



MEASURING GDP IN A DIGITALISED ECONOMY

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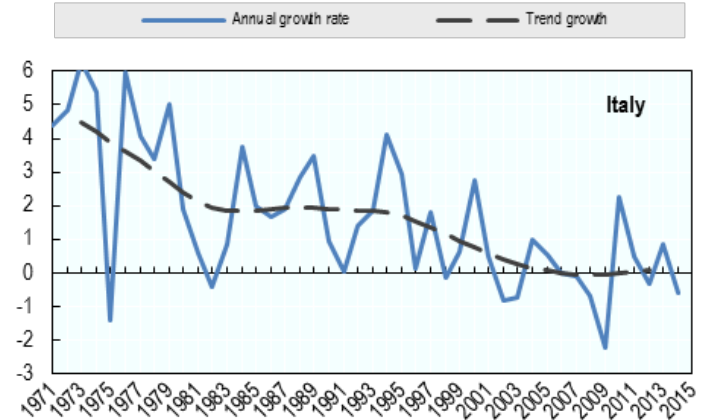
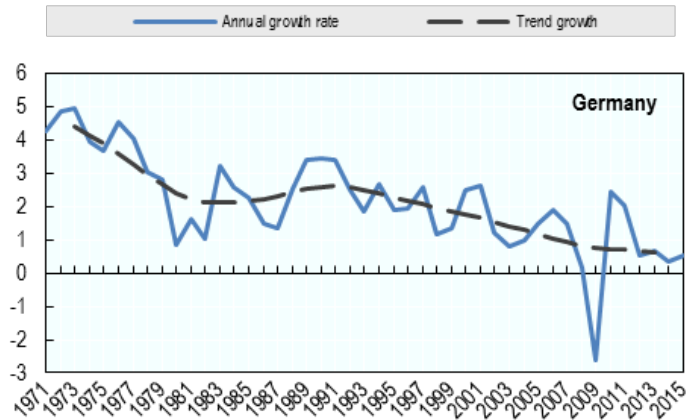
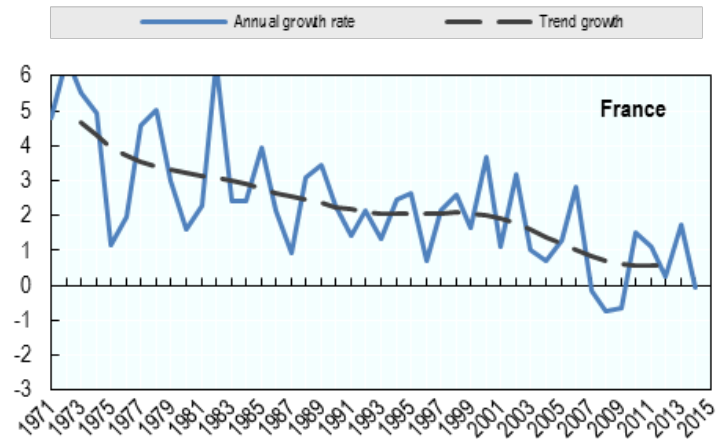
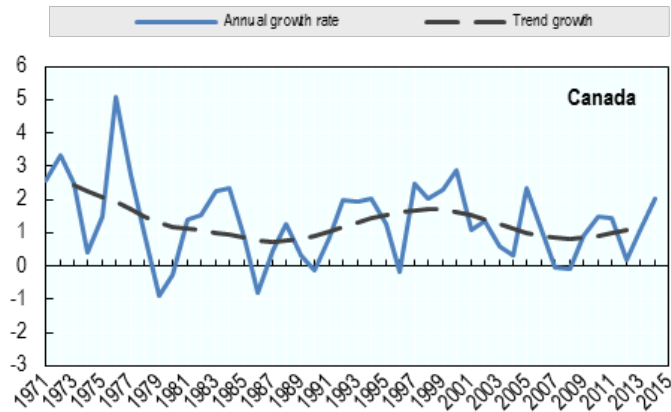
The debate...





