Australia

A: Identification

Title of the CPI: Consumer Price Index

Organisation responsible: Australian Bureau of Statistics (ABS)

Periodicity: Quarterly

Price reference period: 12 months ended 30 June 1990

Index reference period: 12 months ended 30 June 1990

Weights reference period: June Quarter 2011

Main uses of CPI: Indexation of wages, pensions and/or social security payment, indexation of rents, contracts and/or other payments, main inflation indicator used for monetary policy and deflate household expenditures in national accounts.

B: CPI Coverage

Geographical Coverage

Weights: Main cities/metropolitan areas/regions

Price collection: Main cities/metropolitan areas/regions

Population coverage: Resident households of nationals.

Population groups excluded: Institutional households, foreign diplomatic and military personnel stationed in Australia and non-capital city private households.

Consumption expenditure includes:

- Food consumed away from home;
- Purchase of owner-occupied housing (new dwellings excluding land);
- Housing maintenance, minor repairs;
- Major repairs, conversions and extensions to owner occupied housing;
- Second hand goods purchased (motor vehicles that are ex-government and ex-business only);
- Luxury goods;
- Financial services (including fees for financial advice, brokerage fees);
- Non-life insurance premiums (e.g. vehicle, housing, other property, medical), gross of claims;
- Licences and fees (e.g. driver’s licence, hunting licence, vehicle registration);
- Investment-related expenditures (e.g. purchase of shares/stocks) (the service charge only);
• Expenditures abroad (overseas holiday travel and accommodation)

**Consumption expenditure excludes:**

• Foods produced for own final consumption;
• Other goods produced for own final consumption;
• Services produced for own final consumption;
• Income in-kind receipts of goods;
• Income in-kind receipts of services;
• In-kind goods received as gifts;
• In-kind services received as gifts;
• Mortgage repayments;
• Mortgage interest;
• Purchase of gifts of goods and services given to others outside the household;
• Interest payments (excluding mortgage interest payments);
• Life insurance premiums;
• Gambling expenditure, gross of winnings;
• Occupational expenditures;
• Other business-related expenditures;
• Social transfers in-kind of goods and services from government and Non-profit institutions serving households

**C: Concepts, definitions, classifications and weights**

**Definition of the CPI and its objectives:** The Australian Consumer Price Index (CPI) is a general measure of price inflation for the household sector as a whole. The CPI measures the average change over time in the price paid for a fixed basket of goods and services, acquired by consumers in metropolitan private households. The term 'metropolitan' means the six state capital cities, Darwin and Canberra. The current series CPI population group represents about 64% of all Australian private households. The CPI is primarily used as a macro-economic indicator by the government and economists to monitor and evaluate levels of inflation in the Australian economy, and for adjusting dollar values of types of fixed payments, such as pensions and contracts. The Australian CPI uses an acquisitions approach to construct the CPI, as it is the most appropriate method for this purpose.

**Definition of consumption expenditures:** Consumption expenditure includes all those goods and services acquired by the Australian Consumer Price Index (CPI) population group in the weight reference period. The Australian CPI aims to have weights that correspond to the relative importance of each good and service to households. The CPI weights reflect the relative expenditures of the CPI population group as a whole and not those of any particular type or size of household. The weighting pattern for the Australian CPI is based on the acquisitions concept. The weight reference period includes expenditure on all those goods and services acquired (i.e. actually received) by the reference CPI population. The expenditure is included in the CPI weight reference period, regardless of the period in which payment or use occurs.

**Classification:** COICOP (Classification of individual consumption by purpose). Links from CPICC to COICOP are established at the class level.
Weights include value of consumption from own production: No

Sources of weights: Household expenditure surveys, national accounts, population and industry surveys, government and financial institution's data and administrative data.

Frequency of weight updates: Above 5 years

Price updating of weight reference period to the index reference period: The Australian CPI adjusts the expenditure weights from the weight reference period to the price reference period using the ‘price updating of weights’ methodology. The price updated weights are calculated by multiplying the weights from the weight reference period by elementary indices measuring the price changes between weight reference and price reference period and rescaling to sum to unity. The weights in the 16th series Australian CPI generally relate to expenditures in 2009–10, re-valued using price movements in the CPI to June quarter 2011 (the ‘link’ quarter).

