Office for National Statistics

Boosting the Northern Ireland price sample for the Consumer Prices Index

Details of work that the Office for National Statistics is undertaking to produce consumer price inflation estimates for Northern Ireland through a sample boost to the price collection.

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1 . Introduction

Background

Our consumer price inflation measures track the change in price of a fixed basket of goods and services that is representative of consumer spending within the UK. This article provides details of work we are undertaking in collaboration with the Consumer Council for Northern Ireland (Consumer Council) to produce consumer price inflation estimates for Northern Ireland.

The Consumer Prices Index including owner occupiers' housing costs (CPIH) is used to measure consumer price inflation in the UK; that is, the rate at which the prices of consumer goods and services rise or fall. It was introduced in 2013 as a more complete measure of inflation than the Consumer Prices Index (CPI) as it additionally includes owner occupiers' housing costs (OOH), which make up a major portion of household consumption. In July 2017, the CPIH was re-designated as a National Statistic, after improvements to the OOH calculations were made. It is our lead measure of inflation and is based on recognised economic principles. The CPI is based on the methodology for Eurostat's Harmonised Indices of Consumer Prices (HICP), which is a harmonised methodology that allows international comparisons to be made.

CPIH and CPI measure the change in price of a "fixed basket" of goods and services that is representative of spending within the UK as a whole. Price changes for the goods and services in the basket are combined in line with the international Classification of Individual Consumption According to Purpose (COICOP) using a weight that reflects how much is spent on them. For the CPIH, approximately 45% of the price data (by weight) are collected locally from outlets in a sample of locations around the country. The remainder are collected centrally by Office for National Statistics (ONS) staff through websites, and by email and phone. The reasons behind this are explained in more detail in "Methodology" later in this section. Expenditure data for the higher-level weights are drawn from Household Final Consumption Expenditure in the national accounts. For more information on how our consumer price inflation statistics are compiled, please refer to the Consumer Price Indices Technical Manual. The price collection and weights data are optimised to give reliable estimates of inflation at the UK level but do not necessarily support the production of regional or country breakdowns.

Previous research by the University of Southampton, as described in the Feasibility study into producing CPIH consistent inflation rates for UK regions and The development of regional CPIH: assessment of small area estimation for regional expenditure weights, has assessed the feasibility of calculating the CPIH at a regional or country level. Studies have found a provisional regional index is possible to obtain using methods that closely resemble the construction of the national index. The main limitation of these studies was that regional price data have a small sample size and there is a question as to whether the provisional regional index can be said to be statistically significant. When constructing the national CPIH, a suitably large sample size is used that gives a representative and accurate estimate of the national price changes in the basket of goods. Constructing a regional CPIH involves dividing the national sample accordingly to each region.

For expenditure weights, Living Costs and Food Survey (LCF) data can be reconciled to CPIH spending totals to provide a regional breakdown. However, disaggregating the LCF sample into 12 regions means that regional sample sizes are much smaller than the national sample size. When it comes to the local collection, prices are obtained from outlets in 141 locations around the country. Locations are assigned based on the level of consumer spending within that region or country, so the price collection in Northern Ireland is a fraction of the national sample size. The smaller sample sizes would lead to a much less accurate regional index, both in the context of price movements in the region and the representativeness of spending in the region.

We have collaborated with the Consumer Council to boost elements of the price collection in Northern Ireland. Although we are at early stages of developing a reliable regional CPIH, this report aims to present the first steps of overcoming the limitation of having a small sample size for the Northern Ireland price collection. We showcase the early findings of a boosted sample and the challenges that come with it, as well as the steps that are to follow to deal with these challenges. It should be noted that the methodology is at an early stage of development, and so the results presented in Section 2 are purely indicative.

Methodology

We now describe how we have produced a consumer price inflation measure for Northern Ireland. In particular, since January 2022, we have aimed to double the sample of price quotes collected from outlets in Northern Ireland to allow for more robust inflation estimates. Some elements are out of scope of the sample increase, such as basket items with a national pricing policy and items collected in-house by ONS staff. Currently, the basket is weighted with UK-wide spending patterns; however, we are investigating the feasibility of producing weights specific to Northern Ireland.

To tackle the main limitation of regional inflation estimation, which is the small price sample size, a sample boost has been supported by the Consumer Council and funded through the Department for the Economy in Northern Ireland. To understand the sample size needed for the index to be statistically significant, further work is being carried out on standard errors for consumer price inflation measures by the University of Southampton, which will complement the findings of this project. In the interim, we have boosted the current Northern Ireland raw price quotes sample, and this will help provide additional evidence towards determining the optimal sample size for a regional CPIH.