Downward trend in labour productivity growth in many countries

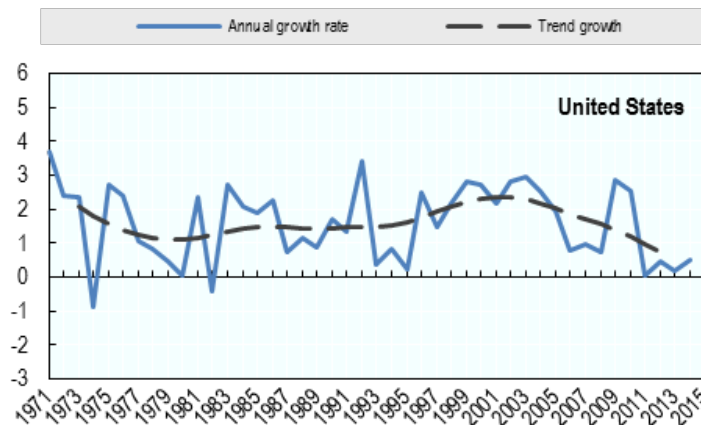
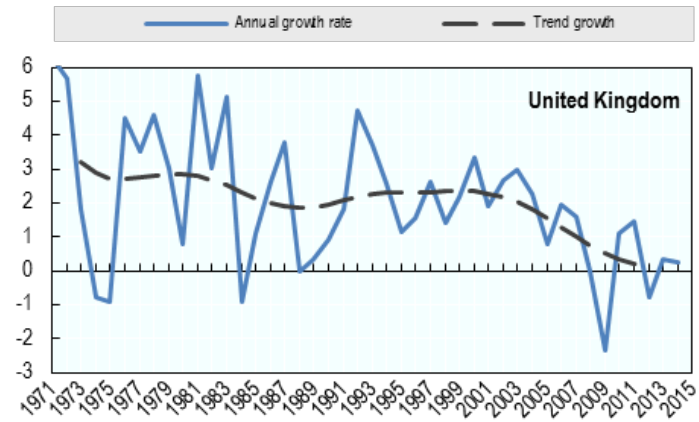
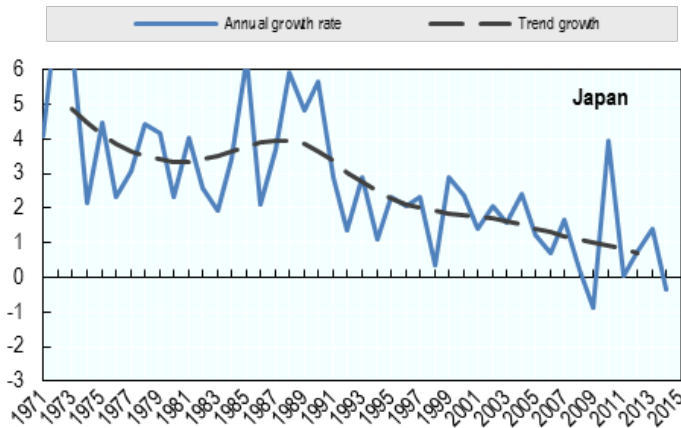
Total economy, percentage change at annual rate





Downward trend in labour productivity growth in many countries

Total economy, percentage change at annual rate





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/McAfee) but not picked up by GDP and productivity figures:
 - **The Mis-measurement Hypothesis**



The Mis-measurement hypothesis (MMH)



MMH very present 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.”

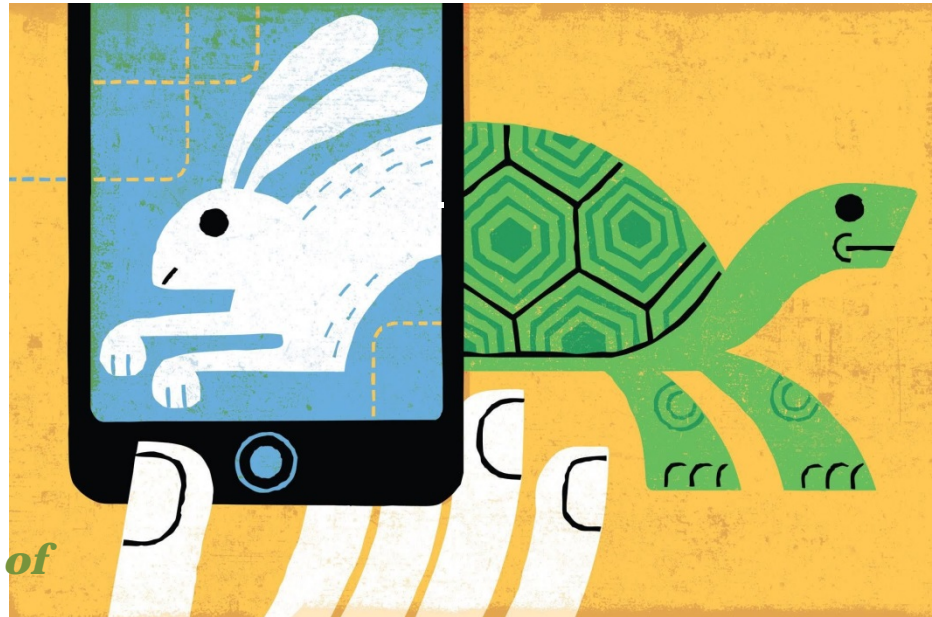
Charles Bean:
“statistics have failed to keep pace with the impact of digital technology”

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? »

