ARTICLE

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Impact of VAT reduction on the consumer price indices

SUMMARY

This article explains how ONS successfully measured prices for the consumer price indices following the temporary reduction in the rate of VAT from 17.5 per cent to 15 per cent from 1 December 2008. It became more difficult to measure prices because in December 2008 many shops lowered their till price to reflect the new VAT rate but they did not change the shelf price - prices are collected for consumer price indices by visiting shops and looking at the shelf price. This article explains how information was collected from each shop on whether it had passed on the VAT reduction and, if so, whether the price was changed on the shelf or only at the till. It explains how ONS used this information to adjust the price information collected from the shelf and how checks were introduced to maintain quality. It provides information on the impact of the VAT change on the Consumer Prices Index and estimates that in December 2008 the effect on the CPI from retailers and service providers passing on both the VAT reduction and increases to excise duty was to reduce the 12-month rate by around 0.5 percentage points.

Introduction

On 24 November 2008 the Chancellor announced in his Pre-Budget Report that he would temporarily reduce the standard rate of Value Added Tax (VAT) from 17.5 per cent to 15 per cent from 1 December 2008 (excise duty for road fuel, alcohol and tobacco were raised so that the combined total of VAT and duty remained unchanged for these commodities).

Each month over 100,000 prices are collected for the Retail Prices Index (RPI) and Consumer Prices Index (CPI) by visiting shops and some service providers and noting the price on the shelf. Also over 80,000 prices are collected centrally, for example, via the internet and by writing to service providers (e.g. energy companies) and other data providers. In December a large number of retailers who had passed on the reduced VAT rate to customers left the shelf price unchanged, but adjusted the price at the till.

This article provides an explanation of how this collection difficulty was overcome and it estimates the impact of the change in the VAT rate on the Consumer Prices Index. The article comprises four sections which are outlined below.

CPI/RPI sources, methods and uses

This section provides some background information about the CPI and the RPI. It explains why these inflation measures are important to their users and how they are calculated. It covers how prices are collected for the CPI and RPI and how they are weighted together to produce the consumer price indices. This provides an insight into why it became more difficult to collect price information following the reduction in the VAT rate.

How prices were measured following the VAT change

This section explains how ONS measured consumer prices when many shops' shelf prices did not reflect the price being charged at the till, following the reduction in the VAT rate. It explains how ONS obtained information about whether each retailer had passed on the VAT reduction to customers and, if so, whether the adjustment to the price had been made at the shelf or only at the till. It shows how this information was used to adjust the prices collected from the shelf. It also covers the difficulties in collecting this information and it explains how checks and procedures were developed and implemented to maintain the quality of the outputs.

Impact of change in VAT rate on CPI

The third section shows the proportion of 'locally collected' shops that passed on the VAT reduction to consumers in December 2008. It looks at the estimated impact on the CPI from the shops, service providers and internet sellers who passed on the reduction in the VAT rate. It also shows how ONS dealt with the impact of the VAT reduction for those few outlets where prices are collected only quarterly. This section also provides information on the extent to which prices that decreased between November and December 2008 to reflect the VAT reduction had returned to the November price, or higher by February 2009.

Conclusions

The article concludes that despite the difficulty in collecting price information the reduction in the quality of the inflation indicators is likely to be negligible.

CPI/RPI sources, methods and uses

Why are the CPI and RPI important?

Both the CPI and the RPI are measures of change in the prices of goods and services bought for consumption in the UK. The RPI is used as the basis for uprating tax allowances and state benefits and many private sector contracts (e.g. rental payments) are linked to RPI. Also, the interest payments and redemption value for index linked gilts are determined by the RPI, and so it is imperative that an accurate RPI is available every month. Should it not be available, it would be necessary to construct an alternative index.

The CPI is used as the basis for the Government's inflation target and so a timely accurate estimate is necessary. Key stakeholders such as the Bank of England and HM Treasury forecast consumer inflation, and so it is also important to them that they understand the impact of the change in the VAT rate on consumer inflation, and the likely impact when the VAT rate reverts to 17.5% from January 2010.

A more detailed explanation of the uses of CPI and RPI and why ONS publishes two measures of consumer inflation is given in **Box 1**.

How are the CPI and RPI calculated?

