A GUIDE TO THE CONSUMER PRICE INDEX

13th Series

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Produced by the Australian Bureau of Statistics

INQUIRIES

- For information about other ABS statistics and services, please refer to the back of this publication.
- For further information please contact the Director, Consumer Price Index on Canberra 02 6252 6006.

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SECTION 1   INTRODUCTION

CPI a widely used economic indicator released quarterly

The Consumer Price Index (CPI) is an important economic indicator. It provides a general measure of changes in prices of consumer goods and services purchased by Australian households. The CPI is used for a variety of purposes, such as in the development and analysis of government economic policy, the adjustment of wages and pensions and in individual contracts. Because of this, the CPI directly or indirectly affects all Australians.

CPI figures are produced by the Australian Bureau of Statistics (ABS) for each quarter (three months ending March, June, September and December) and are typically released within one month of the end of the quarter. They appear in the publication *Consumer Price Index, Australia* (Cat. no. 6401.0). In addition, key CPI results appear on the ABS internet site http://www.abs.gov.au.

CPI introduced in 1960. Now comprises 13 linked series

The CPI was first compiled in 1960 (with index numbers backcast to 1948). It was initially designed to measure quarterly changes in retail prices of goods and services purchased by metropolitan wage earner households. The CPI was preceded by five series of retail price indexes compiled by the (then) Commonwealth Bureau of Census and Statistics. These series were titled the A, B, C, and D Series, and the Interim Retail Price Index respectively. The C Series Index, which began in 1921, was the principal retail price index in Australia prior to the introduction of the CPI.

The introduction of the CPI brought a change in the approach to measuring retail price movements. Instead of the former emphasis on long-term, fixed-weight indexes, the CPI comprises a series of shorter-term indexes which are chain linked together to form a continuous long-term series. This approach allows changes in expenditure patterns to be reflected in the CPI. The CPI now comprises thirteen linked indexes.

This guide

The purpose of this guide is to provide a broad overview of the CPI; how to use the CPI; and how the CPI is calculated. It takes into account changes made with the introduction of the 13th series CPI in the September quarter 1998 and is suitable for general users. Those seeking detailed information on the CPI should refer to the publication *The Australian Consumer Price Index: Concepts, Sources and Methods* (Cat. no. 6461.0), which is also released on the CD-ROM *Statistical Concepts Reference Library* (Cat. no. 1361.0.30.001).

Australian Bureau of Statistics

All Groups
Base: 1989–90=100.0

[index chart, Jun 1996 – Sep 1998, scale 110–130]
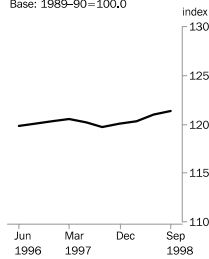
All Groups
Quarterly change

[bar chart of quarterly % change, Jun 1996 – Sep 1998, scale –1 to 2]

- For further information about these and related statistics, contact Steve Whennan on Canberra 02 6252 6251, or any ABS office shown on the back cover of this publication.

SEPTEMBER QTR KEY FIGURES

Weighted average of eight capital cities	% change Jun Qtr 1998 to Sep Qtr 1998	% change Sep Qtr 1997 to Sep Qtr 1998
Food	1.3	3.2
Clothing	–0.3	–0.1
Housing	0.3	–1.1
Household equipment and operation	–0.1	0.4
Transportation	–0.5	–1.7
Alcohol and tobacco	0.5	3.5
Health and personal care	0.8	7.1
Recreation and education	–0.3	2.2
All groups	**0.2**	**1.3**
All groups excluding housing	0.2	1.8

SEPTEMBER QTR KEY POINTS

THE ALL GROUPS CPI

- rose 0.2% in September quarter 1998, down from 0.6% in June quarter 1998.
- rose 1.3% between the September quarters 1997 and 1998.

NOTE: 13th Series CPI commences this quarter - see page 2 for details.

OVERVIEW OF CPI MOVEMENTS

- contributing most to the overall increase this quarter were the cost of fresh vegetables (+6.7%), hospital and medical services (+2.3%), other motoring charges (+4.8%), fresh fruit (+3.9%), house purchases (+0.6%), sweet and savoury snacks (+3.9%) and property rates and charges (+3.1%).
- partially offsetting the above were falls in the cost of motor vehicles (–2.0%), automotive fuel (–2.2%) and electricity (–3.9%).

Treasury's Measure of Underlying Inflation

The index of underlying inflation, as defined by the Commonwealth Treasury, increased by 0.4% between the June and September quarters 1998, and by 1.6% between the September quarters 1997 and 1998.

OVERVIEW OF THE 13TH
SERIES CPI

The 13th series CPI has been specifically designed *as a general measure of price inflation for the household sector as a whole*. The CPI measures the changes in the price of a fixed basket of goods and services acquired by household consumers.

CPI measures price change of a fixed basket of goods and services

The simplest way of thinking about the CPI is to imagine a basket of goods and services comprising items typically bought by Australian househol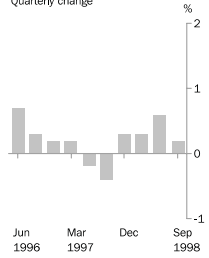ds. Now imagine the basket is purchased each quarter. As prices change from one quarter to the next, so too will the total price of the basket. The CPI is simply a measure of the changes in the price of this fixed basket as the prices of items in it change.

CPI reference population is all metropolitan private households

The CPI measures price changes relating to the spending pattern of all metropolitan private households. This group is termed 'the CPI population group', and includes a wide variety of subgroups such as wage and salary earners, the self-employed, age pensioners, and social welfare beneficiaries. The term 'metropolitan' means the six State capital cities, Darwin and Canberra. The current CPI population group represents about 64% of all Australian private households.

Ideally the CPI population group should encompass all Australian households, but this is not possible due to the substantial additional resources required to collect prices outside the capital cities. ABS research has shown that, in general, price movements (as opposed to price levels) are similar across regions.

Base period index number is 100.0

The price of the CPI basket in the reference base period is expressed as an index by assigning it a value of 100.0 and the prices in other periods are expressed as percentages of the price in the base period. For example, if the price of the basket had increased 35% since the base year, then the index would be 135.0; similarly, if the price had fallen by 5% since the base year, the index would stand at 95.0. The current reference base period for the CPI is 1989–90.

CPI does not measure price levels

It is important to remember that the CPI measures price movements (i.e. percentage changes) and not actual price levels (dollar amounts). For instance, the index for Beef and veal of 104.3 and for Pork of 110.7 in the September quarter 1998 does not mean that pork is more expensive than beef. It simply means that the price of pork has increased at a little over twice the rate of the price of beef since the base period.

CPI not a purchasing power or cost-of-living measure

Although the CPI is also commonly referred to as a measure of changes in purchasing power or a cost-of-living index, in an economic context, these terms are not strictly interchangeable with a measure of price inflation. Their measurement would require separate, purpose built indexes. A single index cannot be expected to adequately fulfil all these roles.

An index designed to measure changes in the purchasing power of household incomes would need to be concerned with changes in the costs of all expenditures made from household income. Such a measure would include items like income tax and interest payments.

A true cost-of-living index, among other things, would need to be concerned with changes in standards of living and with the substitutions that consumers make in order to maintain their standard of living when faced with changing market conditions (for instance, buying chicken rather than beef when beef prices are high).

The CPI on the other hand is constructed by reference to a basket consisting only of actual goods and services acquired by households. Further, as the composition of this basket is held fixed from period to period, it cannot accurately reflect changing consumer preferences and substitutions made in response to changes in relative prices.

HOW IS THE CPI USED?

The CPI is used as a macroeconomic indicator and for adjusting dollar values

The CPI affects almost all Australians because of the many ways in which it is used. The two most common uses of the CPI are:

- As a macroeconomic indicator. The CPI, and other index series derived from CPI data, are used by the Government and economists to monitor and evaluate levels of inflation in the Australian economy. Inflation and the inflationary expectations of the Australian population play a major role in determining various aspects of Government economic policy, and in the business and investment decisions of private firms and individuals.

- As a means of maintaining dollar values. The value of many types of fixed payments such as social welfare benefits can be reduced over time when prices rise. The CPI is often used to adjust these payments to counter the effects of inflation, a process referred to as 'indexation'. Indexation arrangements are also often applied to rental agreements, insurance coverages and child support payments.

There are many different price indexes available

Although the CPI is the most well known price index, it is but one of many produced by the ABS. Examples of other price indexes include:

- price indexes for materials used in, and articles produced by, manufacturing industries;

- materials used in building;

- export and import price indexes; and

- chained price indexes produced in conjunction with the Australian national accounts.

Having determined that a price index is required for a particular application it is important to carefully consider the range of available indexes and select the index which best meets the specific requirement. While the ABS can provide technical and statistical guidance, it does not provide advice on indexation practices, nor can it tell users which index they should use. These are matters for users to determine.

THE CPI BASKET OF GOODS
AND SERVICES

*CPI basket based on 1993–94
HES data*

The composition of the CPI basket is based on the pattern of household expenditure in the 'weighting base period', which is 1993–94 for the 13th series CPI. During this period, information on the spending habits of Australian households was obtained in the Household Expenditure Survey (HES) conducted by the ABS. The HES results provide the starting point for selecting the basket of goods and services to be priced for the CPI.

*CPI basket includes items
representative of all consumer
goods and services*

For practical reasons, the basket cannot include every item bought by households, but it does include all the important kinds of items. It is not necessary to include all the items people buy since many related items are subject to similar price changes. The idea is to select representative items so that the index reflects price changes for a much wider range of goods and services than is actually priced. Examples of the types of items represented in the basket are shown in Appendix 2.

