

## Box C

# The 16th Series Consumer Price Index

Following the review of the Consumer Price Index (CPI) conducted in 2010, the ABS has introduced an updated CPI from the September quarter 2011. Periodic reviews of this sort are necessary to ensure that the weights of individual goods and services included in the index accurately reflect evolving consumption patterns, with the weights last updated in 2005. The review also considered other aspects of the methodology relating to the CPI's compilation. In particular, the ABS has decided to exclude the indirect measure of the cost of financial intermediation services (which had proved difficult to measure) and reviewed the seasonal analysis of CPI components. While the headline CPI was not revised as a result of the CPI update, the seasonal analysis has resulted in small revisions to the statistical measures of underlying inflation. Taken together, the changes suggest that the year-ended rate of underlying inflation in the June quarter 2011 was around  $\frac{1}{4}$  percentage point lower than indicated by the originally published data.

## Changes to the Weighting Scheme

The CPI aggregates the prices of around 1000 different items into a single index, which is designed to measure changes in the price of the typical basket of goods and services acquired by households in capital cities. These prices are categorised into around 90 expenditure classes and then into 11 expenditure groups. The relative weights in the CPI are based on surveys of household expenditure patterns.

The CPI is a fixed-quantities (Laspeyres-type) index and is constructed on the basis of the assumption that, in the short run, consumers do not adjust the relative quantities of goods and services that they

purchase. Although the quantity of each component of the CPI basket is held constant over the life of the CPI, the effective weights of components change between reweightings in line with relative price movements: the effective weights of components with above-average price rises increase over time, while the effective weights for components with below-average price rises decline over time.

In practice, however, households adjust the relative quantities of goods and services that they consume, reflecting changes in preferences and household incomes, the introduction of new products (such as tablet computers and e-book readers), and changes in relative prices. These changes require the weights to be updated periodically. Importantly, the tendency for households to purchase larger quantities of goods and services that have had declines in their relative prices means that fixed-quantity indexes like the CPI are subject to positive 'substitution bias'. This can lead to inflation being overstated when the expenditure weights are out of date (see below).

Table C1 shows the base-period expenditure weights for the 15th series CPI, which was introduced in June 2005, and the new 16th series CPI. The 16th series CPI weights are based on the latest Household Expenditure Survey conducted in 2009/10. Expenditure on housing – which includes rents, the cost of building new dwellings, utilities and maintenance costs – has the largest weight in the index, accounting for over 20 per cent of household expenditure. Food and non-alcoholic beverages account for around 17 per cent of the CPI basket, while transport and recreation & culture each account for a little more than 10 per cent.

**Table C1: Consumer Price Index – Base Period Expenditure Weights**  
Per cent

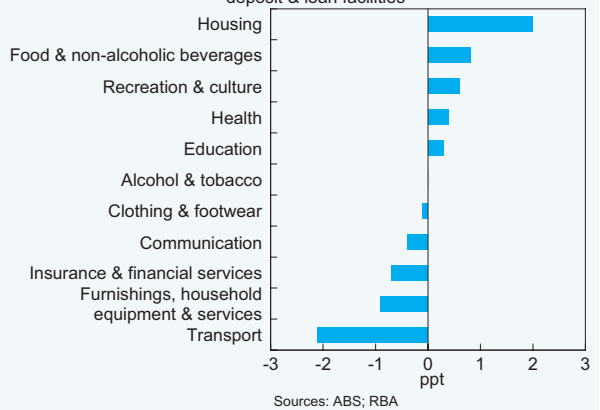
Expenditure group	15th series (2005)	16th series (2011)
Housing	19.5	22.3
Food & non-alcoholic beverages	15.4	16.8
Recreation & culture	11.6	12.6
Transport	13.1	11.6
Furnishings, household equipment & services	9.6	9.1
Alcohol & tobacco	6.8	7.1
Health	4.7	5.3
Insurance & financial services	9.3	5.1
Clothing & footwear	3.9	4.0
Education	2.7	3.2
Communication	3.3	3.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

Source: ABS

The largest change in the weights between the 15th and 16th series is the 4.2 percentage point decline in the weight of insurance and financial services. This change reflects the decision to remove the indirect component of the price of financial intermediation services – a measure of the interest margin earned by financial institutions on deposit and loan facilities – which has proved difficult to measure accurately. The direct component of the price of intermediation services, which captures explicit fees for deposit and loan products, remains in the CPI.

Since the previous reweighting six years ago, the expenditure shares of housing and food & non-alcoholic beverages have increased significantly, while there has been a decline in the expenditure share of transport (Graph C1). ABS analysis shows that the increase in the share of housing reflects increased spending on rents, due to both rises in rents and increases in the size and quality of rental dwellings; the increase in the share of food primarily

**Graph C1**  
**Changes in CPI Base Weights**  
Excluding the effect of removing indirect deposit & loan facilities



reflects increased expenditure on restaurant meals. The decline in the share of household expenditure on transport reflects a decline in expenditure on vehicles and fuel consumption, in part because of a fall in the relative price of motor vehicles.

