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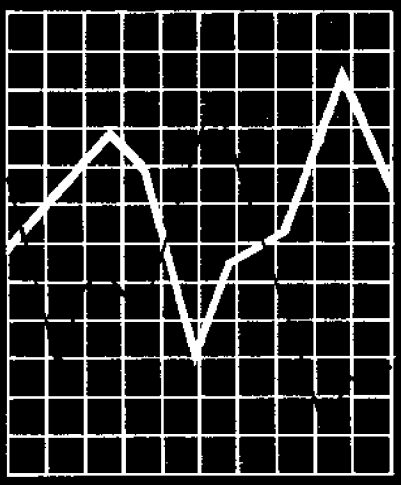

1993 Feature Articles

- National Accounts Rebase
- Describing the Shape of Australia's Economy
- Experimental Composite Leading Indicator
- Economic Importance of Sport and Recreation
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- Major ABS Classifications
- National Accounts Timeliness: An International Comparison
- Australia and New Zealand Standard Industrial Classification
- Population Changes and Housing Demand
- Understanding Labour Costs
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1993 FEATURE ARTICLES

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CHANGE IN BASE YEAR OF CONSTANT PRICE NATIONAL ACCOUNTS ESTIMATES FROM 1984-85 TO 1989-90

Introduction

This article provides details of work recently completed in the Australian Bureau of Statistics (ABS) to rebase constant price national accounts estimates from average 1984-85 prices to average 1989-90 prices. The information in this article has also been published in an Information Paper (ABS Catalogue No. 5227.0). The first quarterly national accounts publication to incorporate the rebased estimates will be the December quarter 1992 issue, to be released on 18 March 1993. Data from this publication will be included in the April 1993 issue of *Australian Economic Indicators (AEI)*.

The purpose of this article is to provide some background to the rebase, which commenced in mid 1991, and to indicate those areas of the accounts which will be subjected to the most significant changes as a result of the rebase. The article is supplemented by a second Information Paper (*Australian National Accounts : Introduction to Constant Price Estimates at Average 1989-90 Prices* ABS Catalogue No. 5243.0), which was released on 25 February 1993 and contains tables showing constant price estimates on a 1989-90 base consistent with those published in the September quarter 1992 issue of the two quarterly national accounts publications (*Australian National Accounts: National Income and Expenditure* (5206.0) and *Australian National Accounts: Gross Product, Employment and Hours Worked* (5222.0)). The Information Paper also describes the major changes in methodology introduced with the rebased estimates. It is available free of charge from the sales locations listed on page iv of *AEI*.

Constant price estimates on a 1989-90 base will be compiled for all quarters from September quarter 1984 to the latest quarter. (Constant price estimates on a 1984-85 base will be maintained for the period from September quarter 1974 to June quarter 1985.) Long-term quarterly and annual series on a 1989-90 base will be compiled for earlier periods by 'splicing' series calculated using earlier base years. The starting date for the quarterly spliced series of GDP(P) will be September quarter 1974, while that for GDP(I) and GDP(E) will be September quarter 1959.

Now that the two quarterly national accounts publications (*Australian National Accounts: National Income and Expenditure* (5206.0) and *Australian National Accounts: Gross Product, Employment and Hours Worked* (5222.0)) have been able to be released simultaneously for several quarters, it has been decided to combine them into a single publication. It will be called *Australian National Accounts: National Income, Expenditure and Product* and its catalogue number will be 5206.0. The first issue will be in respect of December quarter 1992 and is scheduled for release on 18 March 1993.

As part of the rebase, the range of constant price values on a State/Territory basis (hereafter referred to simply as 'State') is being extended. In addition to the constant price estimates of private final consumption expenditure, which are currently published on a State basis, constant price State estimates of government final consumption expenditure and private and public gross fixed capital expenditure will also be published each quarter. As a result, the aggregate measure 'State final demand' will be able to be calculated each quarter in constant price terms. These estimates will not be contained in either the Information Paper to be released on 25 February 1993 or in *Australian National Accounts: National Income, Expenditure and Product* (5206.0). Rather, they will be published in a new quarterly publication - *Australian National Accounts: State Accounts* (5242.0). The first issue will be for December quarter 1992 and is scheduled for release on 6 May 1993. Future issues are expected to be brought out each quarter within two weeks of the corresponding issue of 5206.0. The annual publication (*Australian National Accounts: State Accounts* (5220.0)) will still be released each year, in April or early May.

Background

Constant price estimates provide a convenient way of measuring 'real' growth in various economic statistics (i.e. the growth after adjusting values to remove the effects of inflation). The ABS commenced publishing annual constant price estimates of expenditure on gross domestic product in 1963 and quarterly estimates in 1970. Since 1963, constant price estimates have been developed for other important economic statistics: gross product by industry, retail sales, agricultural output, building activity and approvals, private new capital expenditure, stocks, manufacturers' sales, overseas trade, and expenditure on research and development.

Over time, several different base years have been used for constant price estimates. For expenditure on gross domestic product, the earliest was 1953-54 and this was followed by 1959-60, 1966-67, 1974-75, 1979-80 and, currently, 1984-85. Other constant price estimates have also been compiled using several base years; generally, though not always, the base years have been the same as those for expenditure on gross domestic product. The current base year for all ABS constant price estimates is 1984-85.

All constant price estimates produced by the ABS are currently being rebased to average 1989-90 prices. During 1993, these estimates will replace those at average 1984-85 prices in relevant ABS publications.

The purpose of this article is to answer some of the questions posed when a new base year is introduced for constant price estimates. For example, why do base years have to be changed and why has a particular year been chosen as the new base year? To answer such questions it is useful to first consider why constant price estimates are produced.

Why are constant price estimates needed?

Many economic statistics, such as gross domestic product, relate to a wide range of goods and services. In order to express all transactions in goods and services as a single aggregate, it is necessary to combine quantities of the component goods and services using a common unit of measurement. The only practicable way in which quantities of diverse goods and services can be aggregated is in terms of money values i.e. dollars. One of the difficulties involved in interpreting the impact of changes in money values from one period to another is that any observed movement is generally a combination of a change in price and a change in quantity. In many cases, there is interest in the changes in the physical quantities underlying the dollar value of transactions with the result that there is a need for value estimates to be adjusted to remove the direct effects of price changes. Such estimates are said to be 'at constant prices' (or in 'real terms').

What are constant price estimates and how are they calculated?

The current price value of a transaction may be thought of as being the product of a price and a quantity. The value of the transaction at constant prices can be derived by substituting, for each current price, the corresponding price in the chosen base year. Total estimates at constant prices for a period are then obtained by summing the constant price value of each component transaction during the period. For example, total quarterly exports of goods at constant prices can be considered to be the sum of the constant price value of each good exported during the quarter.

Conceptually, the preferred way of deriving an estimate of expenditure, or output, at constant prices is to explicitly follow the steps in the definition in the previous paragraph (i.e. for each transaction multiply the quantity of each good or service by the base year price of that good or service to obtain the constant price value and then sum the constant price values of all these transactions). This method is called quantity revaluation. In practice, it is only possible to employ quantity revaluation for a minority of estimates for the following reasons: quantity data are often not available, the goods or services are insufficiently homogeneous, or they are subject to quality changes that are difficult to quantify. Exports of merchandise f.o.b. and agricultural and mining output are the major components for which quantity revaluation is used to compile constant price estimates.

The more common method used to derive estimates at constant prices is to divide the current price values by a price index. This method is called price deflation.

The price indexes used in price deflation comprise a number of price indexes of component goods and services weighted together. If a price index were available for each type of good and service contributing to the current price estimate, and if the weight given to it for each period were proportional to the underlying quantity in the current price estimate, then price deflation would give exactly the same result as quantity revaluation. Price indexes weighted in this way are known as current-weighted (or Paasche) price indexes.

However, price information is generally collected for only a selection of goods and services; furthermore, the information needed to calculate weights is usually only available intermittently. Therefore, fixed-weighted (or Laspeyres) price indexes are generally used in price deflation. Fixed-weighted price indexes are inferior to current-weighted ones for the purpose of calculating constant price estimates, but this deficiency is lessened by revaluing current price values at the most detailed level practicable.

Why do base periods have to be changed?

Constant price estimates attempt to isolate the effects of changes in quantities by removing the effects of price movements from current price values. Conceptually, quantities of different commodities are combined using, as weights, the relative prices in the base period. As a result, estimates on different base years will show different rates of growth if the price relativities in the economy have changed between the base years and if the quantities of the components have changed at different rates (as is usually the case). Even though the underlying quantity data are the same in both cases, these quantities are combined using different weighting patterns (i.e. different price relativities).

The price relativities at a particular time reflect the relative economic worth of goods and services at that time. They are not only influenced by past changes in the economy but they also influence future changes. They are signals that play an integral part in the evolution of the economy. It therefore follows that, if one is concerned with the short-term movements in constant price estimates, then it is desirable that the price relativities in the base year (which are used in weighting together

the constant price estimates for all periods in the series) are as close as possible to those for the period concerned, particularly at the end of the series. This is the principal reason why the ABS rebases its constant price estimates at fairly frequent intervals. Another reason arises from the need to accurately estimate quality and specification changes and to give proper weight to new goods (such as compact disc players and video cameras in recent times). A rebase also provides an ideal opportunity to introduce enhanced methods and more appropriate data sources.

Why change the base year now?

There are several criteria for selecting a base year; unfortunately, they are not always compatible. The criteria are:

(a) the base year should be as recent as possible;

(b) 'normal' prices and price relationships should prevail in the chosen base year; and

(c) if possible, the base year should comply with the international recommendations (by the United Nations Statistical Office) that base years be those ending in zero and five (e.g. 1975, 1980, 1985).

Ideally, a 'normal' year would be chosen as the base year, but, even if such years exist, they would be difficult to identify until several years had elapsed. Precedence is given to the other criteria, namely that the base year should be reasonably recent and coincide with international recommendations. The frequency with which the base year should be changed depends on an assessment of the benefits of frequent rebasing, which is largely determined by the pace of changing price relativities, and the costs of rebasing. Most developed countries have chosen to rebase their constant price estimates either every 5 or 10 years. The ABS has chosen to rebase its estimates every 5 years. For these reasons 1989-90 has been chosen as the new base year.

What are the effects of rebasing constant price estimates?

There are three factors contributing to changes in the rebased estimates: the rebase itself; changes in methodology; and revisions to the weights underlying fixed-weighted price deflators.

Rebase effects

The most obvious effect is that the level of the rebased constant price estimates is a lot higher than that of the earlier base year estimates for most series. The reason is that inflation has led to prices being higher in the later base year for most goods and services. A notable exception has been computers, for which prices fell significantly between 1984-85 and 1989-90 (see paras 30 and 31 below). Fuel prices were also lower in 1989-90 than in 1984-85.

As mentioned earlier, constant price estimates of a series calculated using different base years generally have different movements. Often the differences are not very great, but in some cases they can be substantial, particularly if a change in methodology has been adopted in conjunction with the introduction of the rebased estimates. In some cases the differences in movement appear to be random, while in others they appear to be systematic and result in significantly different longterm growth rates. An example of the latter that has occurred at every previous rebase is a lowering of the growth rate of private final consumption expenditure. The reason is that there is a substitution effect in which some goods and services experiencing relatively low price increases also tend to experience relatively high quantity increases and hence are accorded a lesser weight in the constant price estimates with a later base year than those with an earlier base year.

Derived series such as implicit price deflators will be quite different on the new base year. The implicit price deflators will all have a value of 100.0 in 1989-90 instead of in 1984-85. Their movements will also be different, but to a much lesser extent than their levels. Such differences will correspond (inversely) to the differences between the movements of the old and new base year constant price estimates used to derive the implicit price deflators.

The terms of trade are a measure of export prices relative to import prices. They are calculated by the ABS as the ratio of the implicit price deflator for exports of goods and services to the implicit price deflator for imports of goods and services. Consequently, this series will have a value of 100.0 in 1989-90 instead of in 1984-85. There will also be changes in the movements in the terms of trade because of the differences in the movements of the implicit price deflators for exports and imports.

Adjusting gross domestic product (GDP) at constant prices for the terms of trade effect provides a better measure of the change in the real purchasing power of the income generated by domestic production than does the unadjusted estimate. (In future, in accordance with the recommendations in the draft revised issue of the United Nations' *A System of National Accounts* (SNA), this adjusted measure will be referred to as Real gross domestic income.) The adjustment to GDP for the terms of trade effect will be zero in 1989-90, and so the relationship between constant price GDP and real gross domestic income - both at average 1989-90 prices - will be different from that currently observed using estimates at average 1984-85 prices.