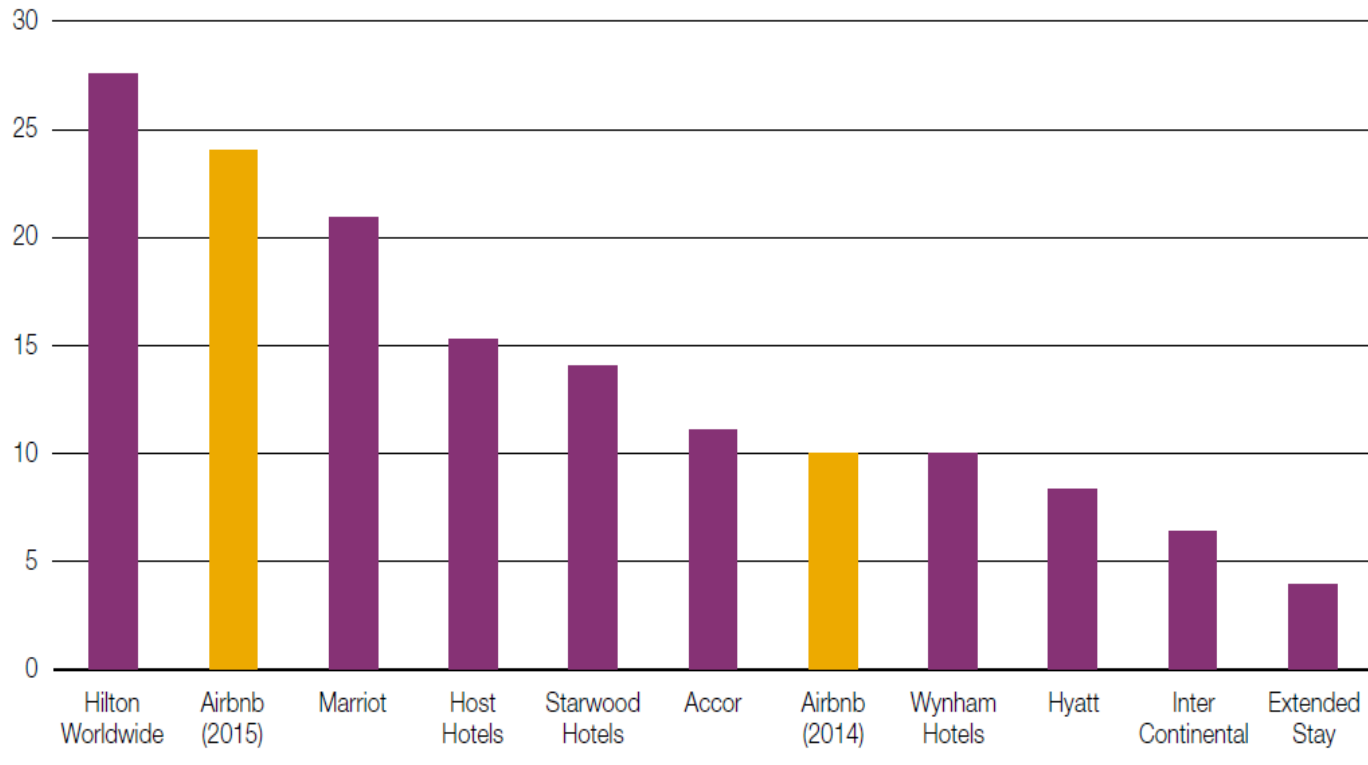
Henri de Castries, Chief Executive AXA Assurance

Les Echos, 31 August 2015



Digitalisation is a pervasive phenomenon...

Market capitalisation of AirBnB (£ Billion)



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:

Independent Review of
UK Economic Statistics

Professor Sir Charles Bean



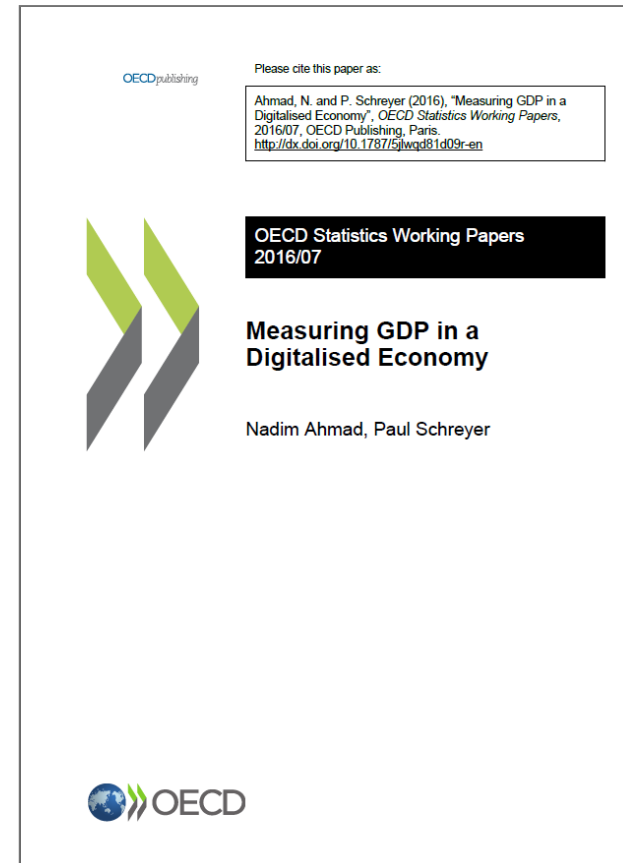


...the ill-defined nature of the issue has not helped

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 6 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*
- **Value added** = 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 ‘**occasional 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 **Labour Force Surveys**
- 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: value-added = **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



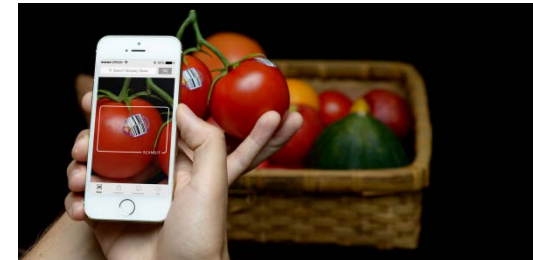


Domain 2: Consumers as producers



Consumers as producers: blurring the production boundary

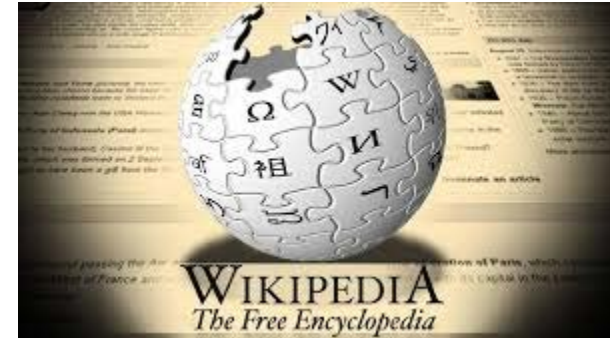
- The pervasiveness of internet access by households has led to **blurring** between household production for market purposes, own account production, consumption, leisure
- **Examples:**
 - Own booking of hotels, flights by households
 - Self-check in at airports
 - Self-service at supermarkets
 - On-line 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 **ads** or **data sales**





Free and subsidised consumer products – advertisement financing

- Implicit transaction between consumer and software provider not directly reflected in GDP
- Some debate about **imputation**
 - Accounting issues: **who produces what?**
 - More important: what's the **order of magnitude?**



Free and subsidised consumer products – advertisement financing (ctd)

- Excellent work by **Nakamura and Soloveichik (2015)**
- Shows 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**”



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** tend to be captured but:
 - International location of use and ownership of assets
 - what is **payment for service**, what is **current transfer**?
 - Allocation to countries biased by firms' **tax considerations/optimisation**
- Case in point: **Ireland's GDP growth in 2015**



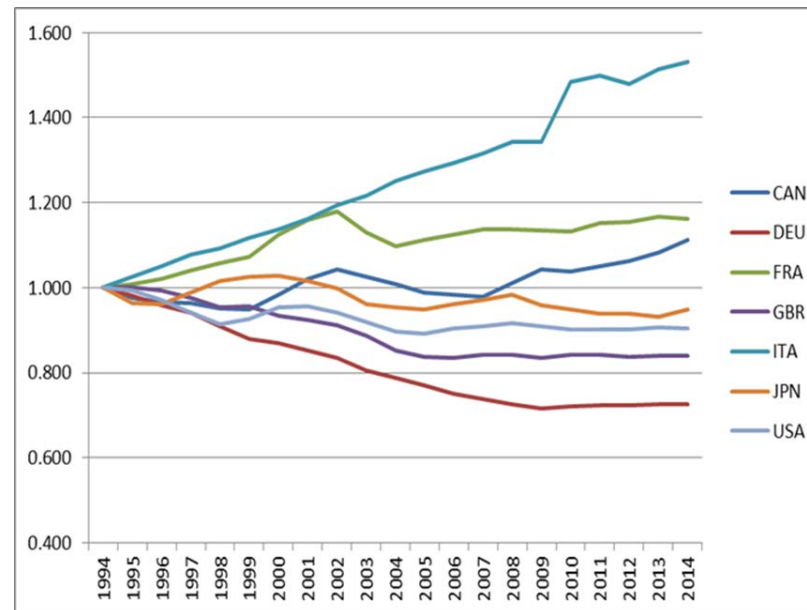
Domain 5: Prices and volumes



Prices and Volumes

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

Example: software deflators





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**, jointly with IMF:
- 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!

