MEASURING GDP IN A DIGITALISED ECONOMY

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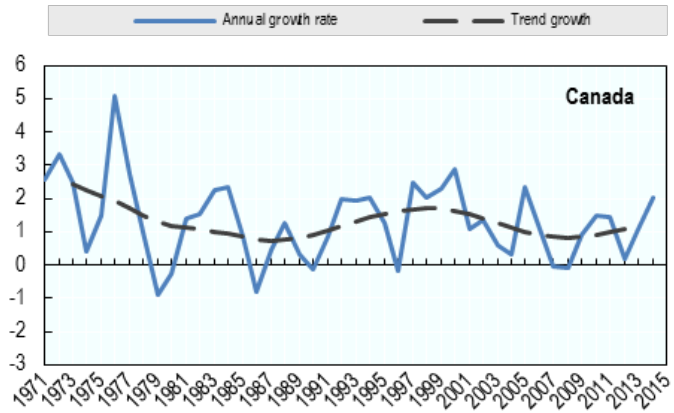
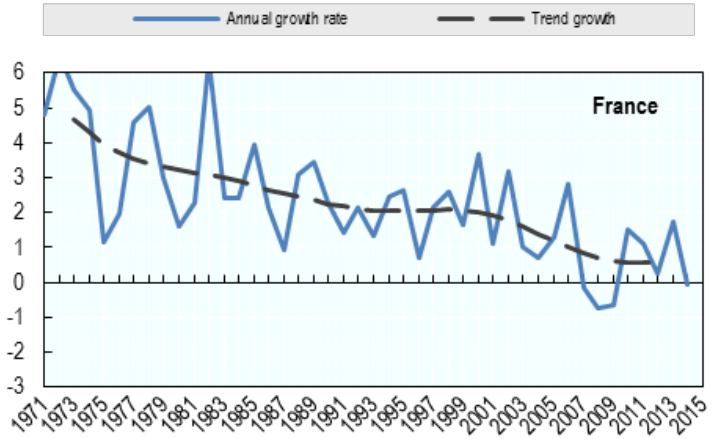
DES POLITIQUES MEILLEURES POUR UNE VIE MEILLEURE

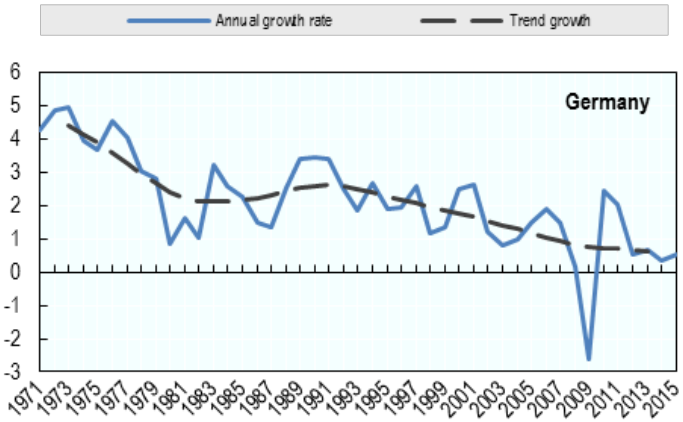
The debate...

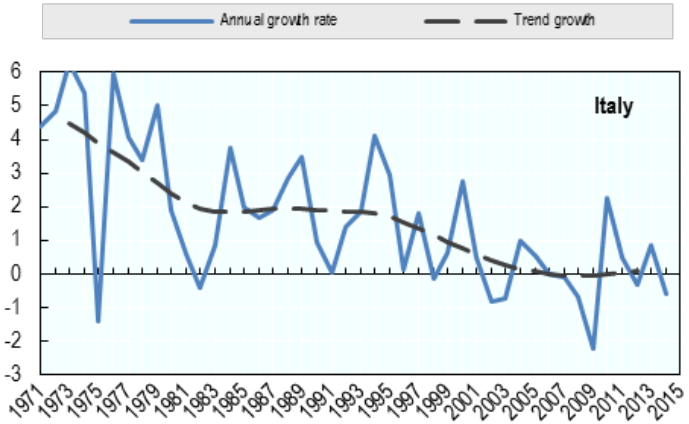
Downward trend labour productivity growth in many countries

