Quality Adjustment in the Irish CPI

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Improving Quality Adjustment

- CSO established CPI Development Unit in 2016
- Enables us to give closer attention to methodological issues
- We determined Quality Adjustment most urgent issue, particularly in 2 areas
  - Clothing and Footwear
  - Electronic Goods
- Both areas have had consistently falling indices
Electronic Goods
Why indices fall - tracking 1 pricer over 2 years

Price's change compared to the index decrease
(Digital Camera)

Time

Prices

Index

Camera 1

Camera 2

Camera 3

Index

www.cso.ie
Why indices fall-tracking 1 pricer over 2 years

- Previous graph shows a common pattern in electronic goods
- New products enter the market at their highest price, then go on sale, finally become unavailable
- We deem the replacement product non-comparable, and do not compute a price relative for that item for that month. This pattern then repeats.
- A similar pattern occurs in clothing and footwear, with fashion the driver of this process instead of technological change.
Quality adjustment for electronic goods

• Initial focus is on computers and printers
• Trial of 2 quality adjustment methods
  • Hedonic Pricing (characteristic method)
  • Option Pricing
• Not able to use historic data because we have not retained enough attribute information
• Parallel run of the different methods from October 2017 to October 2018. We will implement best method in January 2019
Quality adjustment for electronic goods (2)

- Conclusions so far:
  - Hedonic model is giving good results for Computers but not for Printers
  - Option Pricing not practical for Laptop Computers and Printers, trialling it for Desktop Computers only
  - Hedonic approach takes more time to implement each month than current approach, but workload is acceptable
  - Both hedonic and option pricing are replacing falling index with rising index for computers. Hedonic pricing not affecting index for printers
Initial results of the parallel run show the change in the indices from October 2017 to February 2018.

<table>
<thead>
<tr>
<th></th>
<th>Bridged Overlap</th>
<th>Hedonic Pricing</th>
<th>Option &amp; Hedonic Pricing (Hybrid)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers</td>
<td>-3%</td>
<td>6%</td>
<td>17%</td>
</tr>
<tr>
<td>Printers</td>
<td>-11%</td>
<td>-11%</td>
<td></td>
</tr>
</tbody>
</table>

These are preliminary results. However, they indicate that the hedonic pricing method is more promising than option pricing.
Clothing and Footwear
Non-comparable replacements & falling indices

Number of non-comparable replacements

Toddlers outfit

Ladies tops

Index
Linear (Index)

$R^2 = 0.4172$

source: Central Statistics Office
Non-comparable replacements & falling indices

• Previous graph looks at each of the 68 clothing and footwear items we price.

• Large number of non-comparable replacements is associated with a falling index.

• Implications of this
  • Fashion items tend to have falling indices compared with non-fashion items
  • Ladies’ clothing and footwear tend to have falling indices compared with men’s and children’s.
Quality adjustment for clothing and footwear

- Key question is the balance between deciding a replacement is:
  - Non-comparable – leads to bridged overlap QA method
  - Comparable – leads to direct comparison QA method
- CSO have tended to favour deciding a replacement is non-comparable, e.g. for the 48,000 prices collected in April 2017

<table>
<thead>
<tr>
<th></th>
<th>Comparable replacement</th>
<th>Non-comparable replacement</th>
<th>Same representative product as previous month</th>
</tr>
</thead>
<tbody>
<tr>
<td>All items</td>
<td>2%</td>
<td>7%</td>
<td>91%</td>
</tr>
<tr>
<td>Clothing and Footwear</td>
<td>9%</td>
<td>14%</td>
<td>77%</td>
</tr>
</tbody>
</table>
Quality adjustment for clothing and footwear (2)

- We are simulating different approaches to the comparable/non-comparable decision, using historic data.
- If we had decided all replacements were comparable (i.e. Direct Comparison) from April 2016 to February 2017, we would have the following index changes for Ladies’ Dresses and for Men’s Vests:

<table>
<thead>
<tr>
<th></th>
<th>Actual Index</th>
<th>Index if only Direct Comparison was used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ladies’ Dresses</td>
<td>-17%</td>
<td>4%</td>
</tr>
<tr>
<td>Men's Vests</td>
<td>-1%</td>
<td>4%</td>
</tr>
</tbody>
</table>

- These results indicate that we should consider clothing and footwear replacements comparable much more often than we do.
Summary

• Establishing Development Unit enables focus on methodological issues

• Trial of Hedonic Pricing and Option Pricing for Computers and Printers, with hedonic pricing for Computers showing most promising results

• Analysis of historic data showing we need to deem replacements in Clothing and Footwear comparable much more often than we do