

# Perceptions of Consumer Price Inflation

## Abstract

This article considers users' perceptions of consumer price inflation and the various sources of data available to measure these perceptions. The reasons for the differences between the results from these sources and the Consumer Prices Index (CPI) and Retail Prices Index (RPI) are discussed. Consideration is given to whether lessons could be learned from the German Index of Perceived Inflation (IPI) as an alternative to the use of surveys to measure perceptions of inflation. Consideration is also given to the extent to which the ONS Personal Inflation Calculator (PIC) addresses users' perceptions. Finally, the article presents some conclusions to improve the way in which users form a perception of inflation in UK.

## Introduction

The Office for National Statistics (ONS) produces two main measures of consumer price inflation – the Consumer Prices Index (CPI) and the Retail Prices Index (RPI). They both measure the change in the general level of prices charged for goods and services bought for the purpose of household consumption in the UK.

In 2010, the UK Statistics Authority assessed ONS's consumer price indices against the Code of Practice for Official Statistics and considered the communication of consumer price indices more generally. The conclusions were published as Assessment Report 79<sup>1</sup> and Monitoring Brief 7/2010<sup>2</sup>. One of the suggestions made by the UK Statistics Authority as part of the Monitoring Brief 7/2010 was for ONS to:

Evaluate how effective the 'personal inflation calculator' has been in addressing perceptions of inflation. Also, consider with users, whether there are any lessons for the UK from the German index of perceptions of inflation that might supplement the work ONS has already carried out on the way in which inflation is perceived.

A previous article (O'Donoghue, 2007) noted that public perception of inflation tends to differ from official figures such as the CPI and RPI. A possible consequence of such a divergence could be a reduction in public confidence in official inflation figures. It could also impact on inflation expectations and lead to a disconnection between prices and wages. While the purpose of the CPI or the RPI is not to measure public perceptions of inflation, it is important to develop ways to explain the gap between perceived inflation rates and official measures of inflation.

In the UK, there are two national surveys that measure consumers' perceptions of inflation; the Bank of England/ Gfk NOP Inflation Attitudes Survey and the MarkIt Household Finance Index. In addition to these national surveys, perceptions of inflation in the UK are also measured as part of the Joint Harmonised EU Programme of Business and Consumer Surveys. These measurements of inflation perceptions are based on responses from consumers who are asked how they think prices have changed over a given period of time. Efforts to quantify perceptions of inflation using

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<sup>1</sup> UK Statistics Authority Assessment Report 79: Consumer Price Indices - <http://www.statisticsauthority.gov.uk/assessment/assessment/assessment-reports/assessment-report-79---consumer-price-indices.pdf>

<sup>2</sup> UK Statistics Authority Monitoring Brief 7/2010: Communicating Inflation - <http://www.statisticsauthority.gov.uk/assessment/monitoring/monitoring-briefs/monitoring-brief-7-2010---communicating-inflation.pdf>

an alternative tool to consumer surveys have been attempted in other countries. The Index of Perceived Inflation (IPI) was developed to provide a measure of annual perceived inflation that is based on price information, rather than a subjective survey question, and has been calculated in Germany and Malta.

There are other means with which to help users understand the reasons for the difference between perceptions of inflation and official inflation measures. The Personal Inflation Calculator (PIC) was launched by ONS in 2007, with the aim of improving public confidence in inflation statistics by enabling users to gain a greater understanding of how official inflation figures are calculated, and allowing them to relate this to their personal experiences. While not designed to measure perceptions of inflation, the PIC is relevant to this discussion due to the role it plays in improving the way in which inflation is perceived.

This article first discusses the reasons why perceived inflation can differ from measured inflation. Measures of perceived inflation in the UK, which are based on national and EU consumer surveys, are then compared with the German Index of Perceived Inflation and consideration is given to whether the UK can learn lessons from the German IPI. Finally, consideration is given to other available tools which can influence the way in which users form a perception of inflation. Specifically, the ONS Personal Inflation Calculator is evaluated both in terms of how well it meets its original aims, and in terms of how well it supports users in forming a perception of inflation. Finally, a tool that has been developed by the European Commission that allows a comparison to be made between the overall inflation rate and inflation of frequent purchases is examined for its potential to supplement the PIC and improve the way in which users form a perception of inflation.

