Office for National Statistics
Swyddfa Ystadegau Gwladol

Quality Adjustment Review of UK Consumer Price Statistics

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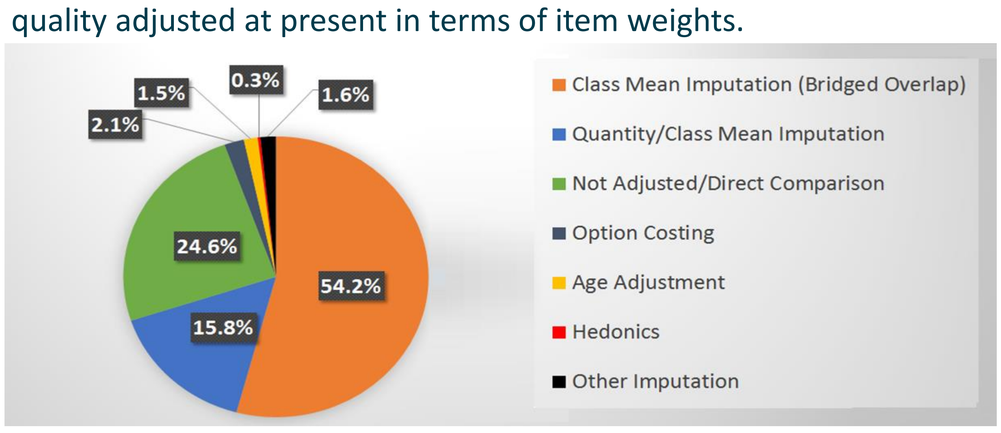
An independent review of UK consumer prices statistics was carried out in January 2015 and made a series of recommendations regarding quality adjustment. These include:

- Assessing the suitability of current quality adjustment methods and to introduce regular monitoring of their impact on consumer price statistics.
- Analysing how often non-comparable replacements occur for each item in the basket and investigating those items where this is frequent
- Collaborating with other NSIs to develop an informed international approach.

Figure 1- Breakdown of how the CPIH basket of goods and services is quality adjusted at present in terms of item weights.



Monitoring of Quality Adjustment

ONS has calculated **Implicit Quality Indices (IQIs),** which have been used to help identify the item level indices that are being impacted the most by our quality adjustment methods with the intention of flagging these items for investigation.

IQI = Standard Reference Index (Unadjusted Index) x 100
Quality Adjusted Index

If the value of the IQI = 100 then the adjusted and unadjusted indices are equal to each other. If the value lies between 95-105 then they are within 5% of each other etc.

The majority of items in the basket lie within the 5% range though certain seasonal items and digital goods have values that fall well outside this range.

Figure 2- Graphical representation of IQI results for food items

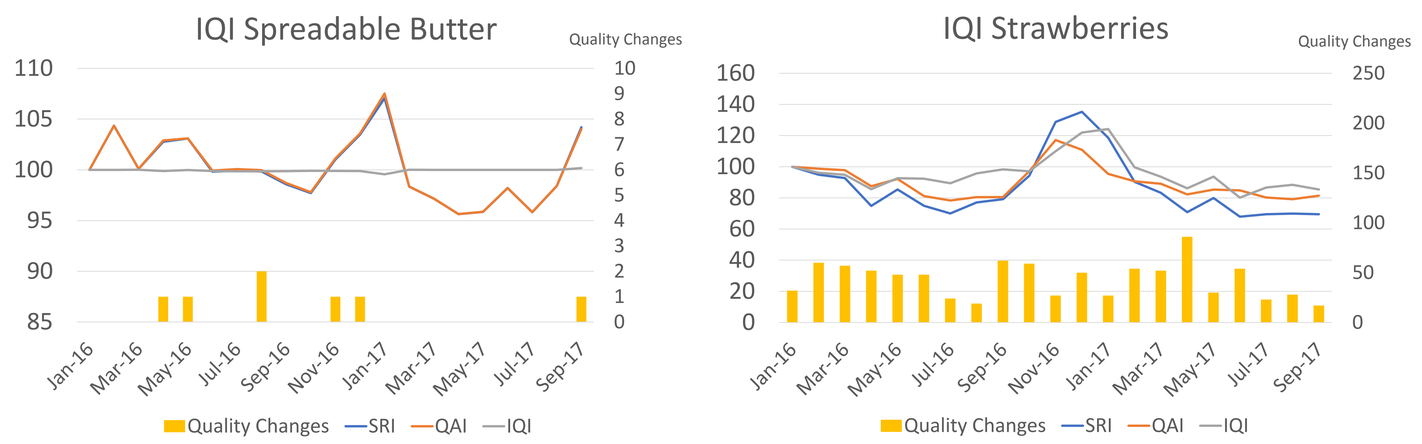
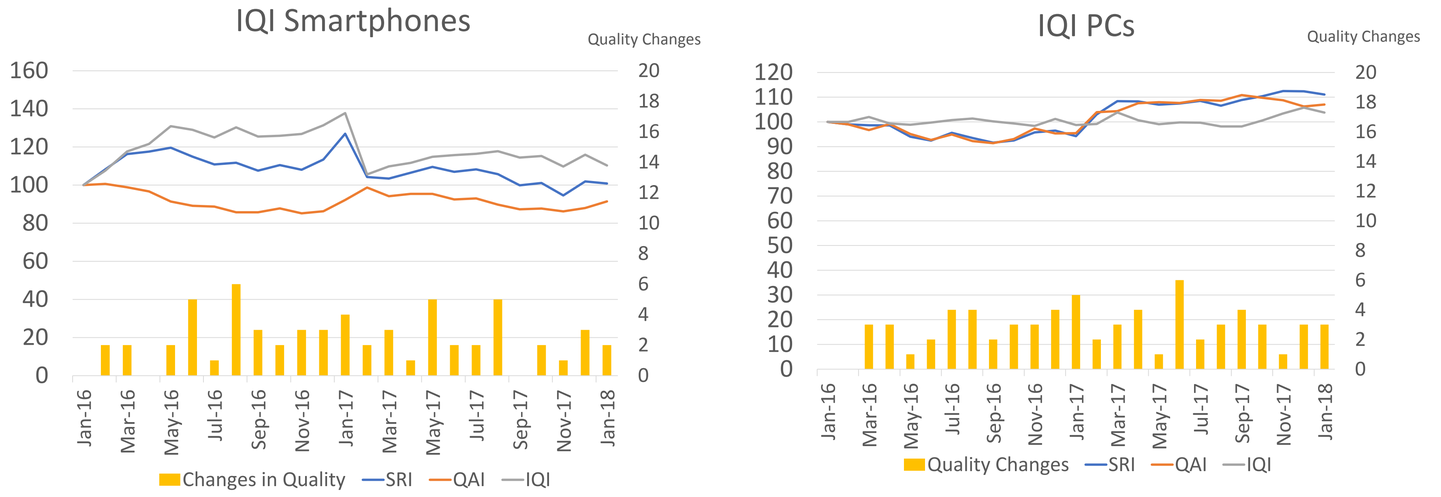