ONS collects around 180,000 prices for 650 items each month from a wide range of shops across the UK (including those in shopping centres, out-of-town retail outlets, supermarkets and corner shops), from the internet and through correspondence with some service providers and specialist retailers. These prices represent the goods and services typically bought by households. Around 100,000 prices are collected from shops under a contract with Research International, a market research company. These are commonly referred to as 'locally collected prices'. A further 12,000 prices are collected centrally, by ONS, for shops that have consistent prices for their goods or services across the UK. Also around 70,000 other prices of goods and services are collected centrally (this includes around 46,000 insurance quotes which are not subject to standard rate VAT). See **Box 2** for more detail on the three methods of price collection.

The items included for price collection are referred to as the basket of goods and services. The basket contains a sample of representative consumer goods and services on which households typically spend their money. The prices of these goods and services are used to give a reliable measure of the price movements for a broader range of items. The number of items chosen to represent each product group depends on the expenditure on the group and the variability of price changes. This information principally comes from household expenditure data within the national accounts for CPI and ONS's Living Costs and Food survey (formerly the Expenditure and Food Survey) for RPI. Other sources include information from market research.

Households spend more on some items than others, and the amount they spend on an item influences the sensitivity of the index to price changes for that item. For example, a 10 per cent rise in the price of petrol should have a larger impact on the CPI and RPI than a 10 per cent rise in the price of tea. To reflect this, products are grouped together, and a weight is allocated to represent the appropriate share of household expenditure. The items in the basket and their weights are reviewed and updated annually so that changes in household spending patterns are reflected.

How prices were measured following the VAT change

Retail outlets' approach to passing on the VAT reduction

In December a large number of retailers who passed on the VAT reduction to their customers adjusted the price at the till, but left the shelf price unchanged. There were two approaches:

- Most shops aimed to change their shelf price to reflect the VAT reduction but, because of the short notice of the change in VAT, they temporarily changed the till price but not the shelf price. The majority of these aimed to have changed the shelf price by the end of January or February 2009. Some

Box 1

Why does the ONS publish two measures of inflation?

A single measure of inflation would not be able to meet all users' needs.

The RPI is the older and more familiar measure of inflation. It is used for the indexation of various incomes and prices and the uprating of pensions, benefits and index-linked gilts. The RPI provides a consistent series back to 1947, allowing analysis of price changes over time. In contrast, the CPI is available back to 1996.

The CPI is the main measure of consumer price inflation for macroeconomic purposes in the UK. It uses methods that are consistent across the European Union, allowing comparisons of the rate of inflation across European countries. It forms the basis for the Government's inflation target that the Bank of England's Monetary Policy Committee is required to achieve.

There are several key differences between the CPI and the RPI

- There are differences in the goods and services represented in the basket. For example:
  - The CPI excludes council tax and mortgage interest payments which are included in the RPI.
  - The CPI includes some charges for financial services that are excluded from the RPI.

- The way prices are combined using people's spending patterns are different:
  - The CPI represents a broader population than the RPI – the RPI excludes households with the top four per cent of income and excludes some pensioners.
  - The CPI produces weights for items in the basket using a breakdown of household expenditure taken from the national accounts. The RPI uses the Living Costs and Food survey to calculate weights.

- Different mathematical formulae are used for combining the prices collected for each item in the basket. The formula effect means that the average price for each item in the CPI is always lower than or equal to the average price for the same item within the RPI.

Box 2

Methods of price collection

There are three distinct methods of price collection:

- Local collection - local price collectors visit shops in 141 locations to collect over 100,000 prices. This ensures that variations in price across the UK are captured. The prices are collected by Research International, a market research company contracted by the ONS. The price collectors visit the same shops each month to collect the prices of identical products to ensure they are collecting like for like. The shelf-price of an item is collected, and entered into a hand-held computer.
- Central shops - for some larger chain stores, there is a central pricing policy which is used throughout their UK branches. These prices are collected centrally, and weighted according to the retailer's market share. The results are then combined with those from the local price collection.
- Central collection – prices are collected centrally for goods and services where the price is the same for all UK residents or the regional variation in prices can be collected centrally (for example, internet purchases and utility costs). Index calculations are carried out separately from the main method of index production. This is the case for around 130 items.

of these shops had notices advising customers that the VAT reduction would be reflected in the price at the till, however many did not.

- A few chains of shops deducted 2.13[1] per cent from the total of all those items that were subject to standard rate VAT, and they showed this adjustment on the till receipt. These shops are likely to continue with this approach throughout the thirteen months that VAT is reduced.

Some shops did change the shelf price by 1 December, although some of these shops that changed the shelf price did so only for some items.

