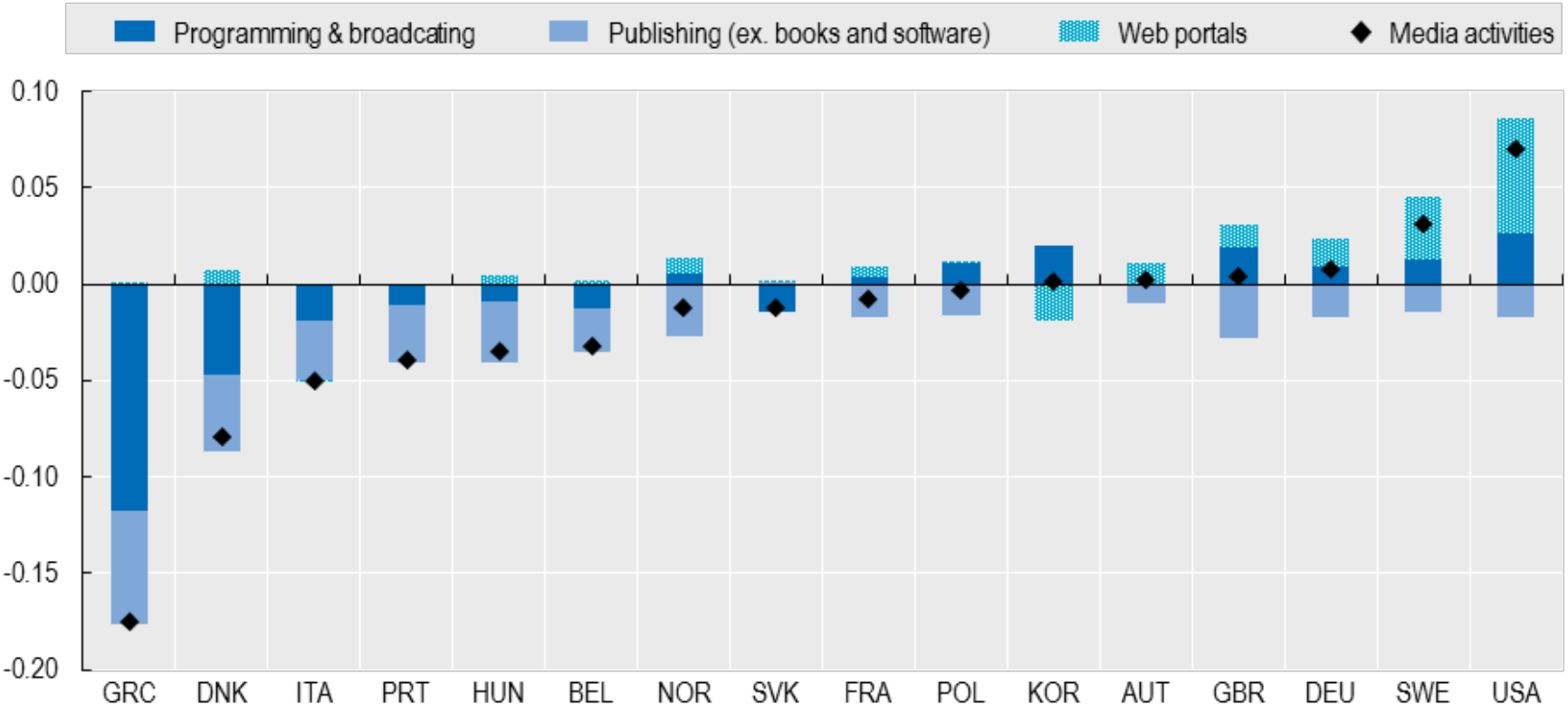
- **No**: because imputation requires:
  - Either *production activity by households*
  - Or *transfer in kind by corporate sector*
  - *Strong assumptions on valuation*

- Do we know how much it matters?

Free and subsidised consumer products – advertisement financing (ctd)

Estimated impact of media activities on GDP growth

Average 2009 – 2013, percentage points



Source: Ahmad, Ribarsky and Reinsdorff (2017) based on OECD SDBS database, OECD Annual National Accounts database and US Census Bureau data.

