BETTER POLICIES FOR BETTER LIVES

Recent developments in productivity measurement

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Introduction

- Productivity = output/input
- Issues:
  - Identifying, measuring and aggregating inputs and outputs
  - Level of measurement (economy, industry, firm)
- Academic community dealing with productivity measurement and analysis
- World KLEMS network
- NSOs: no clear trend

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This presentation

1. Bringing nature into the productivity picture

2. The firm level: productivity measurement with micro-data

No claim for comprehensive presentation of recent developments

Bringing nature into the productivity picture

Bringing nature into the picture – input side (1)

- **Typical inputs:** labour, produced capital, intermediate inputs
- **Often neglected:** non-produced natural assets:
  - Mineral resources
  - Soil/land
  - Timber
  - Aquatic resources
  - Water

Bringing nature into the picture – input side (2)

- Why important?
  - Assessing contribution of natural assets to economic growth
  - Measuring productivity correctly
  - Policy implication: is growth driven by MFP or by natural assets
  - Note: without measurement, direction of bias unknown

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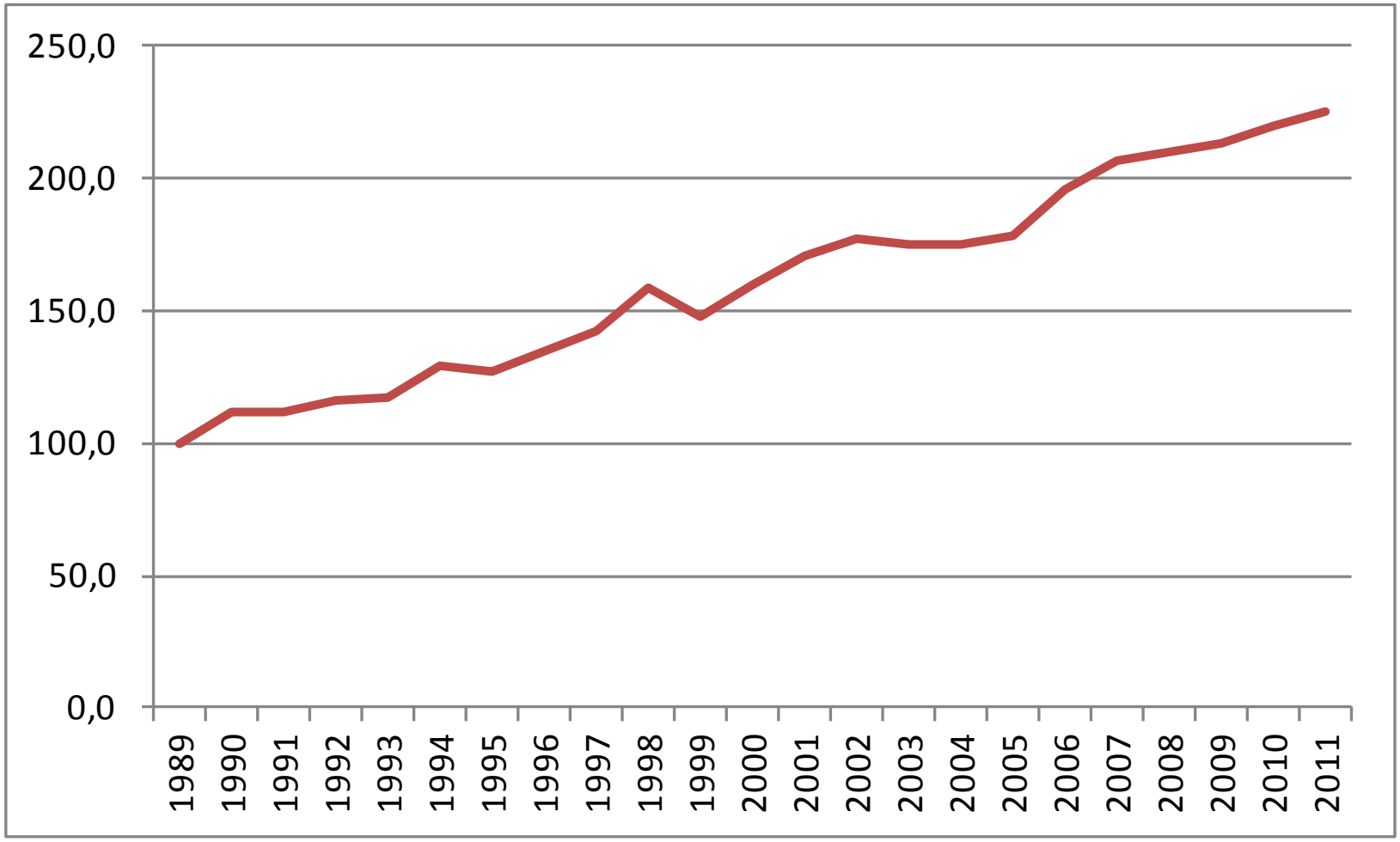
Volume index of subsoil asset removals, Australia, 1989=100