Total economy, percentage change at annual rate









Source: OECD Productivity Compendium 2016

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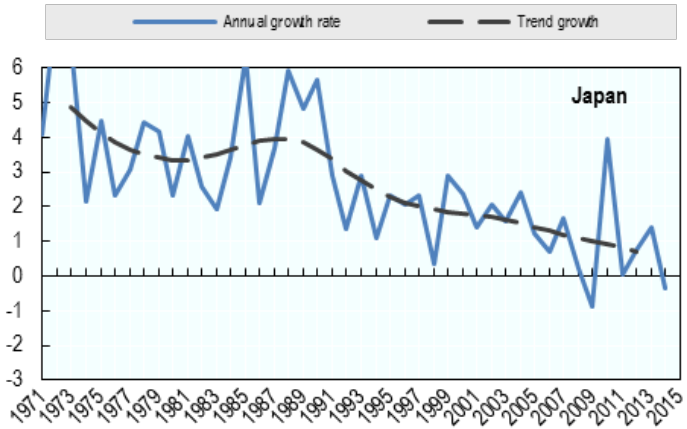
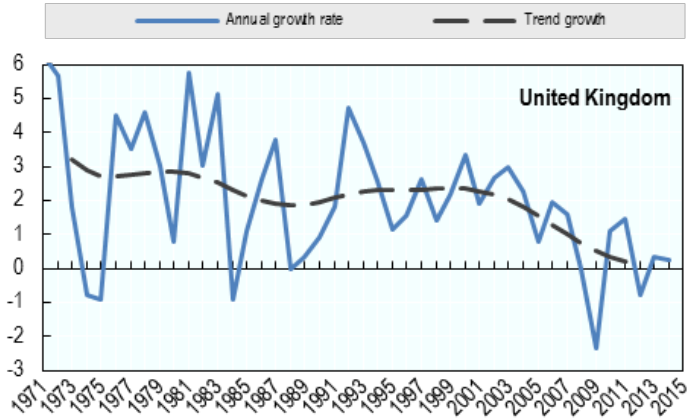
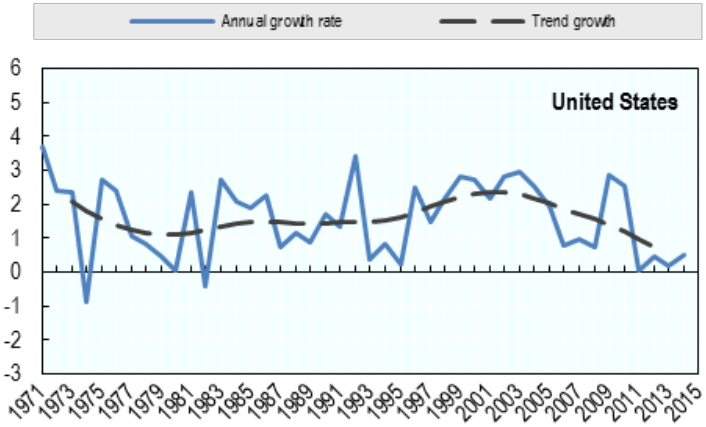