## **Why perceived inflation can differ from official measures of inflation**

There are two principal reasons that can lead to a difference between the official measures of inflation (CPI and RPI) and the public perception of inflation. The first is that the CPI and RPI represent the expenditure and inflation experiences of an 'average household'. As such the CPI and RPI measure the average price for a full range of goods and services bought by the majority of households. An individual is unlikely to consume all the items that are priced. For example, coal, electricity and gas are all included in the RPI in order to ensure it is representative of the majority of UK households; however, it is unlikely that individual households will use all three fuels. All items in the basket are then weighted to reflect their importance in terms of expenditure. Again, individuals' expenditure patterns will differ from the UK average expenditure pattern used to calculate the CPI or RPI. See Powell & O'Donoghue (2007) for more information.

The second reason is the way individuals perceive inflation and the factors that are likely to influence their perception and cause it to deviate from official measures of inflation. Literature in the UK and elsewhere has examined the impact that human behaviour has on perceptions of inflation and suggests, for example, that individuals tend to notice price increases more than price reductions (Brachinger, 2005). Individuals are also more likely to remember price changes for items bought frequently (Antonides, Heijman and Schouten, 2006). Thus individuals will give greater recall weight to goods or services bought frequently, which have increased in price. When frequently bought items like bread or milk have a higher than average price increase, then perceived inflation will be higher than summary measures of inflation (O'Donoghue, 2007). Research on the European Commission measure of inflation (Biau et al, 2010) found that a person's characteristics were correlated with

the inflation rate they perceived. For example, high-income earners tend to perceive lower inflation rates when compared to low-income earners.

Other factors influence perceptions of inflation. For example, over half of all respondents of the Bank of England/ GfK NOP Inflation Attitudes Survey (2010) cited 'media coverage' as either 'very important' or 'important' when forming their perception of inflation.

## **Measures of perceived inflation**

In the UK, there are two national surveys that measure consumers' perceptions of inflation; the Bank of England/ GfK NOP Inflation Attitudes Survey and the MarkIt Household Finance Index.

The **Bank of England/ GfK NOP Inflation Attitudes Survey** is conducted on a quarterly basis. The survey asks consumers whether they consider that prices have changed over the last twelve months and the extent (in percentage terms) to which they believe they have risen or fallen. In recent years the survey has shown perceptions of inflation that have been consistently higher than the CPI, but lower than the RPI, except during 2008-09 where perceptions were higher than both indices. This period coincided with a large fall in the RPI.

The **MarkIt Household Finance Index** asks consumers whether they think prices for goods and services are generally higher or lower compared with the previous month. Results show that most survey respondents consider that prices have risen on the previous month.

In addition to these national surveys, perceptions of inflation in the UK are also measured as part of the **Joint Harmonised EU Programme of Business and Consumer Surveys**. In this survey consumers are asked whether they consider that prices have changed over the past year, and whether they consider they have risen or fallen. The majority of respondents consider that prices have risen over the last year.

These surveys all present a picture of consumers' perception of prices rising consistently in recent years. The Bank of England/ GfK NOP survey also allows comparisons to be made between the perceived increase and actual inflation figures. However, a limitation of consumer surveys as a tool to measure inflation perceptions is the impact that the choice of question has on the underlying concept that each survey measures. For example, the MarkIt survey asks consumers to consider price changes over one month, but the Bank of England/ GfK NOP survey and the EU Programme of Business and Consumer Surveys asks consumers to consider price changes over the previous twelve months, which makes the answers more susceptible to recall effects. Further, the wording of the question can make it unclear what concept the survey is measuring. For example, the question in the Bank of England/ GfK NOP survey and in the EU Programme of Business and Consumer Surveys ask consumers to consider how prices have changed in the last twelve months. It is not clear from this question whether respondents are being asked to consider how prices across the UK have changed or whether they are being asked to consider how prices for the goods and services that they buy themselves have changed. This may mean that some respondents are reporting their perceived personal inflation rate, while others are reporting their perception of inflation for the UK.