Changes in methodology

Numerous changes in methodology are to be introduced with the rebased estimates. They include the compilation of constant price estimates for the whole of domestic final demand on a State basis, greater use of price deflation for imports of goods (rather than quantity revaluation), and the use of alternative data sources for calculating constant price gross product for the Construction industry. These changes will result in revisions to the growth rates for all the series concerned.

Revisions to the weights of fixed-weighted price indexes

When constant price estimates are rebased, the weights used in many of the fixed-weighted price indexes are replaced (usually for just the later part of the series) by weights that most closely pertain to the new base year. Thus, the movements of the new fixed-weighted price indexes usually differ from those of the old fixed-weighted price indexes. Consequently, the movements of the old and the rebased constant price estimates differ. The size of the differences is determined by a combination of the difference between the new weights and the old ones and the extent to which the growth rates of the component price indexes differ from each other.

Will the ABS continue to provide long, continuous series of constant price estimates of expenditure on gross domestic product?

For some applications, such as econometric modelling, there is a demand for long continuous time series at constant prices. In an attempt to meet this demand, in 1987 the ABS began to publish estimates at average 1979-80 prices for the years 1948-49 through to 1968-69 and for the quarters from September quarter 1959 through to June quarter 1969. These estimates were derived by successively 'splicing' estimates relating to earlier base years. With the introduction in 1988 of constant price estimates at average 1984-85 prices, estimates relating to earlier base years were similarly spliced to provide long, continuous series at average 1984-85 prices.

It is also intended to publish spliced estimates at average 1989-90 prices, but a decision has yet to be made as to the method of splicing to be used. There are several alternatives, each with advantages and disadvantages. The implications of these are currently being examined.

Computer equipment and the change in base year

During the last rebase of constant price estimates (to average 1984-85 prices) the ABS introduced a new price deflator to revalue imports, exports and production of, and final expenditures on, computer equipment. (For details of the development of this deflator by the USA Bureau of Economic Analysis and the reasons for its use in the Australian national accounts, see the ABS publication article: *Change in Base Year of Constant Price Estimates from 1979-80 to 1984-85* (5227.0), released on 6 June 1988). Unlike most price indexes, which tend to rise over time, there has been a significant fall in this price index for computers, even after adjustment for exchange rate changes between the Australian dollar and the US dollar. This means that the weight given to computers in constant price estimates will be less in the 1989-90 base year estimates than in the 1984-84 base year estimates. Hence, those constant price estimates in which computers are growing at an above-average rate - which is the general case - will have a lower growth rate at average 1989-90 prices than at average 1984-85 prices, everything else being equal. As a result, the rebase will have a marked effect on the medium-term movements in those aggregates of the accounts which have computers as a significant component. Imports and private gross fixed capital expenditure on equipment will be most affected, while there will be a smaller impact on public gross fixed capital expenditure, private final consumption expenditure and exports. There will be little impact on the movements in constant price expenditure on gross domestic product because the effects on imports will be largely offset by those in the exports and final expenditures components.

Some indications of the magnitude of the above impacts are available at the time of going to press. An example is the **total** rebase effect on imports of goods, which is one of the aggregates most affected. On a 1984-85 base, imports of goods at constant prices have risen by just over 46 per cent between 1984-85 and 1991-92. The equivalent increase between these two years on a 1989-90 base is 35 per cent. The growth rate in private gross fixed capital expenditure on equipment has also been significantly reduced by the rebase.

It should be noted that the rebase will not have any effect on estimates expressed in current price terms (apart from small revisions to the stock valuation adjustment, consumption of fixed capital and capital stock estimates). It will have no effect on current price estimates such as exports and imports of goods and the balance of payments current account deficit.

Queries on any aspect of the rebase can be directed to Charles Aspden on (06) 252 6711. The address for written inquiries is:

Constant Price Estimates Section
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P.O. Box 10
Belconnen A.C.T. 2616

or by fax to (06) 252 5327.

INPUT-OUTPUT TABLES

Describing the Shape of Australia's Economy

Dr Annette Barbetti

Introduction

The purpose of this article is to describe the basic structure of input-output tables, how they are put together, the uses that can be made of them, and their relationship with the other components of the national accounts.

The first input-output tables for Australia were compiled for 1958-59. Since then, eleven more sets of tables have been produced. The most recent tables are for 1986-87 and those for 1989-90 are scheduled for publication in December 1993.

The main input-output publications are *Australian National Accounts: Input-Output Tables* (5209.0) and *Australian National Accounts: Input-Output Tables, Commodity Details* (5215.0). A range of input-output multipliers is published in *Australian National Accounts: Input-Output Multipliers* (5237.0). They are all currently published every three years.

Note that a new table of employment by input-output industry will be included in the 1989-90 input-output tables publication 5209.0. These employment data will also be used in the calculation of the employment multipliers for 5237.0.

Basic structure of input-output tables

Input-output tables show the structure of a country's entire production system for a particular period, usually one year. They show which goods and services are produced by each industry and how they are used (e.g. some goods, such as cars, are sold to final consumers while others, such as steel, are used as inputs by other industries in producing more goods and services). The tables are based on the principle that the value of the output of each industry can be expressed as the sum of the values of all the inputs to that industry plus any profits made. All of the goods and services produced in a period are identified as being used as inputs by industries in their production process, being sold to final users of the goods and services (either in Australia, or overseas as exports), or contributing to the change in stocks (an increase in stocks if more goods are produced than purchased or a rundown in stocks if demand exceeds supply). For the production system as a whole, the sum of all outputs must equal the sum of all inputs or, in other words, total supply must equal total demand.

Figure 1 shows the structure of a typical input-output table or "matrix". The tables may be regarded as consisting of four quadrants. Quadrant 1 (intermediate usage) shows the flows of the goods and services used up in producing other goods and services. For example, the intersection of the third row (Manufacturing) with the fourth column (Construction) shows the value of output from the Manufacturing industry which is used as input by the Construction industry.

Quadrant 2 (final demand) provides details of the sales of goods and services by each industry to final users. For example, the intersection of the second row (Mining) with the third-last column (Exports of goods and services) identifies the value of Mining industry output that is exported.

Quadrant 3 (primary inputs to production) indicates the use in production of primary inputs such as wages, salaries and supplements, secondhand goods (sales by final buyers) and taxes paid by producers. For example, the intersection of the first row in this quadrant (wages, salaries and supplements) with the third column (Manufacturing) shows the amounts paid out to employees by businesses in the Manufacturing industry.

Quadrant 4 (primary inputs to final demand) presents information on taxes paid by final users, flows of secondhand goods to (positive sign) and from (negative sign) final buyers and imports which are subsequently exported. These so-called "re-exports" are recorded in the cell at the intersection of the row "imports of goods and services" and the column "exports of goods and services". It follows that all exports shown in Quadrant 2 are exports of domestically produced goods and services.

Relationship to the national income and expenditure accounts

Input-output tables can be directly related to the main summary account (referred to as the "domestic production account") in the national income and expenditure accounts, (see the annual *Australian National Accounts: National Income, Expenditure and*

Product (5204.0)). The income side of the production account shows the amount of income generated in the economy accruing to labour (in the form of wages, salaries and supplements) and to capital (as profits or, in national accounting terms, "gross operating surplus"), as shown in the rows of Quadrant 3 in Figure 1. The expenditure side of the account shows the value of goods and services entering into the various categories of final demand, as shown in the columns of Quadrant 2 in Figure 1.

The input-output tables provide a much more detailed disaggregation of the domestic production account than is available in the national income and expenditure accounts. The latter only supply details of the end results of economic activity, whereas the input-output tables provide a means of tracing flows of goods and services step by step through the production process. The extra detail provided by the input-output tables is essential for many analyses.

Basic concepts

For the purpose of compiling input-output tables, a production system can be considered to consist of any number of industries, depending on the analyses to be performed. However, from a statistical point of view, these industries must be defined in such a way that each industry produces its own group of characteristic outputs of goods and services, called the commodity group, said to be primary to that industry (i.e. they are produced predominantly by that industry). For example, butter is primary to the milk products industry, while beer is primary to the beer and malt industry. The input-output industry classification used in Australia is based on the Australian Standard Industrial Classification (ASIC). Details of the links between the industry classification used in the input-output tables and ASIC are provided in *Australian National Accounts: Input-Output Tables* (5209.0). Details of the input-output commodity classification are provided in *Australian National Accounts: Input-Output Tables, Commodity Details* (5215.0).

In order to compile input-output tables, the price paid by the final user, the purchasers' price, is broken down into several components. The core component is the basic value, which is the price received by the producer excluding commodity taxes. The basic value plus net commodity taxes (i.e. commodity taxes, such as sales tax, less subsidies) is the actual price received by the producer, the producers' price. To the producers' price are added various margins to give the purchasers' price. Margins include wholesale margins, retail margins and freight margins. For example, if a person buys a loaf of bread, the final price paid may include the values of various margins such as wholesale and retail margins, road freight margins (on delivery of the wheat to the railhead, delivery of the flour from the mill to the baker, and delivery of the baked bread to the shop) and rail freight margins on transport of the wheat to the mill.

Based on recommendations in the United Nations' *A System of National Accounts* (SNA), private households are regarded as not undertaking any capital expenditure and as not holding stocks (i.e. all their purchases of goods and services are considered to be consumed). In addition, all military expenditure is regarded as current expenditure (i.e. as government final consumption expenditure), even where the outlays on the items concerned would usually be regarded as capital expenditure, such as aircraft.

Basic and derived input-output tables

In Australia, the input-output tables are compiled from four basic matrices, published as Tables 1 to 4 of 5209.0:

- the *make matrix* which shows the output of commodities by domestic industries;
- the *absorption matrix* (sometimes referred to as the *use matrix*) which shows the usage of commodities (both domestic and imported);
- the *imports matrix* which shows the usage of those imported commodities which compete against domestically produced commodities; and
- the *margins matrix* which shows the difference between the values at purchasers' prices and the basic values of all the flows in the absorption matrix.

These four basic matrices are used to derive the industry-by-industry flow matrices which provide the starting point for most input-output based analyses.

- The *direct requirements coefficients* matrices are calculated from the industry-by-industry flows matrices by expressing each flow into an industry as a percentage of the output of that industry. These coefficients can then be used to estimate the inputs required to produce any given amount of output of that industry.
- Using the direct requirements coefficients, it is possible to take into account the whole chain of production to calculate *total requirements coefficients*. For example, inputs from the mining industry are needed to produce output from the chemicals industry (first-round effects), but the mining industry itself needs inputs from the chemicals industry (second-round effects) and so on. The additional effects on the production of individual industries from each round can be taken into account and summed to produce "total requirements coefficients". Mathematically, this is equivalent to taking the Leontief inverse of Quadrant 1 of the direct requirements

matrices, which is why the total requirement matrices are sometimes called the inverse matrices. The mathematical details are provided in 5215.0.

Some countries also compile commodity-by-commodity tables, but Australia does not do so because the additional cost is not considered justified. The following discussion refers only to industry-by-industry tables.

Input-output multipliers

Input-output multipliers can be derived from the direct requirements coefficients matrices. The most basic kind of multiplier is the *simple output multiplier*, which is defined as the total value of production by all industries of the economy that is necessary to satisfy a one dollar change in final demand for the output of a particular industry. The *total output multiplier* also takes account of the household sector's increased expenditure leading to increased demand for the output of domestic industries. Other multipliers that can prove useful in analytical work include income multipliers, imports multipliers, and employment multipliers.

Definition of input-output industries

It is desirable to choose input-output industries that are likely to remain fairly stable over time so that the input-output relationships between industries will also remain fairly stable. As well, input-output industries are defined to satisfy as far as possible the homogeneity assumption, which may be described as follows:

- each industry is defined so that all of its products are either perfect substitutes for one another or are produced in fixed proportions;
- each industry has its own unique input structure of commodity and primary inputs; and
- there is no substitution between the products output by the different industries.

While it might seem to be a good idea to define a large number of highly specialised industries, each producing a small number of characteristic commodities, there are a number of practical disadvantages in doing so. Businesses may not keep sufficiently detailed records, particularly for inputs. Also, while the first two homogeneity criteria might be better satisfied, it is likely that the third would not. Most importantly, using a fine industry classification would require additional work, so that the resulting tables would cost more to produce and take longer to compile. On the other hand, if the industries were too broadly defined, the tables would be less useful to those users who wish to study relatively narrowly defined industries. The result is that the input-output tables produced in Australia attempt to strike a balance between cost, timeliness and the level of detail produced.