Figure 3- Graphical representation of IQI results for digital/telecom items



Monitoring of Non-Comparable Replacements

To monitor the number of non-comparable replacements in each item's sample, 3 methods have been used:

- **Method 1** is to calculate the total number of non-comparable markers as a proportion of the total sample size.
- **Method 2** involves working out the total percentage of imputation in the sample (the proportion of quotes in the sample that have an imputed base price as a result of quality adjustment). This is done for a whole year as one.
- **Method 3** is very similar to method 2 but looks at the situation on a month by month basis instead of the whole year as one.
- In general, it is quite unusual to see an item have a method 1 percentage that exceeds 5%, a method 2 percentage that exceeds 10% and a method 3 percentage that exceeds 20% and so items that exceed these thresholds may require investigation. Certain digital goods require a higher threshold, however, as the rate of product churn for these is far higher than average.

Figure 4- Non-Comparable Replacement Monitoring Results for Cheddar Cheese (left) and Blueberries (right). The cheese clearly doesn't require investigation but blueberries do.

Date	N Markers	Sample Size	No. Affected	Method 1: N Marker Prop	Method 2: Overall Imputed Percentage	Method 3: Monthly Imputed Percentage
Jan	1	116	0	0.55	2.00	0
Feb	1	135	0	0.55	2.00	0
Mar	1	140	0	0.55	2.00	0
Apr	0	143	1	0.55	2.00	0.70
May	2	136	2	0.55	2.00	1.47
Jun	0	137	2	0.55	2.00	1.46
Jul	0	143	3	0.55	2.00	2.10
Aug	1	143	4	0.55	2.00	2.80
Sep	1	140	4	0.55	2.00	2.86
Oct	1	143	5	0.55	2.00	3.50
Nov	1	139	5	0.55	2.00	3.60
Dec	0	134	7	0.55	2.00	5.22

Date	N Markers	Sample Size	No. Affected	Method 1: N Marker Prop	Method 2: Overall Imputed Percentage	Method 3: Monthly Imputed Percentage
Jan	22	109	0	20.77	33.20	0
Feb	5	134	22	20.77	33.20	16.42
Mar	12	128	18	20.77	33.20	14.062
Apr	32	78	4	20.77	33.20	5.13
May	42	78	17	20.77	33.20	21.79
Jun	25	81	21	20.77	33.20	25.93
Jul	39	100	41	20.77	33.20	41.00
Aug	12	108	49	20.77	33.20	45.37
Sep	9	86	55	20.77	33.20	63.95
Oct	33	111	59	20.77	33.20	53.15
Nov	20	103	50	20.77	33.20	48.54
Dec	8	131	78	20.77	33.20	59.54

Flagging Items for Investigation

There are a few different ways in which items could be flagged for investigation using the IQI and Non-comparable indicator results.

One option would be to simply apply limits. Eg. 5% for food items and 10% for telecoms as items outside this IQI range, at least going by the testing results, are essentially outliers.

Another approach would be to rank all items by their most extreme value and flag the top x amount where x is the number of items we can realistically investigate with current resources.

One final approach would be to combine the IQI and Non-Comparable results into a single scoring system which also takes into account the item's weight within the basket. Each item will obtain a separate score based on its most extreme IQI value and another score based on the number of non-comparable indicators it would get flagged by if thresholds were to be applied. These scores are then added together and then multiplied by the item's weight. This ensures that if the total of an item's IQI score and non-comparable score is 0 then the item will not get flagged simply because of its weight.

Figure 5- Extract of the scoring system being applied on digital items.

Item Name	CPIH Weight	IQI Score	Non-Comparable Score	Total Score
Laptop Computers	1.25	3	3	7.5
Digital Compact Camera	0.72	3	3	4.32
Digital Camcorder	0.58	2	3	2.9
Flat panel TV 33"/82.5cm or larger	0.84	0	3	2.52
Flat panel TV 23-32"/57.5-80cm	0.72	0	2	1.44
Interchangeable Lens Digital Camera	0.7	2	0	1.4
Tablet Computers	1.05	0	1	1.05
Personal Computers (HICP)	0.3	0	3	0.9
MP4 Player	0.21	0	3	0.63
Smart Phone Handsets	0.2	2	0	0.4
Blu-Ray Player	0.06	0	2	0.12
Digital Television Recorder/Receiver	0.06	0	1	0.06

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