An alternative tool that has been developed to measure perceived inflation is the Index of Perceived Inflation (IPI). The IPI offers a method that quantifies perceptions of inflation using official data rather than the subjective responses of individuals to a consumer survey. The IPI was first developed at the Seminar of Statistics at the University of Fribourg by Hans Wolfgang Brachinger. In a joint project between the University of Fribourg and Destatis<sup>3</sup>, the concept was then used to calculate a **German Index of Perceived Inflation**. The IPI uses the same basket of goods and prices as is used in the construction of the CPI. However, to produce an index of perceived inflation, the weights applied to each product or service in the basket of goods are adapted in line with hypotheses about consumers' perceptions of inflation (see annex A for details of the hypotheses and weights used to calculate the German IPI). The index was calculated once for Germany and covered the years from 1996 to 2005. It showed that perceived inflation has been consistently higher than the German CPI, except during periods in 1999-01, 2002-03 and very briefly in 2004.

There are a number of limitations of the IPI. The first, and perhaps most important, is that the available documentation relating to the IPI does not offer any evidence to suggest that the theory of perceived inflation, upon which the index is based, accurately reflects the way in which individuals perceive inflation. Brachinger, who first developed the IPI, has acknowledged that the index is still in development and therefore does not account for some factors that have been identified as having an impact on perceptions of inflation. For example, the theory that purchases are considered in isolation (that is when considering inflation rates individuals do not offset products that have increased in price against products that have decreased in price as is the case in the CPI and RPI calculations) is not yet accounted for. Furthermore, the use of the IPI is not widespread: the German IPI was calculated only once in 2005 in order to measure perceived inflation following the introduction of the Euro in Germany. A Maltese IPI was also calculated on one occasion to help predict perceived and expected inflation arising from the 2008 euro changeover in Malta.

### **Providing extra information to allow users to gain a greater understanding of inflation**

The consumer surveys and Index of Perceived Inflation described above provide measures of perceived inflation. However, they don't help users to understand why there may be a divergence between perceptions and official inflation figures.

There are a number of ways to help users understand consumer price inflation in general. Steps taken by ONS include producing commentary alongside the release of each CPI statistical bulletin, producing a consumer prices technical manual, publishing a brief summary guide to consumer price statistics, and publishing articles on a range of topical consumer price statistics issues<sup>4</sup>.

Two means of helping users understand perceptions of inflation – one currently used in the UK, and one developed by the European Commission are described below.

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<sup>3</sup> Destatis is the Federal Statistical Office for Germany

<sup>4</sup> Measuring UK inflation - <http://www.ons.gov.uk/ons/rel/elmr/economic-and-labour-market-review/no--9-september-2008/measuring-uk-inflation.pdf>

How ONS consumer price statistics are used, July 2011 - <http://www.ons.gov.uk/ons/rel/cpi/consumer-price-indices/july-2011/how-ons-consumer-price-statistics-are-used.pdf>

Estimated Effect of the Budget on Consumer Prices Index and Retail Prices Index Spring 2011 - <http://www.ons.gov.uk/ons/rel/cpi/estimated-effect-of-the-budget-on-consumer-prices-index-and-retail-prices-index/spring-2011/estimated-effect-of-the-budget-on-cpi-and-rpi-measures-announced-in-the-march-2011-budget.pdf>

## **The Personal Inflation Calculator (PIC)**

The PIC was launched by ONS in 2007. Its aims were to:

- enable users to gain a greater understanding of how official inflation figures are calculated
- allow them to relate this to their personal experiences

The PIC is based on the RPI and allows users to calculate their individual inflation rate by entering their pattern of expenditure in 23 categories. This is then used as a basis to estimate a personal inflation rate, which can be compared with an estimated rate using the national average expenditure pattern.

### **Effectiveness of the Personal Inflation Calculator in meeting its aim to improve understanding of how official inflation rates are calculated**

In order to evaluate the effectiveness of the PIC against its initial aim, three questions were considered:

- Is the PIC being used by those for whom it was intended?
- How many people have used the PIC?
- Has the PIC enabled users to gain an increased understanding of how official inflation figures are calculated, and allowed users to relate this to their personal experiences?

#### **Is the PIC being used by those for whom it was intended?**

The PIC was developed to allow members of the public, who may not understand inflation, to gain a better understanding of how inflation figures are calculated and how price changes affect them. While it is not possible to develop a complete profile of PIC users, the profile of those corresponding with ONS regarding the PIC can act as a proxy measure. The vast majority (84 per cent) of correspondence to ONS regarding the PIC has been received from individuals rather than financial institutions or academics, which suggests that the majority of users are the very people the PIC is aimed at.