At a national level, we use a sample of 141 locations across the UK to collect price data from. The sample is refreshed every year with 30 locations either dropped and replaced, or re-enumerated. The re-enumeration exercise is carried out by Kantar UK, who conduct price collection on our behalf. Re-enumeration involves refreshing the list of outlets within a particular location. The enumeration list is used by Kantar UK to identify outlets in which items from the basket of goods and services can be placed. It is expedient to place as many items as possible in a single outlet, and this also reduces the burden on the outlets themselves. Within each outlet, Kantar UK price collectors will then identify a particular product on the shelf that meets the item definition and that they are likely to be able to collect on an ongoing basis.

Every month from January 2022, we have doubled the collection in existing outlets, which broadly doubles the local sample in Northern Ireland; however, there are some issues where, for example, there may only be one brand offered in an outlet. For example, some items like sweet potato or a pint of lemonade in a pub will only have one brand or type per shop. For items like this, more shops may need to be recruited to collect a second price quote. We're working with Kantar UK, who collect local price data on our behalf, to improve item coverage. However, coverage also needs to be balanced against costs and respondent burden, so other considerations will be taken into account, such as how much of an improvement in coverage an additional outlet will make.

It is important to highlight that only the local collection was boosted. Centrally collected items – that is, items collected from websites, or by email contact or phone – were not included in the boost. Some central items are collected on the basis that a national pricing policy is in place, and are replicated across the UK regions and countries. In other cases, a national index is constructed outside of the system and fed in separately. This is not necessarily a drawback, since a national pricing policy implies that the national price index can be used for all UK regions and countries.

Some central items do have a regional aspect, but we have limited resources to be able to expand the collection in these areas. In these cases, we must assume that the price movements for Northern Ireland follow the national average. For low impact items, this is not a big issue; however, it is likely that there are some items in this category that may be of greater importance to the Northern Ireland economy and, if price growth differs from the UK as a whole, this could introduce bias into our indicative results for Northern Ireland. We are working to identify areas of importance within the central collection that we could boost where feasible through discussions with the Consumer Council. More detail is provided in Section 3.

When referring to weight, we mean how much is spent on an item relative to total spending, for example, oil prices going up by 10% is going to have a much greater effect on inflation than the price of bread going up by 10%. The CPIH is constructed by taking the weighted sum of price changes across different product groups to arrive at the overall index. At higher stages of aggregation, it may be possible to construct Northern Ireland weights using the same methodology as for our CPIH-consistent inflation rates for UK households. This involves reconciling household-level expenditure data from the LCF dataset with CPIH expenditures and using demographic variables in the LCF dataset to derive an estimate for Northern Ireland. However, dividing the LCF sample into 12 regions means that the small sample sizes can introduce volatility into the weights, as identified in research by the University of Southampton. Given these limitations, for the purposes of the Northern Ireland CPIH, we are currently using the UK weights as a proxy for Northern Ireland spending patterns.

It is necessary to combine price indices for basket items to estimate an overall aggregate inflation rate. Items are aggregated according to an internationally defined structure: COICOP. However, below COICOP, at the basket level, the data are too granular to support reconciliation against the LCF data. As a result of these limitations, previous research by the University of Southampton used the national basket weights rather than specific regional ones. For this publication, we have used the same approach.

2 . Results

In this section, we present some early indicative results from the Northern Ireland sample boost. It should be noted that the methodology for producing these estimates is at an early stage of development, and the data are likely to change as methods are refined over the course of this development.