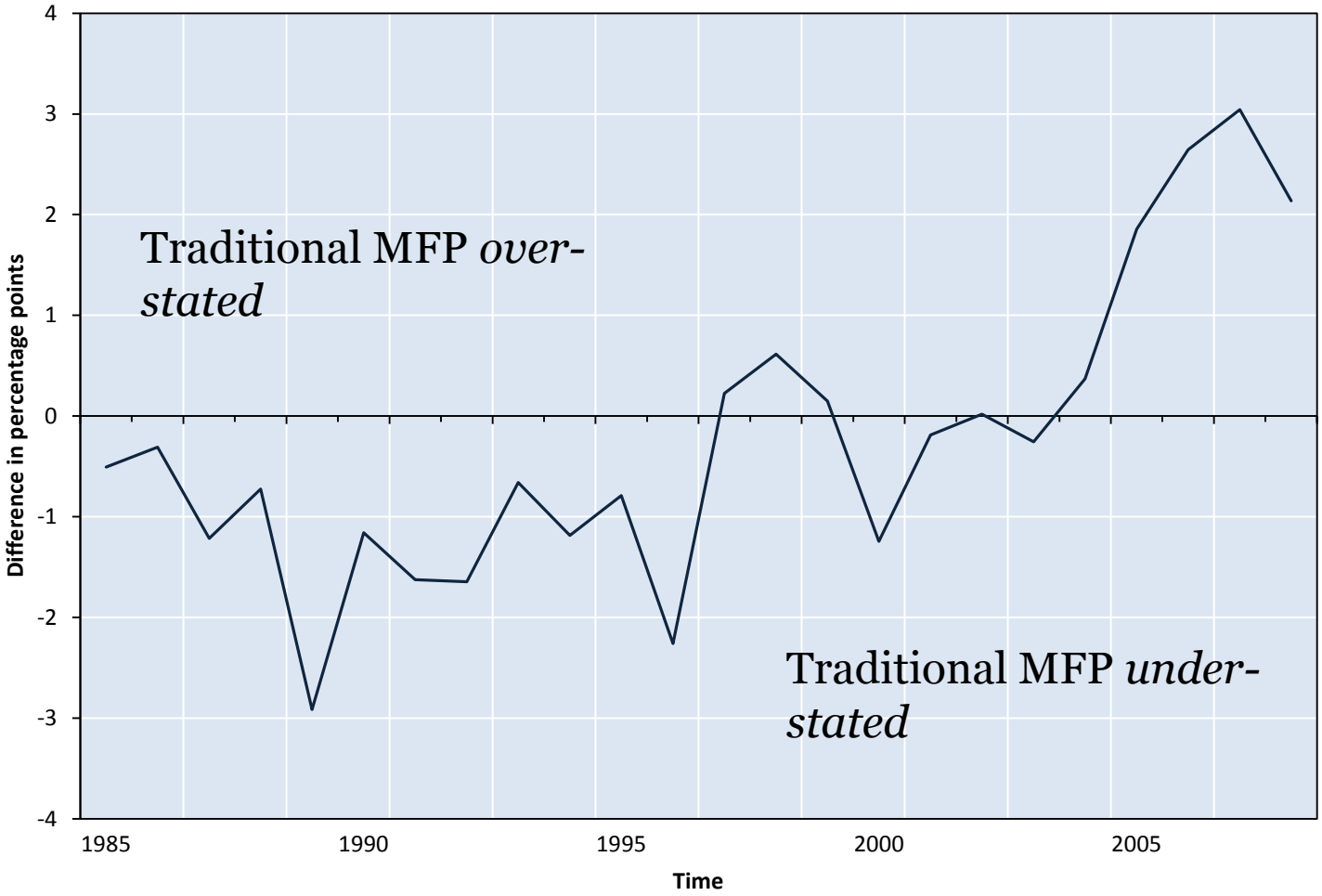
Source: OECD calculations, based on ABS data.

