Does Measurement of the Digital Economy Explain Productivity Slowdown – the Case for Australia?

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Literature review: SNA framework and concepts capture the digital economy quite well:

- Syverson (2017); Byrne et al. (2016), Nakamura & Soloveichik (2016), and Cardarelli & Lusinyan (2015); Ahmad & Schreyer (OECD); Reinsdorf (IMF)

Although more quantitative confirmation useful

The ABS quantitative study was motivated by the NBER paper ‘Challenges to Mismeasurement Explanations for the U.S. Productivity growth’ Chad Syverson
Evolution of market sector (16 industry aggregate) MFP (1995 to 2017)

Index

130
120
110
100
90


Growth phase averaged 1.7% annually
Slowdown phase averaged -0.3% annually
Recovery phase averaged 1.0% annually
Missing output - market sector output growth required after 2004 for various MFP targets

- Baseline
- Growth phase: Output averaged 4% annually
- Slowdown phase: Output averaged 2.9% annually
- Recovery phase: Output averaged 2.8% annually

5.7% annual output growth required to get 2.6% MFP

4.5% annual output growth required to get 2.6% MFP
We undertake ‘what-if’ analysis by applying ‘shocks’ to estimate potential impact of digital mismeasurement on productivity measures. Candidates:

- Sharing economy (P2P retailing, ride sharing, P2P lending)
- Separating telco price and volume more accurately
- Measuring IT capital more accurately (asset life, efficiency decay)

Run thru productivity model and quantify impacts
Retail trade Gross value added (GVA) and MFP growth – 1996 to 2017

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**Australian Bureau of Statistics** Informing Australia's important decisions

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27/11/20
Transport, Postal and Warehousing (TPW) Gross value added (GVA) and MFP growth – 1996 to 2017
Financial and Insurance Services (FIS) Gross value added (GVA) and MFP growth – 1996 to 2017
Figure VI – Telecommunication equipment and services CPI

Window of modelled extendable quality change

Sources: ABS (Consumer Price Index, Australia, Jun 2017, Cat. no. 6401.0 and Internet Activity, Australia Cat. no. 8153.0) and authors' estimates.
### Existing Capital Stock Assumptions for IT Assets

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Age-efficiency slope (Beta)</th>
<th>Mean asset life</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4 years</td>
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<tr>
<td>Computers</td>
<td>0.5</td>
<td>Divs: All</td>
</tr>
<tr>
<td>Computer software (purchased)</td>
<td>0.5</td>
<td>Divs: All</td>
</tr>
<tr>
<td>Computer software (in-house)</td>
<td>0.5</td>
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</tbody>
</table>

Impact of ICT enhancement – 1996 to 2017
## Revised Capital Stock Assumptions for IT Capital Services Simulation

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Age-efficiency slope (Beta)</th>
<th>Mean asset life</th>
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<tbody>
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<td></td>
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<td>2 years</td>
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<tr>
<td>Computers</td>
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<td>Divs K and N</td>
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</tbody>
</table>

- A Agriculture, Forestry and Fishing
- B Mining
- C Manufacturing
- D Electricity, Gas, Water and Waste Services
- E Construction
- F Wholesale Trade
- G Retail Trade
- H Accommodation and Food Services
- I Transport, postal and warehousing services
- J Information, media and telecommunication services
- K Financial and Insurance Services
- L Rental, Hiring and Real Estate Services
- M Professional, Scientific and Technical Services
- N Administrative and Support Services
- R Arts and Recreation Services
- S Other Services
Impact of ICT enhancement – 1996 to 2017

Finance and Insurance Services (FIS) capital services growth

Market sector (MRK) MFP growth
The impact of digital economy on real market sector output growth - 1996 to 2017

% Change

- GVA baseline
- GVA req’d for MFP of 2.6%
- GVA baseline + missing digital economy
Contribution to MFP16 impact from various digital economy platforms (2008 to 2017)
Overall impact of potential digital mismeasurement
Market sector - 2005 to 2017
Overall findings

Missing output per person in 2016-17 for 2.6% MFP > 2003-04

Gap = $12,278 per person

$1,361 Missing digital economy

Missing output not attributed $10,918

Real market sector output per person in 2016-17 was $34,768
Industry sources MFP slowdown – 1995 to 2017

13 strongest industries
Averaged 0.3% annually

Growth phase
Slowdown phase
Recovery phase

MFP market sector (MRKT16)
MFP MRKT16 less Mining
MFP MRKT16 less Mining less EGWW
MFP MRKT16 less Mining less EGWW less RHRES
MFP MRKT16 with 1% from 2004-05
Improving digital visibility

Source: ABS Chief Economist series: MEASURING DIGITAL ACTIVITIES IN THE AUSTRALIAN ECONOMY (Pengfei Zhao)

Figure 2: Average Division Share in Aggregate Value Added (%), Digital Activities Embedded, from 2011-12 to 2016-17, Current Prices
Conclusions

Enterprise operating in the digital economy is engaged in the Australian tax system → Registered on the Business register → Captured in National Accounts

Household expenditure relating to digital economy → Household Expenditure Survey → Captured in National Accounts

Online retailing → Collected in Retail trade survey → Captured in National Accounts

Price impact of digital economy → Captured in price indexes → Contributes to National Accounts
Conclusions

- Research (e.g., OECD, IMF, UN, and NBER) supports the view that the national accounting framework is robust to the challenges posed by digital activity. Conceptually ok.
- Confirmed for Australian data
- But room for improvement in sources and methods & increasing visibility
- Productivity slowdown is real since only a small fraction of the can be attributed to digital mismeasurement, there are other reasons
- Issue of consumer surplus outside production boundary