To construct a Consumer Prices Index including owner occupiers' housing costs (CPIH) for Northern Ireland, it is necessary to combine the boosted price sample with the existing locally collected price data for Northern Ireland. The locally collected Northern Ireland basket items are then aggregated with other central items where a national pricing policy is in place. For centrally collected items with a regional element, and where we have been unable to expand the scope of the pilot boost, we have also used the national item index to represent Northern Ireland price movements. Currently, this includes energy and fuel prices; however, we are exploring the potential to include specific Northern Ireland indices in future estimates (see Section 3 for more information). Using national indices in this way allows us to construct a comprehensive measure of consumer price inflation that reflects consumer spending within Northern Ireland.
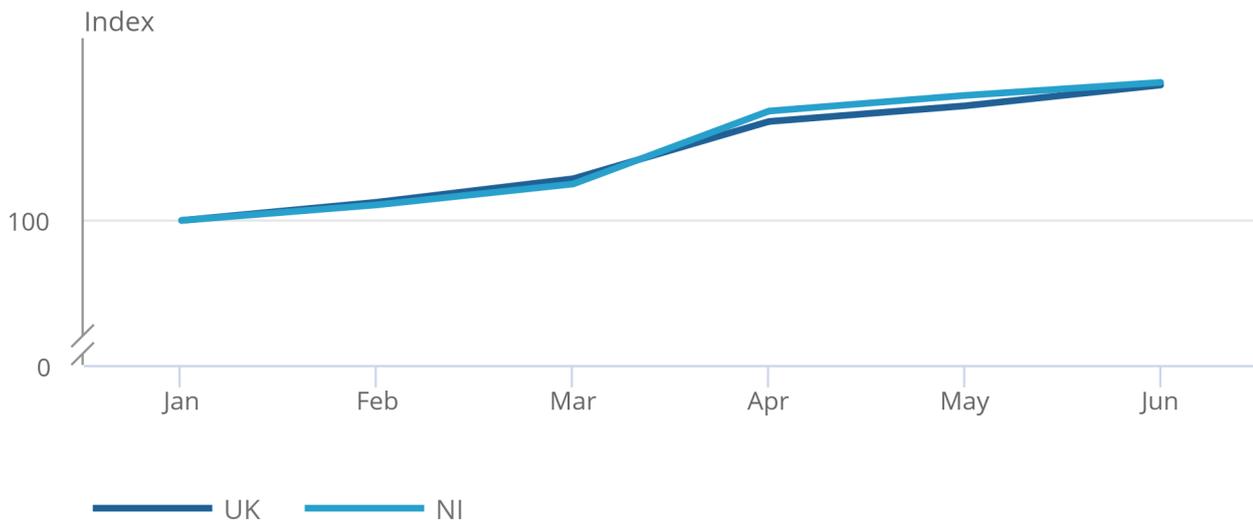
Figure 1 compares the Northern Ireland overall CPIH with the published UK national CPIH. These graphs are early provisional results. We are currently in the process of refining the methodology and so confidence in these results will be greater as we progress in constructing a more accurate CPIH for Northern Ireland. Boosted price data have been collected since January 2022, so the chart shows the difference in cumulative price growth since January. In recent months, Northern Ireland shows higher growth in prices (with the largest difference being 0.4 index points in April and May 2022). However, it should be noted that, despite the sample boost for Northern Ireland, sample sizes for the UK as a whole remain considerably larger. It is not clear that these differences are statistically significant, and it is possible that the relationship between the indices will change as we develop the methodology. This analysis has been repeated for the Consumer Prices Index (CPI) in Figure 2, and the results can be seen to be broadly similar.

Figure 1: There is little difference in CPIH cumulative growth between Northern Ireland and the UK as a whole in June 2022

The Consumer Prices Index including owner occupiers' housing costs (CPIH), UK and Northern Ireland, index (January 2022=100), January to June 2022

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The Consumer Prices Index including owner occupiers' housing costs (CPIH), UK and Northern Ireland, index (January 2022=100), January to June 2022
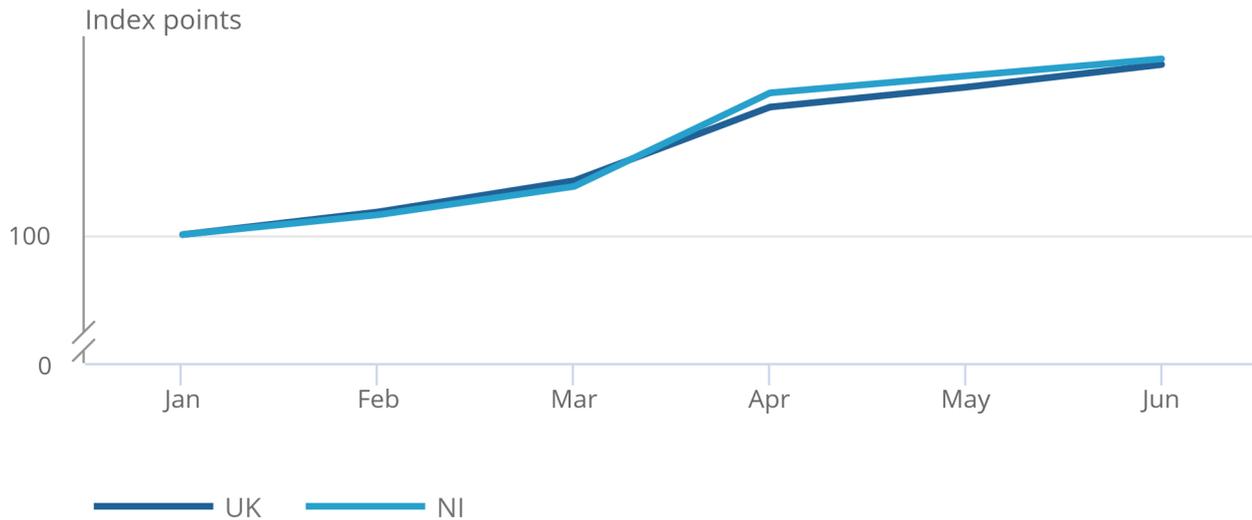