Domain 4:

Cross-border flows of intellectual property products

Cross-border flows of intellectual property products

- IPPs that give rise to royalties or licencing agreements are significant
- How much is domestic production (legal vs. economic ownership)?
- Can produce large jumps in GDP (Ireland)
- But not necessarily in MFP

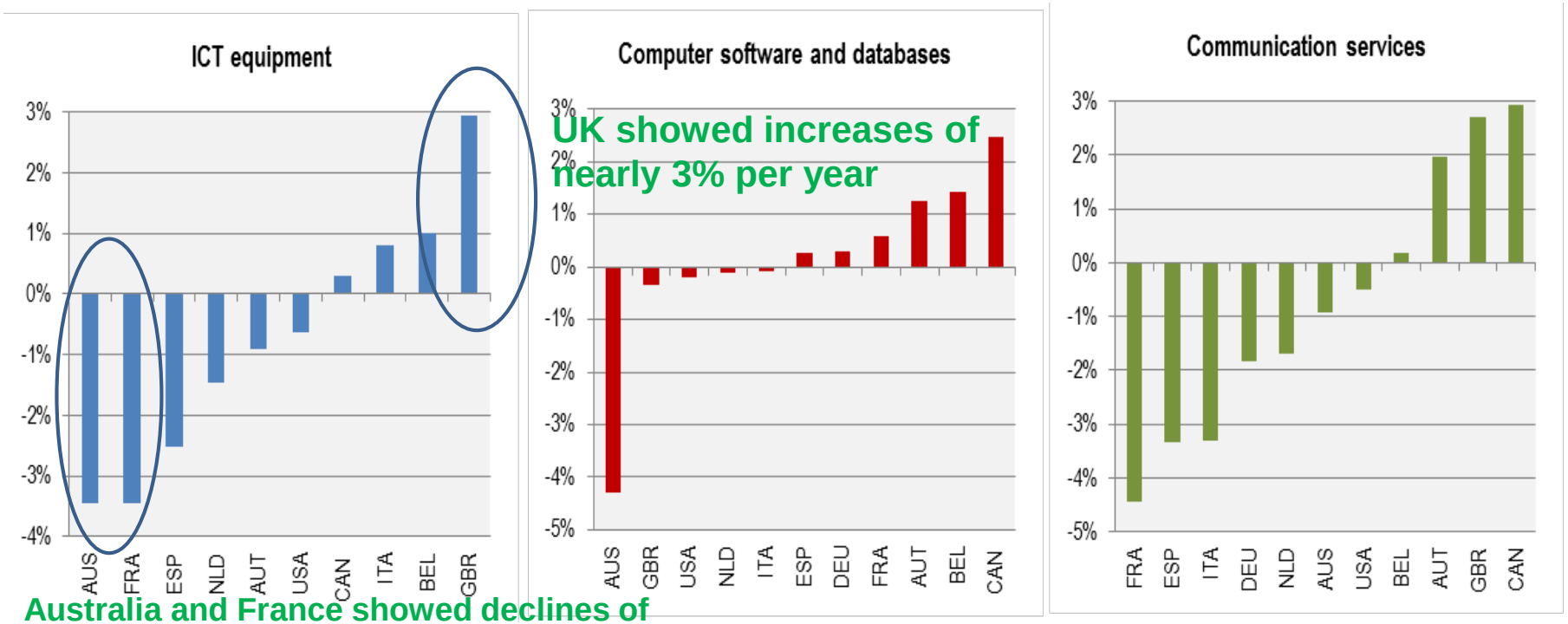
Domain 5:
Prices and volumes

Prices and Volumes

- Price measurement = **big challenge**:
  - customisation
  - new goods problem
  - quality levels and change
- But also: not every welfare gain needs to translate into a drop in prices
- E.g. consumer downloads 10 movies rather than 5 from their unlimited subscription does not imply 50% price drop

Example: ICT price indices show large variations…

Average annual growth rate in percentage, 2010-2015 (or latest available year)