The upper limit to the number of possible compilation industries is the number of industries in ASIC but, in practice, input-output industries are defined by combining 4-digit ASIC industries. The industries for which data are published are determined by consulting with major users and by comparing our input-output industry classification with those used by our major trading partners. There will be 109 publication industries for the 1989-90 tables, the same ones as for 1986-87.

Some economic activities popularly thought of as "industries" are in fact activities that are carried out across a wide range of industries. For example, there is no "tourism" industry in ASIC or in the input-output industry classification. In the input-output framework, such "industries" have to be treated as consisting of parts of one or more input-output industries and users wishing to analyse them must make assumptions about the share of their activities within the totals for each of the input-output industries involved.

Another assumption underlying input-output estimates is the so-called "proportionality assumption". It states that any change in the output of an industry will lead to proportional changes in the quantities of its intermediate inputs (those goods and services supplied by other industries) and its primary inputs, such as wages. This assumption may be invalidated by economies of scale, technological change or substitution of factors (e.g. more capital, less labour).

Data sources and levels of compilation and aggregation

Much of the data used in the tables come from ABS economic censuses and surveys. The data are collected at the ASIC class (or 4-digit ASIC level). Over 400 industries are involved. For those industries not covered by ABS collections, other data sources such as taxation data, administrative by-product data and annual reports are used. However, the matrix showing the use of commodities by industry (the absorption matrix) is compiled for 109 industries, so that the tables can be produced as quickly as possible at the lowest cost.

ABS overseas trade collections provide very detailed commodity data for exports and imports of goods. Concordances are maintained between the trade, manufacturing production and input-output commodity classifications so that data from the different data sources can be compared, the commodities balanced, and the Australian supply of each commodity derived. A summary table showing the results of this process is provided as Table 1 in 5215.0.

In practice, the raw data often do not satisfy the requirement that total supply must equal total demand. There are many reasons why this may be so, such as classification or timing problems. It is

necessary to find the causes of the imbalances and rectify them. This is done for about 1200 different commodities. It is preferable to balance at this level than at, say, the commodity group level (109 commodity groups, one for each input-output industry), because it is easier to detect the causes of any imbalances that may occur.

Data about margins (see the discussion in "Basic concepts" above) are also required for compiling input-output tables. The margins include wholesale, retail, and transport margins, as well as commodity taxes. A complete list can be found in Appendix F of 5209.0. Data about margins are obtained from ABS economic collections, from taxation data and from other sources such as annual reports of public authorities. Details of the margins for each commodity are shown in Table 4 of 5209.0 and in the detailed margin matrices described in Appendix F of 5209.0.

Uses of input-output tables

Figure 2 uses data from Table 11 of 5209.0 to show, in graphical form, the flows of goods and services within the economy. Input-output data can be used to assess the overall effects on the economy of proposed initiatives such as changes in the mix of direct and indirect taxes or the introduction of new incentives for businesses to invest.

Input-output multipliers can be used to provide quick answers about the likely impacts of an increase in demand for the output of an industry, the likely impact of new projects and the likely results of import replacement strategies, not only on the industry itself, but on all the other industries in the economy.

Care must be taken to use the multipliers correctly. In real-life situations, judgements have to be made about the extent to which the homogeneity and/or proportionality assumptions may or may not actually hold. For example, there might be unused production capacity, significant economies of scale, or technological changes for which allowances have to be made. In some industries, such as agriculture and insurance, seasonal conditions or natural disasters can result in the proportionality assumptions not holding.

For more complex or longer term analyses, it is often more appropriate to construct special models based on input-output data. In recent years, input-output models have been developed, both by government departments and by consultants in the private sector, to examine the effects of changes in taxation policy. The Industry Commission uses input-output models to examine the likely effects of changes to tariff policy. The Organisation for Economic Co-operation and Development (OECD) is using input-output methods in its structural analysis, or STAN, project to measure the effects of technological change in OECD countries.

Another major use of the Australian input-output tables has been as a starting point for input-output tables for the States and Territories, and sometimes for smaller regions, of Australia. Input-output analysis for detailed geographic areas has been used in assessing the effects of economic changes on industries such as the sugar industry.

The ABS will be reviewing its program of Input-Output statistics during the first half of 1993. The review will include an assessment of the user requirements for these statistics.

A more detailed description of input-output tables can be found in Section 19 of *Australian National Accounts: Concepts, Sources and Methods* (5216.0). Queries should be directed to Dr Annette Barbetti, Director, Input-Output Section, Australian Bureau of Statistics, P.O. Box 10, Belconnen ACT 2616; by telephone on (06) 252 6908; or by fax on (06) 253 1051.

STRUCTURE OF AUSTRALIAN INPUT-OUTPUT TABLES

Simplified Example

	From \ To	*Intermediate Demand*						*Final Demand*										
		Agriculture, etc	*Mining*	*Manufacturing, etc*	*Construction*	*Services*	*Intermediate usage (sub-total)*	*Final consumption expenditure*	*— private*	*Final consumption expenditure*	*— government*	*Gross fixed capital expenditure*	*— private*	*Gross fixed capital expenditure*	*— government*	*Increase in stocks*	*Exports of goods and services*	*Final Demand*	*Total supply (grand total)*
Intermediate inputs	Agriculture Mining Manufacturing, etc. Construction Services	QUADRANT 1 INTERMEDIATE USAGE						QUADRANT 2 FINAL DEMAND											
	Intermediate inputs (sub-total)																		
Primary inputs	Wages, salaries and supplements Gross operating surplus Commodity taxes net Indirect taxes n.e.c. (net) Sales by final buyers Imports	QUADRANT 3 PRIMARY INPUTS TO PRODUCTION						QUADRANT 4 (a) PRIMARY INPUTS TO FINAL DEMAND											
Australian production																			

The shaded areas correspond to aggregates shown in the domestic production account.

corresponds to aggregates shown as the components of 'gross domestic product' at market prices.

corresponds to aggregates shown as the components of 'expenditure on gross domestic product'.

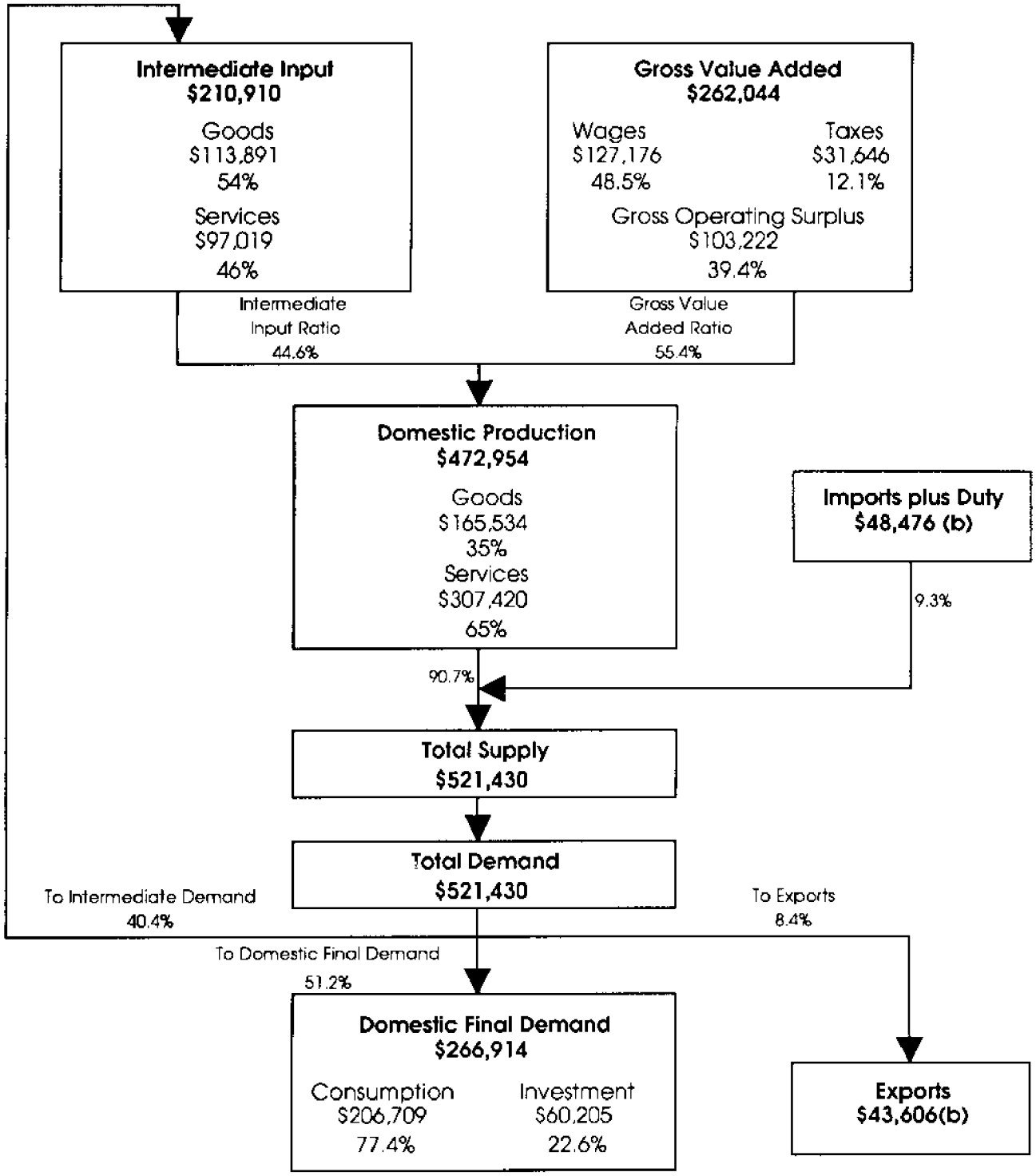
(a) this quadrant contains some cells which are, by definition, zero.

Figure 1

Figure 2

The Australian Economy
Flow of Goods and Services (a)

($Million)



(a) : Flows are based on 1986-87 Input-Output tables.

(b) : Includes re-exports.

An Experimental Composite Leading Indicator of the Australian Business Cycle

Gérard Salou and Cynthia Kim

Introduction

To assist and encourage informed decision making by governments, businesses and the community, the ABS is investigating means of providing earlier signals of movements in economic activity. In particular, it is:

developing collections of additional data on businesses' expectations of future economic conditions;

investigating the feasibility of collecting data on householders' expectations;

refining the analysis and interpretation of the expectations data it already collects; and

developing a composite leading indicator of the business cycle which is intended to summarise the early signals contained in individual partial economic indicators.

This article is the third in a series dealing with the Australian business cycle and its leading indicators. The first article described the Australian business cycle (Salou and Kim, August 1992). The second studied the temporal relationships at turning points between the Australian business cycle and a selection of main economic indicators (Salou and Kim, October 1992). The conclusion of the latter was that individual economic indicators are unreliable for forecasting business cycle turning points, the main reasons being the many different causes and facets of business cycles. This article shows how the combination of individual indicators to form a composite leading indicator (CLI) improves the reliability of the forecasting of turning points. The construction of the indicator and its properties are also described. Static, as well as dynamic, evaluations are performed with particular attention paid to the effects of filtering and data revisions. The last section of the paper explains how to interpret the CLI in forecasting mode.

The CLI has been developed to supplement, rather than compete with, existing forms of economic analysis and modelling and indicators produced by other organisations. It should be noted that the primary use of the CLI is the detection of turning points in the business cycle, not the forecasting of the level of any measure of economic activity. The analysis underlying the development of the CLI has focused on business cycles, which are obtained by removing the long-term trend from the overall measure of economic activity, constant price GDP(A). The expansionary and contractionary phases identified by movements in the CLI are periods of acceleration and slowdown respectively in economic activity *relative to the long term trend of constant price GDP(A)*. As a result, a negative value of the CLI does *not* necessarily indicate that GDP(A) growth will be negative. It could simply mean that, even though growth in GDP(A) is positive, it will be below the growth of its long-term trend. The main function of the CLI is in predicting when turning points relative to the long-term trend of GDP(A) are reached.

The ABS is continuing with the experimental development of the CLI, testing its performance as new data become available, with the intention of publishing an information paper on the CLI in the near future and thereafter publishing the CLI quarterly.

