



# MEASURING GDP IN A DIGITALISED ECONOMY

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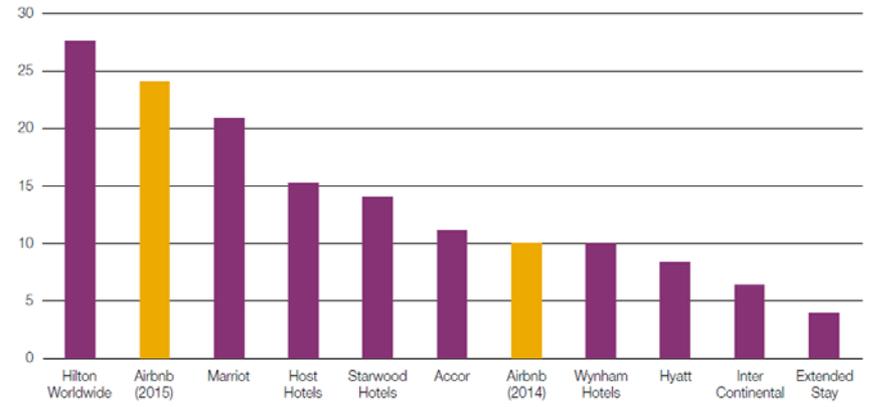
# Background

Increased prevalence of 'new' transformative (digital) technologies

But....