Weights for different population groups or regions: The Australian Bureau of Statistics produces Analytical Living Cost Indexes and a Pensioner and Beneficiary Living Cost Index to measure the impact of price change across different sub–groups of the Australian population. They are produced as a by–product of the Consumer Price Index using the payments (outlays) approach. Households are categorised based on the principal source of income, primarily derived from the Household Expenditure Survey (HES). The four household types that are identified are; employees households, age pensioner households, other government transfer recipient households and self-funded retiree households.

D: Sample design

Sampling methods:

Localities: Judgmental sampling

Outlets: Judgmental sampling, cut-off sampling (the elements with the highest sales or value of other auxiliary variable are included into the sample)

Products: Judgmental sampling, cut-off sampling (the elements with the highest sales or value of other auxiliary variable are included into the sample)

Frequency of sample updates:

Localities: Continuous (on a rotating basis)

Outlets: Continuous (on a rotating basis)

Products: Continuous (on a rotating basis)

Criteria used for determining the optimal sample sizes and the coverage of localities, outlets, items and variety samples: The importance of the expenditure class relative to the total CPI. In general, the more important the expenditure class, the larger the sample of products, outlets and localities.
The geographical spread of outlets: As far as possible, the samples are selected to cover the main areas in which households from the CPI population group are known to make their purchases.

**Criteria used for selecting an item variety in the outlet in case of loose specifications provided by the central office:** The preferred practice in pricing goods for the Australian CPI is for price collectors to price identical specifications at all outlets in all capital cities. Detailed specifications, which are prepared centrally for price collectors include for instance - brand name, material of composition, model number, style, size, and type of packaging. The nature of many goods and services, however, often makes this impossible. Specifically products can be readily defined by form and function, but a multitude of brands and models may exist making it impossible to guarantee that any one example of the product will be available Australia wide (for example daily newspapers, beer). The ABS employs a ‘respondent standard’ in such a case, where a generic description is provided in sufficient detail to ensure that the field officers will be able to locate an example of the product. This example must be consistent with the quality of those chosen in other outlets within the same city, and broadly consistent with those in other cities. An example of the required type of product is chosen at each respondent outlet, and its defining characteristics are added to the generic description for future use at that respondent.

**E: Data Collection**

**Approximate number of localities, outlets and price observations:** Price observations: 100,000

**Frequency with which prices are collected:** As the CPI is compiled quarterly, the prices of most goods and services are collected once each quarter. Prices of goods and services that are considered to be volatile (i.e. likely to change more than once during a quarter) are collected more frequently. A few items are priced only once a year, either because that is the known frequency that prices are reviewed (e.g. council rates) or because of seasonal availability (e.g. football matches). The general approach is to price each item as frequently as is necessary to ensure that reliable measures of quarterly price change can be calculated. Item frequency:
- Food & non-alcoholic beverages: monthly for fresh food, quarterly for meals out, take away and processed food, quarterly for non-alcoholic beverages. Alcohol and tobacco: monthly.
- Clothing and footwear: women’s garments monthly, men’s garments, children’s garments, footwear, accessories and clothing services are all quarterly. Housing: new dwelling purchases by owner occupiers monthly. Rents, utilities and maintenance/repair of dwellings are quarterly. Property rates and charges are annual. Furnishings, household equipment and services quarterly. Health all items quarterly, except for health insurance which is priced annually. Transport all items quarterly, except for motor vehicles (monthly) and automotive fuel (daily). Communication: monthly. Recreation and culture: most items quarterly.
- Exceptions are holiday travel and accommodation, computing equipment and software, newspapers and magazine, all of which are priced monthly. Education all items are priced annually, except for preschool fees which are priced quarterly. Insurance and financial services: insurance services are priced quarterly, financial services monthly.

**Reference period for data collection:** The Australian CPI uses what is known as ‘point-in-time pricing’ for its price collection. Collection schedules are designed so that a particular price collection always occurs in the same period of the quarter. For example ‘a monthly
collection might be priced on the second Wednesday.' This is done to ensure that prices are not affected by cyclical patterns in prices, such as moving from a sale price week, to a regular price week.