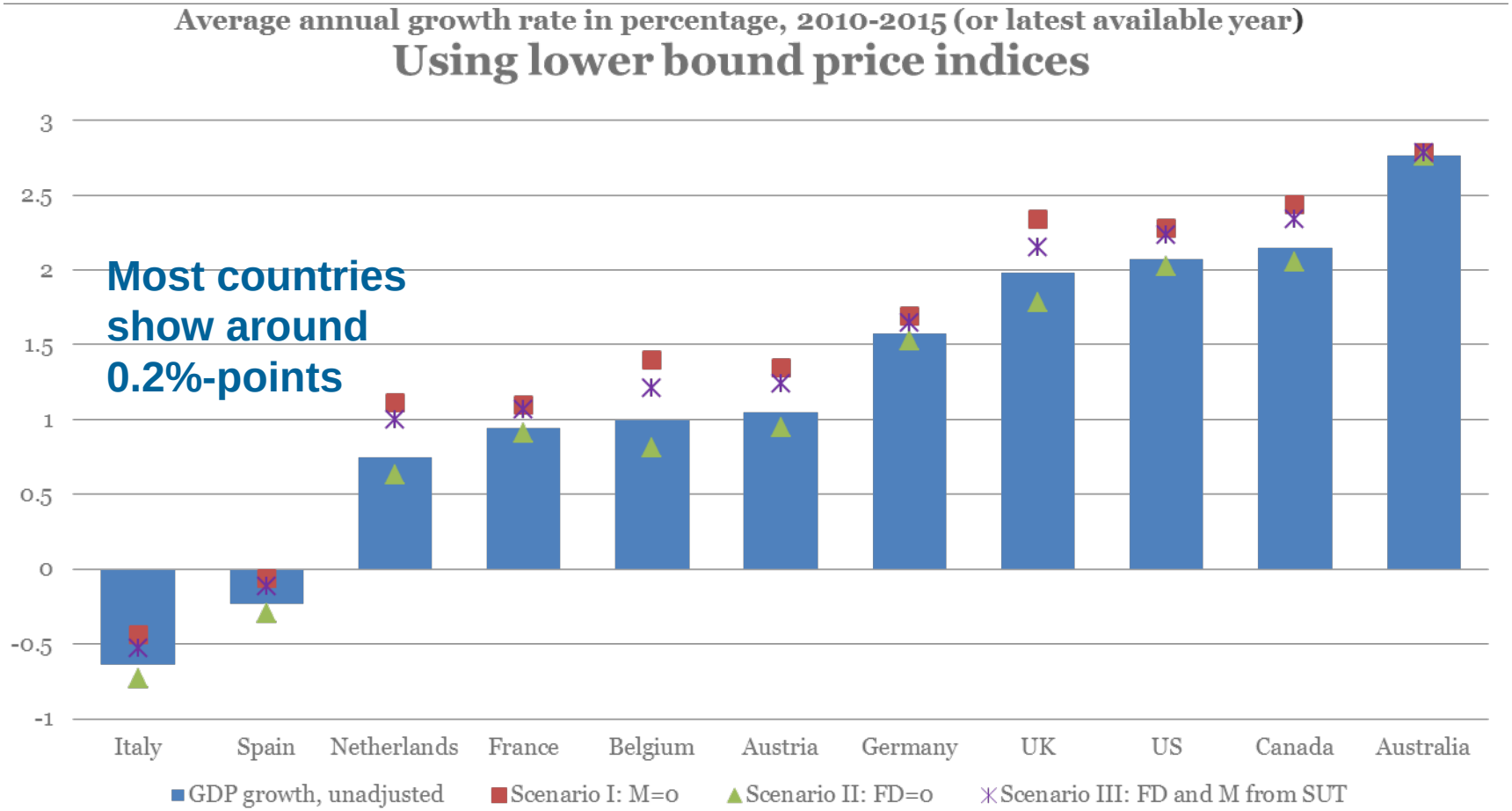
UK showed increases of nearly 3% per year

Australia and France showed declines of more than 3% per year

Notes: Data reported for Spain for ICT equipment and Computer software and database correspond to the period 2010-2014. Data reported for Austria for Communication services correspond to the period 2011-2015.
Source: OECD National Accounts Statistics, OECD Productivity Database, OECD Prices and Purchasing Power Parities database, Australian Bureau of Statistics, U.S. Bureau of Economic Analyses and Statistics Canada, February 2017

Source: Ahmad, N., J. Ribarsky and M. Reinsdorf (2017)

…but simulated impact on GDP growth remains small



Impact depends on whether ICT are for final or intermediate uses, and on whether they are imported or domestically produced.

Source: Ahmad, N., J. Ribarsky and M. Reinsdorf (2017)

In Conclusion

Conclusions (1)

- Good measurement is key in a digital economy but mis-measurement unlikely to explain productivity slowdown
- Conceptually, GDP and productivity appear up to the task
- **But measurement in some areas requires improvement**
  - The occasionally self-employed
  - International transactions in IPPs
  - **And Prices**
- **Satellite accounts to seperate out digital transactions**

Conclusions (2) Can the problem be part of the solution?

- Digital intermediaries are increasingly called to disclose turnover from clients
- Other examples:
  - Airbnb charges VAT on its service fees for customers from the European Union, Switzerland, Norway, Iceland, and South Africa and Japanese consumption tax for customers from Japan.
  - AirBnB directly collects an occupancy tax in Amsterdam, San Francisco and Portland
- Big data offers new ways for price measurement and quality adjustments (as in Cavallo and Rigobon 2016)

Conclusions (3)

- GDP is a measure of production, not welfare
- A rising gap between GDP and welfare?
- Need to complement GDP with well-being and welfare indicators
- Whatever treatment in the NA, need for significantly more basic data on the digital economy

Thank you!