When determining what items are to be priced for the CPI basket, various factors are taken into consideration. Items:

- Must be representative of purchases made by the CPI population group.

- Must have prices which can be associated with an identifiable and specific commodity or service (e.g. a 420g can of baked beans, or motor vehicle registration fees).

- Are not excluded on the basis of moral or social judgements. For example, some people may regard the use of tobacco or alcohol as socially undesirable, but both are included in the CPI basket because they are significant items of household expenditure and their prices can be accurately measured.

Income based taxes, however, are not included in the CPI because they cannot be clearly associated with the purchase or use of a specific good or service.

*Cost of servicing debt excluded, but
financial services in scope*

The design of the 13th series CPI as a measure of inflation means that the cost of servicing debt used to finance the acquisition of goods and services is excluded from the basket. Conceptually, those costs that relate to the purchase of a financial service by consumers are within scope of an inflation measure.

Financial service costs are of two broad types; direct and indirect. Direct costs include fees and charges on credit cards, bank accounts, and service fees such as commissions charged by stockbrokers. Indirect costs are essentially the interest margins applying to the deposits and borrowings of households with financial institutions. Given the changing mix of direct and indirect charges in recent years, it is important that both be included in the CPI if the measure is to be unbiased. The ABS is developing a methodology to measure these services with a view to their inclusion in the CPI early in 2000.

The CPI groups   The total basket is divided into 8 major groups, each representing a specific set of commodities:

> Food
> Clothing
> Housing
> Household equipment and operation
> Transportation
> Alcohol and tobacco
> Health and personal care
> Recreation and education

These groups are in turn divided into 33 subgroups, and the subgroups into 101 expenditure classes. An expenditure class is a grouping of similar items, such as various types of motor vehicles.

See Appendix 1 for a full list of groups, subgroups and expenditure classes and the figure on page 20 for an illustration of the CPI structure.

THE RELATIVE IMPORTANCE OF CPI ITEMS   The overall (or All groups) CPI provides a measure of the average rate of price change. In calculating an average measure of this type it is necessary to recognise that some items are more important than others. Price changes for the more important items should have a greater influence on the average than price changes for less important items. For example, if household expenditure on bread is three times as large as expenditure on cheese, then a 10% price increase for bread should have a similar impact on the CPI as a 30% price increase for cheese.

CPI weights   Measures of expenditure on each of the 101 CPI expenditure classes are obtained primarily from the HES. However, some adjustments are made to HES data to account for known instances of underreporting (the most notable being for alcohol and tobacco) and any other anomalies. The adjusted HES data is then used to derive a 'weight' for each expenditure class. The weights for the 13th series CPI expenditure classes as at June quarter 1998 prices are shown in Appendix 1.

The weights reflect the relative expenditures of the CPI population group as a whole and not those of any particular type and size of household. As such, the weights are said to reflect expenditures of households on average and **not** the expenditure of an average household.

The description of the CPI as measuring the change in price of a *fixed* basket of goods and services requires some qualification.

Basket is fixed in terms of underlying quantities at the expenditure class

First, although the weights are expressed in terms of expenditure shares, it is not the expenditure shares that are held constant (or fixed) from period to period. What is held constant are the quantities of goods and services underpinning these expenditures (where expenditure is given by the product of quantity and price). Presentation of weights in expenditure terms reflects the fact that it is simply not possible to present quantity weights in a meaningful way. The relative expenditure shares of items will change over time in response to changes in relative prices.

Weights below the expenditure class can be varied

Second, while the implicit quantity weights are held constant at the expenditure class level, the weights of items within an expenditure class (e.g. different grades of bread) can be varied between periodic reviews to reflect changed purchasing patterns. Any weight changes are introduced into the CPI in such a way as they do not, of themselves, affect the level of the index.

Review of fixed weights

The underlying quantity weights for CPI expenditure classes are reviewed at approximately five-yearly intervals with timing generally linked to the availability of HES data. The introduction of new weights resulting from these periodic reviews is signaled by the commencement of a new CPI series (e.g. the 13th series CPI was introduced in September quarter 1998). These weights remain fixed for the life of the series.

COLLECTING PRICES FOR THE CPI

CPI goods and services priced at many different types of outlets

The collection of prices in each capital city is largely carried out by trained field staff operating out of the various offices of the ABS, while some prices are collected by special surveys out of the national office. Prices are collected in the kinds of retail outlets and other places where metropolitan households would be expected to purchase goods and services. This involves collecting prices from many sources such as supermarkets, restaurants, travel agents and schools.

CPI based on 100,000 price quotations each quarter

Items like rail fares, electricity and gas charges and telephone charges are collected from the authorities concerned. Information on rents is obtained from property management companies and from government housing commissions. In total, around 100,000 separate price quotations are collected each quarter.

The frequency of price collection by item varies as necessary to obtain reliable price measures. Prices of some items are volatile (i.e. their prices may vary many times each quarter) and for these items frequent price observations are necessary to obtain a reliable measure of the average price for the quarter. Each month prices are collected at regular intervals for goods such as petrol, fresh meat, and fresh fruit and vegetables.

For most other items price volatility is not a problem and prices are collected once a quarter. There are a few items where prices are changed at infrequent intervals, for example education fees where prices are set once a year. In these cases the frequency of price collection is modified accordingly.

Prices collected are what people actually pay

The prices used in the CPI are those that any member of the public would have to pay to purchase the specified good or service. Any taxes levied on goods or services are included in the CPI price. Sale prices, discount prices and 'specials' are reflected in the CPI so long as the items concerned are of normal quality (i.e. not damaged or shopsoiled), and are offered for sale in reasonable quantities. Any concessions available to particular groups of the population (such as age pensioners) are also taken into account where significant.

To ensure that price movements reflect the buying experience of the majority of the metropolitan population, the brands and varieties of the goods and services which are priced are generally those which sell in greatest volume.

CHANGES IN QUALITY

In concept quality embraces all the attributes of an item which consumers would consider before making a purchase. For example in the case of tinned tomato soup it would include the size of the tin as well as the concentration and taste of the contents.

Prices adjusted for changes in quality

As the CPI aims to measure price changes for a fixed basket of goods and services over time, identical or equivalent items must be priced in successive periods. However, products do change; their components or ingredients may change resulting in an improvement or degradation in quality. As the characteristics of products are altered, the statisticians responsible for the price index attempt to separate the effects of a quality change from any price changes so that the CPI measures 'pure' price change. A simple example of quality adjustment is shown on page 11.

Quality change can be difficult to measure

The requirement to take account of changes in quality, to ensure that the index reflects only pure price change, often poses difficult measurement problems and in some cases is impossible to do in practice. For example, while it is fairly easy to monitor changes in rail or bus ticket prices, it is difficult to attach a dollar value to changes in the frequency and punctuality of the service.

PERIODIC REVIEWS OF THE CPI

CPI reviewed at five-yearly intervals

Like any other long-standing and important statistical series, the CPI is reviewed from time to time to ensure that it continues to meet community needs. The ABS undertakes these reviews at approximately five-yearly intervals with timing generally linked to the availability of results from the HES.

While an important objective of these reviews is to update item weights to reflect changes in the range of available goods and services and changes in household spending patterns, these formal reviews also provide an opportunity to reassess the scope and coverage of the index and other methodological issues.

Following these reviews, the new CPI series is linked to the old to form a continuous series. This linking is carried out in such a way that the resulting continuous series reflects only pure price change and not differences in the cost of the old and new baskets.

The reference base period for the CPI is also updated, but at less frequent intervals. Changes in reference base periods have no effect on percentage changes, which are calculated from the index numbers.

Latest review of CPI in 1998

The latest review of the CPI concluded in the September quarter 1998. A major outcome of the review was the decision that the CPI would change from a measure of the change in living costs of employee households to a general measure of price inflation for the household sector. Consequently the population coverage was expanded from wage and salary earner households to include all metropolitan households. Weights were revised to reflect new expenditure patterns (based on the 1993–94 HES) and the expanded population coverage.

HOW DOES THE CPI RELATE TO ME?

CPI unlikely to reflect the price experience of individual households

The CPI is designed to measure changes in retail prices experienced by all metropolitan private households in aggregate. The composition of the basket and the relative importance of items in it relate to this population group as a whole—it represents the expenditures of all households, not the expenditure pattern of the average household or of any particular household type or size. The basket comprises all consumer goods and services acquired over a twelve month period. It includes items acquired infrequently by an individual household (e.g. major electrical appliances, new motor vehicles), items that are acquired almost daily by all households (e.g. bread and milk) and items that are only available at certain times of the year. The basket includes, for example, both rent payments of renting households and the amounts paid by owner occupier households for the purchase of their principal residence—no individual household can incur both expenses at the same time. Changes in the CPI are therefore unlikely to reflect exactly the price experience of particular households.

The CPI does not measure those changes in living costs which may be experienced by individual households as a direct consequence of their progression through the life cycle. For example younger households may incur a higher proportion of their expenditure on housing and child care while those households entering the older age groups may incur increasing expenditure on medical services. However, changes in the demographic make-up of households in aggregate and differences in expenditure patterns will affect the pattern of total household expenditure recorded in the HES. In turn, these changes will be incorporated in the weighting pattern in the CPI.

