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
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Total economy, average annual rates of change in %

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/McAfee) 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

FINANCIAL TIMES
The internet and the productivity slump

ComputerWeekly.com
Why we’re measuring the digital economy in the wrong way

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

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 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.”

In the debate, there is often confusion between:

- Conceptual vs. Empirical issues
- Production vs. Comprehensive 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
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, AirBnB*

**Production** = commissions and fees

**In principle** captured in GDP

**Unless abroad and trade in services incompletely measured**
Example 1: dwelling services by households

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

- **Short-term rentals** – likely increased significantly:
  - Possibly undeclared by the ‘occasional 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
• Few cash transactions so under-declaration by self-employed less likely
• New approaches to measurement, 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
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

Free and subsidised consumer products – advertisement financing (ctd)

- Study 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’
Another alternative (Diewert and Fox 2016): recognising free products in consumption price index

- Imputation of shadow prices
- Shadow prices of using apps = opportunity cost of time
- Effect on price index unclear
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** = *challenge*:
  - customisation
  - new goods problem
  - quality levels and change
- But also: **not every welfare gain needs to be picked up by official price indexes**, e.g. price change from reservation prices
- Some basic **conceptual questions**: 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)

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


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
- Measurement in some areas requires improvement
  - The occasionally self-employed
  - International transactions in IPPs
  - And Prices
- Satellite accounts to separate out digital transactions
Conclusions (2) Can the problem be part of the solution?

- Digital intermediaries are increasingly called to disclose turnover from clients.
- E.g. Airbnb charges VAT on its service fees or collects occupancy tax in some cities.
- 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 (comprehensive) 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!