National Accounts transformation and improvement to deflator quality

Craig Taylor & Rebecca Keane
Outline

• Transforming the UK National accounts
  - Increased exposure for use of deflators

• The deflator dashboard

• Drive for dedicated deflator teams

• Next steps for the team
Transforming the UK National Accounts
Background

• The same production process for compiling national accounts has been in place since the early 1990s
• Based around Supply and Use Tables (SUT) for Current Price balancing and top-level confrontation of volume GDP
• Sector and Financial Accounts and Balance of Payments were subsequently compiled after GDP is settled
• Public Sector Finances compiled alongside national accounts
Reasons for reviewing process

• The old production process was regarded as complex, inefficient and time consuming
• Caused mainly by the approach to balancing data in stages:

  Annual CP GDP → Quarterly CP&CVM GDP → Sector Accounts → Balance of Payments

• New requirements (particularly Supply and Use Tables in Previous Years’ Prices) meant that the whole process needed reviewing
Key goals

- Implement **double deflation** in order to meet key stakeholder requirement needs
- Produce **SUTs in PYPs** to meet legislative and regulatory requirements
- Develop systems and processes to **produce real GDP on annual basis through SU framework**
- Streamline production process, drawing **closer connection between two key presentations of National Accounts; product and industry through SUT and Institutional Sectors**
- Maintain **consistency across the accounts** (include GDP, SFA & BoP)
- Exploit **new data** and improve quality of outputs
Target Production Process

• Implement annual SUTs in PYPs, via the H-Approach, with increased integration with Sector and Financial Accounts

• The approach will see both nominal and real estimates produced via the same detailed framework in a more iterative approach

• As a result there will be greater coherence between the deflators used across the Production and Expenditure measure of GDP
The H-Approach in 5 Stages

1. **Current Prices**
   - Supply
     - Industry
     - I
     - M
     - T
   - Use
     - Industry

2. **Domestic Supply**
   - Industry
   - Product

3. **Domestic Use**
   - Industry
   - Product
   - Deflation (with domestic and export split)

4. **Previous Years’ Prices**
   - Supply
     - Industry
     - I
     - M
     - T
   - Use
     - Industry
   - Re-allocate PYP estimates of:
     - Taxes and subsidies on products
     - Trade and transport margins
   - Add PYP estimates of:
     - Imports of goods and services

5. **Other supporting analyses**
   - Taxes/subsidies split at each stage
   - Deflation
   - PY rate x volume change

**Purchasers’ prices**
- Re-allocate:
  - Taxes and subsidies on products
  - Trade and transport margins
- Remove:
  - Imports of goods and services
Visual look at the new framework

<table>
<thead>
<tr>
<th>112 Industries</th>
<th>Inputs at basic prices</th>
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<thead>
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<th>112 Industries</th>
<th>Intermediary Use</th>
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- VAT
- Other taxes
- Other subsidies
- Trade and Transport Margins
- Import of Goods (EU)
- Import of Goods (Non-EU)
- Import of Services
- Output at basic prices
- Inventories
- Market output: Export of Services
- Market output: Export of Goods (Non-EU)
- Market output: Export of Goods (EU)
- Non-market output produced by NPISH
- Non-market output produced by Government
- Market output for domestic use
Recap on previous approach

• Fundamental difference in the balancing approach for current price and volume estimates
  ➢ Volume only reconciled at aggregate GDP level, not by product and industry through the SUT framework

• Sequential approach
  ➢ Close current price balancing before moving onto later stages

• Inconsistent use of deflators
  ➢ Applied directly to each transaction, at varying degrees of detail and different classifications
Deflator dashboard – increased understanding to support the new process
Deflators approach to national accounts transformation

• The new framework confronts data at a product level across both CP and volume indicators
  ➢ Each matrix has product detail, so appropriate deflator required for each
• Required us to review deflators at this level of detail right across the accounts
• For each matrix and each product, there is a default deflator (e.g. IPIs for Trade in Goods import matrix)
• Develop a way to evaluate if these are most appropriate and evidence decisions to change
• Review the data deflated with each choice to confirm the recommendation makes sense
Deflator Dashboard

- An interactive tool bringing together information on deflators
  - Conceptual Scores
  - Data Quality Scores
  - Coverage of the aggregation structure
  - Data Content Score – how many items/prices are collected for each index
  - Price and Volume data and deflator variability over time
Deflator Dashboard

Architectural and engineering services; tel

Deflitor Review

Compositbn of Top Level Deflitors

Prod (AEI PRDD series)
WMCP
SP
PPA
Implied
EPI
CPY
CPICOP
COXOP_CPA
AWE
Quality measures

- Conceptual quality
- Data content
- Data coverage
- Deflator changes over time
Conceptual scores