In their correspondence with ONS, members of the public also volunteered their reason(s) for using the PIC. The principal reason given was to estimate an inflation rate that was tailored to the individual. For some others, the PIC was used to estimate cash flows or to estimate their financial situation in the future.

#### **How many people have used the PIC?**

Since its inception in January 2007, the webpage containing the PIC has been visited over 64,000 times. While this provides an approximate indication of the number of people who have used the PIC to date, it must be noted that this does not provide an indication of the number who use the PIC on a regular basis. The BBC also hosts a version of the PIC on its website which encourages use of the PIC by a wider audience. Information on the total number of visits to the BBC PIC is not available. However, for the three month period between July and September 2011 the PIC had been visited 33,088 times on the BBC website. As a result of a re-promotion on the BBC website it received 97,114 page views on 18 October 2011 alone, with 28,992 clicks on the calculate button (i.e. 30.4 per cent of users reached the end of the form).

### **Has the PIC enabled users to gain an increased understanding of how official inflation figures are calculated, and allowed users to relate this to their personal experiences?**

In their correspondence with ONS, users of the PIC reported that it works well as a tool to examine their personal inflation rate, which can be compared to the RPI. Some users questioned the rationale for including or excluding certain spending categories. These comments demonstrate user engagement with the RPI calculation process. By questioning the calculation process, users are given the opportunity to understand the rationale behind the calculation process, which serves to increase understanding about the RPI.

Around 20 per cent of comments suggested some confusion over parts of the output. These were focussed on particular elements of the PIC, namely: the derivation of the estimated car expenditure, the estimated annual interest on a mortgage and the estimated annual depreciation of the condition of a property. Those commenting on the estimated car expenditure primarily reported that they felt the figure given was not accurate. Although the supporting documents to the PIC, such as the article by Powell and O'Donoghue (2007), provide greater detail on the calculations and assumptions used to produce each individual's inflation rate, the comments suggest that users may not be reading these. This could have a significant effect on the credibility of the PIC and therefore its ability to meet its aim of improving public confidence in inflation statistics.

### **Effectiveness of the Personal Inflation Calculator in addressing perceptions of inflation**

User feedback was examined for indications that the use of the PIC influenced users' perceptions in some way. Some users indicated that the PIC confirmed their perceptions of inflation, but this was not universally the case. From this evidence it is not possible to determine the extent to which the PIC is effective in explaining why users' perceptions of inflation may be different to the official figures. Nonetheless, the PIC does address perceptions of inflation to some extent by enabling users to gain an increased understanding of how official inflation figures are calculated.

### **European Commission tool to compare overall inflation rates with inflation of frequently purchased goods or services**

The results from the Inflation Attitudes Survey in February 2010 (Bank of England, 2010) showed that consumers felt the prices of frequently purchased goods such as food and drink, transport and petrol are 'very important' when forming their perceptions of inflation. Thus, when frequently bought items have a higher than average price increase, perceived inflation will deviate from official measures of inflation. In their correspondence with ONS, some users recognised this and indicated a need for an indicator of inflation for frequently purchased goods.

A section of the European Commission website focuses on inflation<sup>5</sup>. Part of the section contains a chart that allows users to compare the overall inflation rate with the inflation rate for 'frequent, out-of-pocket' purchases<sup>6</sup>. By doing so, this tool helps users to understand better why perceptions of inflation may differ from official

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<sup>5</sup>[http://ec.europa.eu/economy\\_finance/focuson/inflation/inflation\\_in\\_daily\\_life\\_across\\_the\\_eu\\_en.htm](http://ec.europa.eu/economy_finance/focuson/inflation/inflation_in_daily_life_across_the_eu_en.htm)

<sup>6</sup> Frequent, out-of pocket purchases are purchases carried out by the consumer on a monthly basis, or more regularly, that are paid for directly by the consumer. Examples include food and petrol.

measures of inflation since it allows users to separate the price movements of frequently purchased goods from the price movements of all goods.