No unambiguous direction

Effect of including natural resource input on measured productivity growth:

- Traditional MFP > adjusted MFP if :
  - natural resource input growth > traditional input growth
  - i.e., total input growth has been *under*stated
  - i.e., traditional MFP growth has been *over*stated
- And vice versa

Norway – Difference between adjusted and traditional MFP growth



Source: *OECD, work in progroess.*

Challenge: quality of natural resource input

- Capture changing **marginal extraction costs** (which may be increasing)

- Capturing changing **quality in the resource itself** eg declining soil quality

→ failing to do so will overstate measured contribution of natural resource to output and understate MFP

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Effects on productivity measures: Australia's mining industry

- Study by Productivity Commission (Topp, Soames, Parham, Bloch 2008):
- Similar in spirit except that mining output is adjusted for declining yields
- Underlying rate of productivity growth is around 2.5 per cent p. a., compared with stagnant standard MFP (1974 to 2007)

→Natural resource input has grown less quickly than other inputs, so MFP was understated by traditional measure

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Bringing nature into the picture – output side (1)

- Production processes often accompanied by undesirable outputs, e.g., emissions
- From producer and MFP measurement perspective:
- Relevant in presence of environmental policies:
  - explicit price (e.g., tax) or
  - implicit price (marginal abatement costs due to regulation)
- Are traditional MFP measures over-or understated?

Again, no unambiguous effect on measured productivity (1)

Example:

- Given inputs (labour, capital,…)
- Rising traditional output
- Constant emissions

→adjusted MFP > traditional MFP

→Productivity growth was required to keep emissions at bay

Again, no unambiguous effect on measured productivity (2)

- But overstatement of traditional MFP if emissions grow quicker than traditional output

- For many pollutants (NOx, Sox, CO2,…) relative decoupling in many OECD countries

→ Understatement of traditional MFP

Private and social valuation

- **Producer perspective = private valuation**
  - marginal abatement cost for producer
- **Welfare perspective = social valuation**
  - marginal cost to society = producer costs + consumer costs + externalities
- Both perspectives meaningful but should not be mixed up
- If productivity measurement is based on producer theory, producer perspective is called for

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OECD work in this area…

- As part of *green growth indicator* work
  - MFP adjustment with **natural asset inputs**
  - MFP adjustment with **undesirable outputs**
  - **Index of natural resources**

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Important international development: SEEA

- System of Integrated Environmental and Economic Accounts
- Adopted at UN level in 2012
- Consistent accounting for environment-economy interaction
- Basis for indicator work
- Unifying element: balance sheets
  - Stocks, additions, removals
  - Physical and monetary valuation
- Major task ahead: implementation

The firm level: productivity measurement with micro-data

Firm-level measurement

- Drawbacks
  - No prices, capital proxy, employees, incomplete sector coverage, short time-spans
- Avantages
  - Entry, exit, reallocation
  - Within-firm cycle/growth
  - Understanding/measuring both firm-level levers and environmental factors driving growth