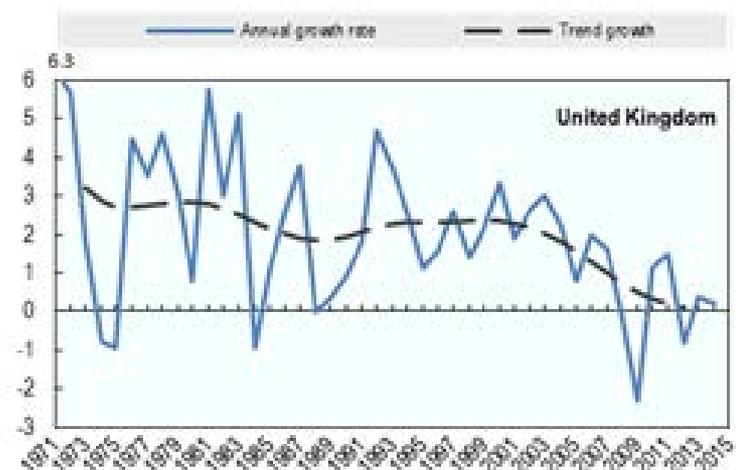
.... Declining productivity

## Market capitalisation of AirBnB (£ Billions)



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

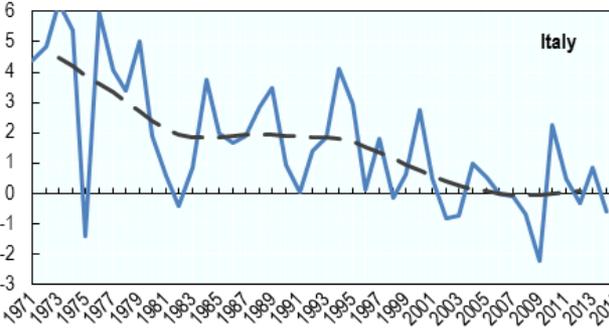
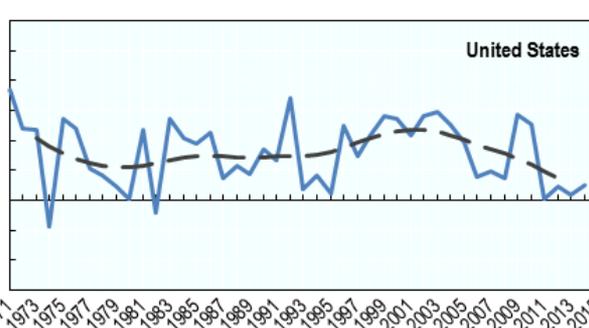
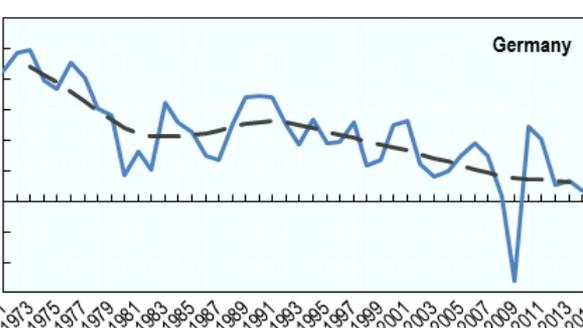
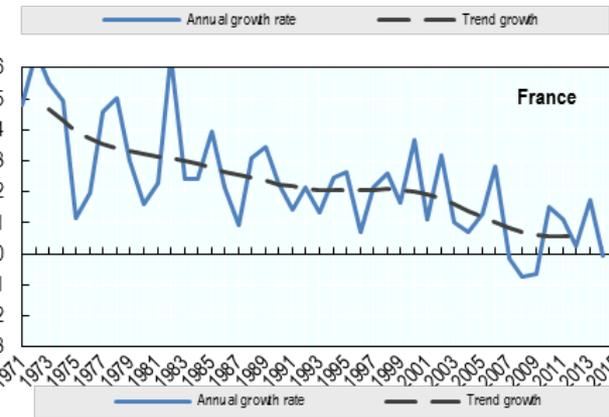
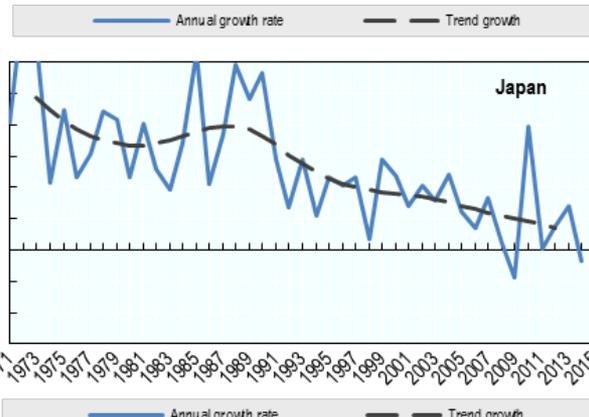
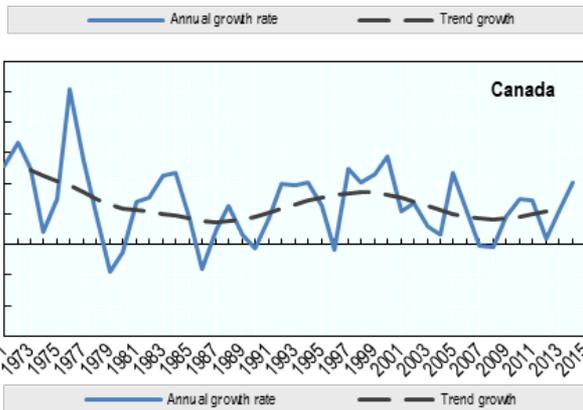
## Trend labour productivity growth





