MEASURING GDP IN A DIGITALISED ECONOMY

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Background

Increased prevalence of ‘new’ transformative (digital) technologies

But....

.... Declining productivity
– Shortage of ideas (Gordon)
– Break-down of the diffusion machine and inequality (OECD)
– A business cycle effect

➢ The Mis-measurement Hypothesis
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 U.S. Underestimates Growth

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.
But our collective response has (until lately) been less visible

..and despite some notable responses..


- *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 current rate of productivity is similar to earlier periods*

*The fast-growth period from 1995-2004 was an anomaly, thanks to the Internet, reorganization of distribution sectors, etc.*

Adjustments to growth in output per hour, business sector, percentage points per year.

*March 2016*

[Diagram showing relationships between concepts: What, Size, Who, Where, How, Type]
OECD response

• 2016

• 2017
  – Advisory Expert Group of NSOs (members of OECD WPNA), Eurostat, IMF, UN, and members of OECD WPMade
  – OECD-IMF: Measuring Consumer Inflation in a Digital Economy
  – OECD-WTO Task Force on International Trade in Services expert group
  – OECD-UPU-WTO-UNCTAD initiative on de minimis trade
Survey on measurement of GDP and productivity in a digitalised economy

Stocktaking of current and best practices of OECD countries and key partners

What
Who
How
Where

Size

29 country responses
Our take on the MMH in 5 domains
1: New forms of intermediation services
Digital intermediaries

Dwelling services
Business & Transport
Distribution (e-Bay)

Conclusions:

Underlying activities not new
> Conceptual framework robust – (VA=fees, commissions, margins)

But rise in ‘informal’ (occasionally employed) activities may require reviews of estimation methods

Impact of mismeasurement not expected to be large:

- Dwelling services vs Imputed rent
- Distribution services provided by households – margin not expected be large

Dual Use of Uber vehicles has no impact on GDP and only marginal impact on GFCF if recorded as investment – between 0.01% (France) and 0.05% (UK) in 2015
2: Consumers as producers – ‘participative and displacing production’
‘Participative’ & ‘displacing’ production

Households engaging in the intermediation process

Household production of services for own-consumption:
- Hotels and flight bookings
- Supermarket self-service
- On-line check-in
- Cash-machines

Not a new phenomena
- Accounting framework excludes many other ‘non-market’ transactions
  - Current price GDP unaffected
  - But volume measures may not adequately capture quality changes
3: Free and subsidised consumer products
Free assets

Households as ‘producers’ of free assets

Production of freely available ‘public’ goods:

Wikipedia, Software

Not a new phenomena

Covered in the Handbook on Deriving Capital Measures of IPPs

Wikipedia: Page views and estimated advertising revenue

<table>
<thead>
<tr>
<th>Number of page views (millions)</th>
<th>2010</th>
<th>2012</th>
<th>2013</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>World GDP (GDP USD, current prices, constant)</td>
<td>65 058 816</td>
<td>73 355 559</td>
<td>76 787 466</td>
<td>83 300 939</td>
<td>86 905 866</td>
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<table>
<thead>
<tr>
<th>Revenue (USD millions)</th>
<th>Display network</th>
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<tbody>
<tr>
<td>CTR = 0.35%</td>
<td>CPC = 0.58</td>
</tr>
<tr>
<td>291.1</td>
<td>308.8</td>
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<table>
<thead>
<tr>
<th>Value/ World GDP Ratio</th>
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<tr>
<td>0.0004%</td>
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<th>Revenue (USD millions)</th>
<th>Search network</th>
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<tbody>
<tr>
<td>CTR = 1.91%</td>
<td>CPC = 2.32</td>
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<tr>
<td>6 354</td>
<td>6 740</td>
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Adjusted for PPPs

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<tr>
<td>266.9</td>
<td>274.5</td>
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<th>% change between 2010 and 2015</th>
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<tr>
<td>5 826.8</td>
<td>5 992.9</td>
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4: Cross-border flows of intellectual property products
Knowledge based capital and globalisation

‘Investment’ outside of the SNA asset boundary and cross-border flows

Many ‘intangible’ assets already in the SNA but many are not:

- Human capital,
- Knowledge in databases,
- Organisational capital,
- Brands

And for those assets in the boundary, difficulties with cross-border transactions remain

Not a new phenomena

Considered in the 2008 SNA revision process but ruled out on practical grounds.