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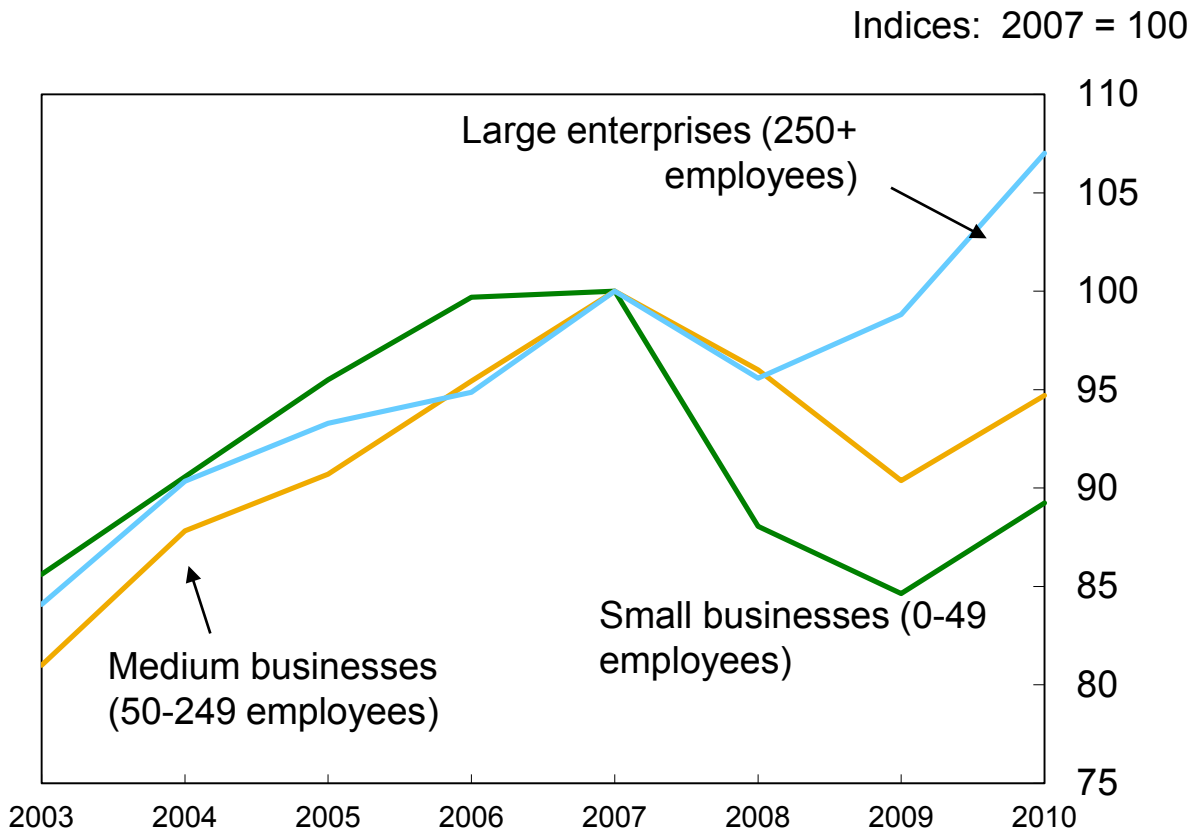
Stylised facts from micro estimates (1)

- Huge productivity dispersion
  - Even within very narrowly defined industries
  - Firm size plays an important role
  - But how accurately are outputs measured?