CPI cannot be used to measure price levels

The CPI is also not designed to measure price levels; rather its purpose is to measure changes in prices over time. While price levels in country regions often differ from those in metropolitan areas (some higher and others lower), the factors influencing price movements generally tend to be similar. Therefore the CPI can be expected to provide a reasonable indication of the changes in prices in Australia as a whole in the longer term.

Similarly, the CPI cannot be used to compare price levels between capital cities. For example, the fact that the CPI All groups index in the September quarter 1998 for Adelaide (123.0) was higher than in Perth (119.6) does not indicate that Adelaide was more expensive to live in than Perth. Rather, it indicates that prices in Adelaide had risen more than in Perth since 1989–90.

At the end of the day, the CPI is most useful as an *indicator* of price movements, whether it be for specific items, a particular city, or the economy as a whole. The CPI is not a precise measure of individual household price experiences.

EXAMPLE: ADJUSTING FOR
QUALITY

To illustrate the process used to adjust for changes in the quality of
items priced in the CPI, consider the case of a change in the size of a
can of tomato soup. In this example, Acme brand tomato soup is priced
in three periods (1, 2 and 3) and the size of the can is reduced from
440gms to 400gms between period 2 and period 3:

Period 1	Period 2	Period 3

Price:	$1.50	$1.75	$1.70
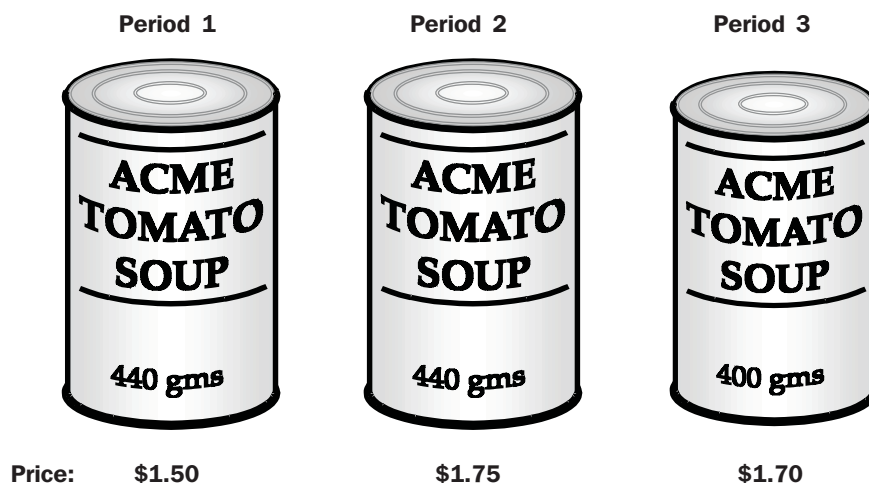
Using the observed prices produces the following measures of price
change:

Period 1 to Period 2	Period 2 to Period 3	Period 1 to Period 3
(1.75–1.50)/1.50x100	(1.70–1.75)/1.75x100	(1.70–1.50)/1.50x100
= 16.7%	= –2.9%	= 13.3%

However, this does not provide a measure of 'pure' price change because
the item priced in period 3 is not identical to the item priced in the
previous periods. What is required for period 3 is the 'price that would
have been paid for the item that was priced in period 2'. This price can
be estimated by adjusting the period 3 price by the ratio of the item's
weight in period 2 to its weight in period 3; giving a quality adjusted
price of $1.87 ($1.70x440/400).

Using this adjusted price in period 3 results in the following correct
measures of price change:

Period 1 to Period 2	Period 2 to Period 3	Period 1 to Period 3
(1.75–1.50)/1.50x100	(1.87–1.75)/1.75x100	(1.87–1.50)/1.50x100
= 16.7%	= 6.9%	= 24.7%

After adjusting for the reduction in quality between periods 2 and 3, the
fall in the observed price of 2.9% has been translated into a pure price
increase of 6.9%. Similarly, the measure of price change between periods
1 and 3 has been increased from 13.3% to 24.7%.

HISTORY OF THE CONSUMER PRICE INDEX, Annual percentage changes(a)
1949–1998
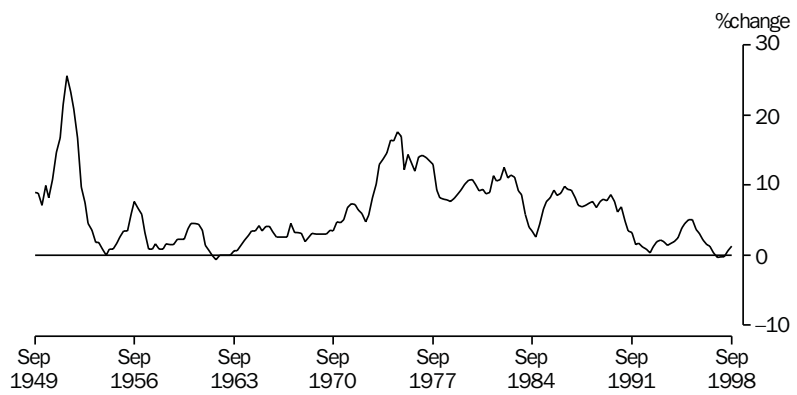
(a) Percentage change from corresponding quarter of previous year.
Source: Consumer Price Index, Australia (Cat. no. 6401.0).

INTERPRETING INDEX
NUMBERS

Why use index numbers?

Deriving useful price measures for single, specific items such as Granny Smith apples is a relatively straightforward exercise. An estimate of the average price per kilogram in each time period is sufficient for all applications. Price change between any two periods would simply be calculated by direct reference to the respective average prices.

However, if the requirement is for a price measure that covers a number of diverse items, the calculation of a 'true' average price is both complicated and of little real meaning. For example, consider the problem of calculating and interpreting an average price for two commodities as diverse as apples and motor vehicles.

Description of a price index

Price indexes provide a convenient and consistent way of presenting price information that overcomes problems associated with averaging across diverse items. The index number for a particular period represents the average price in that period relative to the average price in some base period for which, by convention, the average price has been set to equal 100.0.

A price index number on its own has little meaning. For example, the CPI All groups index number of 121.3 in the September quarter 1998 says nothing more than the average price in September quarter 1998 was 21.3% higher than the average price in the base year 1989–90 (when the index was set to 100.0). The value of index numbers stems from the fact that index numbers for any two periods can be used to directly calculate price change between the two periods.

Percentage change is different to a change in index points

Movements in indexes from one period to any other period can be expressed either as changes in index points or as percentage changes. The following example illustrates these calculations for the All groups CPI (weighted average of the eight capital cities) between the September quarter 1996 and the September quarter 1998. The same procedure is applicable for any two periods.

	Index numbers:
September quarter 1998	121.3
less September quarter 1996	120.1
equals change in index points	1.2

Percentage change = 1.2/120.1x100 = 1.0%

Movements in the CPI best measured using percentage changes

For most applications, movements in price indexes are best calculated and presented in terms of percentage change. Percentage change allows comparisons in movements that are independent of the level of the index. For example, a change of 2 index points when the index number is 120 is equivalent to a percentage change of 1.7%, but if the index number was 80 a change of 2 index points would be equivalent to a percentage change of 2.5%—representing a significantly different rate of price change. Only when evaluating change from the base period of the index will the points change be numerically identical to the percentage change.

Percentage changes are not additive

The percentage change between any two periods *must* be calculated, as in the example above, by direct reference to the index numbers for the two periods. Adding the individual quarterly percentage changes will not result in the correct measure of longer term percentage change. That is, the percentage change between say the June quarter one year and the June quarter of the following year typically will not equal the sum of the four quarterly percentage changes. The error becomes more noticeable the longer the period covered and the greater the rate of change in the index. This can readily be verified by starting with an index of 100 and increasing it by 10% (multiplying by 1.1) each period. After four periods, the index will equal 146.4 delivering an annual percentage change of 46.4%, not the 40% given by adding the four quarterly changes of 10%.

Calculating index numbers for periods longer than quarters

Although the CPI is compiled and published as a series of quarterly index numbers, its use is not restricted to the measurement of price change between particular quarters. Because a quarterly index number can be interpreted as representing the average price during the quarter, index numbers for periods spanning more than one quarter can be calculated as the simple (arithmetic) average of the relevant quarterly indexes. For example, an index number for the year 1995 would be calculated as the arithmetic average of the index numbers for the March, June, September and December quarters of 1995.

This characteristic of index numbers is particularly useful. It allows for comparison of average prices in one year (calendar or financial) with those in any other year. It also enables prices in say the current quarter to be compared with the average prevailing in some prior year.

ANALYSING THE CPI

The quarterly change in the All groups CPI represents the weighted average price change of all the items included in the CPI. While publication of index numbers and percentage changes for components of the CPI are useful in their own right, these data are often not sufficient to enable important contributors to overall price change to be reliably identified. What is required is some measure that encapsulates both an item's price change and its relative importance in the index.

Points contribution and points contribution change

If the All groups index number is thought of as being derived as the weighted average of indexes for all its component items, then the index number for a component multiplied by its weight to the All groups index results in what is called its 'points contribution'. It follows that the change in a component item's points contribution from one period to the next provides a direct measure of the change in the All groups index resulting from a change in that component's price.

Information on points contribution and points contribution change, is of immense value when analysing sources of price change and for answering 'what if' type questions. Consider the following data extracted from the September quarter 1998 CPI publication.

