Quality Change for Services Producer Price Indexes (SPPI)

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Goals

1. Consult with price experts to obtain further opinions and guidance on quality adjustment of SPPIs
2. Opportunity for interaction between Voorburg Group and Ottawa Group
Services Producer Price Indexes

- SPPIs are the output PPIs of services industries.

  “The principal conceptual basis for the output PPI is the fixed-input output price index (FIOPI). The output PPI thus aims to measure an output price index constructed on the assumption that inputs and technology are fixed.” PPI manual, 7.44
Question 1

Traditionally statistical offices have used a production function approach to quality adjustment of Service Producer Price Indexes (SPPI). Are there service industries for which a consumer utility approach would be a better conceptual basis for quality adjustment?
Air Transport

- Unit value is one of the recommended approaches for measuring price change in this industry.
- Production function approach to QA fits well with this model.
  - Quality change based on changes to inputs (seating configuration, flight crew, etc., fuel, etc.)
  - Fix quality of the flight, not the individual consumer.
## Discrepancy between producer and consumer valuations of the QA
### Aircraft seat example

<table>
<thead>
<tr>
<th>Year</th>
<th>Observed price (£)</th>
<th>Quality adjustment (£)</th>
<th>Quality Adjusted Price (£)</th>
<th>Price index SPPI</th>
<th>Observed Turnover (£)</th>
<th>Derived (constant price) output</th>
<th>Change in volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>140</td>
<td></td>
<td>140</td>
<td>100</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>-</td>
</tr>
<tr>
<td>2010</td>
<td>126</td>
<td>14</td>
<td>140</td>
<td>100</td>
<td>5,250,000</td>
<td>5,250,000</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

- Change in configuration of aircraft, increase number of seats (smaller), change in production function
  - Leads to a decrease in operating costs and a decrease in price
  - To deliver same level of quality, firm needs to increase price by 14 (QA)
  - Leads to increase in volume

<table>
<thead>
<tr>
<th>Year</th>
<th>Observed price (£)</th>
<th>Quality adjustment (£)</th>
<th>Quality Adjusted Price (£)</th>
<th>Price index CPI</th>
<th>Observed Consumer Expenditure (£)</th>
<th>Derived (constant price) expenditure</th>
<th>Change in volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>140</td>
<td></td>
<td>140</td>
<td>100</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>-</td>
</tr>
<tr>
<td>2010</td>
<td>126</td>
<td>28</td>
<td>154</td>
<td>110</td>
<td>5,250,000</td>
<td>4,772,727</td>
<td>-4.5%</td>
</tr>
</tbody>
</table>

- Consumers place more value on leg room than the QA estimated from the producer side. A QA of 28 is required to get back to same level of quality.
  - Translates into a 10% increase in CPI
  - Leads to decrease in volume
Discrepancy between producer and consumer valuations of the QA Aircraft seat example, continued

- The supply-demand identity for a given product or service in the SNA is:

\[
\text{Supply} = \text{output} + \text{imports} + \text{transport margin} + \text{trade margin} + \text{taxes} - \text{subs. on products} = \text{intermediate consumption} + \text{final consumption expenditure} + \text{gross capital formation} + \text{exports} = \text{Demand}
\]

- Assuming that consumers purchase 100% of the output and that there are no margins or taxes, it follows that:
  \[
  \text{output} = \text{final consumption expenditure}
  \]

- Identity cannot be resolved in real terms if PPI and CPI are different
Question 2

If National Statistics Offices follow a production-function approach to quality adjustment of SPPIs, where in the System of National Accounts would we account for the conceptual source of the discrepancy between CPI-based deflators of final demand and PPI-based deflators of service industry outputs?
Wholesale and Retail Services

Quality adjusting goods or service portion?

- SNA output definition excludes the good
  - The recording in the SNA of transactions for wholesalers and retailers does not mirror the way in which those involved view them. The purchases of goods for resale by wholesalers and retailers are not recorded by these units explicitly, and they are viewed as selling, not the goods, but the services of storing and displaying a selection of goods in convenient locations and making them easily available for customers. This partitioning measures output for traders by the value of the margins realized on goods they purchase for resale. (SNA 2008, 3.68)

- If output definition excludes the good then QA should not be carried out on the underlying good.
Question 3

- Is the underlying good part of the distributive trade service? Should the changes in the quality of the good sold be included when quality adjusting the distributive trade service?
Wholesale and Retail Services

Quality adjusting goods or service portion?

Example:

- $V = \text{value}$, $P = \text{price}$, $Q = \text{quantity}$, $V = P \times Q$
- 10 widgets produced by manufacturer and sold to a consumer by a wholesaler/retailer
- Produce price of widgets = $10
- Final purchase price of widgets = $15

<table>
<thead>
<tr>
<th></th>
<th>Output</th>
<th>+</th>
<th>Trade Margin</th>
<th>=</th>
<th>Final Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V$</td>
<td>100</td>
<td></td>
<td>50</td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>$P$</td>
<td>10 (PPI)</td>
<td></td>
<td>5 (15-10) (Margin Price)</td>
<td></td>
<td>15 (CPI)</td>
</tr>
<tr>
<td>$Q$</td>
<td>10</td>
<td></td>
<td>10</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

- Example shows that margins are additive in terms of value and price
- The margins and margins prices are mark-ups on the output and output prices. They exclude the value of the good.
- Quality adjustment for the margin index should exclude any adjustment for good because the good is netted out of the margin calculation.
Wholesale and Retail Services
Quality adjusting goods or service portion?

- Service only view - Productivity is a function of capital and labour
- Goods view – Productivity of a firm is not based solely on its production function but also on the value provided to the consumer
Discussion
Questions

1. Are there service industries for which a consumer utility approach would be a better conceptual basis for quality adjustment?

2. Where in the System of National Accounts would we account for the conceptual source of the discrepancy between CPI-based deflators of final demand and PPI-based deflators of service industry outputs?

3. Is the underlying good part of the distributive trade service? Should the changes in the quality of the good sold be included when quality adjusting the distributive trade service?