Some shops had changed some but not all of their shelf prices by index day (the day the prices were collected) in December. Other shops had changed some but not all of their shelf prices when collection took place on the January and February index days. These mainly represent shops that were in a transitional phase of updating shelf prices to reflect the change in the VAT rate, having previously changed only their till price for all goods subject to VAT.

ONS's approach to measuring prices

For the locally collected prices, each shop and service provider that was visited by Research International was asked to provide information about whether they had passed on the VAT reduction to customers and, if so, whether the adjustment to the price had been made at the shelf or only at the till. Where the price had been changed only at the till, and the item was subject to standard rate VAT, the shelf price collected was adjusted to reflect the new VAT rate, rounding each price to the nearest penny. Where shops had fully passed on the VAT reduction but had adjusted only some shelf prices by December index day, 2.13 per cent was deducted from those prices that, on December index day, were unchanged compared with the price on November index day. A similar procedure was adopted in January and February.

The information about the shops' approach was quality assured by identifying where there were inconsistent responses for different shops within a chain. A team of price analysts telephoned local shops and head offices to clarify the position in these cases. Where no information was obtainable or the situation could not be clarified the prices from these shops were excluded from the index.

At this point, it may be helpful to explain one particular challenge in collecting information about passing on the VAT reduction. When shops reported that they had passed on the VAT reduction by changing the till price but not the shelf price, it was assumed that the retailer had reduced the price of all their goods that were subject to full rate VAT. It was not practical to collect information on an individual item basis. If a retailer had passed on the VAT reduction by only adjusting the price at the till, for only some of the items, it is possible that ONS would have applied a reduction in the price where the price should have remained constant. In these cases the price would be seen to return to the November price when the shelf price was updated. So it is possible that in some cases the price did not move at all. However, in the main, enquiries to shops revealed that they had initially passed on the VAT reduction for all prices.

For centrally collected prices, where the prices were collected on the internet, the prices were extracted from the "checkout" to ensure the price collected was the price charged to the customer. Prices collected through correspondence with organisations included any change in the rate of VAT. See Pike (2009) for a more detailed explanation of ONS's approach to measuring the prices.

Impact of change in VAT rate on CPI

Proportion of shops passing on VAT reduction in December

Table 1 shows the proportion of locally collected shops (i.e. those visited by RI) that passed on the VAT reduction to customers in December 2008. It also shows the proportion that had updated the price information on the shelf and the proportion that had changed only the till price. The results show that although 66 per cent of these shops had passed on the VAT reduction, only 14 per cent of shops had passed on the price reduction and updated all their shelf prices.

Impact of VAT reduction on CPI

Method

The change in the VAT rate had an impact on both the CPI and the RPI inflation rates. However for practical reasons this article focuses on the CPI alone in analysing the impact of the change in the VAT rate. An analysis covering both the CPI and RPI would have taken substantially longer.

The estimated impact of the VAT reduction on CPI was calculated by identifying the prices that had decreased in December because of the lower VAT rate and reverting these prices to the price they were in November. The CPI aggregation was re-run using these adjusted prices. The adjusted data were then compared with the data that were published for the December 2008 CPI. This approach facilitates a comparison of component series; a breakdown of differences by COICOP category is presented in this article.

A three-stage approach was used to identify which prices had to be increased. First those series that are subject to full rate VAT were selected. Then a program was run to identify which prices had decreased by around 2.13 per cent between November 2008 and December 2008 (a range of -1.4

Table 1
Local shops' approach to passing on VAT reduction in December 2008

Method of passing on VAT reduction	Per cent
Shelf price changed	14
Only till price changed	43
Mixed – some shelf prices updated, other prices changed only at till	9
Not passing on VAT reduction	34

Source: ONS Consumer Prices

per cent to -2.9 percent was used for the price decrease, to allow for rounding to the nearest penny). This information was checked against information about the relevant shop's approach to passing on the VAT reduction. For locally collected prices this information had been collected by Research International and for the 'central shops' the information had been collected by ONS's prices analysts, mainly by telephone.

Only those prices that had decreased by around 2.13 per cent were returned to their November price for this analysis. Some prices had fallen by substantially more than 2.13 per cent between November and December 2008 (in December there was some strong discounting in the closing down sales of two major retailers, and other sales were taking place). Some shops that were asked whether they had passed on the VAT reduction within a sale price (for example a reduction of 20 per cent) replied that they had because the reduced VAT rate was included within the price reduction. However, in these circumstances it seemed unlikely to the authors that a retailer would have reduced the price by less if there had not been a reduction in the VAT rate (for example they were unlikely to have reduced the price by around 18 per cent instead of 20 per cent). For simplicity this analysis excluded all price reductions outside the bound -1.4 per cent to -2.9 per cent. It is possible that this approach under-estimates the impact of the VAT reduction slightly. However, it is likely that if all price reductions had been increased to reflect the higher VAT rate the result would have over-estimated the impact. The price quotes that decreased by more than 2.9 per cent in December, and were therefore excluded from the analysis, account for less than ten per cent of all price quotes that decreased between November and December.