Source: Office for National Statistics

Figure 2: There is little difference in CPI cumulative growth between Northern Ireland and the UK as a whole in June 2022

Consumer Prices Index (CPI), UK and Northern Ireland, index (January 2022=100), January to June 2022

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Consumer Prices Index (CPI), UK and Northern Ireland, index (January 2022=100), January to June 2022

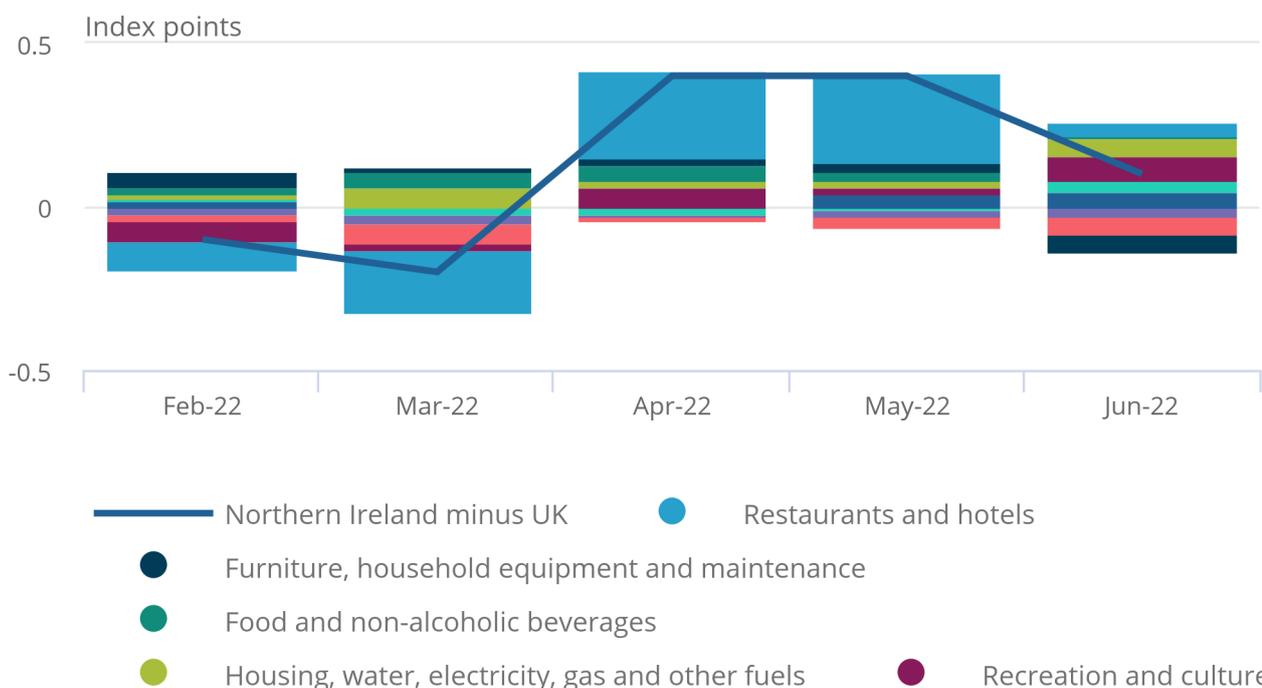**Source: Office for National Statistics**

To understand why the indices differ, we plot the contributions to the difference between the Northern Ireland and the UK for CPIH (Figure 3). The line chart shows the difference between the indices each month, and the bars show how much each division has contributed to that difference. Divisions that have made a positive contribution to the difference, therefore, are contributing more to price growth in Northern Ireland. Similarly, divisions that have made a negative contribution to the difference are contributing more to price growth in the UK as a whole. Given that the same weights are used in the construction of both indices, the differences are driven purely by the differing price movements in Northern Ireland and the UK.