**Methods of Price Collection**

- Personal data collection for most prices. Personal visits are made to the selected outlets by trained ABS price collectors, who observe actual marked prices. They discuss with the retailers matters such as discounts, special offers, market shares and quality changes – and record such information.

- Mailed questionnaires for real estate agent fees and rents.

- Telephone interviews for new dwelling purchases by owner occupiers, domestic holiday travel and accommodation, veterinary fees, medical services and household services.

- Internet for domestic internet retailers only, holiday travel and accommodation, banking fees and charges, health insurance and car hire.

- Official tariffs for property rates and charges, stamp duties and levies, motor vehicle registration fees, urban transport.

- Administrative data and records, electronic questionnaire – various levels of government and government authorities, industry bodies, individual businesses) for rents, new dwelling purchases by owner occupiers, utilities, child care, automotive fuel, pharmaceutical products, postal services, telecommunications, education, insurance and tobacco.

**Treatment of:**

**Discounts and sales prices:** Most prices are collected by personal visits to the selected outlets by trained ABS price collectors, who discuss with the retailers matters such as discounts, special offers, and volume-selling items on the day. Discounted prices are recorded only when the discounts are not discriminatory and can be obtained without difficulty. The Australian CPI does not include items on clearance i.e., disappearing goods at unusually heavily discounted prices. Special and discounted prices are taken into consideration when these are generally available to the buying public. An important test of whether these prices can validly be used in compiling the CPI is whether the goods are of a quality identical to that in the item specifications (e.g. the goods are not damaged or superseded stock). Another test is that the goods are available in quantities sufficient for shoppers generally to buy them on the pricing date (i.e. supplies are not limited to so-called early-bird shoppers, or purchases subject to some other restriction). Although special and discounted retail prices are readily observable for most goods, it is not necessarily so for large and expensive durables. Take motor vehicles as an example. The prices of motor vehicles may not be advertised widely and may be disguised with bonuses, trade-ins, factory cash-back offers and a package of extra features included for the list price of the vehicle. In these cases, substantial effort, including interviews with senior sales staff, is made to ensure that full particulars of the transactional prices are obtained.

**Black market prices:** Decisions regarding the composition of the CPI basket are not based on moral grounds, but rather on practical considerations – such as obtaining weight and price
estimates, and measures of quality. In the Australian CPI, gambling is excluded as it is difficult to establish the service or utility that households derive from gambling, and thus to determine an appropriate price measure. Similarly recreational drugs and prostitution are both excluded.

**Second hand purchases:** In practice, all transactions involving second hand goods are assumed to occur within the household sector, with acquisitions and purchases cancelling out to give an effective weight of zero. The exception is for motor vehicles where household expenditure on ex-business and ex-government cars plus the dealer margin on used cars is included. There is difficulty in obtaining on-going prices to constant quality for second hand goods. Prices for second hand goods are not collected for the Australian CPI.

**Missing or faulty prices:** All price data collected locally in outlets benefit from real-time editing made possible by the use of hand-held computers. If there is a large difference between quarters in the price for the same item in the same shop then the hand-held computer prompts the price collector to check the price. When prices are entered into the CPI computer system further validation checks are undertaken, supported by a tolerance level program which identifies outliers. If there is a large difference in the price level or change compared with similar items in other shops, then generally the price collector is asked to confirm the price by re-contacting the outlet. This also applies to observations which are not consistent with knowledge gained from other sources. If an item misses continually the ABS strategy for minimizing the occurrence of missing observations is to maintain the relevance of the sample of items priced by continuous review. Also common patterns are examined as part of a longer-term maintenance of price samples, items, and locations for which prices are missing. If a price cannot be observed or is faulty in a particular quarter, the ABS has several ways of dealing with this occurrence. Where an item is temporarily out of stock in the sampled outlet then a price is imputed normally using the average change of prices for the same product collected in other outlets. Only if reliable information is available indicating that prices have moved in a certain direction will this imputation be adjusted. The ABS procedure for imputing a price for a product which has no close substitutes is to estimate the movement where reliable market data is available supporting the movement or to impute a movement from an upper level (related) component.