A different method was used for identifying the 'central collection' prices. These prices are processed using spreadsheets, so it would have been a lengthy process to adjust individual prices. ONS's price analysts obtained information about whether the online retailer or the data provider had passed on the VAT reduction. This information was used to estimate the proportion of retailers that had passed on the VAT reduction, for each item. The December index for each item was increased by a ratio of between 0 and 2.17[2] per cent, depending on the proportion of retailers that had passed on the VAT reduction. The impact of these price changes was more difficult to measure because the individual prices are not held on a database.

Results

Table 2 presents the contributions to the published CPI 12-month rate in December 2008 (column 1) and the contributions to an estimate of what the CPI 12-month rate would have been if there had not been a reduction in the VAT rate (column 2). The difference between these columns represents the impact of shops and service providers passing on the VAT reduction and is presented in column 3.

Using the approach described above it is estimated that if VAT had remained at 17.5% in December 2008 and there had been no change to November's excise duty rates, the CPI 12-month rate to December 2008 would have been around 0.5 percentage points higher than the published figure of 3.1 per cent. ONS estimates that if the VAT reduction and offsetting changes in excise duty (for alcohol, tobacco and road fuel) had been taken on in full the impact on the CPI 12-month rate would have been around -1.3 percentage points (-1.5 percentage points from VAT partly offset by +0.2 percentage points from excise duties).

The largest effect from the change in the VAT rate is seen in recreation and culture where the VAT reduction was passed on in December for most televisions, radios, cameras, CDs and DVDs.

Another large effect came from transport where the effect of the VAT reduction is seen in prices for motorcycles, bicycles and new cars (VAT is payable only on the profit margin for used cars).

There was also an effect from:

- Furniture, household equipment and routine maintenance, as retailers across the furniture sector passed on the VAT reduction.
- Clothing and footwear where most items had seen the VAT reduction passed on by the retailer.
- Miscellaneous goods and services where the effect came from items including haircuts, tissues, toothpaste and electric razors.
- Restaurants and hotels, with meals and non-alcoholic drinks across the sector showing the impact of the VAT reduction.
- Communication where the effect came from telephone charges, mobile phone charges and phone handsets.

There were some very small effects within categories where most items are not subject to standard rate VAT:

- Food and non-alcoholic beverages, mainly due to ice cream, crisps, fizzy drinks and fruit drinks. There was no effect from alcoholic drinks, as the VAT reduction was offset by increases in excise duty.
- Housing, water, electricity, gas and other fuels, mainly due to wallpaper, paint and general DIY items.
- Health, mainly due to non-prescription medicine, spectacle frames and contact lenses.

Also there is no effect from most holidays. For holidays the relevant price paid is the price paid when the holiday was booked. So for most holidays taken in December 2008 the price paid would have included VAT at 17.5 per cent.

There were no effects from alcohol, tobacco or road fuel because in December 2008 the reduction in their VAT was offset by an increase in their excise duty.

Prices collected quarterly

Some prices are collected only quarterly. The rationale is that these prices do not change frequently and so it is not necessary to visit the outlet each month. While this provides savings on collection costs, inevitably there is a delay in picking up some price changes. Quarterly series include estate agents' fees, car servicing, and services such as plumbers as well as centrally collected prices such as golf course fees. Most quarterly prices are collected for the month of January as this is the base month.