Figure 3: Restaurants and hotels has contributed most to the differences between Northern Ireland and UK price growth

Consumer Prices Index including owner occupiers' housing costs (CPIH) contributions to the difference between Northern Ireland and UK indices (January 2022=100), February to June 2022

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Consumer Prices Index including owner occupiers' housing costs (CPIH) contributions to the difference between Northern Ireland and UK indices (January 2022=100), February to June 2022

Source: Office for National Statistics

Notes:

1. Contributions may not sum to the total difference because of rounding.

The largest driver of the differences between the UK and Northern Ireland is restaurants and hotels. This division pushed UK inflation up relative to Northern Ireland in February and March 2022, and pushed Northern Ireland inflation up relative to the UK between April and June 2022. Of the 0.4 index point difference between Northern Ireland and the UK in April and May 2022, 0.27 index points came from restaurants and hotels. However, it should be noted that the swing from a negative to a positive contribution reflects the greater volatility in the Northern Ireland restaurants and hotels index compared with the UK. This may be an artefact of the smaller sample sizes in Northern Ireland (even with the sample boost in effect), rather than a genuine reflection of different price growth. A further consideration is whether the item placement issues discussed in "Methodology" in Section 1 are more problematic in this division. Further analysis will be undertaken here.

Miscellaneous goods and services has consistently driven larger increases in the UK index relative to Northern Ireland, reducing the difference by 0.07 index points to 0.1 in June 2022.

These results and the analysis of drivers must be treated with a degree of caution, as they are liable to change as the methodology is developed and improvements to the collection are made. They are intended to give a first indication of the pilot results and should not be used for decision making or for policy purposes.

3 . Next steps

In this section, we discuss the further work required to improve estimates of consumer price inflation for Northern Ireland.

Coverage

Further development aims to improve the data collection specifically. As discussed in Section 1, it has not been possible in all cases to collect additional quotes for an item in the same outlet, where only one brand or option exists. We are therefore currently investigating whether we can recruit a small number of additional outlets in a way that maximises coverage of under-represented items while minimising costs and burden on respondent outlets.

Scope

A further limitation is that we have been unable to boost the sample for a number of items that are centrally collected, but which have a regional aspect to them. In most cases, this is unlikely to result in any significant bias. However, through our engagement with the Consumer Council for Northern Ireland (Consumer Council), we have identified a number of items that may be of greater importance to the Northern Ireland economy. For example, the Northern Ireland Department for the Economy's report highlights that 68% of Northern Ireland households are reliant on oil as a source of heating, compared with 4% of the UK as a whole. Some of these items can be effectively disaggregated using the existing data to give a reasonable price index for Northern Ireland and will therefore be incorporated into the Northern Ireland index as part of ongoing development. We are also planning to boost some items (of most importance to Northern Ireland) where the current sample does not support a regional disaggregation to give us a more accurate representation of the Consumer Prices Index including owner occupiers' housing costs (CPIH) difference between the samples.

Weights

Currently, estimates of consumer price inflation in Northern Ireland are based on UK-wide spending patterns. The available Living Costs and Food Survey (LCF) data should allow the derivation of specific expenditure for Northern Ireland, although previous research by the University of Southampton indicates that there are likely to be challenges with small sample sizes in some spending categories and volatility from year to year. We will investigate whether LCF data can be used to construct expenditure weights for a Northern Ireland CPIH. Work in the Office for National Statistics (ONS) is ongoing to improving the collection of consumer expenditure data, which may improve the accuracy of regional weights.

Sample-size analysis

The University of Southampton are currently carrying out research on our behalf to calculate standard errors for consumer price indices. This will give us a statistical means to identify optimal sample sizes for a given level of precision. We aim for the Northern Ireland pilot boost data to complement this research, by assessing the impact on Northern Ireland's CPIH of using different sizes of boost. By drawing repeated sub-samples from the boosted dataset and averaging over the results, we can analyse how different sample sizes affect the Northern Ireland CPIH. This will also help to understand empirically the volume of data needed to produce estimates to a reasonable degree of precision.

Further analysis of trends

We are continuing to collect boosted data. As time goes on, we will have a wider time frame to analyse the data, and patterns and trends will be more apparent, allowing us to draw stories and conclusions. By the end of 2023, we should have two years of boost data, which will give us a year of annual growths and will help to give a better understanding of the spending areas that are driving inflation in Northern Ireland. We aim to have investigated most of the issues highlighted in this report and to have made methodological improvements by this point.

4 . Cite this methodology

Office for National Statistics (ONS), released 20 September 2022, ONS website, methodology, [Boosting the Northern Ireland price sample for the Consumer Prices Index](#)