Rationale for aggregating individual indicators

In the October 1992 issue of *Australian Economic Indicators*, the performance of economic indicators over the past two decades was examined (Salou and Kim, op. cit.). The main conclusion of this analysis was that, while individual economic indicators contain some information about short-term movements in aggregate economic activity, they may also show extra or missing cycles and produce false signals. Consequently, using indicators independently to forecast turning points in the business cycle is unreliable. This reflects the fact that all cycles are different in their causes, effects, duration and amplitude. Aggregating individual leading indicators into a composite indicator broadens the coverage of the possible causes and early indications of future or current fluctuations in the economy.

Aggregation therefore improves the forecasting ability of the system of leading indicators. The resulting indicator can be seen as a summary of the early signals contained in each individual component. A composite indicator is therefore more likely to capture future fluctuations than each component used independently. For the same reason, the composite indicator will produce fewer false signals than any individual indicator used in isolation. The aggregation process also reduces any measurement errors that may be present in the individual indicators for the most recent observations. More details on the aggregation technique and its history can be found in Zarnowitz (1992). Other composite leading indicators for the Australian economy have been developed and published (see for instance Boehm and Moore,1984).

Table 1
Leads and lags of individual components
(position relative to business cycle in quarters)

Turning point in GDP(A)	72 Q2	73 Q4	75 Q3	76 Q3	77 Q4	78 Q4	80 Q2	82 Q1	83 Q1	85 Q3	86 Q4	89 Q4	91 Q3
Trough / Peak	T	P	T	P	T	P	T	P	T	P	T	P	T
Real interest rate (inverse)	7	6	5	6	2			9	6	11	7	6	9
Commodity price/ PPI imported materials	2	0	1	1	1	-1			3	3	1	5	0
USA GDP	2	2	2	2	0	0	–1	3	1	5	–1	–2	1
Job vacancies	na	na	na	na	na	na	na	1	–1	1	–4	2	1
Housing finance commitments	na	na	na	na	–1			6	2	1	2	5	3
All industrials index	3	3	3	2	3	1	3	3	1	7	4	0	3
Production expectations	2	3	3					4	1	0	1	5	3
Business expectations	3	5	4					4	2	7	2	5	2

Selection of components

Individual indicators were selected for inclusion in the CLI according to their economic significance and coverage, their cyclical conformity and their timeliness. The main results of their evaluation against these criteria have been reported in Salou and Kim (October 1992, op. cit.). The experimental CLI is an aggregation of the following eight time series:

Real interest rates, lagged four quarters:
An estimate of real short-term interest rates was computed by subtracting the annual growth in the final domestic demand fixed-weighted price index (growth rate from the corresponding quarter the year before) from the quarterly average of the two year Treasury bond rate.

Commodity price/Producer Price Index (PPI), imported materials:
The commodity price index used was that compiled by the Australian Bureau of Agricultural and Resource Economics. It includes the more relevant world market prices for Australian export commodities weighted by their share of exports in 1987-88. It is expressed in Special Drawing Rights in order to exclude exchange rate movements. The producer price index of imported materials is compiled by the ABS (Cat. No. 6411.0). The ratio gives an early estimation of terms of trade.

USA GDP:
The United States gross domestic product from the United States Bureau of Economic Analysis, Department of Commerce.

Job vacancies, all industries:
The ABS quarterly data on job vacancies, all industries (ABS Cat. No. 6354.0), are available in continuous series from 1980.

Housing finance commitments:
The value of total secured housing finance commitments to individuals (ABS Cat. No. 5609.0), deflated by the housing component of the consumer price index.

All Industrials index:
Index of the market prices of a sample of shares of 240 Australian companies on the Sydney and Melbourne Stock exchanges. It excludes mining, oil and other resources shares.

Production expectations, lagged one quarter:
Compiled by the Australian Chamber of Commerce and Industry and Westpac. This series has been smoothed but not detrended, since investigations indicated that entrepreneurs' expectations do not contain any long-term trend.

Business expectations, lagged one quarter:
Compiled by the Australian Chamber of Commerce and Industry and Westpac. This series has been smoothed but not detrended, since investigations indicated that entrepreneurs' expectations do not contain any long-term trend.

The performance of these components when used independently is summarised in Table 1. The particular combination used to construct the CLI was chosen after several iterations of the performance evaluation described below, using tests for cyclical conformity, timeliness and behaviour in dynamic mode. The coverage of the CLI was also a criterion in the selection of components. The proposed CLI has a balanced coverage of several different aspects of

economic activity. External demand (US GDP), monetary policy (real interest rates), a measure of terms of trade (ratio of commodity prices to import prices), pressures on production capacity (job vacancies), internal demand (housing finance) and entrepreneurs' expectations (production and business expectations) are represented. The first three of the eight components of the CLI are measures of forces driving the Australian economy. Job vacancies and housing finance are early indicators of changes in production and demand conditions. The All industrials index and the two expectations indicators incorporate assessments of the future by players in the economy.

It should be noted that not all of the series are available for the period considered, which is the March quarter 1971 to the September quarter 1992. The time series for housing finance starts in the September quarter 1975 and consistent data on job vacancies start in the March quarter 1980. All other time series are available from the beginning of the period.

Aggregation technique

The technique for aggregating the individual series can be summarised as follows:

All series were first filtered to extract the business cycles by eliminating the long-term trend, and the seasonal, trading day and irregular variations.

All series were standardised so that their amplitudes had an average of one and a deviation from average of one. This was done to reduce the weight of the more volatile series.

The standardised components were aggregated with equal weights. During the aggregation some components were lagged to adjust their phases to the target phase.

The result of this process was a series expressed as a deviation from long-term trend with a standardised amplitude.

Weighting system

Since the components used in the CLI differ in their performance as leading indicators, one might think that giving more weight to components that have a better historical performance could potentially improve the performance of the CLI. One may also believe that a weighting system could improve the "fit" of the composite to the reference series.

One way of incorporating a system of weights is by estimating a multivariate equation. Unfortunately, the selected indicators as a group of data series do not provide a model of the business cycle, but simply show cyclical conformity with the reference series for various theoretical reasons (de Leuew, 1989). Therefore, it is not possible to use regression techniques to find a weighting system which maximises the fit of the CLI to the reference series and conforms to the constraints of all weights being positive and summing to one.

An alternative way of deriving weights is to construct a scoring system based on the forecasting abilities of individual indicators. In developing the CLI on an experimental basis, the following characteristics were taken into account:

correlation with the reference series;

missing or extra cycles;

number of false signals;

reliability or regularity at turning points;

timeliness; and

length of the series.

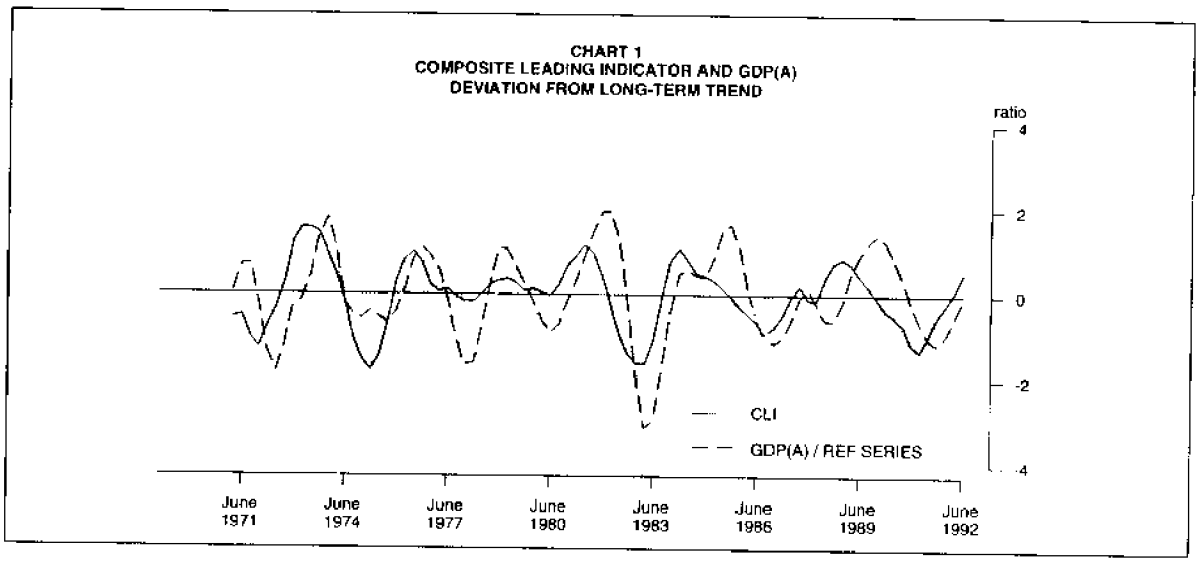
The scoring system awarded points to each series when individual criteria were fulfilled. The objective was to get a set of positive weights summing to one.

The experiment showed that the weights obtained from scores had very little influence on the performance of the CLI. An explanation is that, since the components have been selected using the same criteria, their overall performances are roughly equal on average. An indicator with poor overall performance would not have been chosen and one with outstanding performance would be used on its own. Therefore, the weights obtained by a scoring system were not sufficiently different from each other to change the performance of the resultant CLI.

Moreover, giving different weights to the components of the CLI also implies allocating different degrees of importance to the selected causes, early manifestations and expectations related to the business cycle. It is very unlikely that economic theory would support this because all cycles are different in their causes and effects. In addition, it is probable that the weighting system applying to the current cycle would not be suitable for every subsequent cycle. Most of the institutions which have developed CLIs do not use weights for the reasons described above. The above factors have led to the decision to use equal weights for aggregating the standardised components.

Cyclical conformity and lead length of the CLI

In this study, an indicator is said to demonstrate cyclical conformity with the reference series when it shows one, and only one, cycle per cycle of the reference series. As can be seen from chart 1, the CLI did not show any missing or extra cycles. The last cycle of the 1970s, which went from a trough in the December quarter 1977 to a peak in the December quarter 1978, falling again to a trough in the June quarter 1980, was



very weak in the CLI, but nevertheless present. This cycle was largely due to the agricultural sector and consequently was difficult to track and anticipate. Not surprisingly, the turning points associated with this cycle were the only ones on which the CLI did not lead.

No false signals (defined as more than one quarter of change in direction where there is no turning point nearby) were present. The double turn in 1987 in the CLI, associated with the stock market crash, led the 1987 double-turn in GDP(A).

Charts 2A and 2B show the number of occurrences of lead values in the CLI at peaks and troughs respectively. They show clearly that the lead time was much more regular at troughs than at peaks. With the exception of the two values corresponding to the last cycle of the 1970s which were minus one and zero, all leads at troughs were either of two or one quarters. The lead at peaks was spread between one and six quarters. The six quarter lead, rather longer than the average, was observed in the March quarter 1984. On average the CLI led the business cycle by two quarters. Cross-correlation calculations produced the highest correlation between the CLI and GDP(A) when the CLI lead the business cycle by two quarters.

Timeliness

The timeliness of the CLI depends on the timeliness of the last component available and therefore it will be available between one and two months after the end of the reference period. The timeliness of data was a criterion for the selection of components in order to ensure that all components would be available at the time of calculation of the CLI for a particular period, thus avoiding the need to calculate an incomplete composite. The final domestic demand price index used for calculating the real interest rate comes from quarterly national accounts data but, as it is lagged by four quarters in the aggregation, it does not interfere with the overall timeliness of the indicator.

Leading the reference series by two quarters on average, the CLI gives some indication of potential movements in the business cycle between four and five months before the end of the corresponding quarter. The dynamic simulation reported below showed that, because data for additional periods are always needed to determine and confirm turning points, the information given by the CLI actually coincides with business cycle developments.

Using the CLI in dynamic mode: data revisions

The CLI historical time series is only used for evaluating the performance of the CLI in past cycles in static mode. However, the main use of the CLI being the early detection of turning points in economic activity, it is only the current end of the series that will be of interest, quarter after quarter. There are two complications at the end of the series. First, GDP(A) data, as well as some of the data used in the CLI, are subject to revision from quarter to quarter. Second, systematic revisions to trend estimates are induced by the use of Henderson moving averages as shown below.