## Conclusions

Measuring perceptions of inflation has an important role to play in allowing users to gain a greater understanding of inflation. While consumer surveys are currently used in the UK to measure perceptions of inflation, the different questions used by each survey mean that the concept of perceived inflation being measured is not consistent across all surveys.

The Index of Perceived Inflation (IPI) measures perceived inflation using price information, rather than a subjective survey question. ONS has considered whether there are any lessons to be learned from the German IPI, as an alternative to the use of consumer surveys to measure perceived inflation. While the use of official data in the German IPI provides an objective measure of perceived inflation, the IPI is based on an untested hypothesis about how individuals perceive inflation. Given this, ONS judges that, at this time, the IPI is insufficiently developed for a UK equivalent to offer any further information on perceptions of inflation over and above the existing UK surveys and the PIC. ONS will continue to monitor developments with the IPI and will re-evaluate its position in light of these.

The Personal Inflation Calculator (PIC) is a tool that is currently used by ONS to help improve user understanding of inflation. ONS has evaluated the PIC against its original aims and found that it supports users in forming a perception of inflation, increases their understanding of how inflation figures are calculated and the reasons why these measures may differ from their personal experience of inflation.

ONS will continue to publish the Personal Inflation Calculator on the ONS website and will look to improve further users' understanding of it. Although there is an accompanying document (Powell & O'Donoghue, 2007), which aims to provide users with further information on the PIC and the categories of spending included, it seems that users are not using this as a reference guide. ONS will look for ways to make this more accessible to users of the PIC.

ONS will also consider what more can be done to improve users' understanding of the difference between official inflation figures and their own perceptions of inflation. This may take the form of an annual update that includes a graph allowing users to compare visually the previous years' overall inflation rate with inflation of frequently purchased goods. This tool will be similar to the one developed by the European Commission and will enable users to gain an understanding of the impact of the inflation rate of individual products and of frequently bought goods on their own perceptions of inflation.

## Next steps

ONS welcomes feedback on the information presented and conclusions it has reached in this paper. ONS will engage with the newly established CPI/ RPI User Group<sup>7</sup> to aid this user engagement process and will use this feedback to inform the forward work programme for consumer prices.

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<sup>7</sup> For more information regarding the RPI/ CPI User Group please see the StatsUserNet section of the RSS website:  
<http://statsusernet.org.uk/StatsUserNet/Resources/LibraryDocumentsList/?LibraryKey=1ada0177-22f1-45e3-8ab5-f3eb1ceea2d4&CommunityKey=3fb113ec-7c7f-424c-aad9-ae72f0a40f65>

## Annex A

The German Index of Perceived Inflation (IPI) is based on the theory of inflation perception developed by Brachinger (2005). Three hypotheses relating to the way in which individuals perceive inflation underpin the theory, namely:

1. when considering the price change of a product or service, individuals do not necessarily consider the price change between the current and base period, as is the case in the CPI or RPI. Rather, they choose a point of reference for comparison with the current price. This may be the price paid for the item when last bought, or an average price of the product over a series of recent purchases. Further, individuals do not consider a price change in terms of a monetary value but only consider whether prices have increased or decreased when compared to their point of reference. So, for example, when asked to consider inflation of petrol prices, an individual may remember only that the price has increased since the last time they re-fuelled their car
2. individuals place more weight on price increases than price decreases
3. inflation is perceived more powerfully for *frequently* bought goods that have increased in price (and inversely, a reduction in the price of goods bought *infrequently* will scarcely be noticed)

Using the same basket of goods and their associated prices as the German CPI, the IPI then adapts the weights according to the three hypotheses detailed above. To meet hypothesis 1 and 2, the products or services that have increased in price are given greater weight in the index by applying a factor greater than one. On the other hand, a factor of one is applied to products or services whose prices have stayed the same or decreased in the calculation. In theory, the factor applied should vary by good and by price level since individuals will place greater or less weight on price changes for certain products or services; however in practical terms this approach was not possible so a constant value is used, independent of good or price level. The value two was chosen since the index produced using this value was assumed to represent a reasonable approximation of the 'true' index of perceived inflation. Hypothesis 3 is met by introducing a weight for each product or service that reflects the purchasing frequency of that product or service relative to all other products or services purchased by the average consumer during the base period.



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