Source: OECD Productivity Compendium 2016

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

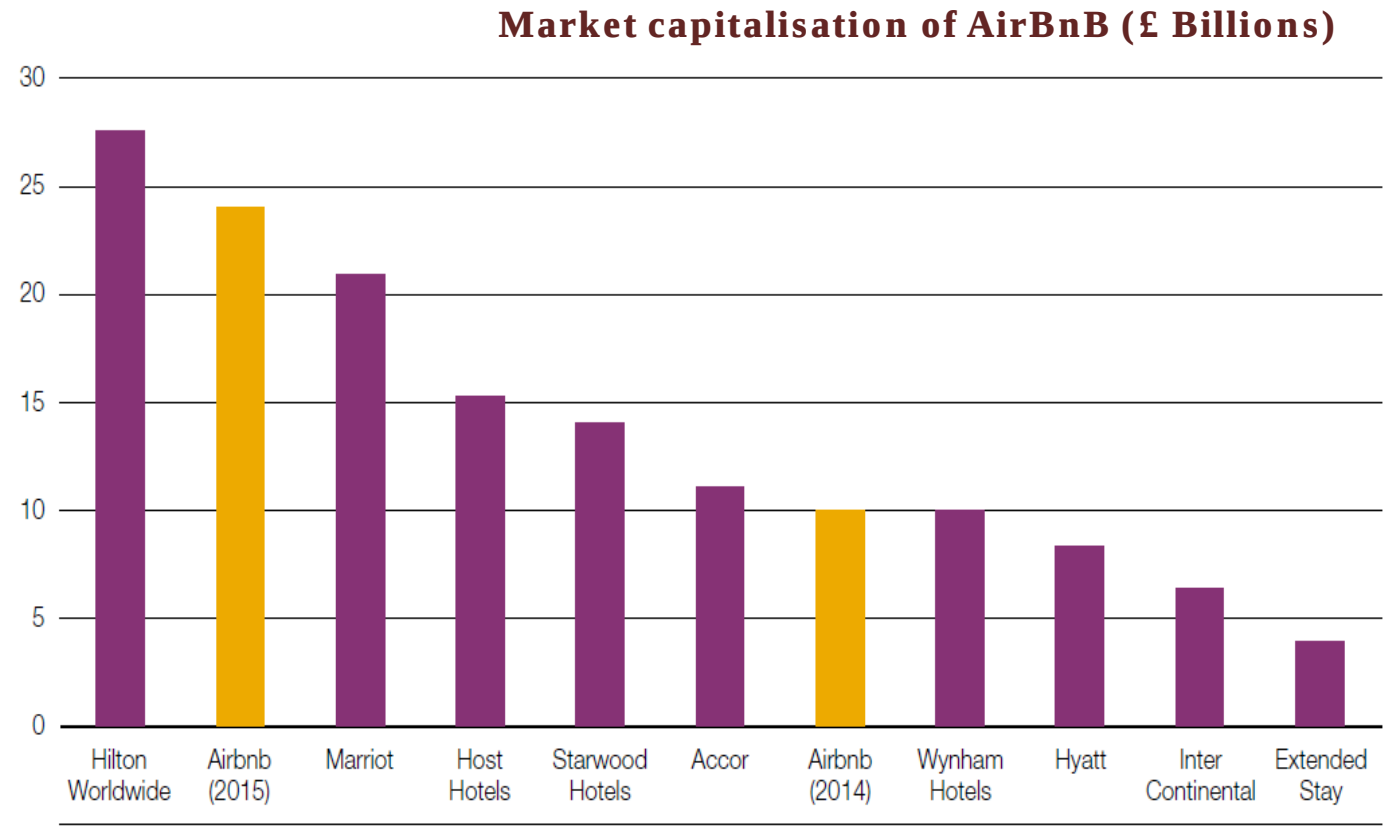
Some optimists argue instead that the problem is one of measurement. Technological progress often raises productivity in ways that statistical agencies struggle to detect

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

Digitalisation is a pervasive phenomenon…



Source: Davidson, L., (2015). 'Airbnb boss calls the UK the "centre of the sharing economy",' The Telegraph.

…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.

There remain more questions than answers..

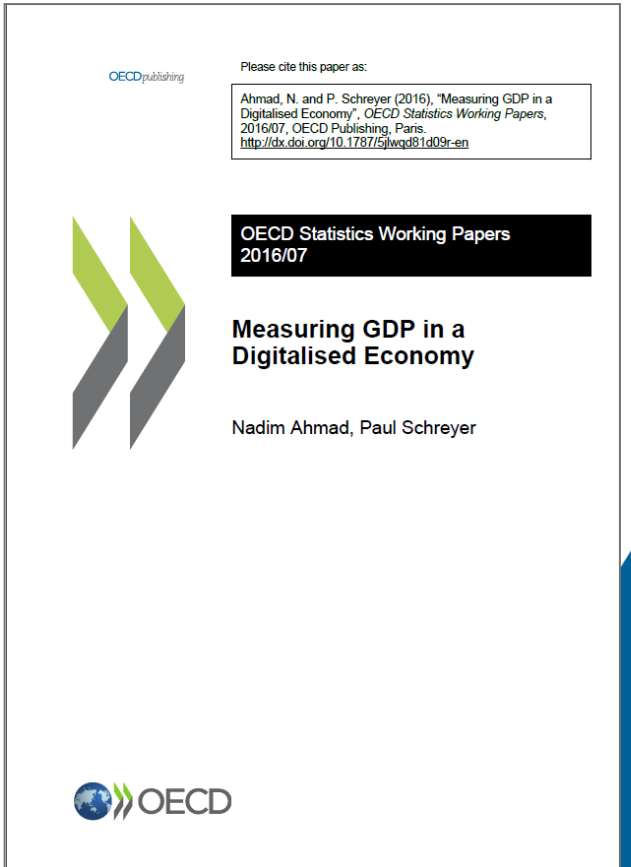
…and calls for action:

…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 OECD work 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
  - Question: is price index correct?
  - 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
- Issue: treatment of **consumer durables**
  - No impact on GDP
  - But impact on measured productivity and investment

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

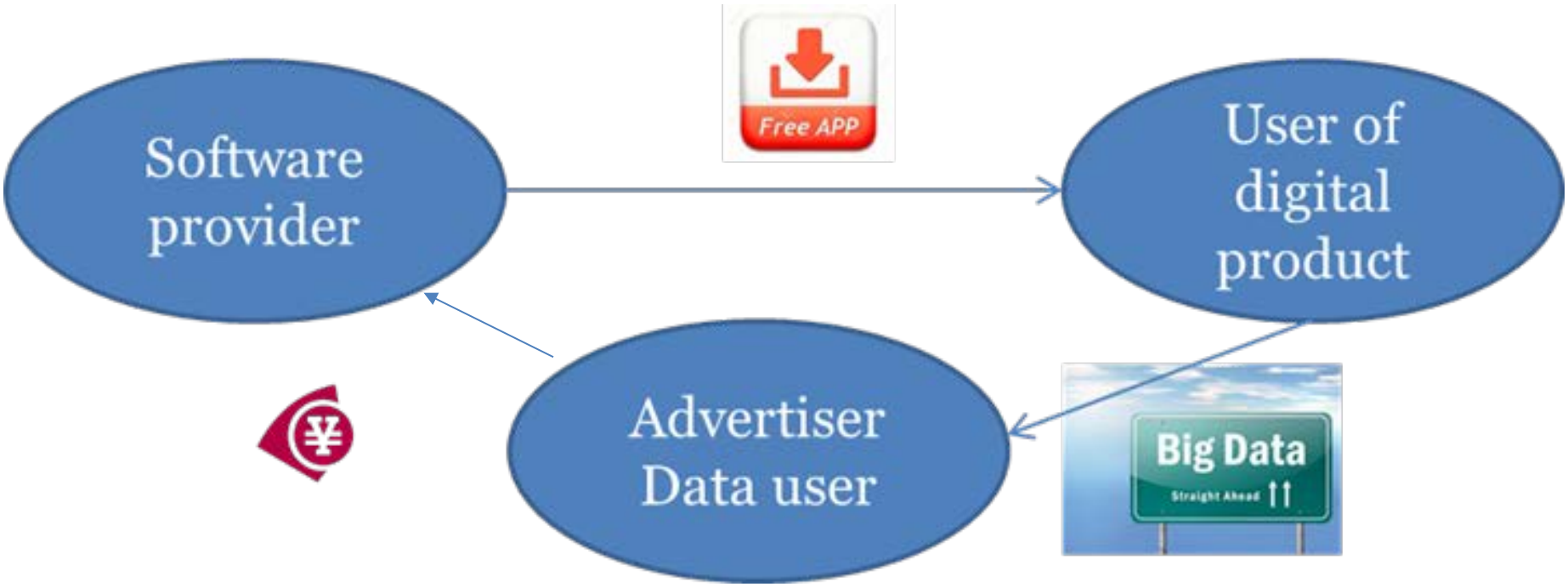
- **Is there a problem?** Joins traditional discussion about own-account production of households. Imputations for:
  - Childcare
  - Cooking
  - Gardening, ...?
- And unlikely to resolve productivity puzzle

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

- 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
- Everything else equal, GDP would rise through imputation

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 assumption on valuation**
- **No** because value of advertising is reflected in final products

- Do we know how much it matters?