Chart 3 shows two generations of the CLI obtained with two recent generations of component data. The corresponding generations of GDP(A) (expressed as deviations from trend) are also present in chart 3. This shows that revisions in the CLI were minor, the two corresponding lines being virtually on top of each other. The reason is that only three components, namely US GDP, housing finance and real interest rates, are subject to revision of the data itself. These revisions, largely due to irregular components, tend to cancel each other out. Revisions in the component series incorporate both the effects of actual revisions in the data and revisions due to filtering. It is possible to isolate the effects of filtering, and this is described in the following paragraph. The most recent generation of data available has not been used for the purpose of analysing data revisions because it includes the change in the base year of constant price estimates from 1984-85 to 1989-90, and therefore reflects more than routine revisions.

CHART 2A
OCCURRENCES OF DIFFERENT CLI LEADS IN TROUGHS

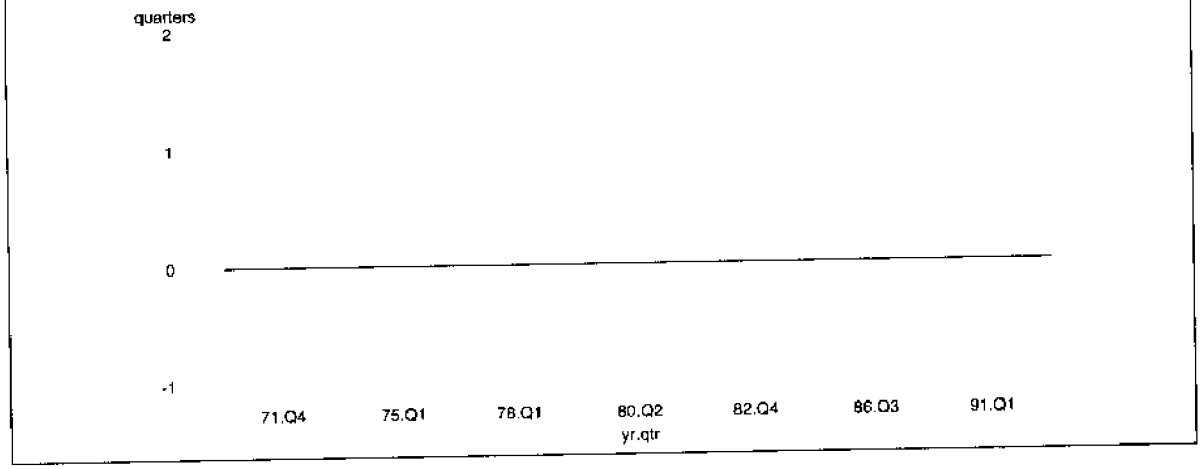


CHART 2B
OCCURRENCES OF DIFFERENT CLI LEADS IN PEAKS

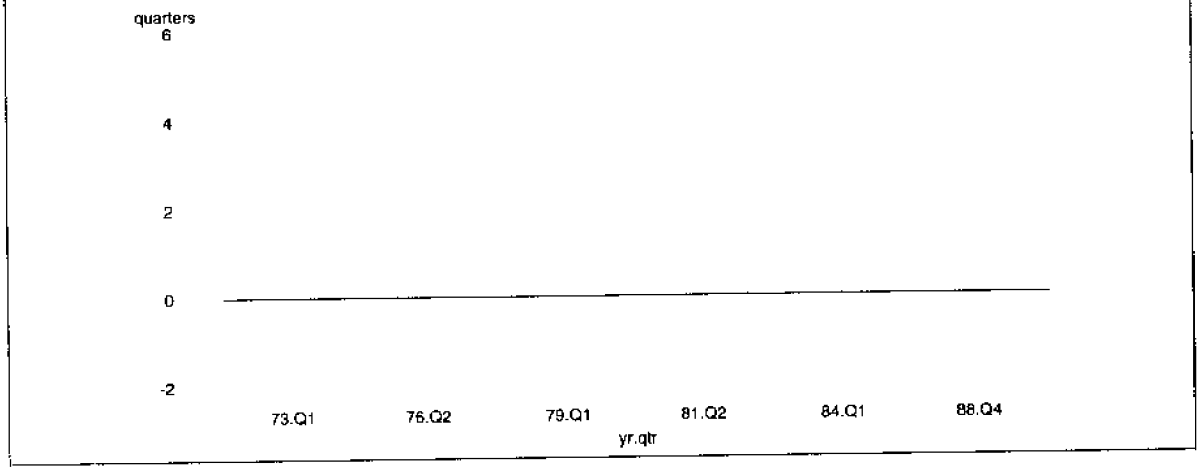


CHART 3
EFFECTS OF REVISIONS ON GDP(A) AND CLI

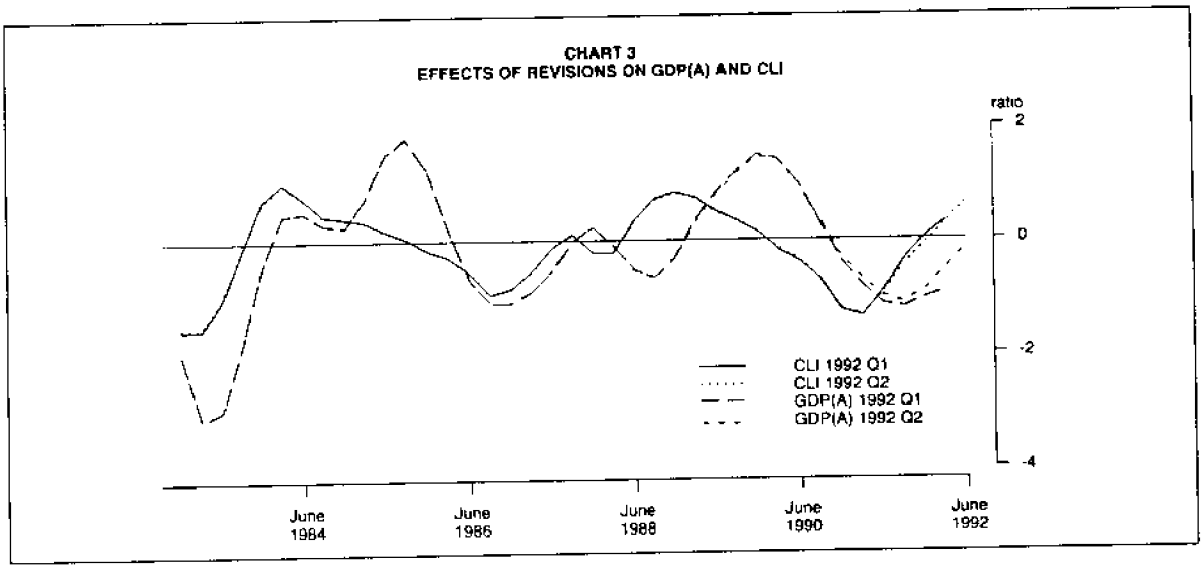


CHART 4
SIMULATION OF 1983 Q1 TROUGH

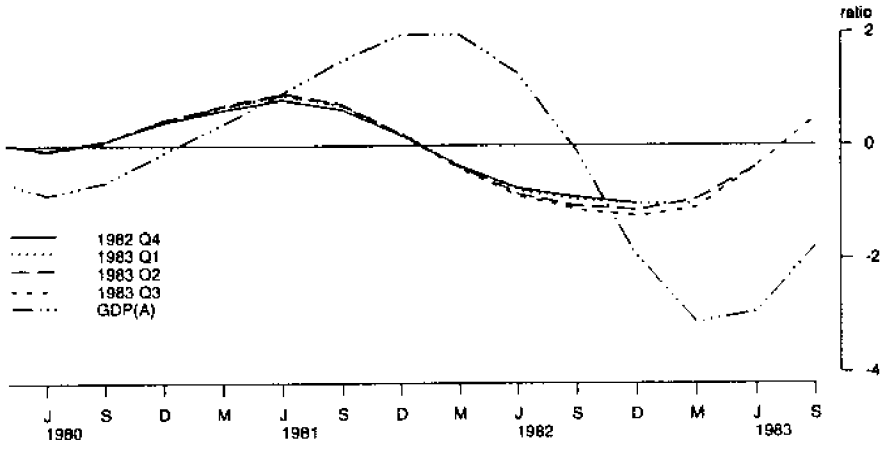


CHART 5
SIMULATION OF 1988 TROUGH

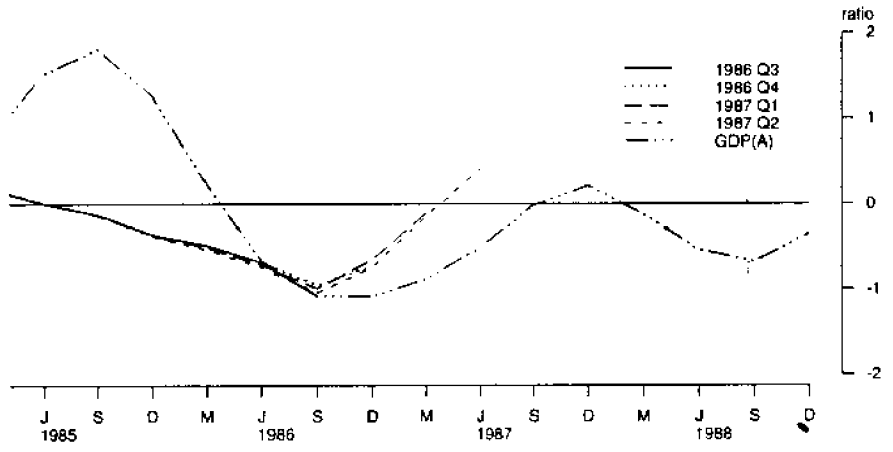
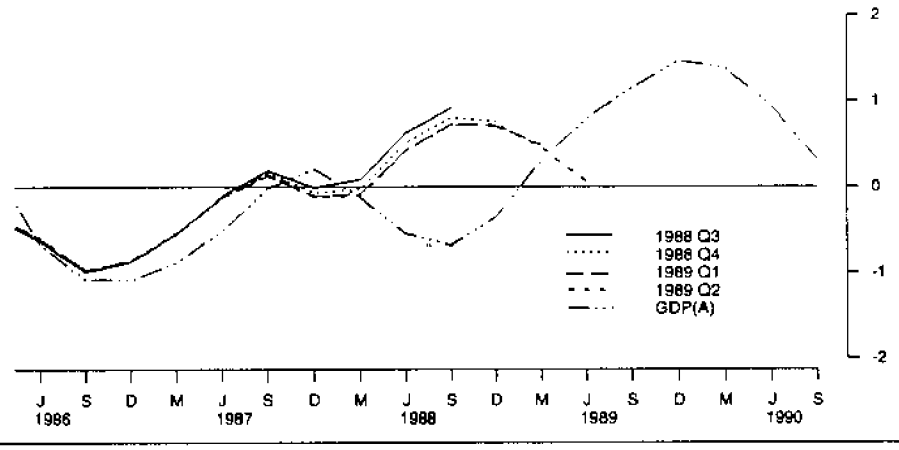


CHART 6
SIMULATION OF THE CLI AROUND THE 1989 Q4 PEAK



Effects of filtering

A Henderson moving average (HMA) is a weighted moving average centred on the observation being adjusted. Long-term trends have been estimated using a thirty three-term HMA while the series have been smoothed using a seven-term HMA. As with all centred moving averages, surrogate weights are needed for estimating the trend at the end point of the time series. When more data points become available, the distance of the observation being adjusted from the end of the series lengthens and the surrogates gradually converge towards the real HMA. The successive surrogates induce systematic revisions at the end of the smoothed series and therefore at the end of the deviation from trend series. The effects of the HMAs on the end-points have been simulated by taking the final data available at the time of the study and cutting the series successively at each quarter since 1981. The shortened time series were then smoothed and de-trended. This made it possible to examine the effect of the filters alone without the impact of other revisions to the data. All the data used were from the latest generation available at the time of the study, the June quarter 1992. All turning points from 1981 were simulated and three are used to illustrate the method and the results obtained.

Chart 4 shows the results of the simulation of the developments in the CLI just before and through the March quarter 1983 trough. The successive generations of CLIs are labelled using their reference quarters: the December quarter 1982, the March quarter 1983, the June quarter 1983 and the September quarter 1983. The overall message is that the CLI has turned consistently around the turning point. With the March quarter 1983 generation, the fall in the CLI was stopped. With the June quarter 1983 generation, the turning point appeared with two consecutive quarters of positive growth. A preliminary date for the trough was found in the CLI in the December quarter 1982, heralding a trough in GDP(A) in the March or June 1983 quarters. This date was subsequently confirmed. Chart 4 contains the most recent generation of GDP(A) for comparison. In this case, although the CLI did not lead the developments themselves, it would have led the release of information on the occurrence of a turning point.