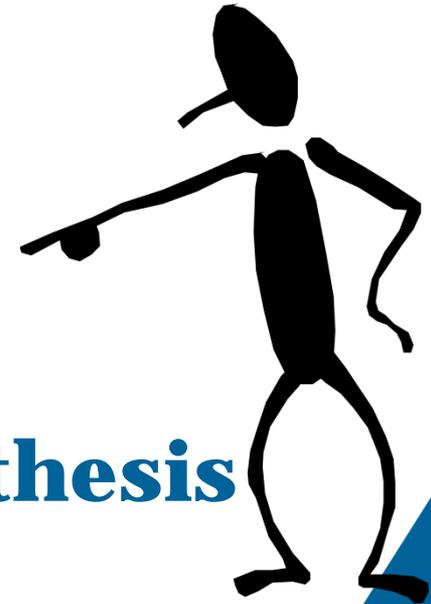
# Labour productivity growth

Total economy, percentage change at annual rate





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



## ➤ **The Mis-measurement Hypothesis**



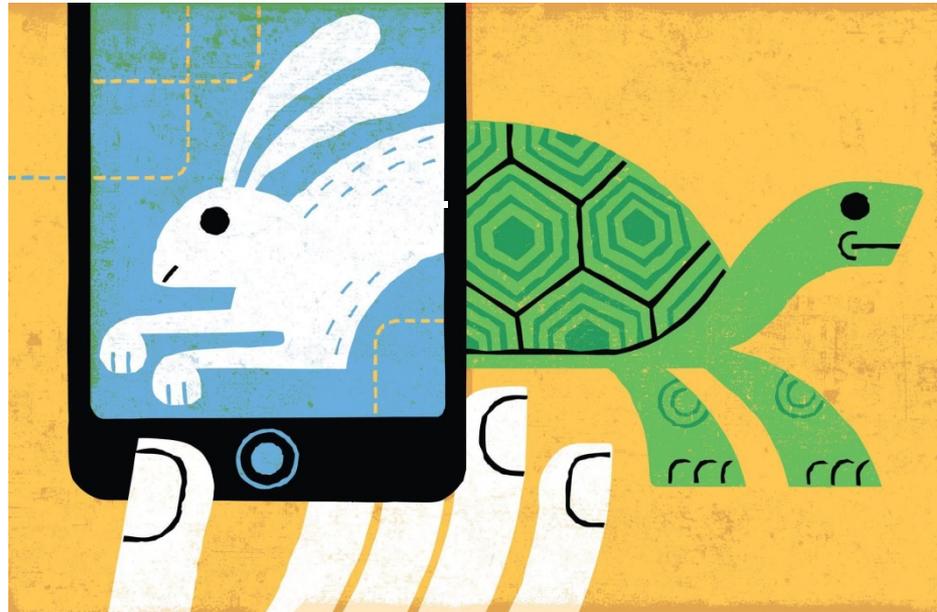
**Charles Hulten:**  
*Valuing the Net and the wide range of applications... is challenging... and their omission or undervaluation surely affects GDP."*

**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*



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



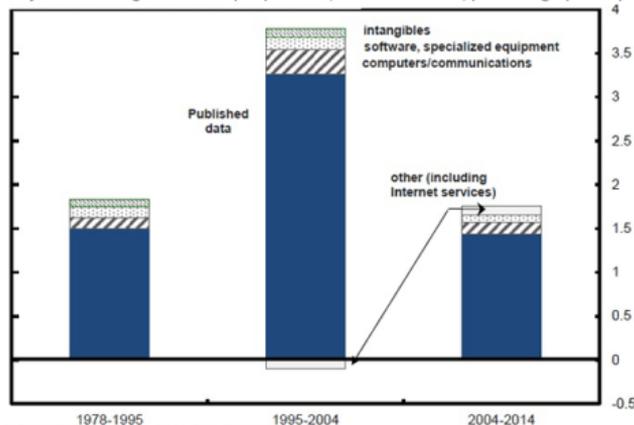
**..and despite some notable responses..**

