Measuring substitution bias in the CPI – theory and practice.

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Overview

- Types of substitution bias
- Upper level substitution bias and estimation
- ABS methods
- Results from previous and current approach
- Conclusions
- Discussions/Recommendations
- References
Types of substitution bias

- Upper level substitution bias
- Lower level substitution bias

- Focus is on upper level bias
Components and estimation

- Laspeyres or Laspeyres-type
- Paasche or Paasche-type
- Monthly, quarterly and annual indexes
- No currently agreed standard approach?
ABS methods

- **Method 1 (Previous):** Quarterly indexes
  - Laspeyres-type
  - Paasche-type

- **Method 2 (Current):** Annual indexes
  - True Laspeyres
  - Paache and Paasche-type

- Method 2 implies annual underlying quantities and indexes?
  - True Laspeyres
## Results: Current and previous methods

<table>
<thead>
<tr>
<th>Time since re-weight</th>
<th>Laspeyres-type (June 2000-June 2017) (a)</th>
<th>CPI (June 2000-June 2017)</th>
<th>Laspeyres (ABS method)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year (b)</td>
<td>0.17</td>
<td>0.24</td>
<td>0.11</td>
</tr>
<tr>
<td>2 Years</td>
<td>0.10</td>
<td>0.14</td>
<td>0.17</td>
</tr>
<tr>
<td>3 Years</td>
<td>0.11</td>
<td>0.11</td>
<td>0.17</td>
</tr>
<tr>
<td>4 Years</td>
<td>0.13</td>
<td>0.13</td>
<td>0.18</td>
</tr>
<tr>
<td>5 Years</td>
<td>0.17</td>
<td>0.17</td>
<td>0.21</td>
</tr>
<tr>
<td>6 Years (c)</td>
<td>0.18</td>
<td>0.18</td>
<td>0.20</td>
</tr>
</tbody>
</table>

**a.** This takes the average of the average annual item substitution bias for the period June quarter 2000 - June quarter 2005, June quarter 2005 - June quarter 2011 and the period June 2011 – June 2017.

**b.** This figure includes the banana price increase in March 2006 and June 2011 for the CPI and the Laspeyres-type, which was a result of cyclone Larry and cyclone Yasi respectively.

**c.** The six-year average annual item substitution bias is only based on the index numbers for June quarter 2005 to June quarter 2011, and June quarter 2011 to June quarter 2017.
Conclusions

- Overall results similar and consistent to previous analysis
- Results consistent with other studies
- Annual indexes are conceptually sound
Can NSOs agree on this method?

Do NSOs consider this a true Laspeyres index?

Do annual indexes capture substitution better than point in time quarterly indexes?

Enable comparison of estimates across countries

Further analysis into these estimates
References


References


References


• van Kints, M & Bishop, G. (2013), “Geometric indexes and substitution bias in the CPI. Paper presented to the Ottawa Group”
Thank you!