UK: Labour productivity by firm size

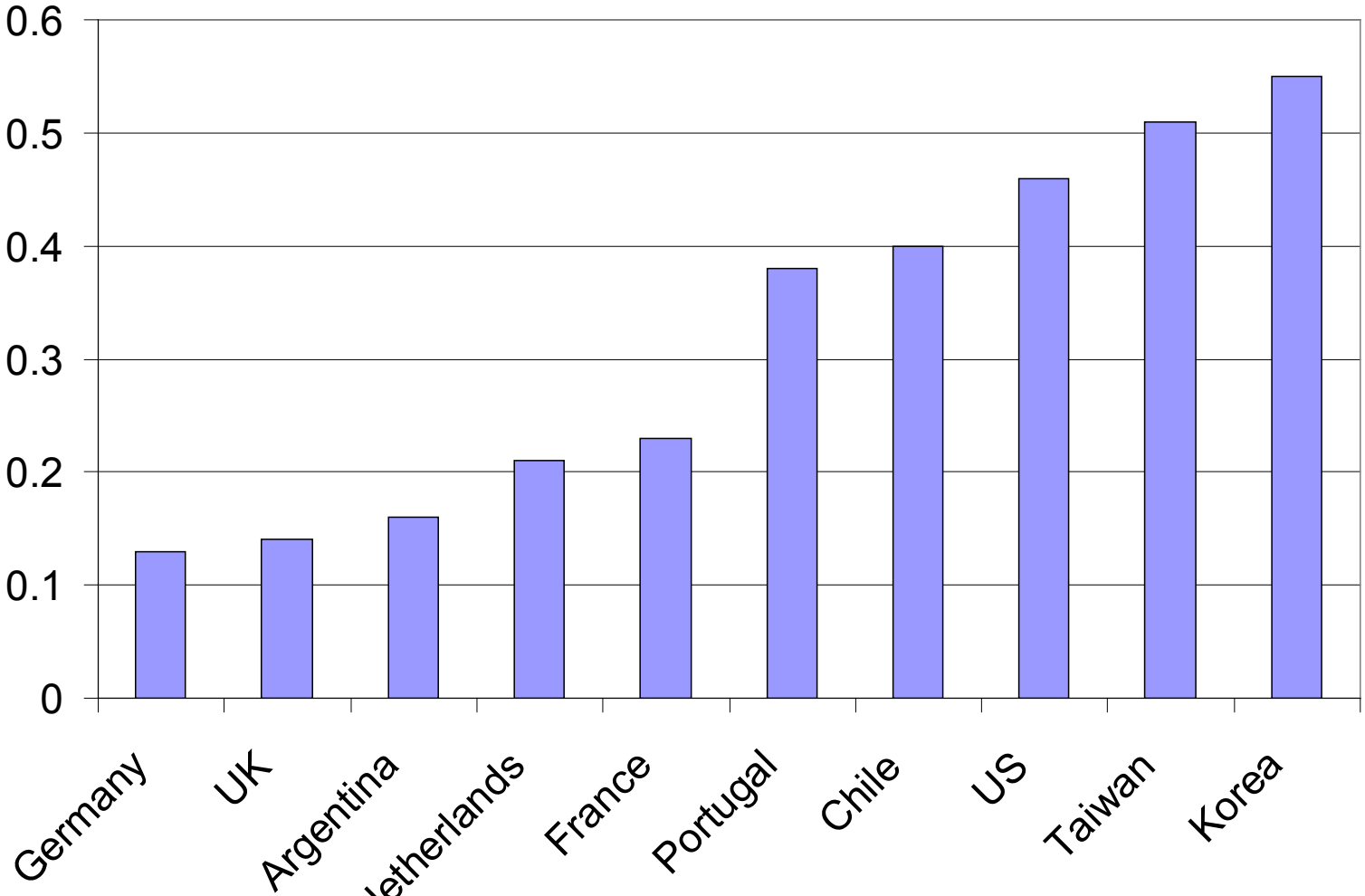


Source: J. Saleheen, Bank of England 2012

Stylised facts from micro estimates (2)

- Reallocation or resources to high-productivity producers important
- Competition—consumers can easily switch suppliers
- Labor and capital market flexibility
- Summary measure of reallocation: correlation between productivity and market share

Correlation between Productivity and Market Share



Source: Ch. Syverson November 2012

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Firm-level measurement requires dealing with…

- Large volumes of data
- Confidentiality issues
  - Small countries
  - Narrowly defined industries
- No international standards – reduced comparability

- NSOs have taken up issue

Conclusions

Conclusions (1)

- Nature of productivity implies cumulation of measurement challenges
- Quality of source data (national accounts, firm-level data) key
- Integrating productivity measurement into official statistics important but not yet widespread

Conclusions (2)

- Tricky output measurement in particular in:
  - Financial services
  - Health, education, general administration
  - Undesirable outputs

- Tricky input measurement:
  - Hours worked by industry and by skills
  - R&D capital (new in national accounts)
  - Natural capital

- Intangibles

Thank you!