Chart 5 shows the results of the simulation just before and through the December quarter 1986 trough. The overall message is that there is no false signal around the turning point period. As on the previous chart, the successive generations of CLIs are labelled using their reference quarters: the September quarter 1986, the December quarter 1986, the March quarter 1987 and the June quarter 1987. With the December quarter 1986 generation the turning point appeared with only one quarter of positive growth. A preliminary date for the trough was found in the CLI in the September quarter 1986, heralding a trough in GDP(A) in the December 1986 or March 1987 quarters, the former having been confirmed since then. In this case the CLI would have also led the release of information on the occurrence of a turning point.

Another interesting point coming out of the simulation exercise is the way the CLI deals with the double turn in the December quarter 1986-December quarter 1989 expansion. Chart 6 shows how a turning point progressively appears in successive generations of the CLI. A one quarter fall acknowledged the 1987 double turn with following data implying continued growth. Then, with the September quarter 1988 generation, two consecutive quarters of fall signalled a turning point ahead. This was confirmed by subsequent generations of data.

The two main conclusions to be drawn from the simulations are the following:

The trending and smoothing techniques do not induce instability in measuring the timing of turning points. In all cases where a local maximum/minimum was detected, it was confirmed with the next quarter of data. All except one of the turning points in the CLI stabilised in the same quarter in which the turning points were first observed. The exception, the peak in the December quarter 1988, was first observed to be in the September quarter 1988. By the addition of data corresponding to the generation ending in the June quarter 1989 the peak moved to the December quarter 1988 and subsequently stabilised.

There were no false signals from the CLI and all turning points were picked up.

The use of the CLI in forecasting mode

The main use of a CLI constructed as described is to help in the early detection of turning points in the business cycle. The evaluation of performance, and particularly the dynamic simulations, have shown how a turning point gradually appears in the CLI. The CLI is being tested with data as they become available to confirm this performance.

It is important to note that the amplitude of the CLI at turning points cannot be used as an indicator of the amplitude of the corresponding cycle. The CLI does not give any indication of the level of the reference series at any particular point in time.

The second output of this analysis is the level of the underlying long-term trend of the reference series. The long-term cycles and the business cycles interact and should be used in conjunction. The long-term trend provides information on the average performance of the economy over the last four to eight years. It is derived by using a thirty three-term HMA. These averages are centred on the point under consideration (ie. sixteen observations before and sixteen observations after the point of interest are included in the weighted average). At the end of the series the sixteen observations after the point of interest are not available. Surrogates, which are shorter and non-centred moving averages, are used as a

solution to the problem. As more data become available, longer averages can be used until finally, sixteen quarters later, the final long-term trend estimate becomes available. In the meantime, the long-term trend is continually revised depending on the subsequent values of GDP(A). These revisions affect the level of the CLI but, as shown by the simulations, do not influence its movements and therefore the detection of turning points.

For reasons of presentation, the average amplitude and the long-term trend of the reference series could be re-incorporated into the CLI to create a series that looks comparable to GDP(A) in level terms. It has been decided not to do so since this series could be misleading. As indicated above, the level of the CLI is not related to the level of the business cycle and this series cannot be used as a predictor of the level or the growth rate of GDP(A).

One final element to take into account when using the CLI is the contribution of each individual component to the movement of the composite. In doing so, some information may be added to help in interpreting the final results.

Conclusion

This study has produced a composite leading indicator which, with one exception, has led consistently the major turning points in the Australian business cycle as defined by deviations of GDP(A) from its long-term trend. The one exception was the December quarter 1977-December quarter 1978-June quarter 1980 cycle, during which the CLI was coincident with the business cycle. The components have been selected for their balanced coverage of the various types of economic indicators available. The CLI has been proven to be robust in dating turning points in dynamic mode, picking up all turning points in the 1980s and not showing any false signals. Real time testing is being conducted as data become available to confirm this performance.

To ensure that the CLI continues to perform correctly on future cycles, it is essential that relevant coverage of the economy be maintained. As a result, the components will be reviewed periodically, from one cycle to another, in order to take into account long-term changes in the structure of the economy.

References

Australian Bureau of Statistics, *A Guide to Smoothing Time Series - Estimates of Trends* (Catalogue No. 1316.0), 1987.

Boehm, Ernst and Geoffrey H. Moore, New Economic Indicators for Australia, 1949-84, *Australian Economic Review, 4, 1984.*

de Leuew, Frank. 1989. Leading Indicators and the 'Prime Mover' view. *Survey of Current Business, August 1989.*

Salou, Gérard and Cynthia Kim. 1992. The Australian Business Cycle 1959-1992. *Australian Economic Indicators*. Australian Bureau of Statistics (Catalogue No. 1350.0), August 1992.

Salou, Gérard and Cynthia Kim. " Leading Indicators of the Australian Business Cycle: Performance over the Last Two Decades. *Australian Economic Indicators*. Australian Bureau of Statistics (Catalogue No. 1350.0), October 1992.

Zarnowitz, Victor, *Business Cycles, Theory, History, Indicators and Forecasting*, The University of Chicago Press, Chicago, 1992

THE ECONOMIC IMPORTANCE OF SPORT AND RECREATION

Carol Soloff

Views expressed in this paper are those of the author and do not necessarily represent those of the Australian Bureau of Statistics.

INTRODUCTION

This article examines the statistical information, mainly from the ABS, that is relevant to the measurement of the economic importance of sport and recreation in Australia. ABS industry data are collected using the Australian Standard Industrial Classification (ASIC). Sport and recreation are not classified as separate industries within ASIC, but cover a range of activities from several different industries. The scope of sport and recreation for the purpose of this article includes many of the activities which people undertake for leisure, as well as the related activities of, for example, the entertainment, manufacturing, wholesale, retail and service industries.

ECONOMIC BENEFITS

The economic importance of sport and recreation can be examined by analysing the actual expenditure on sport and recreation activities by individuals and by government, as well as the size of the industry as reflected by employment, participation and goods and services produced and sold. Economic benefits explored below include household and government expenditure, employment and industry information, imports, exports and production, and participation statistics.

Potential indirect economic benefits, such as less demand on health and welfare services which could result from involvement in sport and recreation activities, are not covered by this article.

Expenditure information

Information on expenditure can be used directly to measure the economic importance of sport and recreation.

Household expenditure: The ABS Household Expenditure Survey (HES) provides information on how much households spend on a range of items. Results from the last HES show that in 1988-89 Australian households spent on average $60 per week on items classified as "recreation", comprising 12 per cent of their total expenditure. Expenditure on recreation is compared to other categories of expenditure in Table 1. A detailed breakdown of recreation expenditure is given in Table 2. Note that the averages in both Tables 1 and 2 are over all households, including those which had no expenditure on these items.

Tables 1 and 2 include only expenditure that is directly classified as recreation. It could be argued that there is other expenditure that should be included as recreational expenditure. For example, the car and petrol usage in travelling to a recreational activity, the

TABLE 1:
AVERAGE WEEKLY HOUSEHOLD EXPENDITURE, AUSTRALIA, 1988–89
All households

Expenditure	*Amount ($)*	*Per cent*
Current housing costs	71.80	14.3
Fuel/power	12.87	2.6
Food/non–alcoholic beverages	95.83	19.1
Alcoholic beverages	16.90	3.4
Tobacco	6.89	1.4
Clothing/footwear	30.73	6.1
Household items	37.37	7.4
Household services	24.11	4.8
Health expenses	21.68	4.3
Transport	76.13	15.1
Recreation	**59.37**	**11.8**
Personal care	9.95	2.0
Other	39.08	7.8
Total	**502.71**	**100.0**

Source: ABS Household Expenditure Survey 1988–89, States and Territories (6533.0).

TABLE 2:
AVERAGE WEEKLY HOUSEHOLD EXPENDITURE, AUSTRALIA, 1988–89
All Households

Recreational item	*Amount ($)*	*Per cent*
Television and other audio–visual equipment	9.23	15.5
Books, newspapers, magazines and other printed material	5.82	9.8
Other recreational equipment (eg photographic, musical, sporting goods, toys, etc)	8.15	13.7
Gambling	3.55	6.0
Entertainment and other recreational services (eg sports lessons, memberships, entrance fees)	12.12	20.4
Animal expenses	4.48	7.5
Holidays in Australia	9.56	16.1
Holidays overseas	6.45	10.9
Total	**59.37**	**100.0**

SELECTED SPORTS RELATED EXPENDITURE

Item	*Amount ($)*
Sports equipment	1.98
Repair of sports/recreational equipment	0.19
Health and fitness studios	0.55
Sporting clubs subscriptions	0.75
Green fees	0.24
Sports equipment hire	0.05
Sports services charges	1.05
Spectator admission fees to sport	0.49

Source: ABS Household Expenditure Survey 1988–89, Australia, Detailed Expenditure Items (6535.0).

food and drink that is bought while participating in a recreational activity, clothing that is purchased, and so on. These other related expenditures were considered in a study undertaken by the former federal Department of the Arts, Sport, the Environment, Tourism and Territories (DASETT) based on the 1984 HES. The results have been published in DASETT Technical Paper no 1, *The Economic Importance of Sport and Recreation - Household Expenditure*. This study determined that the average annual expenditure in 1984 on sport and recreation by Australian households was between $3,900 and $4,700. This made a total expenditure of between $19.8 and $23.7 billion nationally and contributed between 8.6 and 10.1 per cent of GDP and between 9.2 and 10.6 per cent of employment.

Government expenditure: Table 3 gives some preliminary estimates of government expenditure on recreation. This information shows that $1,786m was spent by all levels of government on recreation facilities and services in 1990/91. Information is also available from the ABS at an individual state and territory level for Local Government expenditure.

TABLE 3:
GOVERNMENT OUTLAYS ON RECREATIONAL FACILITIES AND SERVICES

$ million

Level of government	*86/7*	*87/8*	*88/9*	*89/90*	*90/1*
Commonwealth	*111*	*91*	*51*	*72*	*92*
State/Territory Total	*680*	*723*	*828*	*964*	*966*
New South Wales	216	225	212	260	256
Victoria	168	205	280	313	273
Queensland	95	103	126	95	137
South Australia	61	67	64	102	116
Western Australia	70	65	68	67	61
Tasmania	38	27	39	32	36
Northern Territory	34	32	39	38	41
Australian Capital Territory	na	na	na	56	46
State/Territory and local combined	*1,348*	*1,449*	*1,594*	*1,744*	*1,717*
Commonwealth, State/Territory and local combined	**1,449**	**1,540**	**1,642**	**1,805**	**1,786**

It is not possible to add across the different levels of government as all financial transactions between the different levels are removed from the totals.

Source: Unpublished ABS Government Finance data.

Employment and industry information

Employment and industry information can help measure the economic significance of sport and recreation. The contribution of unpaid volunteer work is especially significant.

Employment: The Censuses of Population and Housing provide information on employment in sport and recreation related industries. Table 4 shows data from the 1986 Census on the numbers of people employed in certain sport and recreation related industries. Note that many people involved in sport and recreation are not covered by this data (for example, medical sports specialists, federal, state and local government employees in the sport and recreation field, and those involved with other support services for sport and recreation activities).

Information from the 1991 Census is becoming progressively available, and national detailed industry tables will be released in September 1993. Information relevant to sports equipment manufacturing and sport and toy stores (such as number of establishments, employment, wages and salary and turnover) is also available from the Manufacturing and Retail Censuses, respectively (8202.0 and 8622.0).

TABLE 4:
PERSONS EMPLOYED IN THE SPORT AND RECREATION INDUSTRIES, AUSTRALIA, JUNE 1986

Industry	*Persons*
Sport equipment manufacturing	1,763
Sport and toy wholesalers	3,753
Sport and toy stores	11,456
Motion picture production, hire, theatres	8,695
Radio and TV stations	18,484
Live theatre, orchestras, bands	5,784
Creative arts	4,875
Other entertainment	8,894
Parks and gardens	6,611
Gambling and lotteries	15,726
Other sport and recreation	29,531
Restaurants, hotels and accommodation	176,729
Clubs	35,999

Source: ABS 1986 Census of Population and Housing, Table CX0056

The ABS also publishes information on the labour force on a more regular basis. Occupation and industry information is collected quarterly from ABS household surveys and published in aggregate categories. Table 5 contains labour force data for some sport and recreation related industries.