Period for allowing imputed missing prices: For missing prices the Australian CPI distinguishes between items that are permanently and temporarily missing. For missing prices that are temporary the nature of any seasonality in the prices is determined, as well the characteristics of the particular good or service. Items within fruits and vegetables, and clothing categories, which often have missing prices, are allowed, and with prices for them imputed off other items in the sample that are available at the time or are close substitutes. In such a case a missing price will generally not be allowed for extended periods. The goods and services included in the Australian CPI pricing samples are selected carefully to represent the range of goods and services bought by the CPI population group. Selection of replacement items in any sample must conform to the generic specification of the sample, and be a reasonable alternative to the missing item. CPI price collectors select replacement items on this basis so as to minimise any quality adjustments, at best the items will be directly comparable and require No quality adjustment. For sampling decisions, including replacement items, the Australian CPI uses information on the buying habits of the CPI population group such as brands, packaging sizes and product availability. This process involves extensive consultations with retailers, manufacturers, government authorities and other forms of market intelligence.
Disappearance of a given type or quality from the market: When a particular item or variety becomes unavailable in the Australian CPI, price collectors seek a replacement product which satisfies the criteria of the generic specification description. A different variety of the item priced should have a high enough market share to warrant replacement of the item that disappeared. CPI price collectors monitor this situation and make changes as part of regular sample maintenance.

Quality differences: The concept of quality used in the Australian CPI is based on a notion of consumer utility. Quality change is measured by reference to the expected value to the consumer of the changes. Quality differences between new and replaced products are handled by the CPI head office analysts and price collectors using a variety of methods, including expert judgment, direct comparison (i.e. no quality change and adjustment to the price), proportional quantity adjustment for small changes in package size, and option prices where the price of the feature is obtained from the manufacturer or wholesaler. In the case of personal computers, hedonic regression is used. These are all examples of explicit quality adjustment methods. In some cases there may be overlapping prices for the replacement item with the quality/utility difference and the item it replaces, and it may be assumed that there is a competitive market and that in consequence the difference between the two prices is fully accountable by differences in utility. But implicit quality adjustment methods are not the default method—the CPI computer system does not automatically apply the overall mean imputation or similar methods without an instruction from the compiler.

Appearance of new items: If a new product or service is deemed to be a completely different category of product (i.e. a new expenditure class) from any of the goods and services already included in the CPI, its inclusion would be considered only during one of the periodic reviews of the index where updated weighting patterns at the published level were available. Where a new product or service falls within the definition of an existing expenditure class, the Australian CPI takes a conservative approach with their introduction. Products and services are introduced into existing expenditure classes only after it is deemed that they have become widely available to the buying public, have become a permanent part of household expenditure, and their price structures are free from premiums attributable to novelty value or scarcity. Expenditure weights within the commodity grouping are adjusted when the new good substitutes for specific items in an existing expenditure class. All introductions of new items are done through a process of linking (chaining), so that the new items do not affect the level of the index.

Treatment of seasonal items and seasonality

Items that have a seasonal character and their treatment: The Australian All groups CPI is produced as an original series with no seasonal adjustment. Since the September quarter 2011, the ABS has produced an analytical series all groups CPI, seasonally adjusted. It comprises all components included in the all groups CPI, with seasonal adjustment of components where seasonality has been identified at the weighted average of eight capital cities level. Seasonal adjustment factors are calculated using the history of price changes up to the current quarter CPI and are revised each quarter. Each quarter the ABS publishes the factors used to calculate the seasonally adjusted expenditure class series at the weighted average of eight capital cities level of the CPI. Using this ABS seasonal adjustment methodology, 62 of the 87 expenditure class price indexes in the 16th series of the CPI were deemed to have a seasonal pattern at the weighted average of eight capital cities level. They are listed as follows; cakes and biscuits, electricity, breakfast cereals, gas and other
Seasonal food items: Seasonal food items are included in the CPI using fixed weights approach: the weights are kept constant over the year, while prices of out-of-season products are estimated or imputed.

Seasonal Clothing: Seasonal clothing items are included in the CPI using fixed weights approach: the weights are kept constant over the year, while prices of out-of-season products are estimated or imputed.

Method to impute the price of seasonal items: Impute the price by using price development of in-season products.