	Index numbers			Points contribution		
Item	*June qtr*	*Sept. qtr*	*Per cent change*	*June qtr*	*Sept. qtr*	*Points change*
All groups	121.0	121.3	0.2	121.0	121.3	0.3
Fresh vegetables	103.3	110.2	6.7	1.50	1.60	0.10

Using points contributions

Armed only with knowledge of the index numbers, the most that can be said is that between the June and September quarters 1998, prices of fresh vegetables increased by more than the CPI on average (by 6.7% compared with an increase in the All groups of 0.2%). The additional information on points contribution and points change can be used to:

a) **Calculate the effective weight for fresh vegetables in the June and September quarters** (given by the points contribution for Fresh vegetables divided by the All groups index). For June, the weight is calculated as 1.50/121.0x100 = 1.24% and for September as 1.60/121.3x100 = 1.32%. Although the underlying quantities are held fixed, the effective weight in expenditure terms has increased due to the fact that prices of fresh vegetables have increased by more than the prices of all other items in the basket (on average).

b) **Calculate the relative contribution of the change in fresh vegetable prices to the change in the All groups index** (given by the points change for Fresh vegetables divided by the points change in the All groups index). In September quarter 1998 this is calculated as 0.10/0.3x100 = 33.3%. In other words, the 6.7% increase in fresh vegetable prices accounted for one third of the increase in the All groups index. Note: Calculations of this type are not always meaningful, for example when the total points change is small or when the change in the component is of a different sign to the change in the total.

c) **Calculate the percentage increase that would have been observed in the CPI if all prices other than those for fresh vegetables had remained unchanged** (given by the points change for Fresh vegetables divided by the All groups index number in the previous period). For September quarter 1998 this is calculated as 0.10/121.0x100 = 0.1%. In other words, a 6.7% increase in fresh vegetable prices in September quarter 1998 resulted in an increase in the overall CPI of 0.1%.

d) **Calculate the average percentage change in all other items excluding fresh vegetables** (given by subtracting the points contribution for Fresh vegetables from the All groups index in both quarters and then calculating the percentage change between the resulting numbers—which represent the points contribution of the 'other' items). For the above example, the numbers for All groups excluding Fresh vegetables are: June, 121.0–1.50 = 119.5; September, 121.3–1.60 = 119.7; and the percentage change, (119.7–119.5)/119.5x100 = 0.2%. In other words, prices of all items other than fresh vegetables increased by 0.2% on average between the June and September quarters 1998.

e) **Estimate the effect on the All groups CPI of a forecast change in the prices of one of the items** (given by applying the forecast percentage change to the item's points contribution and expressing the result as a percentage of the All groups index number). For example, if prices of fresh vegetables were forecast to increase by 25% in December quarter 1998, then the points change for Fresh vegetables would be 1.60x0.25 = 0.4, which would deliver an increase in the All groups index of 0.4/121.3x100 = 0.3%. In other words, a 25% increase in fresh vegetable prices in December quarter 1998 would have the effect of increasing the CPI by 0.3%.

ABS rounding conventions To ensure consistency in application of data produced from the CPI, it is necessary for the ABS to adopt a set of consistent rounding conventions or rules for the calculation and presentation of data. The conventions strike a balance between maximising the usefulness of the data for analytical purposes and retaining a sense of the underlying precision of the estimates. These conventions need to be taken into account when using CPI data for analytical or other special purposes.

Index numbers are always published to a base of 100.0. Index numbers and percentage changes are always published to one decimal place, with the percentage changes being calculated from the rounded index numbers. Points contributions are published to two decimal places, with points contributions change being calculated from the rounded points contributions. Index numbers for periods longer than a single quarter (e.g. for financial years) are calculated as the simple arithmetic average of the relevant rounded quarterly index numbers.

SOME EXAMPLES ON USING THE CPI

The following questions and answers illustrate the uses that can be made of the CPI.

Question: *What would $200 in 1988 be worth in September quarter 1998?*

CPI can be used to compare money values over time

Response: This question is best interpreted as asking 'How much would need to be spent in September quarter 1998 to purchase what could be purchased in 1988 for $200?' As no specific commodity is mentioned, what is required is a measure comparing the general level of prices in September quarter 1998 with the general level of prices in calendar 1988. The All groups CPI would be an appropriate choice.

Because CPI index numbers are not published for calendar years, two steps are required to answer this question. One, derive an index for calendar 1988. Two, multiply the initial dollar amount by the ratio of the index for September quarter 1998 to the index for 1988.

The index for calendar 1988 is obtained as the simple arithmetic average of the quarterly indexes for March (87.0), June (88.5), September (90.2) and December (92.0) 1988—giving 89.4 rounded to one decimal place. The index for September quarter 1998 is 121.3.

The answer is then given by:

$$\$200 \times 121.3/89.4 = \$271.$$

Question: *Household Expenditure Survey data shows that average weekly expenditure per household on the purchase of motor vehicles increased from $19.49 in 1988–89 to $26.61 in 1993–94 (i.e. an increase of 36.5%). Does this mean that households, on average, purchased 36.5% more motor vehicles in 1993–94 than they did in 1988–89?*

For specific items, need to use indexes representative of those items

Response: This is an example of one of the most valuable uses that can be made of price indexes. Often the only viable method of collecting and presenting information about economic activity is in the form of expenditure or income in monetary units (e.g. dollars). While monetary aggregates are useful in their own right, economists and other analysts are frequently concerned with questions related to volumes—for example, whether more goods and services have been produced in one period compared to another period. Comparison of monetary aggregates alone are not sufficient for this purpose as dollar values can change from one period to another due to either changes in quantities or changes in prices (most often a combination).

To illustrate this, consider a simple example of expenditure on oranges in two periods. The expenditure in any period is given by the product of the quantity and the price. Suppose that in the first period 10 oranges were purchased at a price of $1.00 each and in the second period 15 oranges were purchased at a price of $1.50 each. Expenditure in period one would be $10.00 and in period two $22.50. Expenditure has increased by 125%, yet the volume (number of oranges) has only increased by 50% with the difference being accounted for by a price increase of 50%. In this example all the price and quantity data are known, so volumes can be compared directly. Similarly, if prices and expenditures are known, quantities can be derived.

But what if the actual prices and quantities are not known? If expenditures are known and a price index for oranges is available, the index numbers for the two periods can be used *as if they were prices* to adjust the expenditure for one period to remove the effect of price change. If the price index for oranges was equal to 100.0 in the first period, the index for the second period would equal 150.0. Dividing expenditure in the second period by the index number for the second period and multiplying by the index number for the first period, results in a value that equals the expenditure that would have been observed in the second period had the prices remained as they were in the first period. This can easily be demonstrated by reference to the oranges example:

$$\$22.50/150.0 \text{x} 100.0 = \$15.00 = 15\text{x}\$1.00.$$

So, without ever knowing the actual volumes (quantities) in the two periods, the adjusted second period expenditure ($15.00), can be compared with the expenditure in the first period ($10.00) to derive a measure of the proportional change in volumes—$15/$10 = 1.50, which equals the ratio obtained directly from the comparison of the known volumes.

Turning to the question on expenditure on motor vehicles recorded in the HES in 1988–89 and 1993–94. As the HES data relates to the average expenditure of Australian households, the ideal price index would be one that covers the retail prices of motor vehicles for Australia as a whole. The price index which comes closest to meeting this ideal is the index for the Motor vehicles expenditure class of the CPI for the weighted average of the eight capital cities. The Motor vehicles index number for 1988–89 is 95.8 and for 1993–94 it is 113.6. Using these index numbers, recorded expenditure in 1993–94 ($26.61) can be adjusted to 1988–89 prices as follows:

$$\$26.61/113.6 \text{x} 95.8 = \$22.44.$$

The adjusted 1993–94 expenditure of $22.44 can then be compared to the expenditure recorded in 1988–89 ($19.49) to deliver an estimate of the change in volumes. This indicates a volume increase of 15.1%.

Question: *What would be the impact of a 10% increase in petrol prices on the All groups CPI in the December quarter 1998?*

Forecasting impact of price changes on the CPI

Response: Two pieces of information are required to answer this question; the All groups index number for September quarter 1998 (121.3), and the September quarter 1998 points contribution for Automotive fuel (4.78).

An increase in petrol prices of 10% would increase Automotive fuel points contribution by 4.78x0.1 = 0.48 index points which would result in an All groups index number of 121.8, an increase of 0.4%.

SECTION 4 CALCULATING THE CPI

CONSUMER PRICE INDEX STRUCTURE

All groups

Groups

Subgroups

Expenditure classes

Elementary aggregates

Prices
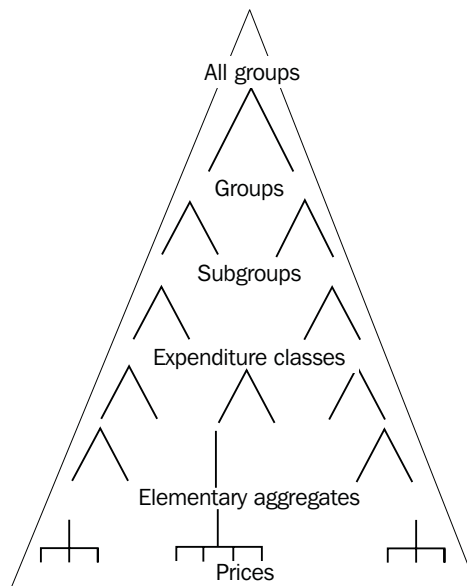
All groups is the highest level of the index. In the September quarter 1998 the All groups index was 121.3, a rise of 1.3% on the September quarter 1997.

Expenditure classes are groups of similar goods or services. They are the lowest level at which indexes are published and weights are fixed. There are 101 expenditure classes in the 13th series CPI.