TABLE 5:
PERSONS EMPLOYED IN THE SPORT AND RECREATION INDUSTRIES, AUSTRALIA, NOVEMBER 1992

Industry	*Males*	*Females*
Sport and recreation	26,600	29,200
Entertainment	24,400	25,300
Total entertainment and recreational services	**51,000**	**54,500**
Restaurants, hotels and accommodation	102,300	138,800
Clubs	28,200	30,200
Total restaurants, hotels and clubs	**130,600**	**168,900**
TOTAL SPORT AND RECREATION	**181,600**	**223,400**

Note: Totals may not be exactly the sum of components due to rounding.

Source: ABS Labour Force Survey, unpublished data, November 1992.

It is important to note that both the Census and the labour force information only report people's main jobs. There are a number of people who are employed in the sport and recreation industry as a second job. The ABS conducted a survey in March 1993, as a supplement to the labour force household survey, that collected information on paid and unpaid work in a number of the arts, and also had some related questions on involvement with sport. Results will be available later in the year.

Industry: Table 6 contains data from the ABS Business Register on the number of businesses engaged in certain sport and recreation activities.

The data in Table 6 are classified by ASIC. As mentioned earlier in this article, sport and recreation include activities classified to several ASIC industries, making measurement of employment difficult.

TABLE 6:
NUMBER OF BUSINESS ESTABLISHMENTS BY INDUSTRY AND EMPLOYMENT SIZE, AUSTRALIA, AUGUST 1992

Industry	*<5*	*5–9*	*10–19*	*20+*	*Total*
Sporting equipment manufacturers	169	59	28	15	271
Sport and toy wholesalers	679	192	72	33	976
Sport and toy retailers	2,889	572	109	15	3,585
Radio and TV stations	341	79	89	173	682
Live theatre, orchestras and bands	615	178	92	102	987
Creative arts	892	58	17	8	975
Other entertainment nec	1,226	315	166	110	1,817
Parks and gardens	328	150	88	88	654
Lotteries and gambling	1,876	875	262	98	3,111
Other sport and recreation services	4,494	1,257	718	516	6,985
Cafes and restaurants	7,314	5,346	2,153	1,241	16,054
Hotels	1,513	1,730	1,296	1,179	5,718
Accommodation	4,417	1,803	865	807	7,892
Licensed bowling clubs	638	330	138	51	1,157
Licensed golf clubs	298	178	140	83	699
Other licensed clubs	992	551	386	533	2,415
Non–licensed clubs	472	110	72	69	723
Total	**29,153**	**14,783**	**6 691**	**5,074**	**54,701**

Source: ABS Business Register, August 1992.

In an attempt to make a more complete measure of employment in sport and recreation, DASETT employed a consultant to undertake research into the sport, recreation and fitness sector. A model was developed for the sport, recreation and fitness sector and results of a survey undertaken by the consultant indicated that there were more than 20,000 establishments in the sector employing in total in excess of 280,000 people Australia-wide. Details of the results of the research are available in the Department of the Arts, Sport, the Environment and Territories (DASET) Technical Paper No. 6, *Economic and Employment Characteristics of the Australian Sport, Recreation and Fitness Industries.*

The above study has helped highlight the need for the development of an appropriate statistical framework for the sector. DASET are now funding research to develop the recreation and sport component of the culture/leisure industry framework established by the Statistical Advisory Group (SAG) of the national Cultural Ministers' Council, which is made up of the Federal and State Government Ministers responsible for cultural portfolios. The ABS is involved with SAG through the National Culture/Leisure Statistics Unit.

Imports/exports and production: In examining the impact of sport and recreation with respect to manufacturing and production, it is useful to examine ABS data on goods imported to and exported from Australia. Table 7 contains data on foreign trade activity for Australia and shows that, for the selected commodities, the value of goods imported far exceeds the value of those exported. Details of production of some recreational equipment are available in the ABS publication *Manufacturing Commodities : Principal Articles Produced* (8303.0).

TABLE 7:
FOREIGN TRADE ON SELECTED COMMODITIES, AUSTRALIA, 1992

Commodity	*Exports ($'000)*	*Imports ($'000)*
Snow–skis	26	4,086
Sailboards	250	2,103
Golf clubs	2,122	3,251
Lawn tennis racquets	177	12,417
Fishing rods	168	9,024
Ice skates and roller skates	303	21,821
General athletic/exercise equipment	2,326	41,251

Source: ABS Foreign Trade FASTTRACS System.

Voluntary activity: Voluntary activity is a very important aspect of sport and recreation which impacts both on employment in the industry and on the cost to households participating in sport and recreation. The contribution of unpaid work falls outside the production boundary used to define the activities measured by ABS economic surveys and censuses. This is mainly because of the difficulty of assigning a market value to these activities. Experimental estimates of the value of volunteer and community work have been made by the ABS and other organisations.

Surveys on voluntary activity were conducted by the ABS in 1982 in Victoria and Queensland, and in 1988 in South Australia. Voluntary activity has also been covered by the national ABS Time Use Survey, conducted during 1992.

The 1982 data were used by DASETT, in Technical Paper No. 3, *The Economic Impact of Sport and Recreation - The Voluntary Sector*, to extrapolate the information on sport and recreation volunteers to the Australia level at June 1987 and to calculate the cost for households if voluntary work had to be paid for.

Results indicated that a total of 3.6 million people provided some 436.4 million hours of voluntary work in Australia. Volunteers in sport and recreation or-

ganisations accounted for just over 40 per cent (1.45 million) of all volunteers, while their work amounted to almost 38 per cent of all voluntary hours worked.

It was estimated that the labour cost equivalent of the voluntary work in sport and recreation amounted to approximately $1.7 billion in 1986-87. Calculations based on labour force information show that this cost was roughly equivalent to the labour cost of the paid workforce in the sport and recreation industry. Further analysis indicated that the voluntary work, if paid for, would lead to an increase in the cost of sport and recreation for each household of about $330 per annum.

Experimental estimates of total volunteer and community work have been made, and have been published in the ABS information paper *Measuring Unpaid Household Work : Issues and Experimental Estimates* (5236.0). The information paper contains an informative discussion of the issues involved in the valuation of unpaid work.

Participation information

Information on participation can be used to indicate the importance of sport and recreation to people's lives and, given the extent of people's involvement, support the status of sport and recreation as making a major economic contribution to the community.

Sports participation: In 1989 the ABS conducted a sports participation survey for Victoria. It showed that at some time during that year, about 42 per cent of Victorians aged 15 years and over participated in a sporting activity (51 per cent of men and 33 per cent of women). The 10 most popular sports are shown in Table 8. In terms of sports played at least once a week, tennis was the most popular (6.1 per cent), followed by netball (4.1 per cent) and golf (3.8 per cent). Information is also available on the demographic profile of participants, the costs of participation, spectator information and reasons for non-participation.

TABLE 8:
SPORTS MOST FREQUENTLY PARTICIPATED IN, VICTORIA, 1989

Sport	*Per cent*
Golf	11.0
Tennis	10.2
Squash	5.7
Netball	4.8
Basketball	4.2
Ten pin bowling	4.2
Australian Rules Football	4.0
Billiards/snooker/pool	3.8
Indoor cricket	3.3
Cricket	3.3

Source: ABS Sports Participation Survey, Victoria, October 1989 (4118.2).

A survey that collected information on people's sport and recreation activity was conducted in the Northern Territory in 1991. This covered a wider spectrum of activities than the Victorian survey and showed that walking (33 per cent), swimming (27 per cent) and cycling (24 per cent) were the most popular activities.

Participation data are also available from a number of other sources. These are detailed in the ABS publication *A Guide to Australian Social Statistics* (4160.0), edition no. 5 of *Sports Economics*, published by The Centre for South Australian Economic Studies, at the University of Adelaide, and in *Sport and the Quality of Life*, published by the Australian Sports Commission.

Culture/leisure: The ABS has conducted a national survey that collected information on people's attendance at cultural activities during the previous year. Attendance rates for various activities are shown in Table 9, which indicates that libraries were the most popular venue, followed by museums. Further data on the number of performances and attendance at music and performing arts events are being collected and the results are due for release in mid 1993 as *Music and Performing Arts, Australia, 1991* (4116.0).

TABLE 9:
ATTENDANCE AT CULTURAL VENUES/ACTIVITIES, AUSTRALIA, 1991

Venue/activity	*Participation rate (per cent)*
Library	36.7
Museum	30.0
Popular music concert	28.6
Art Gallery	23.9
Musical theatre performance	20.1
Other theatre performance	17.8
Dance performance	11.2
Classical music performance	8.2

Source: ABS Attendance at Selected Cultural Venues, June 1991 (4114.0)

Arts and crafts: A recent ABS survey in Western Australia showed that during a 6 month period over 38 per cent of adults participated in art/craft as a leisure activity and over 57 per cent of households had purchased a finished art or craft product. Participation rates for the activities reported are shown in Table 10.

TABLE 10:
ACTIVITIES OF PERSONS PARTICIPATING IN ART/CRAFT, WESTERN AUSTRALIA, 1990

Activity	*Participation rate (per cent)*
Handicrafts	52.4
Photography	19.7
Music making	18.6
Drawing/painting/sculpting	15.8
Writing	8.7
Other	10.2

Source: ABS Arts and crafts: Purchasing and Participation Survey, Western Australia, October 1990 (4111.5).

Leisure: Participation information can be supplemented by examining the way people spend their time. During 1987 the ABS undertook a pilot Time Use Survey in Sydney. Results from the survey show that on average a person spent 43 minutes a day on active leisure and 191 minutes on passive leisure, which amounted to approximately 25 per cent of a person's waking day. Some results are shown in Table 11.

TABLE 11: AVERAGE DAILY TIME SPENT ON ACTIVITIES, SYDNEY, 1987

Activity	*Time (minutes)*	*Proportion of waking day**
Labour Force	223	24.1
Domestic activities	137	14.8
Child care/minding	32	3.5
Purchasing goods and services	40	4.3
Sleeping	513	na
Eating and personal care	128	13.8
Education	39	4.2
Volunteer work	16	1.7
Social/entertainment	78	8.4
Active leisure	43	4.6
– sport/exercise	18	1.9
– hobbies	10	1.1
Passive leisure	191	20.6

** based on 927 minute waking day*

Source: ABS Time Use Pilot Survey, Sydney, 1987 (4111.1).

As previously mentioned, during 1992 the ABS undertook a national Time Use Survey. Results are expected towards the end of 1993, and there will be more detail available on the type of leisure activities undertaken.

Population data

The ABS produces population and demographic information which can be used when examining the economic impact of sport and recreation on different groups in the community. For example, data from the Population Census can give details of the population distribution for different age groups, which can be useful when planning the location of recreational services and thus ensuring the best economic return for that service. The ABS publishes yearly population estimates for local government areas; both totals and age by sex distributions.

Major events

One area that has not been covered by this article is the economic impact of major events, which may contribute to the economic importance of sport and recreation. Examples include the Formula One Grand Prix in Adelaide, the Australian Open Tennis Championships, and the staging of Commonwealth and Olympic Games.

A range of economic impact studies have been undertaken for a variety of events around Australia. Some of these have been reviewed in the newsletter, *Sports Economics*, published by The Centre for South Australian Economic Studies.

NATIONAL CULTURE/LEISURE STATISTICS UNIT

The ABS has a National Culture/Leisure Statistics Unit located in its Adelaide Office. The role of the Unit is to assist in the development of a framework for culture/leisure statistics, to coordinate statistical activity, and to participate in relevant research. Work so far in the Unit has been mainly in the arts/culture area, but it is anticipated that this will expand into the sport and recreation sector. For further information contact Roger Mableson, Manager, National Culture/Leisure Statistics Unit, on (08) 237 7449.

CONCLUSION

An article of this nature can only touch upon the range of issues associated with the economic benefits of sport and recreation. The emphasis of this article has been to introduce the array of information available which can be used to support the economic worth of this sector. There is considerable room, however, for further information and research in this field and the ABS is available to work with the sport and recreation sector to increase the level of knowledge.