Free and subsidised consumer products – advertisement financing (ctd)

- Excellent work by Nakamura and Soloveichik (2015)
- Show fast rise of services 7.6% per year for advertising-supported entertainment
- But small effect: '*…accounts for less than 0.5% of global GDP. As a result, our experimental methodology only raises overall real GDP growth by 0.019% per year*"

Free and subsidised consumer products – data sales financing

- **Situation (even) murkier**
- Software provider builds up digital asset (data base) for subsequent production of data services
- If imputation, what is value to proxy this investment?
- Provision of data by households (the corollary of consumers watching adverts) may not result in free goods or services in exchange (e.g. scanner data by supermarkets)

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
- Associated income flows are captured but in which country? (legal vs. economic ownership)
- Issue for GDP more than for GNI
- Irish case

More generally, KBC is important in productivity analysis but hasn't resolved the productivity puzzle

Computerised information (knowledge stored in programmes)	Innovative property (research and development assets)	Economic competencies (human and organisational capital)
Software*, databases*	Scientific R&D*, mineral exploration*, artistic originals*, financial product innovation, design, R&D in social sciences and humanities	Branding (advertising, marketing), training, organisational structure

Source: Corrado, C., Hulten, C., and Sichel, D., (2005). 'Measuring Capital and Technology: An Expanded Framework,' in Corrado, C., Haltiwanger, J., and Sichel, D. (eds.), Measuring Capital in the New Economy, *National Bureau of Economic Research and University of Chicago Press.*

*Contains assets currently capitalised in the official measure of investment.

Domain 5:
Prices and volumes

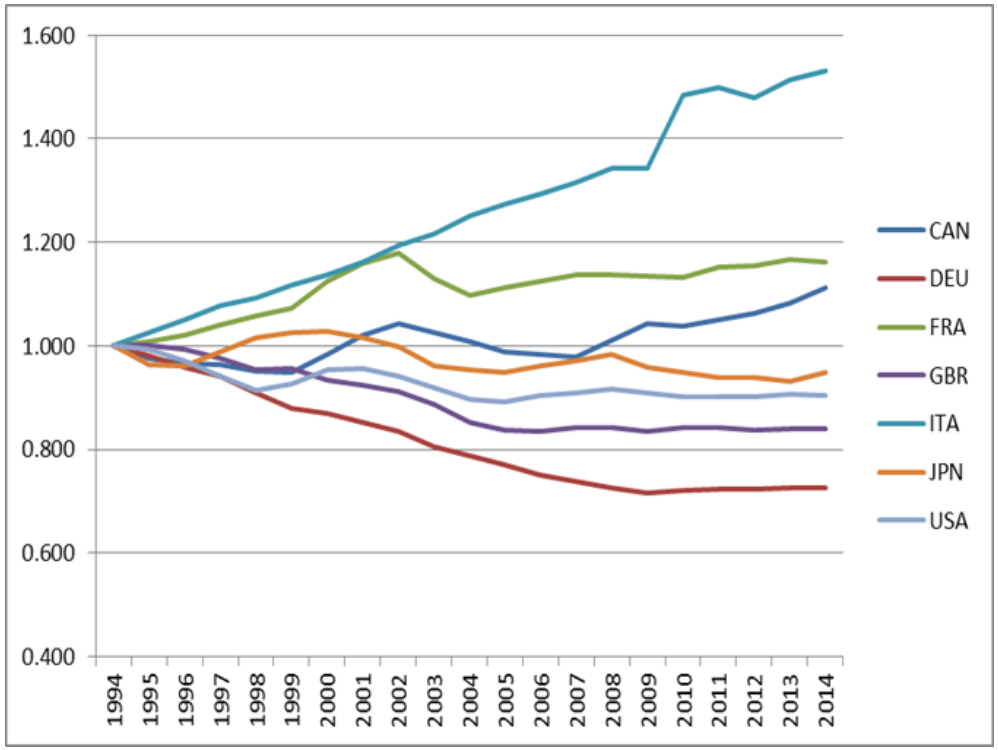
Prices and Volumes

- Price measurement = **big challenge**:
  - customisation
  - new goods problem
  - quality levels and change (eg AirBnB)
- 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

Prices and Volumes

And old problems dont seem to go away...

Example: software deflators



Source: OECD Annual National Accounts

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**
- **Consumer durables**

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

OECD work - looking ahead

- OECD carries out work on Digital Economy
- Active involvement in work mandated by the G20:
- NAWP has carried out survey on country practices
- Planned work in the OECD Statistics Directorate includes:
  - Assessing the effects of possible bias in price indices on measured GDP and productivity
  - Assessing the effects of partial use of consumer durables as business assets on measured GDP and productivity

Thank you!

N. Ahmad and P. Schreyer (2016) "GDP in a Digitalised Economy" ;

OECD Statistics Working Paper

http://dx.doi.org/10.1787/5jlwqd81d09r-en