Elementary aggregates are the basic building blocks of the CPI. Each elementary aggregate contains several prices for a particular good or service. There are approximately 1,500 elementary aggregates in each capital city. About 100,000 price observations are collected each quarter across the capital cities.

OVERVIEW

The CPI has previously been described in terms of a basket of goods and services which is 'purchased' each quarter. As prices change from one quarter to the next so too will the total cost (or price) of the basket. Of the alternative ways in which a CPI could be described, this description conforms most closely with the procedures actually followed.

Using this description, the construction of the CPI can be thought of as being done in four major steps:

1 subdividing the total expenditure into individual items for which price samples can be selected;

2 collecting price data;

3 estimating price movements for individual items; and

4 calculating the current period cost of the basket.

SUBDIVIDING THE BASKET

Expenditure aggregates

Based primarily on the HES, estimates are obtained for total annual expenditure of private households in each capital city for each of the 101 expenditure classes in the CPI. As these estimates relate to the expenditure of households in aggregate, they are referred to as 'expenditure aggregates'.

While these expenditure aggregates are derived for well defined categories of household expenditure (e.g. bread), they are still too broad to be of direct use in selecting price samples. For this purpose, expenditure aggregates need to be subdivided into as fine a level of commodity detail as possible. As the HES is generally not designed to provide such fine level estimates, it is necessary to supplement the HES data with information from other sources such as other official data collections and industry data. The processes involved are illustrated below by reference to a stylised example for the Bread expenditure class of the CPI.

Suppose that, based on information reported in the HES, the annual expenditure on bread by all private households in a particular city is estimated at $8m. Further, suppose that there exists separately some industry data on the market shares of various types of bread. In combination these two data sources can be used to derive expenditure aggregates at a much finer level of detail than that available from the HES alone. The results are shown in the following table.

Type of bread	Market share %	HES data $'000	Derived expenditure aggregates $'000
1 White, sandwich, sliced	30	—	2 400
2 White, sandwich, unsliced	2	—	160
3 White, high fibre	20	—	1 600
4 White, high top	3	—	240
5 Wholemeal	10	—	800
6 Multigrain	15	—	1 200
7 Bread rolls	15	—	1 200
8 Specialty	5	—	400
Total breads	**100**	**8 000**	**8 000**

The next stage in the process involves determining the types of bread for which price samples should be constructed. This is not as simple an exercise as might be imagined and relies heavily on the judgement of the prices statisticians. In reaching decisions about precisely which items to include in price samples, the prices statisticians need to strike a balance between the cost of data collection (and processing) and the accuracy of the index. Factors taken into account include the relative significance of individual items, the extent to which different items are likely to exhibit similar price behaviour, and any practical problems associated with measuring prices to constant quality.

In this example, a reasonable outcome would be to decide to construct price samples for items 1, 3, 5 and 6. Separate price samples would not be constructed for items 2 and 4 due to their relatively small market share. Price samples would also not be constructed for items 7 and 8 (bread rolls and specialty breads) as they would prove difficult to price to constant quality due to the tendency for these items to be sold by number rather than weight.

Elementary aggregates must have a price sample

The items for which it is decided to construct specific price samples are referred to as 'elementary aggregates'. (There are approximately 1,500 elementary aggregates for each of the eight capital cities, or approximately 12,000 price samples at the national level.) The expenditure aggregates for the items that are not to be explicitly priced are reallocated across the elementary aggregates in such a way as to best preserve the representativeness of the price samples. In this example, this would be done in two stages. First, the expenditure aggregate for item 2 would be allocated to item 1 and the expenditure aggregate for item 4 would be allocated to item 3. In the second stage, the expenditure aggregates for items 7 and 8 would be allocated, on a proportional basis, across the four elementary aggregates. This process is illustrated in the following table.

| Bread type | Expenditure aggregates | | | Elementary aggregate |
	Initial $'000	Stage 1 $'000	Stage 2 $'000	
1	2 400	2 560	3 200	White sandwich
2	160	—	—	
3	1 600	1 840	2 300	White high fibre
4	240	—	—	
5	800	800	1 000	Wholemeal
6	1 200	1 200	1 500	Multigrain
7	1 200	1 200	—	
8	400	400	—	
Total	**8 000**	**8 000**	**8 000**	

The rationale for this allocation is as follows. Price behaviour of item 2 (white, sandwich, unsliced) is likely to be best represented by the price behaviour of item 1 (white, sandwich, sliced). Similarly for items 4 and 3. Price behaviour for items 7 and 8 (bread rolls and specialty bread) is likely to be best represented by the average price behaviour of all other breads.

Determining outlet types

Having settled on the items for which price samples are to be constructed, the next step is to determine the outlet types (respondents) from which prices will be collected. In order to accurately reflect changes in prices paid by households for bread, prices need to be collected from the various outlets from which households purchase bread. Data are unlikely to be available at the individual elementary aggregate level by type of outlet. It is more likely that data will be available for bread in total. Suppose industry data indicates that supermarkets accounted for about 80% of bread sales and hot bake outlets the remainder. A simple way to construct the price sample for each elementary aggregate that is representative of household shopping patterns is to have a ratio of four prices from supermarkets to every hot bake price.

COLLECTING PRICE DATA

Selecting respondents

When price samples have been determined, ABS field staff determine from which individual supermarkets and hot bakes the prices will be collected. The individual outlets are chosen to be representative of the two types of outlets taking into account many perspectives. For example, the outlets should be representative of the socio-economic characteristics of the city. The prices are collected each quarter from the same respondents for the same items.

Selecting items to price

When a respondent is first enrolled in the collection process the field staff will determine, in conjunction with the outlet management, which specific items are best representative of each elementary aggregate. For example, at one outlet it might be decided that the 680gm sliced white sandwich loaf is best representative of white sandwich bread; at another outlet it might be a 700gm white toast sliced sandwich loaf.

An important part of the ongoing price collection process is the monitoring of the items for quality change. In the stylised bread example this could occur in various ways. A possible quality change would be a change in the size (weight) of the loaf of bread. In this case prices would be adjusted to derive a pure price for the item along the lines illustrated in the example on page 11. Individual item prices are also validated against prices collected in the previous period to check their accuracy and to verify any large movements.

ESTIMATION OF PRICE MOVEMENTS FOR ELEMENTARY AGGREGATES

Price samples are constructed for the sole purpose of estimating price movements for each elementary aggregate. These estimates of price movements are required to revalue the expenditure aggregates to current period prices in much the same way as illustrated in the example on using price indexes (see page 17). This is achieved by applying period to period price movement to the previous period's expenditure aggregate for each elementary aggregate. It provides an estimate of the cost of acquiring the base period quantity of the elementary aggregate in the current quarter.

Four options for calculating price movement

There is no single correct method for calculating the price movement for a sample of observations. Four commonly used methods are described below using as an example price observations from two periods for multigrain bread.

	Price observations in			Estimates of sample price movement
	Period 1	Period 2		
	$	$	*Price relative*	
	(a)	(b)	(b)/(a)	
Outlet data				
Supermarket A	**1.50**	**1.80**	1.200	..
Supermarket B	**1.60**	**1.90**	1.188	..
Supermarket C	**1.85**	**1.50**	0.811	..
Supermarket D	**1.75**	**1.50**	0.857	..
Hot bake	**2.00**	**2.20**	1.100	..
Average prices				
Arithmetic mean	1.74	1.78	..	..
Geometric mean	1.73	1.76	..	..
Four methods of calculating price movement				
Relative of average prices				
Arithmetic mean	..	..	..	1.023
Geometric mean	..	..	..	1.017
Average of price relatives				
Arithmetic mean	..	..	..	1.031
Geometric mean	..	..	..	1.017

The differences between the four methods involve choices as to:

- whether the price movement for the sample is calculated as the average of each period's prices or as the average of price movements between periods for each item; and

- the type of average used.

The two commonly used forms of average are the arithmetic mean and the geometric mean. For a sample of n price observations, the arithmetic mean is the sum of the individual prices divided by the number of observations, while the geometric mean is the nth root of the product of the prices. For example, the arithmetic mean of 4 and 9 is 6.5, while the geometric mean is 6 (the geometric mean is always lower than or equal to the arithmetic mean).

Relative of arithmetic mean prices
Based on these options, one method is to construct a ratio of the arithmetic average prices in the two periods. In the above example the arithmetic average of prices in period 1 is $1.74 and in period 2 it is $1.78, giving a relative of 1.023 (1.78/1.74) or a percentage change of 2.3%. This method is called the 'relative of arithmetic mean prices' (RAP), sometimes referred to as the 'Dutot' index formula.

Arithmetic mean of price relatives
A second method is to calculate the price movement between periods for each individual item and then take the arithmetic average of these movements. The price movement for each item must be expressed in relative terms (i.e. period 2 price divided by period 1 price as shown in the second column from the right in the above table). In the example above the arithmetic average of the price relatives is 1.031, a price change of 3.1%. This method is called the 'arithmetic mean of price relatives' (APR), sometimes referred to as the 'Carli' index formula.

Geometric mean
A third method is to construct a ratio of the geometric mean of prices in each period. The geometric mean of the sample prices in period 1 is $1.73 and in period 2 it is $1.76 giving a relative of 1.017 (1.76/1.73) or a percentage change of 1.7%.

The fourth method is to calculate the geometric mean of the price movements for each individual item. Again, the price movements must be in the form of price relatives. In the above example, the geometric mean of the price relatives is 1.017, indicating a price increase of 1.7%, the same as using the ratio of the geometric mean of prices in each period.