• Based on the A, B, C methods in the Eurostat Price and Volume handbook
  A method – most appropriate deflator
  B method – used where an A method cannot be applied (less appropriate)
  C method – not an appropriate deflator
    – should not be used
• Implied deflators scored as B methods
• Converted to numerical scores to allow visual graphs to be produced in a dashboard format:

<table>
<thead>
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<th>Method type</th>
<th>Score</th>
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<tr>
<td>A</td>
<td>10</td>
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<td>B</td>
<td>7</td>
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<td>C</td>
<td>4</td>
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Conceptual scores

- Based on the A,B,C methods in the Price and Volume handbook. (A=10, B=7, C=4)

- Applies to the concept it is currently used to deflate.
- Any deflator ‘swaps’ would need to be reviewed for conceptual appropriateness.
Average data quality score

- Overall quality scores given to deflator types – i.e. CPI, PPI, IPI, EPI or SPPI and selected others.
- Based on 21 factors such as pricing methods, geographical coverage, frequency of updating weights, sampling methods etc.
Coverage score

- Reflects how much of the CPA structure is covered by the available deflators: PPI, SPPI, EPE, IPI and CPI-type deflators.

- For a CPA product:

\[
\text{% Coverage score} = 100 \times \frac{\text{unique 6-digit indices collected}}{\text{total unique 6-digit indices}}
\]

- Eg. CPA 1.1: 72 separate 6-digit indices
  - 9 have prices collected
  - Coverage = 13%
Coverage score

- Blue bar – proportion of each top-level deflator with coverage score assessed
  - No blue bar indicates not possible to score deflator coverage within matrix for the selected product
    - All main deflators under ONS responsibility were assessed
    - Analysis did not extend to some smaller or externally held deflators – consideration for future
- Orange line – shows % coverage
Average data content score

• RAG score assigned to each 6-digit index
  According to the number of prices collected:
  • Red – Minimal
  • Amber – Acceptable
  • Green – Good

• Product level indices are then scored numerically
  Range 0 – 10
  Based on % R, A and G 6-digit indices within that product level

• Ignores indices where no data is collected; shows the quality of the sample where a sample was collected
• Each 6-digit index is assigned a RAG score based on the number of prices collected for each index.

• Ignores indices where no data is collected i.e the quality of the sample where a sample was collected.
Deflator changes over time

**Price and Volume Data**
- The Deflator Value graph shows the time series of top level deflators over time, using the annual average of the deflator for each year between 1997 and 2017 (Data provided by the PPIP Team).

**Average Annual Change in Deflator**
- The average change in a deflator year to year was aggregated to generate a variance score.

- Those which deviated by two standard deviations from the mean are highlighted as having high variance.

- Information on the number of years since the deflator value changes is provided to allow for early detection of flat lining.
Outcome of this work

• Much clearer understanding of the quality of our deflators across National Accounts
  ➢ Not the end of the journey though, as have lots more work to do here
• In a better position to support adoption of new target approach – able to make more informed decisions
• Also has shone a light on weak areas
  ➢ Allowed us to identify priority areas of deflator development from point of view of core accounts compilation
  ➢ Given us a framework for measuring progress
Dedicated deflator team
Why we need a deflator team

• Bean Economic review- recommends a better understanding and use of deflation across the accounts
• No clear ownership of deflators causing inconsistent application and lack of understanding
• Integration of annual chain linked business prices into national accounts
• Raising visibility of quality assurance and story telling for deflators
• Improving consistency of deflators used in national accounts
Structure for the deflator teams

- Split into 2 teams with 2 different functions

<table>
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<tr>
<th>Deflator Production team</th>
<th>Deflator Development team</th>
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<tr>
<td>● Use Price indices and other sources (admin, microdata) to compile the best quality deflators—gateway into National Accounts</td>
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<td>● Ensure consistent use of deflators across Economic Statistics</td>
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<tr>
<td>● Feed requirements to Deflators development team e.g. priorities areas</td>
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<tr>
<td>● Providing briefing and training to National Accounts colleagues</td>
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<tr>
<td>● Providing deflators to meet needs of ESG and wider outputs.</td>
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<td>● Explain the impact on volume estimates as a result of changes to deflators</td>
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<tr>
<td>● Deflator methods – horizon scanning, sourcing new data inputs, continuous improvement</td>
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<tr>
<td>● Working with colleagues across National Accounts to identify priority areas for development</td>
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<tr>
<td>● Key emphasis on areas raised by key external stakeholders (e.g. Bean review), exploring role that mismeasurement of deflators could have on such things as the productivity puzzle</td>
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<tr>
<td>● Working closely with Prices division to set requirements for prices development, making the optimum use of Price indices in the creation of deflators</td>
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Next steps for the deflator team

• Collect and refine requirements from short term indicator teams and national accounts

• Develop deflators highlighted with areas of improvement in line with transformation

• Develop the dashboard and metrics for ongoing measurement and reporting on deflator quality

• Set up the team structure for making this a production area—work with Finland