Guidance developed in various Task Forces but further work needed as the scale of the problem remains unknown

Case in point: Ireland’s GDP growth
Digital trade

Not always clear whether flows are cross-border — Mode 1 vs Mode 3 — nor indeed the nature of the service — e.g. transportation or business services
De minimis trade

Possible that larger sums are falling below the radar screen

Information is patchy:

Where evidence is available it points to relatively small sums but likelihood is that these are growing.

Working with UPU, UNCTAD and WTO
5: Prices and volumes
Prices and volumes

A significant challenge

Not a new phenomena but challenges remain

Customisation

Outlet bias

Quality change

Price indices for software investment
Price indices for ICT assets and communication services

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

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

UK showed increases of nearly 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.
Impact on GDP growth, using alternative ICT & communication prices

Belgium shows largest impact 0.4%-points

Most countries show around 0.2%-points
### Prices and volumes: results from survey of national practices

<table>
<thead>
<tr>
<th><strong>Issue</strong></th>
<th><strong>Response</strong></th>
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<tbody>
<tr>
<td>• Price differences in distribution margins from buying products on-line versus in a store:</td>
<td>• change in price; (16) change in quality. (9)</td>
</tr>
<tr>
<td>• If producer prices of goods that appear identical differ:</td>
<td>• Difference in price (18), in quality (5)</td>
</tr>
<tr>
<td>• Participative production</td>
<td>• One country (self-service checkouts)</td>
</tr>
</tbody>
</table>

8 countries using or exploring **new data sources**, such as **web-scraping** to deal with **rapid quality changes**. 5 others mention interest for compiling CPI.
Tentative conclusions and on-going actions
Conceptual framework is robust

Measurement in some areas may require improvement and new approaches for
- The occasionally self-employed
- International transactions in IPPs
- Consistent classification of what is the ‘digital’ economy

**But the impact is not expected to be significant for current price estimates**

**Volumes and Prices**
- *Evidence so far suggests that this will not be able to explain the productivity slowdown (at most adds around 0.2% to growth)*

The problem can be part of the solution

- **Digital intermediaries** are increasingly asked to disclose turnover
- **Big data** offers new ways for price measurement and quality adjustments (as in Cavallo and Rigobon 2016)
On-going actions

A typology

Included in the SNA production boundary
- Corporations
- Households
- Government
- NPISH
- ROW

Excluded from the SNA production boundary

Producers ('who')
- Corporations
- Households
- Government
- NPISH
- ROW

Product ('what')
- Goods
- Services
- Information/data

Nature ('how')
- Digitally ordered and/or
- Platform enabled and/or
- Digitally delivered

Users ('who')
- Corporations
- Households
- Government
- NPISH
- ROW

Enablers
And satellite accounts

<table>
<thead>
<tr>
<th>product a (non-digital good)</th>
<th>digitally ordered</th>
<th>directly from counterparty via a resident digital intermediary platforms via a non-resident digital intermediary platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>product b (digital good)</td>
<td>Direct from counter party</td>
<td>digitally ordered, physically delivered digitally ordered and digitally delivered (e.g. 3D printing) digitally delivered not digitally ordered (3D printing unlikely to be entry) other (non-digital) Via resident digital intermediary platforms digitally ordered, physically delivered digitally ordered and digitally delivered Via non-resident digital intermediary platforms digitally ordered, physically delivered digitally ordered and digitally delivered</td>
</tr>
<tr>
<td>product d (non-digital service, paid)</td>
<td>Digitally ordered</td>
<td>directly from counterparty and other digital platforms Via resident digital intermediary platforms value of the service intermediation fee (both implicit and explicit) Via non-resident digital intermediary platforms value of the service intermediation fee (both implicit and explicit)</td>
</tr>
<tr>
<td>product e (digital service, paid)</td>
<td>Direct from counter party and other digital platforms</td>
<td>digitally ordered digitally ordered and digitally delivered digitally delivered but not digitally ordered (may include transactions such as data services, Website design, software) Via resident digital intermediary platforms value of the service intermediation fee (both implicit and explicit) Via non-resident digital intermediary platforms value of the service intermediation fee (both implicit and explicit)</td>
</tr>
<tr>
<td>product f (digital service, free)</td>
<td>(outside the current SNA framework)</td>
<td>Digital data services of which intra-firm provision of data/ and or use of databases Other digital services (e.g., free search services, social media, etc.)</td>
</tr>
</tbody>
</table>
Thank you