Treatment of housing

Treatment of owner-occupied housing: Under the acquisitions approach in the Australian CPI, price inflation for owner-occupied housing (OOH) is represented by the purchase price of new dwellings (excluding land), local government rates and charges, house repair and maintenance expenses and charges for house insurance services. The treatment of owner-occupied housing under the acquisitions approach requires the separation of the consumption and investment elements of owner-occupied housing – that is, land is treated as an investment item not a consumable item. The ABS considers that adherence to the acquisitions approach for OOH is appropriate considering the overall purpose of the Australian CPI and the concept it is attempting to measure. Pricing of house purchases is limited to transactions in newly constructed owner-occupied houses. Project home builders are approached to obtain prices for a few specified types and models of project homes. The types of project homes selected are those most commonly constructed in each capital city. The method of pricing owner occupied housing (pricing project homes) is easily understood by users, and more importantly, it reflects actual price movements in the period being recorded.

Types of dwellings covered by the rent data: Changes in rents are measured for that part of the reference CPI population that resides in rented dwellings. The rent component of the Australian CPI covers payments made by households as rent for both privately owned and
government–owned dwellings. Costs such as maintenance of rental dwellings are paid by investors who are out of scope of a CPI. Rental payments for holiday homes are excluded as these are classified under domestic holiday travel and accommodation. Prices for a sample of rented dwellings within each capital city are collected every quarter, with the sample stratified according to location, dwelling type and size of dwelling based on the most recent census of population and housing. Rental payments for privately owned dwellings in the metropolitan areas of each capital city are obtained from real estate agents under a matched sample approach, i.e. prices are collected for the same sample of private rental dwellings every quarter. Government rents charged to pensioners and other welfare recipients are set as a proportion of income. As these incomes are known, rents for government–owned properties are derived from information provided by the state and territory housing authorities. Consequently, price movements can be readily estimated. Occasionally, the proportion used to set rents is changed. Again this is public knowledge and so is readily available for use in estimating price movements. This sort of information on pensions and incomes is sourced from social security agencies or other agencies.

F: Computation

**Formula used for calculation of elementary indices:** The ratio of arithmetic mean prices (Dutot index) (Direct form) and the ratio of geometric mean prices (Jevons index) (Direct form)

**Formula to aggregate elementary indices to higher level indices:** The Australian CPI uses weighted arithmetic aggregation, specifically a base–weighted modified Laspeyre’s index formula (known as Lowe index) which keeps quantities fixed between major revisions but allows prices to vary. The period whose quantities are actually used in a CPI is described as the weight reference period. In the 16th series this generally refers to the HES which is 2009–10 and it will be denoted as period b. Period 0 is the price reference period which is the June quarter 2011 in the 16th series CPI. The Lowe index using the quantities of period b can be written as follows:

\[
P_{t0} = \frac{\sum_{i=1}^{n} p_i^b q_i^b}{\sum_{i=1}^{n} p_i^0 q_i^0} = \sum_{i=1}^{n} \left( \frac{p_i^b}{p_i^0} \right) s_i^{0b}
\]

where

\[
s_i^{0b} = \frac{p_i^0 q_i^b}{\sum_{i=1}^{n} p_i^0 q_i^b}
\]

\(p = \) price of item \(i\) and time \(t\)
\(q = \) quantity of item \(i\) and time \(t\)
\(b_i = \) weight reference period of item \(i\) (e.g. 2009-10 HES)
\(s = \) expenditure share of item \(i\)

In practice weights are expressed in terms of relative expenditure shares, and are price updated each period.

**Formula of aggregating regional/population group indices into national index:** The ABS compiles the Australian CPI on a separate basis for each capital city based on the acquisition
of goods and services by the resident population of that city. The ABS also constructs the equivalent of a national index at the all groups CPI, group, sub-group and expenditure class level, which is published as the weighted average of the eight capital cities. A weighted arithmetic aggregation is used to form the Australia level index (weighted average of eight capital cities). A base period expenditure aggregate is calculated for each city at the group, sub-group and expenditure class level, using information primarily sourced from the HES on the number of households in each city and the average weekly household expenditure for specific items.