In fact the geometric mean will always produce the same result whether the relative of mean prices or the mean of relative prices is used. Both approaches are simply referred to as the geometric mean (GM), sometimes called the 'Jevons' index formula.

Geometric mean is the preferred method

The method of calculating price change at the elementary aggregate level is important to the accuracy of the price index. The arithmetic average of price relatives (APR) approach has been shown to be more prone to (upward) bias than the other two methods. In line with various overseas countries, the ABS is using the geometric mean formula for calculating elementary aggregate index numbers where practical in the 13th series of the CPI. Where the geometric mean is not appropriate the relative of arithmetic mean prices (RAP) is used. The reasoning behind using geometric means is outlined below.

Geometric mean allows for substitution

At the elementary aggregate level of the index it is usually impractical to assign a specific weight to each individual price observation. The three formulae described above implicitly apply equal weights to each observation, although the bases of the weights differ. The geometric mean applies weights such that the expenditure shares of each observation are the same in each period. In other words the geometric mean formula implicitly assumes households buy less (more) of items that become more (less) expensive relative to the other items in the sample. The other formulae assume equal quantities in both periods (RAP) or equal expenditures in the first period (APR), with quantities being inversely proportional to first period prices. The geometric mean therefore appears to provide a better representation of household purchasing behaviour than the alternative formula in those elementary aggregates where there is likely to be high substitutability in consumption within the price sample.

Geometric mean not appropriate for all elementary aggregates

The geometric mean cannot be used to calculate the average price in all elementary aggregates. It cannot be used in cases where the price could be zero (i.e. the cost of a good or service is fully subsidised by the government). It is also not appropriate to use geometric means in elementary aggregates covering items between which consumers are unable to substitute. An example of this is local government rates where it is not possible to switch from a high rate area to a low rate area without physically moving location.

CALCULATING THE CURRENT COST OF THE BASKET

Once price movements are calculated for each elementary aggregate, the expenditure aggregates can be moved forward and then summed to derive the current cost of the basket. It is from the expenditure aggregates that index numbers are calculated at any level of the index. The stylised example above is continued, to show the process for the Bread expenditure class.

Elementary aggregate	Expenditure aggregate Period 1	Price movement Period 1 to Period 2	Expenditure aggregate Period 2
	$'000	(a)	$'000
White sandwich	3 200	1.025	3 280
White high fibre	2 300	1.015	2 334
Wholemeal	1 000	1.020	1 020
Multigrain	1 500	1.017	1 526
Total	**8 000**	—	**8 160**

(a) Geometric mean of price relatives.

The expenditure aggregates are revalued to period 2 prices by applying the movements between period 1 and period 2. The expenditure aggregate for the expenditure class Bread is the sum of the expenditure aggregates for the elementary aggregates comprising the expenditure class. Summing the elementary aggregates says that in period 2 it would cost $8.160m to buy the volume of Bread in period 1 that cost $8m. The price change for Bread between period 1 and 2 is simply the ratio of these expenditure aggregates, that is, a price increase of 2.0% (8.160/8). Thus if the price index for bread was 100.0 in period 1, it would be 102.0 in period 2.

The derivation of the expenditure class movement as shown above is mathematically equivalent to a weighted average of the price movements for the individual elementary aggregates, that is, a weighted version of the mean of price relatives formula discussed above. In this case period 1 expenditure aggregates are the weights. The same formula is used at higher levels of the index.

Similar procedures are used to derive price movements at higher levels of the CPI. For example, the current period cost of purchasing items in the Cereal products subgroup of the CPI is obtained by summing the current period expenditure aggregates of the expenditure classes Bread, Cakes and biscuits, Breakfast cereals and Other cereal products. The ratio of the current and previous period expenditure aggregates for the Cereal products subgroup gives the price movement for the subgroup.

Points contributions (see page 15) are also calculated using the expenditure aggregates. The current period points contribution of a CPI component, for example the expenditure class Bread, is the current period expenditure aggregate for Bread relative to the expenditure aggregate for the All groups CPI multiplied by the current period All groups index number.

The CPI publication does not show the expenditure aggregates, but rather the index numbers derived from the expenditure aggregates. Expenditure aggregates vary considerably in size and would make the publication difficult to read and interpret. The published index numbers and points contributions are a convenient presentation of the information.

SECTION 5   FURTHER INFORMATION

CONTACTING THE ABS

Many unpublished index numbers are available on request. This special data service provides, separately for each capital city and for the weighted average of the eight capital cities, time series of index numbers for all expenditure classes, subgroups, groups and the special groupings.

If you want to know more about the CPI, or CPI special data services, write to:

Director
Consumer Price Indexes Section
Australian Bureau of Statistics
PO Box 10
Belconnen   ACT   2616

Phone: (02) 6252 6006
Fax: (02) 6252 6130

A full list of statistical publications produced by the ABS is detailed in the *Catalogue of Publications and Products, Australia* (Cat. no. 1101.0), which is available on request to this address or from any of our State offices.

ABS PUBLICATIONS ON PRICES

Consumer Price Indexes

Consumer Price Index (Cat. no. 6401.0)—quarterly

Average Retail Prices of Selected Items, Eight Capital Cities (Cat. no. 6403.0)—quarterly

House Price Indexes: Eight Capital Cities (Cat. no. 6416.0)—quarterly

The Australian Consumer Price Index: Concepts, Sources and Methods (Cat. no. 6461.0)—infrequent

Information Paper: Feasibility of Constructing Price Indexes for Special Population Groups (Cat. no. 6445.0)

Information Paper: An Analytical Framework for Price Indexes in Australia (Cat. no. 6421.0)

Information Paper: Issues to be Considered During the 13th Series Australian Consumer Price Index Review (Cat. no. 6451.0)

Information Paper: Outcome of the 13th Series Australian Consumer Price Index Review (Cat. no. 6453 .0)

Information Paper: Introduction of the 13th Series Australian Consumer Price Index (Cat. no. 6454.0)

Producer Price Indexes	*Price Index of Materials Used in Building Other Than House Building, Six State Capital Cities* (Cat. no. 6407.0)—quarterly
	Price Index of Materials Used in House Building, Six State Capital Cities (Cat. no. 6408.0)—quarterly
	Price Indexes of Materials Used in Manufacturing Industries, Australia (Cat. no. 6411.0)—quarterly
	Price Indexes of Materials Used in Coal Mining, Australia (Cat. no. 6415.0)—quarterly
	Price Indexes of Articles Produced by Manufacturing Industry, Australia (Cat. no. 6412.0)—quarterly
	Price Indexes of Copper Materials, Australia (Cat. no. 6410.0)—quarterly
	Export Price Index (Cat. no. 6405.0)—quarterly
	Import Price Index (Cat. no. 6414.0)—quarterly
Household Expenditure Survey	*Household Expenditure Survey, Australia: Detailed Expenditure Items* (Cat. no. 6535.0)

WEIGHTING PATTERN, 13TH SERIES CPI, JUNE QUARTER 1998, EIGHT CAPITAL CITIES

Group, subgroup and expenditure class		Percentage contribution to the All groups CPI in June quarter 1998		
		Group	Subgroup	Expenditure class
1	**FOOD**	19.19		
1.1	**Dairy and related products**		1.47	
1.1.1	Milk and cream			0.89
1.1.2	Cheese			0.33
1.1.3	Other dairy products			0.25
1.2	**Cereal products**		2.44	
1.2.1	Bread			1.01
1.2.2	Cakes and biscuits			0.94
1.2.3	Breakfast cereals			0.27
1.2.4	Other cereal products			0.22
1.3	**Meat and seafoods**		2.83	
1.3.1	Beef and veal			0.63
1.3.2	Lamb and mutton			0.32
1.3.3	Pork			0.16
1.3.4	Poultry			0.48
1.3.5	Bacon and ham			0.29
1.3.6	Processed meat			0.52
1.3.7	Fish and other seafood			0.42
1.4	**Fresh fruit and vegetables**		2.27	
1.4.1	Fresh fruit			1.03
1.4.2	Fresh vegetables			1.24
1.5	**Processed fruit and vegetables**		0.75	
1.5.1	Processed fruit			0.15
1.5.2	Processed vegetables			0.26
1.5.3	Fruit and vegetable juices			0.35
1.6	**Soft drinks, ice cream and confectionery**		2.42	
1.6.1	Soft drinks and cordials			1.01
1.6.2	Ice cream and ice confectionery			0.32
1.6.3	Sweet and savoury snacks			1.09
1.7	**Meals out and take away foods**		5.25	
1.7.1	Restaurant meals			2.41
1.7.2	Take away and fast foods			2.84
1.8	**Other food**		1.75	
1.8.1	Eggs			0.15
1.8.2	Jams, honey and sandwich spreads			0.17
1.8.3	Tea, coffee and food drinks			0.38
1.8.4	Food additives and condiments			0.31
1.8.5	Fats and oils			0.25
1.8.6	Food n.e.c			0.49

