Online price changes for high-demand products methodology

Latest quality and methodology information for online price indices for high-demand products from several, large UK retailers. These are experimental data created as part of the faster indicators release in response to the coronavirus (COVID-19) pandemic.

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1 . Overview of online price changes data

This methodology article referred to experimental online price changes published between 2 April and 20 August 2020 for products in a high-demand basket. These have now been replaced with an expanded set of indices, published for the first time on 10 September. For more information about these new indices, please see Faster indicators: online weekly price changes methodology

During the coronavirus (COVID-19) pandemic, we have been providing timely indicators of the effect of the disease on the UK economy and society in our Coronavirus, the UK economy and society, faster indicators bulletin.

These faster indicators include experimental online price indices for several high-demand products (HDPs), covering items such as long-life food, health, and household and hygiene products. These indices are created using daily web-scraped data from several, large, online UK retailers and provide an indication of weekly price change for items in the HDP basket.

As experimental indices, these data are subject to revisions as we develop our methodology and systems. Since the first publication of these data on 2 April, we have made a series of methodological improvements. These are detailed in Section 4: Timeline of changes to online price indices data.

2 . How we measure online price changes data

Prices are scraped daily from a number of large online UK retailers (typically supermarkets and other prominent high-street chains with an online presence) starting at 16 March 2020, and continuing over the course of the coronavirus (COVID-19) pandemic for selected items chosen to form the HDP basket (Table 1).

Table 1: Items in the high-demand products (HDP) basket

Long-life food	Household & hygiene products	Health	Other
Dried pasta	Antibacterial wipes – hand	Anti-inflammatory medication	Pet food
Long-life milk	Antibacterial wipes – surface	Paracetamol	
Pasta sauce	Handwash	Cough and cold medication	
Rice	Kitchen rolls	Vitamin C	
Tinned beans	Tissues		
Tinned soup	Toilet rolls		
Baby food	Spray cleaning products		
Flour	Nappies		
Tomato puree	Hand sanitizer		

Source: Office for National Statistics

An average weekly price is then calculated for each unique product.

Method

Because of the nature of these data and the impact that daily changes in product availability can have on chain drift within a chained Jevons series, we have chosen to apply a movement splice GEKS-Jevons index to these data. The movement splice GEKS-Jevons method is essentially equivalent to the GEKS method but it uses a rolling window of 5 weeks to ensure the data remain relevant to the current time period.

For more information on the movement splice GEKS method and our wider research into suitable index methodology for alternative data sources such as web-scraped data, please see our latest project update The winning formula? A framework for choosing an appropriate index method for use on web-scraped and scanner data (PDF, 434KB).

3 . Strengths and limitations of online price changes data

Comparability with other sources

It is not appropriate to compare the online price movements detailed in the Coronavirus, the UK economy and society, faster indicators release with the headline Consumer Prices Index including owner occupiers' housing costs (CPIH).

The CPIH is produced using different methods, data and quality thresholds, and incorporates a broader range of goods and services, such as housing. The online price movements data are experimental and are produced using experimental web-scraping techniques.

Strengths of the experimental online price indices

- The data present an indicator of the price movements of high-demand products during the coronavirus (COVID-19) pandemic.

- The data are available on a weekly basis, to allow week to week comparisons of price movements in these high demand products.

- The data are available 4 days after the reference period. This makes them a timely indicator for users.

Limitations of the experimental online price indices

- No comparable replacement or quality adjustments have been applied, which may lead to downward bias in the indices.

- Because of the nature of web-scraped data, there are no expenditure weights available at the product level. Therefore, there is no accounting for consumer substitution within these items. As we follow the same unique product over time, any substitution towards cheaper or more expensive items will not have an impact on the index, unless these types of products follow a different price change trend.

- For retailers that have a clear label indicating that a product is out of stock, we have removed those products from the analysis. However, other retailers may not have a clear indication of this, so there may be products currently out of stock that have still been included. If the prices of these items do not change, this could cause the index to remain static.

- Limited sample size and daily changes in product availability may result in volatility at the item level. In particular, the size of the sample means that sometimes single retailers can contribute to substantial movements at the item level.

4 . Timeline of changes to online price indices data

The publication of online price indices data was included in the first faster indicators publication on 2 April. As experimental indices, these data are subject to revisions as we develop our methodology and systems.

On 20 April we noticed an issue with the way our automated web-scrapers collected prices from one particular high-street retailer, which meant that these experimental price indices were overstating online price changes for some categories of high-demand products. This led to the online price indices being suspended and not published in the faster indicator's publication on 23 April.

We resumed publication of these data on 30 April. The data were corrected for the initial data collection error. The impact of this error was large, in particular on categories such as pet food, cough and cold medication and rice, which all saw substantial changes to the overall index values.

We have also taken the opportunity to improve our retailer weights and classification methods. While the impact of these changes was much smaller than the correction of the data collection error, they still had a small impact on items such as spray cleaning products and antibacterial wipes.

An additional retailer was also introduced from week beginning 6 April (week 4), which began contributing to the index and weekly changes from week 5.

In the weekly publications on 7 May and 14 May 2020, we made improvements to the way products are matched over time. On the 14 May, we also removed a single retailer from the series while we improved our methods for identifying unique products.

In the weekly publication on 21 May 2020, we reintroduced the retailer we removed in the previous week. We also improved the methods used to calculate the indices (the movement splice GEKS-Jevons method). The impact of these changes is small at the aggregate index level, although there were some larger changes for individual items, such as nappies and rice.

In the weekly publication on 4 June 2020, we made improvements to the way that we aggregate data from different retailers together. This change was made to ensure that retailers with particularly low or volatile samples had less impact on the final indices.

In the weekly publication on 2 July 2020, we improved the classification for the categories "antibacterial hand wipes" and "antibacterial surface wipes", and we made some further refinements to how we calculate the average weekly price for each unique product. The impact of these changes is small at the aggregate index level, although there were some larger changes for individual items including vitamin C and tinned soup, as well as the two antibacterial wipes categories.

In the weekly publication on 16 July 2020, we improved the classification for the categories "antibacterial hand wipes" and "spray cleaning products". The impact of these changes is small at the aggregate index level, although there were some larger changes for these items.

In the weekly publication on 20 August 2020, we improved the identification of unique products for one particular retailer. The impact of these changes is small at the aggregate index level, although there were some larger changes for individual items including vitamin C and tissues.

The updated historical time series for all individual HDP items are published in a dataset, updated weekly.

5 . Related links

Coronavirus, the UK economy and society, faster indicators: 16 April 2020
Bulletin | Released 16 April 2020
New data and experimental indicators on the UK economy and society, including information related to the coronavirus (COVID-19). Indicators are constructed from rapid response surveys, novel data sources and experimental methods.

Coronavirus (COVID-19) product page
Webpage | Updated as data become available
Latest data and analysis on the coronavirus (COVID-19) pandemic and its effects on the UK economy and society.

Rapid Review of Coronavirus, the UK economy and society, faster indicators
Webpage | Released on 9 April 2020
Letter from Ed Humpherson, the Director General for Regulation at the UK Statistics Authority, endorsing ONS's new experimental faster indicators.