**Seasonally adjusted indices:** The ABS uses the Autoregressive Integrated Moving Average (ARIMA) X11 technique for seasonal adjustment.

**Software used for calculating the CPI:** ABS designed software for price index compilation.

**G: Editing and validation procedures**

**Control procedures used to ensure the quality of data collected:** As a purposive survey, the more common measures of statistical (sampling) error are not applicable to the CPI. The question of error rates is addressed by focusing on statistical quality in collecting and processing the data. Quality assessment is a feature at all stages. Outliers are identified by the ABS commodity experts using their best informed judgment, including historical prices levels, and accepted tolerance levels. If there is a large divergence from informed expectations the data provider is asked to confirm the new price or indicate special factors that have come into play or changes in specification. The collection staff submits relevant reports and comments to the staff responsible for analysing and compiling the data. The latter, in turn, provide editing notes to senior CPI staff that include counts of quality adjustments and imputed prices for each index. Market reports, media articles, and other external sources are used to confront the reported price data during this process. The ongoing sample maintenance program ensures that the sample of items and specifications to be priced is kept up to date.

**Control procedures used to ensure the quality of data processed:** Statistical confrontation of similar sub-series in the CPI and Producer Price Index (PPI) is conducted routinely each quarter. The national accounts uses the data in their analysis and processing, providing confrontation of the outputs post release. Discrepancies between these various series are thoroughly investigated, to ensure the coherence of CPI outputs with other relevant economic statistics. The CPI results are also assessed against market expectations, industry reports, media commentary and other external sources, with discrepancies thoroughly investigated. Confrontation of the data in this way also informs the on-going sample maintenance and sample review program, ensuring that the items and specifications priced in the CPI are representative of household consumption patterns. Formal clearance meetings are scheduled where the results are reviewed in detail by senior section and branch staff, and major issues surrounding collection, sampling, methodology and processing are discussed.

**H: Documentation and dissemination**

**Timeliness of dissemination of the CPI data:** The CPI is compiled quarterly by the ABS for quarters ending on 31 March, 30 June, 30 September, and 31 December each year. The data are typically released on the fourth Wednesday after the end of the reference quarter,
depending on public holidays, but no later than the last Wednesday of the month after the end of the reference quarter, in the publication Consumer Price Index, Australia (cat. no. 6401.0). Each quarterly CPI publication announces the precise publication dates for the subsequent four CPI quarterly publications as part of the ABS advance release schedule.

**Level of detailed CPI published**

**Paper publication:** All items CPI, Division-level (12 Divisions), Group-level app. 40 groups, Class-level (100 classes)

**Online:** All items CPI, Division-level (12 Divisions), Group-level app. 40 groups, Class-level (100 classes)

**Separate indices published for specific population groups:** The Australian Bureau of Statistics produces Analytical Living Cost Indexes and a Pensioner and Beneficiary Living Cost Index to measure the impact of price change across different sub–groups of the Australian population. They are produced as a by–product of the consumer price index using the payments (outlays) approach. Households have been categorised based on the principal source of income, primarily derived from the household expenditure survey (HES). The four household types that have been identified are; employees households, age pensioner households, other government transfer recipient households and self-funded retiree households. Analytical Living Cost Indexes for Selected Australian Household Types (cat. no. 6463.0) Pensioner and Beneficiary Living Cost Index (cat. no. 6467.0)

**Documentation**

**Publications and websites where indices can be found:** Consumer Price Index, Australia (cat. no. 6401.0), Analytical Living Cost Indexes for Selected Australian Household Types (cat. no. 6463.0), Pensioner and Beneficiary Living Cost Index (cat. no. 6467.0) available from www.abs.gov.au. Details on seasonal adjustment of CPI indices can be found in the information Paper: An Introductory Course on Time Series Analysis, January 2005 (cat. no. 1346.0.55.001) available at http://www.abs.gov.au

**Publications and websites where methodological information can be found:** Consumer Price Index: Concepts, Sources and Methods, 2011 (cat. no. 6461.0) and A Guide to the Consumer Price Index: 16th Series, 2011 (cat. no. 6440.0) are available from www.abs.gov.au

**I: Other Information**

Reported by the country in 2012.