WEIGHTING PATTERN, 13TH SERIES CPI, JUNE QUARTER 1998, EIGHT CAPITAL CITIES—*continued*

Group, subgroup and expenditure class		*Percentage contribution to the All groups CPI in June quarter 1998*	
	Group	*Subgroup*	*Expenditure class*
2 **CLOTHING**	5.72		
2.1 **Men's clothing**		1.19	
2.1.1 Men's outerwear			0.65
2.1.2 Men's shirts			0.34
2.1.3 Men's underwear, nightwear and socks			0.20
2.2 **Women's clothing**		2.35	
2.2.1 Women's outerwear			1.95
2.2.2 Women's underwear, nightwear and hosiery			0.39
2.3 **Children's and infants' clothing**		0.53	
2.3.1 Boys' clothing			0.31
2.3.2 Girls' clothing			0.22
2.4 **Footwear**		0.87	
2.4.1 Men's footwear			0.21
2.4.2 Women's footwear			0.51
2.4.3 Children's footwear			0.16
2.5 **Clothing accessories, supplies and services**		0.78	
2.5.1 Clothing accessories			0.40
2.5.2 Fabrics and knitting wool			0.16
2.5.3 Clothing services and shoe repair			0.22
3 **HOUSING**	19.35		
3.1 **Rents**		5.80	
3.1.1 Privately-owned dwelling rents			5.13
3.1.2 Government-owned dwelling rents			0.67
3.2 **Utilities**		3.56	
3.2.1 Electricity			1.78
3.2.2 Gas			0.69
3.2.3 Other household fuel			0.14
3.2.4 Water and sewerage			0.96
3.3 **Other housing**		9.99	
3.3.1 House purchase			6.88
3.3.2 Property rates and charges			1.18
3.3.3 House repairs and maintenance			1.72
3.3.4 House insurance			0.21

...continued

WEIGHTING PATTERN, 13TH SERIES CPI, JUNE QUARTER 1998, EIGHT CAPITAL CITIES—*continued*

		Percentage contribution to the All groups CPI in June quarter 1998		
	Group, subgroup and expenditure class	Group	Subgroup	Expenditure class
4	**HOUSEHOLD EQUIPMENT AND OPERATION**	12.56		
4.1	**Furniture and floor coverings**		3.58	
4.1.1	Furniture			2.88
4.1.2	Floor coverings			0.71
4.2	**Household textiles**		0.49	
4.2.1	Bedding			0.27
4.2.2	Towels, linen and curtains			0.23
4.3	**Household appliances, utensils and tools**		2.77	
4.3.1	Appliances			1.60
4.3.2	Tableware, glassware and cutlery			0.25
4.3.3	Household utensils			0.37
4.3.4	Tools			0.54
4.4	**Household supplies**		2.46	
4.4.1	Household cleaning agents			0.60
4.4.2	Pet foods, pets and supplies			0.71
4.4.3	Other household supplies			1.14
4.5	**Household services**		1.23	
4.5.1	Pet services including veterinary			0.22
4.5.2	House contents insurance			0.21
4.5.3	Repairs to household durables			0.30
4.5.4	Domestic services			0.51
4.6	**Postal and communication services**		2.03	
4.6.1	Postal services			0.18
4.6.2	Communication services			1.85
5	**TRANSPORTATION**	14.13		
5.1	**Private motoring**		13.22	
5.1.1	Motor vehicles			3.88
5.1.2	Automotive fuel			4.04
5.1.3	Vehicle insurance			0.57
5.1.4	Motor vehicle repair and servicing			2.59
5.1.5	Motor vehicle parts and accessories			1.12
5.1.6	Other motoring charges			1.02
5.2	**Urban transport fares**		0.91	
5.2.1	Urban transport fares			0.91
6	**ALCOHOL AND TOBACCO**	8.14		
6.1	**Alcoholic drinks**		5.06	
6.1.1	Beer			2.68
6.1.2	Wine			1.38
6.1.3	Spirits			1.00
6.2	**Cigarettes and tobacco**		3.08	
6.2.1	Cigarettes and tobacco			3.08

...continued

WEIGHTING PATTERN, 13TH SERIES CPI, JUNE QUARTER 1998, EIGHT CAPITAL CITIES—*continued*

		Percentage contribution to the All groups CPI in June quarter 1998		
	Group, subgroup and expenditure class	Group	Subgroup	Expenditure class
7	**HEALTH AND PERSONAL CARE**	6.98		
7.1	**Health services**		3.80	
7.1.1	Hospital and medical services			3.06
7.1.2	Optical services			0.18
7.1.3	Dental services			0.56
7.2	**Personal care products**		2.41	
7.2.1	Pharmaceuticals			1.09
7.2.2	Toiletries and personal products			1.33
7.3	**Hairdressing and personal care services**		0.76	
7.3.1	Hairdressing and personal care services			0.76

WEIGHTING PATTERN, 13TH SERIES CPI, JUNE QUARTER 1998, EIGHT CAPITAL CITIES—*continued*

Group, subgroup and expenditure class		*Percentage contribution to the All groups CPI in June quarter 1998*	
	Group	*Subgroup*	*Expenditure class*
7 HEALTH AND PERSONAL CARE	6.98		
7.1 **Health services**		3.80	
7.1.1 Hospital and medical services			3.06
7.1.2 Optical services			0.18
7.1.3 Dental services			0.56
7.2 **Personal care products**		2.41	
7.2.1 Pharmaceuticals			1.09
7.2.2 Toiletries and personal products			1.33
7.3 **Hairdressing and personal care services**		0.76	
7.3.1 Hairdressing and personal care services			0.76
8 RECREATION AND EDUCATION	13.93		
8.1 **Books, newspapers, magazines and stationery**		1.91	
8.1.1 Books			0.60
8.1.2 Newspapers and magazines			0.76
8.1.3 Stationery			0.55
8.2 **Recreation**		5.80	
8.2.1 Audio, visual and computing equipment			1.33
8.2.2 Audio, visual and computing media and services			0.73
8.2.3 Sports and recreational equipment			0.59
8.2.4 Toys, games and hobbies			0.35
8.2.5 Repairs to recreational goods			0.13
8.2.6 Sports participation			0.84
8.2.7 Other recreational activities			1.83
8.3 **Holiday travel and accommodation**		3.89	
8.3.1 Domestic holiday travel and accommodation			2.19
8.3.2 Overseas holiday travel and accommodation			1.70
8.4 **Education and child care**		2.32	
8.4.1 Education			1.82
8.4.2 Child care			0.50
ALL GROUPS(a)	**100.00**	**100.00**	**100.00**

(a)Percentages may not add due to rounding

APPENDIX 2 TYPES OF GOODS AND SERVICES PRICED IN THE 13TH SERIES CPI

The following table gives an indication of the types of items that are priced and where particular items are classified in the CPI structure (e.g. soy milk is classified as belonging to the expenditure class Milk and cream).

The mention of an item in the table does not necessarily mean that there is a specific price sample for that item, nor does it mean that all the price samples are specifically listed.

TYPES OF GOODS AND SERVICES PRICED IN THE 13TH SERIES CPI

Group, subgroup and expenditure class	Description/examples of item coverage
FOOD	
Dairy and related products	
Milk and cream	Fresh milk (including flavoured), cream and substitutes (e.g. soy milk)
Cheese	All types, including sliced and grated
Other dairy products	Yoghurts and other dairy snacks, powdered and condensed milk
Cereal products	
Bread	All types of bread
Cakes and biscuits	Cakes, muffins, pastries and biscuits
Breakfast cereals	All grain based breakfast cereals, including muesli
Other cereal products	All types of flour, rice, pasta and similar grain based products, including bran
Meat and seafoods	
Beef and veal	All cuts of beef and veal; fresh, chilled and frozen, including mince
Lamb and mutton	All cuts of lamb and mutton; fresh chilled and frozen
Pork	All cuts of pork; fresh, chilled and frozen
Poultry	Pieces or whole poultry; fresh, chilled or frozen
Bacon and ham	All styles of bacon and ham; fresh and canned
Processed meat	Sausages, salami and other processed meats; fresh, canned or frozen
Fish and other seafood	All seafoods; fresh, chilled, frozen, canned or processed
Fresh fruit and vegetables	
Fresh fruit	All fruit; fresh and chilled
Fresh vegetables	All vegetables; fresh and chilled
Processed fruit and vegetables	
Processed fruit	All fruit; canned, dried or frozen
Processed vegetables	All vegetables; canned, frozen, dried or pickled
Fruit and vegetable juices	All fruit and vegetable juices and drinks
Soft drinks, ice cream and confectionery	
Soft drinks and cordials	All carbonated non-alcoholic drinks and cordials
Ice cream and ice confectionery	Milk and water based ice confectionery
Sweet and savoury snacks	Lollies, chocolates, nuts, corn and potato chips, gum and similar items
Meals out and take away foods	
Restaurant meals	All meals eaten in restaurants, hotels, cafes etc offering full table service
Take away and fast foods	All take away and delivered meals and fast food suitable for immediate consumption
Other food	
Eggs	Fresh (avian) eggs
Jams, honey and sandwich spreads	Jams, syrups, cheese and yeast based spreads and dips