- *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.*

### 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



**...there remain more questions than answers..**

## ...and calls for action:

### Independent Review of UK Economic Statistics

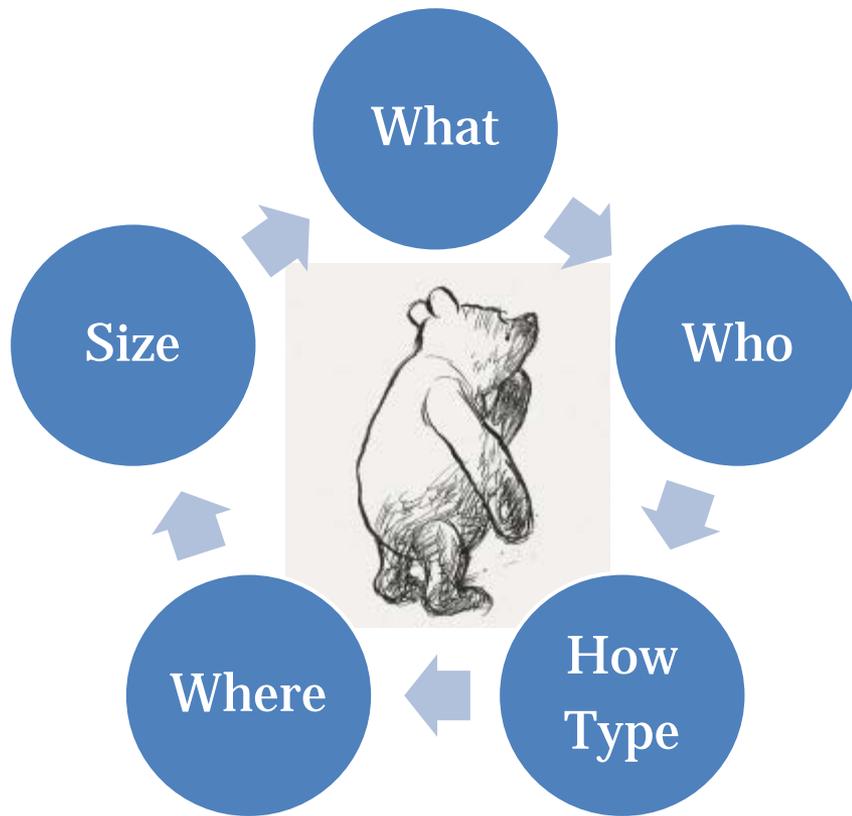
Professor Sir Charles Bean





# Partly reflecting the ill defined nature

*...of the 'digital', 'sharing', 'uberised', 'knowledge based' economy*





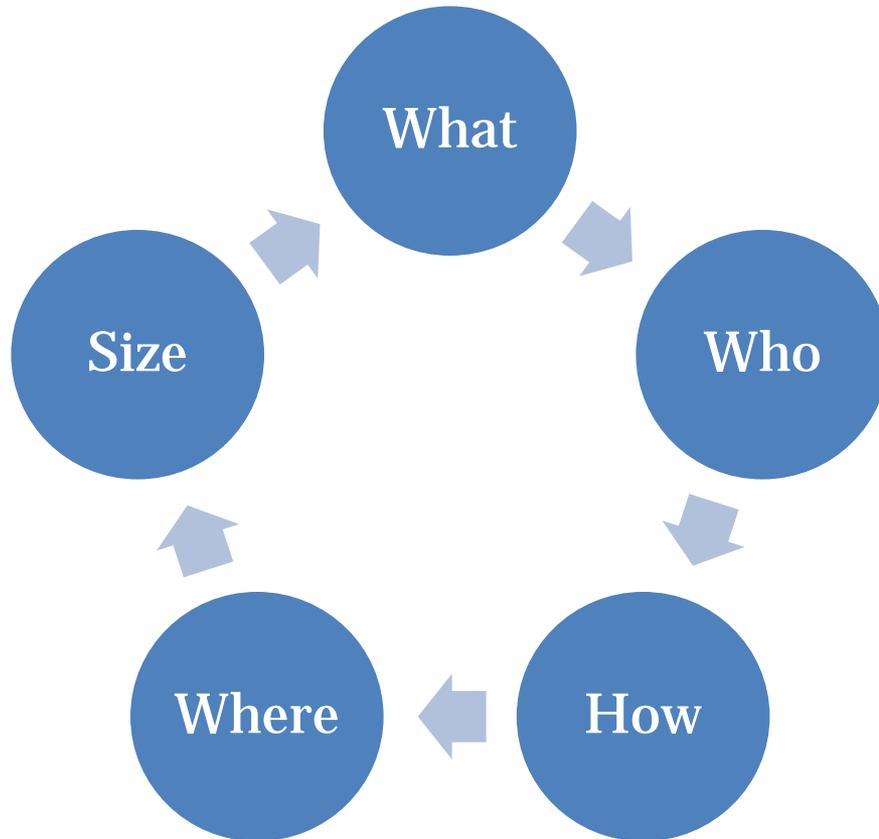
## OECD response

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- 2016 (CSSP)
  - *Measuring GDP in a digitalised economy*
- G20 Digital Economy Task Force
  - IMF-OECD G20 issues paper
  - OECD horizontal project: *Seizing the Benefits of Digitalisation for Growth and Well-being*
- Typology for digital Trade



# Survey on measurement of GDP and productivity in a digitalised economy



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

29 country responses  
(as of 1/10/2016)



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# Our take on the MMH in 6 domains



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# 1: New forms of intermediation services



# Digital intermediaries

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## Digital intermediaries

### For C2C

Dwelling services  
(AirBnB)

Business & Transport  
(Uber),

Distribution (e-Bay)

Finance (crowd-  
sourcing)

## Conclusions:

**Underling activities are not new > Conceptual framework sufficiently robust – (VA=fees, commissions, margins)**

**But rise in ‘informal’ (*occasionally employed*) activities means that estimation methods may need to be adjusted**



# Dwelling services by households



## Issue

- Long-term rentals

## However

- Short-term rentals – likely to have increased significantly:
  - And may be undeclared by the ‘occasional self-employed’

## Impact

- Not expected to be large as a result of imputed rent.
- Matters if short-term price is significantly larger than long-term (and imputed price)
  - Affecting in turn volumes
- Labour input?