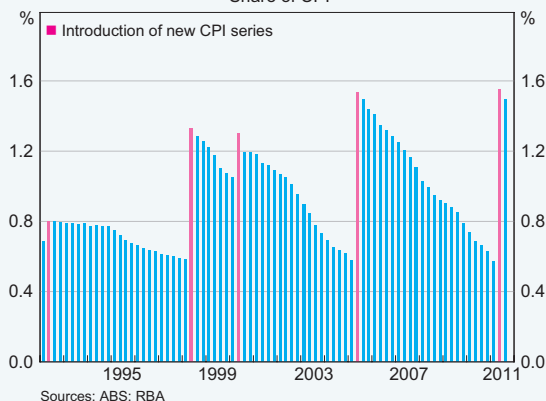
## Effective Weights and Substitution Bias

Turning to the items in the CPI, as noted above, the effective weights of particular goods and services change over time in line with changes in relative prices. This has been particularly the case for audio, visual and computing (AVC) equipment. Following the 15th series review, the base weight for AVC equipment was 1.5 per cent, but by the June quarter 2011 the effective weight for this component had declined by almost two-thirds to just 0.5 per cent, given the large price declines that had occurred for these goods (Graph C2). However, with the introduction of the revised weights in the 16th series CPI, the new weight is similar to that in 2005, reflecting the fact that households have purchased more AVC goods as prices have declined.

The new base weights of a number of other items have also changed materially from the effective weights at the end of the 15th series CPI (Graph C3). Weights for some items that had experienced relative price increases, such as tobacco and automotive fuel, have declined as households have substituted away from these goods. In contrast, for some items, such as rents and restaurant meals, the effective weights are larger in the new CPI, despite increases in the relative prices of these items. In part this reflects the tendency for spending on certain types of goods and services to rise as incomes increase.

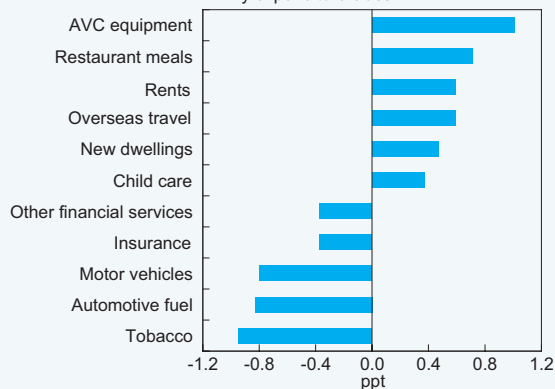
Given the fixed-quantities methodology used in the CPI, the effective weight of goods with falling prices – like AVC equipment – is likely to be too low on average. This ‘substitution bias’ becomes larger over time as CPI weights become more out of date and the effective weights increasingly diverge from the actual current expenditure shares. Analysis by the ABS of previous reweightings indicates that the average annual substitution bias in inflation is

**Graph C2**  
Effective Weight of AVC Equipment  
Share of CPI



Sources: ABS; RBA

**Graph C3**  
Largest Changes in Effective Weights\*  
By expenditure class



\* 16th series base weight less effective weight in June quarter 2011; excluding the effect of removing indirect deposit & loan facilities  
Sources: ABS; RBA

around 0.2 percentage points, but by the fifth year may be as large as ½ percentage point.<sup>1</sup> Consistent with this, the Bank estimates that substitution bias had reached around ½ percentage point for year-ended CPI inflation to the June quarter 2011, mostly reflecting the under-representation of AVC equipment.

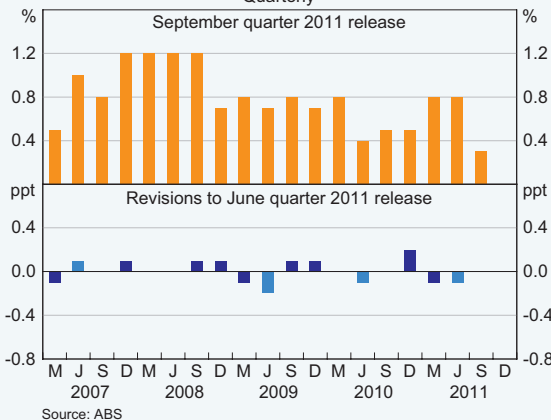
<sup>1</sup> For details, see Appendix 7 of Australian Bureau of Statistics (2010), ‘Outcome of the 16th Series Australian Consumer Price Index Review’, ABS Cat No 6469.0, December.