TYPES OF GOODS AND SERVICES PRICED IN THE 13TH SERIES CPI—*continued*

Group, subgroup and expenditure class	Description/examples of item coverage
Other food *continued*	
Tea, coffee and food drinks	Tea (leaves, bags etc) and coffee (instant, ground etc), chocolate based food drinks
Food additives and condiments	Sugar and artificial sweeteners, salt, spices, sauces and pastes and salad dressings
Fats and oils	All butter, margarine and cooking oils
Food n.e.c	Foods not classified above, including canned and packet soups, baby foods, prepared meals (fresh and frozen requiring cooking/heating)
CLOTHING	
Men's clothing	
Men's outerwear	Suits, jumpers, jeans and swimwear
Men's shirts	Business and casual shirts, T-shirts
Men's underwear, nightwear and socks	Briefs, singlets, pyjamas and socks
Women's clothing	
Women's outerwear	Dresses, blouses, suits, jeans and coats
Women's underwear nightwear and hosiery	Bras, briefs, nightwear and lingerie
Children's and infants' clothing	
Boys' clothing	Jeans, shorts, T-shirts, socks, underwear
Girls' clothing	Jeans, shorts, T-shirts, socks, underwear
Footwear	
Men's footwear	All footwear except sport or game specific footwear
Women's footwear	All footwear except sport or game specific footwear
Children's footwear	Shoes, sandals, general sports shoes and baby shoes
Clothing accessories, supplies and services	
Clothing accessories	Items complementary to clothing, including hats, wallets, sunglasses, umbrellas, watches and luggage
Fabrics and knitting wool	Fabrics, wool, dress-making patterns, and sewing materials
Clothing services and shoe repair	Clothing and footwear services including hire, dry cleaning, shoe repairs, and dressmaking
HOUSING	
Rents	
Privately-owned dwelling rents	Rent paid to private landlords
Government-owned dwelling rents	Rent paid to public housing authorities, including Defence Housing Authority
Utilities	
Electricity	Electricity charges and connection fees
Gas	Mains and bottled gas, and connection fees
Other household fuel	Firewood, heating oil, charcoal, and coal
Water and sewerage	Water supply and sewerage charges
Other housing	
House purchase	New homes (excluding land) and major improvements to existing homes
Property rates and charges	State and local council property based rates and charges except water and sewerage
House repairs and maintenance	Materials and tradesmen's labour for repairs and maintenance to dwellings
House insurance	Service component of comprehensive dwelling insurance
HOUSEHOLD EQUIPMENT AND OPERATION	
Furniture and floor coverings	
Furniture	All household furniture (including outdoors), lamps, ornaments and blinds
Floor coverings	All floor coverings and ceramic and vinyl tiles

...continued

TYPES OF GOODS AND SERVICES PRICED IN THE 13TH SERIES CPI—*continued*

Group, subgroup and expenditure class	Description/examples of item coverage
Household textiles	
Bedding	Bed linen, pillows, blankets, doonas and similar items
Towels, linen and curtains	Bathroom, table and kitchen linen, window and shower curtains
Household appliances, utensils and tools	
Appliances	Purchase and hire of all 'white' goods, smaller appliances (toasters, vacuum cleaners) and air conditioners (not ducted)
Tableware, glassware and cutlery	Dinner sets, cutlery, stoneware and steak knives
Household utensils	Pots, pans, cookware, brooms, and mops
Tools	Lawnmowers, garden tools, electric drills and paint brushes
Household supplies	
Household cleaning agents	Laundry soaps and powders, bleach, disinfectants and polishes
Pet foods, pets and supplies	Pets, pet foods, aquariums and other items for the housing and care of pets
Other household supplies	Other items used in households, including toilet paper, insect repellent, garbage bags and aluminium foil
Household services	
Pet services including veterinary	Services to care for animals, including veterinary, kennel and stable fees
House contents insurance	Service component of comprehensive dwelling contents insurance
Repairs to household durables	Repair and maintenance of appliances, tools and furnishings
Domestic services	Includes house cleaning, lawn mowing, gardening and pest control services
Postal and communication services	
Postal services	Envelopes, stamps and delivery charges
Communication services	Local and long distance calls, mobile phone services and connection fees and internet services
TRANSPORTATION	
Private motoring	
Motor vehicles	Purchase and long term hire/lease of new cars and motor cycles
Automotive fuel	Leaded and unleaded petrol
Vehicle insurance	Comprehensive and compulsory third party vehicle insurance
Motor vehicle repair and servicing	Crash repairs, panel beating, tune ups and maintenance
Motor vehicle parts and accessories	Separately purchased parts and accessories, motor oils and tyres
Other motoring charges	Registration fees, parking fees, and driving lessons
Urban transport fares	
Urban transport fares	Bus, train, ferry, tram and taxi fares, not for holiday travel
ALCOHOL AND TOBACCO	
Alcoholic drinks	
Beer	Beer of all strengths; bottles, cans, tap; purchases in bar, club, bottle shop and restaurant
Wine	Still and sparkling wine; bottles, casks and glass; purchases in bar, club, bottle shop and restaurant
Spirits	Bottle shop and bar purchases
Cigarettes and tobacco	
Cigarettes and tobacco	Cartons and packs of cigarettes, cigars and pipe tobacco
HEALTH AND PERSONAL CARE	
Health services	
Hospital and medical services	Medical insurance, doctor and specialist fees
Optical services	Opticians fees, prescription spectacles and repairs
Dental services	Dentists fees including fillings, dentures and braces

TYPES OF GOODS AND SERVICES PRICED IN THE 13TH SERIES CPI—*continued*

Group, subgroup and expenditure class	Description/examples of item coverage
Personal care products	
Pharmaceuticals	Prescription medicines, vaccines and treatments, vitamins, sun block and therapeutic appliances
Toiletries and personal products	Soaps, shampoos, hair brushes, nail polish and nappies
Hairdressing and personal care services	
Hairdressing and personal care services	Includes haircuts, hair removal, weight loss and ear piercing services
RECREATION AND EDUCATION	
Books, newspapers, magazines and stationery	
Books	Fiction, nonfiction, hardback and paperback
Newspapers and magazines	Newspapers, comics, magazines and catalogues
Stationery	Supplies including pens, paper, greeting cards and diaries
Recreation	
Audio, visual and computer equipment	Equipment including televisions, videos, computer hardware and stereos
Audio, visual and computing media and services	Media including blank and pre-recorded cassettes, CDs, computer software, photographic film, and services including film developing, pay television
Sports and recreational equipment	Equipment used in playing sport (including specialist footwear) and for recreation, including camping equipment
Toys, games and hobbies	TV games, musical instruments and board games
Repairs to recreational goods	Repairs to audio, visual equipment and musical instruments
Sports participation	Fees and charges for playing sport including lessons, ground fees, gym fees
Other recreational activities	Other recreation and entertainment expenses including video tape rental, admission fees (e.g. cinema, national parks, video arcades)
Holiday travel and accommodation	
Domestic holiday travel and accommodation	Air, sea and rail travel, car hire, hotel and motel accommodation and package charges for holidays in Australia
Overseas holiday travel and accommodation	Air, sea and rail travel, car hire, hotel and motel accommodation and package charges for holidays overseas
Education and child care	
Education	Private and government, primary, secondary, and tertiary education fees
Child care	Pre-schools and child care centre fees

GLOSSARY

Aggregation	The process of combining lower level price indexes to produce higher level indexes.
All groups	Highest level of the CPI, containing all the groups, subgroups and expenditure classes.
Cost-of-living (index)	A measure of the change in household income required to maintain a constant level of utility.
CPI	A general indicator of the rate of change in prices paid by households for consumer goods and services.
CPI basket	A commonly used term for the goods and services priced for the purpose of compiling the CPI.
CPI population group	The subset of the Australian population to which the CPI specifically relates. For the 13th series CPI this is all metropolitan private households.
Elementary aggregate	The lowest level of commodity classification in the CPI and the only level for which index numbers are constructed by direct reference to price data.
Expenditure class	A group of similar goods or services. The level at which weights are fixed for the life of an index series and the lowest level for which indexes are regularly published. There are 101 expenditure classes in the 13th series CPI.
Expenditure aggregate	The current cost in dollars per year of purchasing the same quantity of goods or services as was purchased in the weighting base period by the CPI population group.
Group	The first level of disaggregation of the CPI. There are 8 groups in the 13th series CPI. It is expected that a ninth group, Financial services, will be added to the CPI in early 2000.
Household Expenditure Survey (HES)	A sample survey conducted by the ABS to determine the expenditure patterns of private households. Data from the 1993–94 HES were the primary source of information for the expenditure weights for the 13th series CPI.
Indexation	The periodic adjustment of a money value according to changes in a price index.
Inflation (deflation)	A term commonly used to refer to changes in price levels. A rise in prices is called inflation, while a fall is called deflation.
Link factor	A ratio used to join a new index series to an old index series to form a continuous series.

Metropolitan	For purposes of the CPI, 'metropolitan' refers to the six State capital cities, Darwin and Canberra.
Price index	A composite measure of the prices of items expressed relative to a defined base period.
Price levels	Actual money values in a particular period of time.
Price movements	Changes in price levels between two or more periods. Movements can be expressed in money values, as price relatives or as percentage changes.
Price relative	A measure of price movements; the ratio of the price level in one period to the price level in another.
Private households	Households living in private dwellings. Private dwellings exclude prisons, non self-care units for the aged, defence establishments, hospitals and other communal dwellings.
Quality Adjustment	The elimination of the effect that changes in the quality or composition of an item have on the price of that item in order to isolate the pure price change.
Reference base period	The period in which the CPI is given a value of 100.0. The CPI is currently on a reference base of 1989–90.
Regimen	The selected goods and services priced for the purpose of compiling a price index.
Splicing	A technique used to introduce new items or respondents into the index calculations so that the level of the index is not affected.
Subgroup	A collection of related expenditure classes. There are 33 subgroups in the 13th series CPI.
Transaction prices	The prices actually paid by consumers to acquire goods or services.
Utility	Often defined as the satisfaction derived from consumption of a good or service.
Weight	The measure of the relative importance of an item in the index regimen. Weights can be expressed in either quantity or value terms. Value weights are used in the CPI.
Weighting base period	The period to which the fixed quantity weights relate. The weighting base period for the 13th series CPI is 1993–94.

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