## Business and transportation services



### Issue

- Again: emergence of the ‘**occasionally self-employed**’
- Treatment of **consumer durables**

### Impact

- Possible increase in ‘informal’ activity
  - and current (e.g. LFS) methods may require reviewing
- But also possible that ‘formalisation’ has increased.....
- No impact on GDP
  - But impact on measured productivity and investment
  - **A few countries make this distinction** based on car registration, surveys, private market research, assumptions



# Distribution services



## Issue

- Sale of **second hand goods** between households...
- Sale of **new goods**: recording of value-added unlikely but **small scale in OECD countries**

## Impact

- Distribution margin = zero by assumption
- Not expected to be significant



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## 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**



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## 3: Free and subsidised consumer products



## Free services

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Households as 'producers' of advertising services and Big Data

**Access to free media services, financed by:**

**Not a new phenomena**

*And estimates point to small consumer surplus*

*Advertising revenues*  
*Big data collection*

**And on the 2008 SNA  
Research Agenda**

The survey indicated only **one country has done research** on this issue:  
Nakamura and Soloveichik (2015)

***Advertising-supported entertainment accounts for less than 0.5% of nominal GDP. Only raises overall growth rates by 0.018% per year***



# Free assets

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## 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*

**But there may be  
benefits in  
understanding scale and  
contribution to growth**



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## 4: Cross-border flows of intellectual property products



# Knowledge based capital and globalisation

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**'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 may be needed as the scale of the problem remains unknown**

**Case in point: Ireland's GDP growth**



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## 5. Prices and volumes



# Prices and volumes

A significant challenge

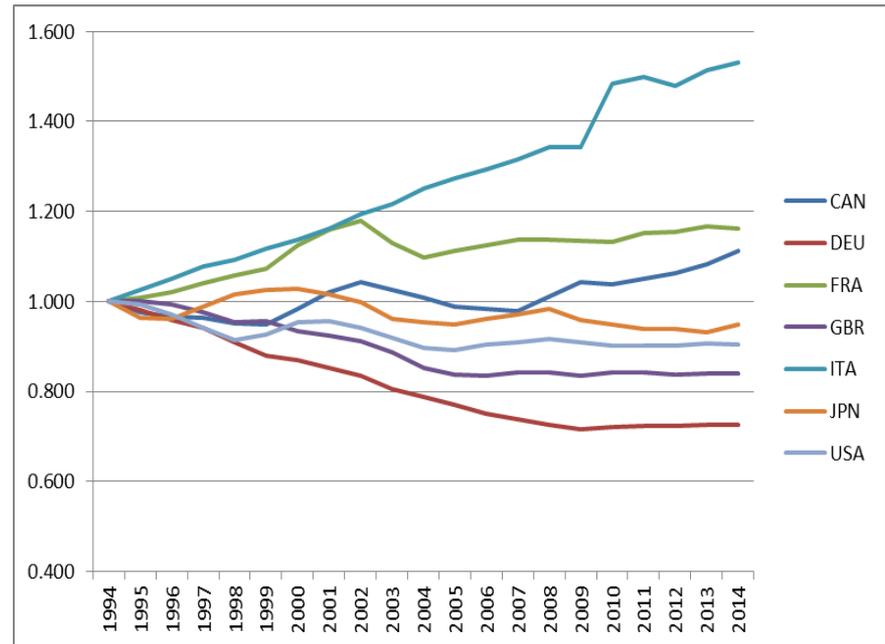
Not a new phenomena  
**but challenges remain**

Customisation

Outlet bias

Quality change

Price indices for software investment





## Prices and volumes: results from survey

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### Issue

- Price differences in distribution margins from buying products on-line versus in a store:
- If producer prices of goods that appear identical differ:
- Participative production

### Response

- **change in price; (16)**  
**change in quality. (9)**
- **Difference in price (18), in quality (5)**
- One country (self-service checkouts)

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.