## New Seasonal Adjustment Methodology

As part of the CPI review, the ABS has also revised the seasonal adjustment of the individual CPI components used in calculating some of the underlying inflation measures.<sup>2</sup> In calculating the trimmed mean and weighted median measures, the ABS had previously adjusted 20 CPI components that were identified as seasonal in Roberts (2005). Under the updated approach, and with the benefit of additional data, the ABS will now seasonally adjust around 60 of the 87 expenditure classes.

The reanalysis – which has occurred in two steps<sup>3</sup> – has generally resulted in downward revisions to trimmed mean and weighted median inflation in June quarter estimates and upward revisions to December quarter estimates (Graph C4). The reanalysis has also resulted

**Graph C4**  
Trimmed Mean Inflation  
Quarterly



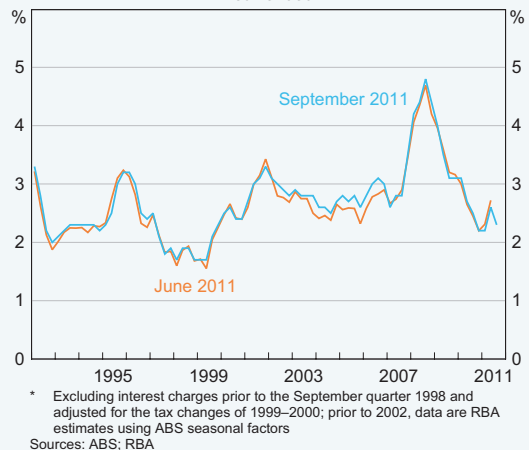
2 Further information on these measures can be found in Roberts I (2005), 'Underlying Inflation: Concepts, Measurement and Performance', RBA Research Discussion Paper No 2005-05.

3 The ABS first published an information paper in September 2011 ('Seasonal Adjustment of Consumer Price Indexes', Cat No 6401.0.55.003) outlining the new approach to seasonal adjustment based on the June quarter 2011 data. The September quarter 2011 CPI release incorporated the extra quarter of data and also reflected the revised assessment by the ABS of which components are seasonal. Looking ahead, the updating of seasonal factors will occur every quarter whereas the reassessment of which components are seasonal will occur every September quarter.

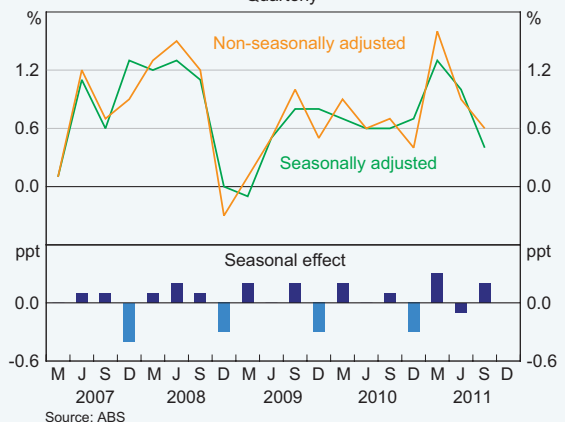
in small changes to the year-ended estimates of the underlying measures in history (Graph C5).

The ABS has also included a seasonally adjusted estimate of the headline CPI. The seasonal adjustments show that headline inflation tends to be seasonally low in December quarters (Graph C6). The seasonally adjusted CPI will be a useful analytical tool for assessing inflation trends quarter to quarter, with the seasonally adjusted components also allowing better analysis of inflation in particular components of the CPI, such as tradables and non-tradables.

**Graph C5**  
Trimmed Mean Inflation\*  
Year-ended



**Graph C6**  
Seasonal Pattern in the CPI  
Quarterly



## Effect on Assessment of Underlying Inflation

Using the updated 16th series weights together with the revised seasonal factors, it is possible to calculate alternative estimates of some of the underlying measures over the year to the June quarter. The use of the updated weights helps to remove the effects of substitution bias by providing an estimate of underlying inflation based on more representative

weights (Table C2). In particular, Bank estimates suggest that the use of the more current weights reduces these measures by around  $\frac{1}{4}$  percentage point, which is less than the effect of substitution bias on headline CPI inflation. Taken together these changes suggest underlying inflation – abstracting from substitution bias – was running at  $2\frac{1}{4}$ – $2\frac{1}{2}$  per cent over the year to the June quarter, lower than earlier assessments of around  $2\frac{1}{2}$ – $2\frac{3}{4}$  per cent. ↗

**Table C2: Selected Underlying Inflation Measures**  
Year to June 2011

	Originally published (15th series weights, previous seasonal adjustment)	Most recently published (15th series weights, latest seasonal adjustment)	Estimates based on 16th series weights and latest seasonal adjustment <sup>(a)</sup>
Trimmed mean	2.7	2.6	2.4
Weighted median	2.7	2.9	2.6
CPI excl. volatile items and deposit & loan facilities <sup>(b)</sup>	2.4	2.4	2.1

(a) RBA estimates

(b) Based on non-seasonally adjusted data

Sources: ABS; RBA