For the December estimate, many of the prices for items that are collected on a quarterly basis were not collected. All prices were, however, collected in January 2009. At the time the December index was finalised the price was adjusted down for the December index where information about the outlet passing on the VAT reduction was available (e.g. for Estate Agents' fees) but for other areas the previous prices were rolled forward to December. Once January data had been collected it appeared likely that

Table 2

Impact of the VAT cut to the contributions to the 12 month CPI

Column number	1	2	3 (1–2)
	LIVE PUBLISHED CPI 3.1%	IF VAT HAD NOT BEEN REDUCED	IMPACT OF VAT CUT IN DEC 08
Contribution To 12 Month Change	Dec–08	Dec–08	
All HICP	**3.05**	**3.54**	**–0.49**
Food And Non-Alcoholic Beverages	1.13	1.15	–0.02
Alcoholic Beverages, Tobacco	0.18	0.18	0.00
Clothing And Footwear	–0.67	–0.60	–0.07
Housing, Water, Electricity, Gas And Other Fuels	1.63	1.65	–0.02
Furniture, Household Equipment And Routine Maintenance	0.06	0.13	–0.07
Health	0.05	0.06	–0.01
Transport	0.02	0.10	–0.08
Communication	–0.08	–0.03	–0.05
Recreation And Culture	–0.19	–0.08	–0.11
Education	0.16	0.16	0.00
Restaurants And Hotels	0.49	0.53	–0.04
Miscellaneous Goods And Services	0.26	0.30	–0.04
Goods And Services			
Goods	0.99	1.37	–0.38
Services	2.06	2.17	–0.11

Note:

1 Column 3 components do not sum to total due to rounding.

Source: ONS Consumer Prices

the number of quarterly outlets that had passed on the VAT reduction in December had been under-estimated. The impact on the December CPI 12-month rate is estimated to be around -0.02 percentage points (it is important to note that these quarterly prices were fully captured in the January 2009 index and so the current inflation rate is not affected). A more detailed explanation of the issues relating to quarterly collection can be found in Pike (2009).

Prices returning to higher levels by February 2009

The CPI 12-month rate for February rose to 3.2 per cent from 3.0 per cent in January. One of the reasons for this increase was that some prices returned to the November price, or higher, having previously decreased in price due to the VAT reduction in December. Reasons given for the price rises include "higher import costs" and, to a lesser extent, "company policy".

An analysis of these price changes shows the extent to which prices that decreased between November and December 2008 to reflect the VAT reduction had returned to the November price, or higher by February 2009. The analysis is restricted to prices collected from 'local shops' or 'central shops' and it is based on goods and services that are subject to standard rate VAT. It uses all data where a price quote can be tracked for an identical good or service from December 2008 through to February 2009.

This analysis shows that 36 per cent of prices that decreased between November and December 2008 to reflect the VAT reduction had returned to exactly the same price as November 2008 by the time prices were collected in February 2009. A further 15 per cent of the prices that decreased between November and December 2008 to reflect the VAT reduction had risen to a figure that was higher than the November price by February 2009.

The prices used in compiling the CPI have different weights attributed to them, depending on whether they represent "local shops" or "central shops" and what item they represent, so it is not practical to provide a precise estimate of their impact. Nevertheless the pattern is broadly consistent for centrally collected prices and locally collected prices with around fifty percent of February prices having risen to a figure that was equal to or higher than the November price by February 2009.

An analysis of the actual prices for the 'local shops' has shown that around 20 per cent of those prices that returned to the November price were returning to a price pitched one penny below the pound (£0.99, 1.99, 2.99 etc).

Conclusions

Following the Chancellor's announcement on 24 November 2008 that the VAT rate would be temporarily reduced from 17.5% to 15% many retail outlets initially changed their prices only at the till. ONS overcame this collection challenge by collecting information about the approach shops and service providers were taking, and adjusting the shelf prices that had been collected. Comprehensive checks were put in place to quality assure the information provided, and where discrepancies were identified further investigation was carried out. The transition stage, when many shops were in the process of introducing new shelf prices, was particularly difficult. The situation had stabilised by the time prices were collected in March. Although the price collection was more difficult over this period it is likely that there was a negligible reduction in the quality of the CPI and RPI. The impact on the CPI 12-month rate from retail outlets passing on the VAT reduction and the offsetting alcohol, tobacco and road fuel duties in December 2008 is estimated to be around -0.5 percentage points. However, it is estimated that by February 2009 a substantial proportion of the prices that decreased in December 2008 had returned to the November 2008 level or higher.

Notes

1. Reducing the total price by 2.13 per cent takes the price to the correct level for VAT at 15 per cent. Another way of looking at it would be to say that the original price (including VAT at 17.5 per cent) was divided by 1.175 (to remove the 17.5 per cent VAT) and multiplied by 1.15 (to apply the 15 per cent VAT).
2. The index was increased by 2.17 per cent if all retailers or service providers for this item had passed on the VAT reduction. An increase of 2.17 per cent is arrived at by multiplying by 1.175 and dividing by 1.15. This represents applying VAT at 17.5 per cent and removing the 15 per cent VAT rate.

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