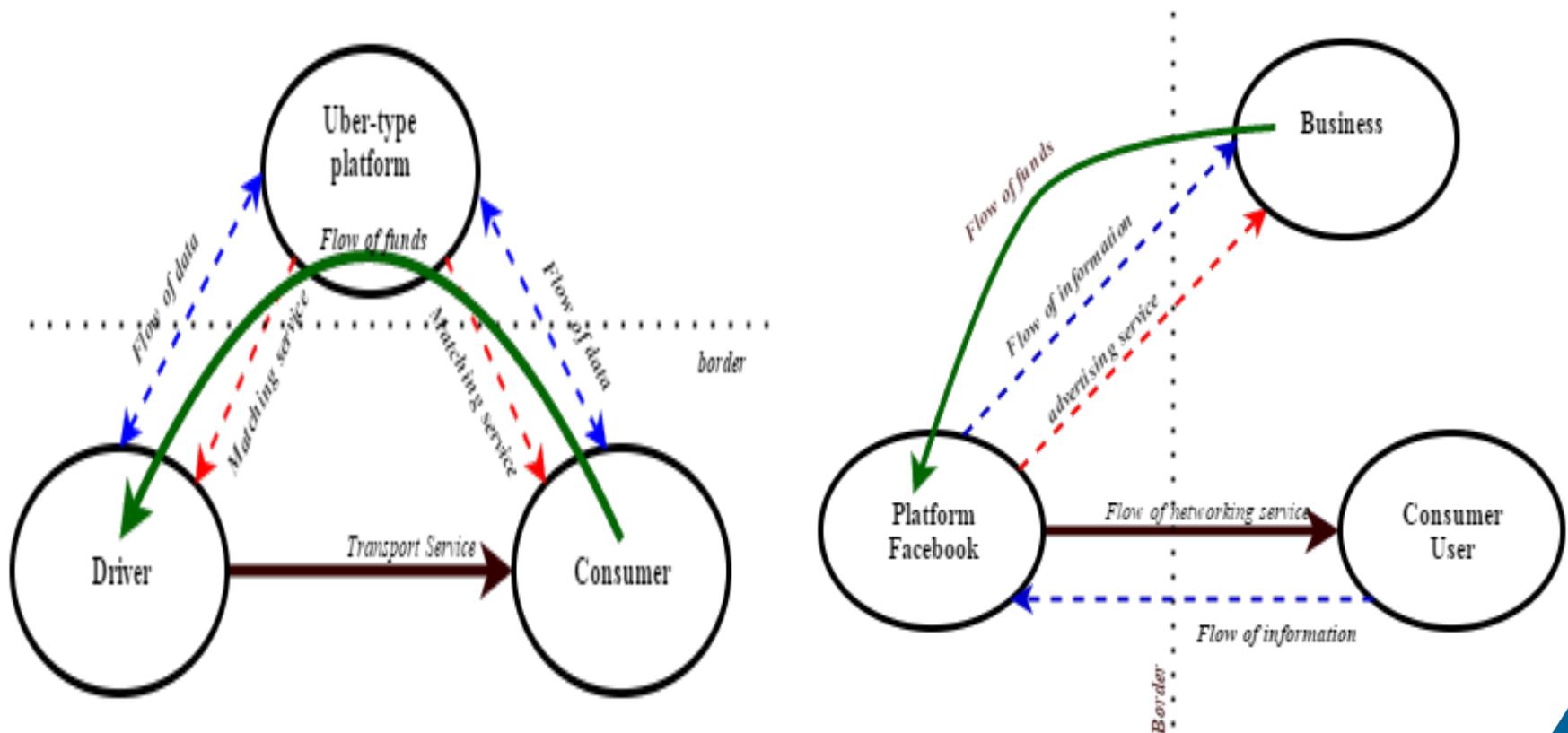
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## 6. Digital Trade



# 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**





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# In Conclusion





## Conclusions

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- **That the 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***
  - **And, of course Prices**
    - ***Although, again, the evidence so far suggests that this will not be able to explain the productivity slowdown***



## Conclusions (2)

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- **But the problem can be part of the solution**
  - **Digital intermediaries** are increasingly called to disclose turnover from clients
- **Big data** offers new ways for price measurement and quality adjustments (as in Cavallo and Rigobon 2016)
- Also need to recognise need for complementary statistics to bridge gaps between consumer surplus and GDP (satellite accounts)



## Follow-up

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- **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
  - **Value of free digital services** financed by revenue from advertising and explicit monetary transactions of user data;
  - **Value** (to consumers) **of free digital services** provided by Wikipedia.
- **Create a task force** of national accountants to discuss issues related to the digital economy + G20 work



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**Thank you**