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BIBLIOGRAPHY

Australian Bureau of Statistics, *1991 Census - Community Profiles*, Australia (Catalogue No. 2722.0)

Australian Bureau of Statistics, *1991 Census - First Counts: National Summary*, Australia (Catalogue No. 2702.0)

Australian Bureau of Statistics, *A Guide to Australian Social Statistics*, Australia, 1992 (Catalogue No. 4160.0)

Australian Bureau of Statistics, *Arts and Crafts, Purchasing and Participation*, Western Australia, October 1990 (Catalogue No. 4111.5)

Australian Bureau of Statistics, *Attendance at Selected Cultural Venues*, Australia, June 1991 (Catalogue No. 4114.0)

Australian Bureau of Statistics, *Bicycles*, Urban Northern Territory, October 1991 (Catalogue No. 9215.7)

Australian Bureau of Statistics, *Bicycle Usage and Safety*, Western Australia, October 1989 (Catalogue No. 9215.5)

Australian Bureau of Statistics, *Bicycle Use and Safety*, New South Wales, October 1988 (Catalogue No. 4505.1)

Australian Bureau of Statistics, *Community and Volunteer Work*, South Australia, October 1988 (Catalogue No. 4402.4)

Australian Bureau of Statistics, *Estimated Resident Population by Sex and Age: States and Territories of Australia*, Australia, (Catalogue No. 3201.0)

Australian Bureau of Statistics, *Government Finance Statistics*, Australia, 1989-90 (Catalogue No. 5512.0)

Australian Bureau of Statistics, *Government Financial Estimates*, Australia, 1992-93 (Catalogue No. 5501.0)

Australian Bureau of Statistics, *Household Expenditure Survey, Detailed Expenditure Items*, Australia (Catalogue No. 6535.0)

Australian Bureau of Statistics, *Household Expenditure Survey, States and Territories*, Australia (Catalogue No. 6533.0)

Australian Bureau of Statistics, *Manufacturing Commodities: Principal Articles Produced*, Australia,1986-87 (Catalogue No. 8303.0)

Australian Bureau of Statistics, *Manufacturing Industry, Summary of Operations*, Australia, 1989-90 (Catalogue No. 8202.0)

Australian Bureau of Statistics, *National Health Survey, Exercise*, Australia, 1989-90 (Catalogue No. 4383.0)

Australian Bureau of Statistics, *National Health Survey, Health Risk Factors*, Australia, 1989-90 (Catalogue No. 4380.0)

Australian Bureau of Statistics, *Retail Industry, Details of Operations*, Australia, 1985-86 (Catalogue No. 8622.0)

Australian Bureau of Statistics, *Sport and Recreation*, Urban Northern Territory, 1991 (Catalogue No. 4108.7)

Australian Bureau of Statistics, *Sports Participation*, Victoria, October 1989 (Catalogue No. 4118.2)

Australian Bureau of Statistics, *Time Use Pilot Survey*, Sydney, May-June 1987, Information Paper (Catalogue No. 4111.1)

Australian Sports Commission, *Sport and the Quality of Life*, Canberra, 1992

Department of Arts, Sport, the Environment, Tourism and Territories, *The Economic Impact of Sport and Recreation - Household Expenditure*, Technical Paper No. 1 (Catalogue No. 88 0630 8)

Department of Arts, Sport, the Environment, Tourism and Territories, *The Economic Impact of Sport and Recreation - Regular Physical Activity*, Technical Paper No.2 (Catalogue No. 88 0629 X)

Department of Arts, Sport, the Environment, Tourism and Territories, *The Economic Impact of Sport and Recreation - The Voluntary Sector*, Technical Paper No. 3 (Catalogue No. 89 0369 3)

Department of Arts, Sport, the Environment and Territories, *Government Expenditure on Sport and Recreation*, Technical Paper No. 4 (Catalogue No. 91 1167 8)

Department of Arts, Sport, the Environment and Territories, *The Fitness of Australians*, Technical Paper No. 5 (Catalogue No. 92 2577 2)

Department of Arts, Sport, the Environment and Territories, *Economic and Employment Characteristics of the Australian Sport, Recreation and Fitness Industries*, Technical Paper No. 6 (Catalogue No. 92 1829 6)

The Centre for South Australian Economic Studies, *Sports Economics*, No. 5, Adelaide, February 1993

Experimental Price Indexes for Age Pensioner Households: An Update

Introduction

In January 1992 the ABS, acting upon a recommendation of the House of Representatives Standing Committee on Finance and Public Administration, published an information paper entitled *The Australian Consumer Price Index: Feasibility of Constructing Price Indexes for Special Population Groups* (ABS Cat. No. 6445.0). In this study experimental price indexes were constructed for one and two person age pensioner households, total age pensioner households, and wage and salary earners.

This paper presents updated versions of these indexes and compares their behaviour.

Assumptions and methodology

In constructing the experimental indexes it has been assumed that current Consumer Price Index (CPI) price samples provide price information relevant to the target population groups. This assumption was also made in constructing the experimental indexes in the earlier study.

Weights for the experimental indexes were calculated as follows: Average weekly expenditure data for the special population groups from the 1988/89 Household Expenditure Survey (HES) were aggregated to the expenditure classes used in compiling the CPI. Adjustments were made for under reporting of spending on tobacco and alcohol and then expenditure for all categories was inflated to 1989/90 levels using movements in the relevant components of the CPI. The resulting average weekly household expenditures were used to calculate weights, with the weight for any category of expenditure being the percentage of total expenditure for which it accounts.

The procedure used in this study represents a refinement of that used previously in two areas; the level of HES data used to calculate weights and the definitions of special population groups.

In this study, fine level HES data were aggregated to the CPI sub-group level in most instances and to the expenditure class level in some cases. By contrast, the previous study simply assumed that broad level HES classifications were interchangeable with their nearest CPI equivalents, generally a CPI group.

In this study, single person age pensioner households were defined as capital city households of one person having the age pension as the largest source of income and with a weekly income of less than 175 dollars. Two person age pension households were defined as capital city households of two people with the age pension as the largest source of income and having a weekly income of less than 290 dollars. Upper income levels were calculated so that households with incomes below this figure would be receiving at least half of their income from the age pension (based on the old age pension levels and means test during 1988/89). The total pensioner household group was a weighted average of the one and two person pensioner household groups.

Wage and salary earner households were defined as the CPI population group, namely metropolitan households deriving at least three quarters of their total income from wages and salaries but not including the ten percent of this group with the highest income. An important point here is that the wage and salary earner index is *not* the same as the CPI; the

GRAPH 1: EXPERIMENTAL INDEX LEVELS FOR TOTAL PENSIONER AND WAGE AND SALARY EARNER HOUSHOLDS

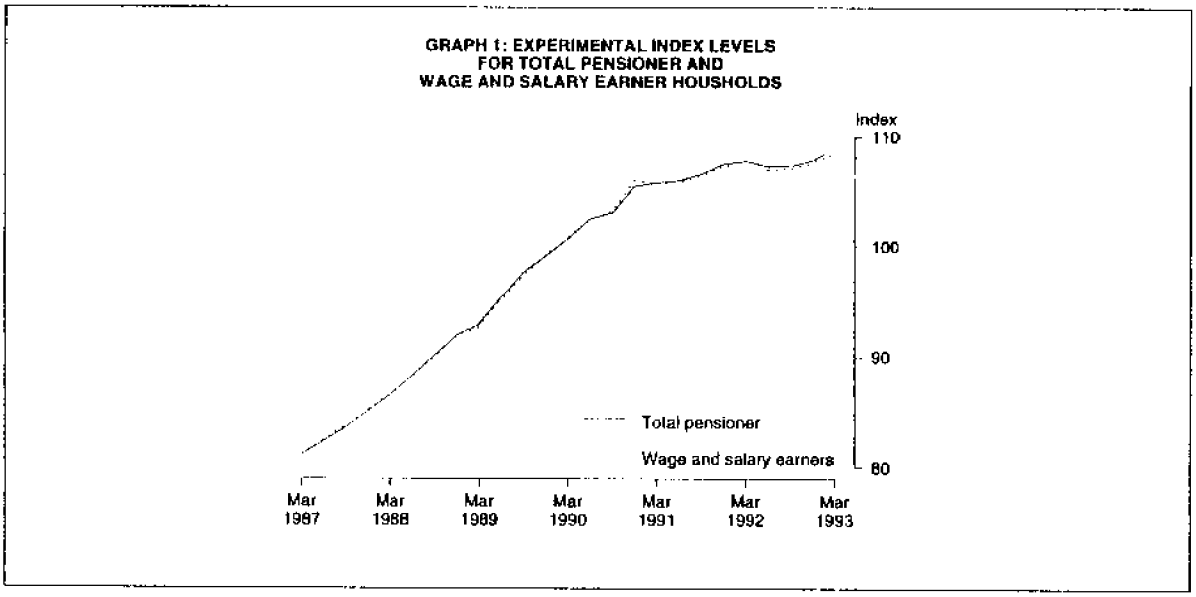


Table 1: Average weekly expenditure ($)

CPI expenditure category	Age pensioner households: 1 person	2 person	Total	Wage and salary earner households
Food	38.16	69.69	56.48	114.98
Clothing	9.65	14.37	12.39	39.71
Housing	26.61	26.18	26.37	112.45
Rents	9.07	8.82	8.93	30.83
Privately owned dwelling rents	8.27	8.04	8.14	28.48
Government owned dwelling rents	0.80	0.78	0.79	2.35
Home ownership	17.54	17.36	17.44	81.62
Mortgage interest charges	0.10	0.46	0.31	55.47
Local government rates & charges	7.31	8.66	8.09	12.75
House repairs & maintenance	8.39	5.82	6.90	11.21
House insurance	1.74	2.42	2.14	2.19
Household equipment	27.45	39.66	34.55	115.90
Transportation	10.17	35.05	24.63	98.84
Private motoring	8.48	32.38	22.37	92.11
Motor vehicles	1.46	7.03	4.70	25.25
Automative fuel	2.77	9.61	6.74	29.15
Vehicle insurance	1.96	6.45	4.57	13.14
Motoring charges	0.48	1.34	0.98	4.97
Tyres & tubes	0.00	0.00	0.00	2.29
Vehicle servicing repairs & parts	1.81	7.95	5.38	17.31
Urban transport fares	1.69	2.67	2.26	6.73
Tobacco and alcohol	5.63	17.44	12.49	43.62
Health and personal care	11.93	10.25	10.95	38.36
Recreation and education	9.51	12.89	11.47	68.75
Total	139.11	225.53	189.33	632.61

procedures used to adjust HES expenditure data for the calculation of CPI weights are more sophisticated than those employed here and yield different results. Further, the CPI is a series of chain linked indexes, the weights of which are adjusted every five years. By contrast, the experimental indexes presented here are based on a single set of weights.

Results and discussion

Table 1 shows the average weekly expenditures calculated from HES data for each of the experimental populations while Table 2 lists the weights calculated for use in constructing each of the four experimental indexes. Graph 1 is a plot of both wage and salary earner and total pensioner households index levels against time for the period March 1987 to March 1993. Graph 2 is a plot of both one person and two person pensioner household index levels against time for the period March 1987 to March 1993. Graphs 3 and 4 plot changes in the levels of these indexes from the corresponding quarter of the previous year over the same period.

Table 1 shows that there are significant differences in absolute expenditures across the population groups. However, the relevant comparison in studying the behaviour of price indexes is the proportion of total expenditure accounted for by each category; this is reflected in the weights. Examination of Table 2 reveals substantial differences in weighting patterns for wage and salary earners and the total pensioner households group. A much higher weight is assigned to the food and health and personal care groups for the total pensioner households index while the wage and salary earner index gives greater weight to transportation and to recreation and education. These differences partly reflect the greater mobility and disposable household income of wage and salary earner households.

At the finer levels of classification, it is notable that mortgage interest charges represent a very much more significant burden to the wage and salary earner population than to the total pensioner households.

Interestingly, differences in weighting patterns for one and two person pensioner households are greater than the differences between the wage and salary earner households and total pensioner households. The most extreme differences occur in the housing and transportation groups. One person pensioner households spend a much greater proportion of their income on private rents, local government rates and charges and house repairs and maintenance than two person pensioner households. Examination of the transportation group suggests a much heavier reliance upon public transport by one person pensioner households; weights within this group for two person pensioner households are very similar to those used for the wage and salary earner population.

Despite the significant differences between weighting patterns for the wage and salary earner and the total pensioner households indexes, the actual index numbers produced differ only slightly, as Graphs 1 and 3 show. Larger, though still not significant, differences in index numbers are observed between one person and two person pensioner households (see Graphs 2 and 4).

This observation illustrates an important consideration in exercises of this type; price indexes are insensitive to weights if prices move together. Significant differences in the levels of experimental indexes such as those constructed in this study are to be expected only if there is considerable divergence

Table 2: Weights used in constructing experimental indexes

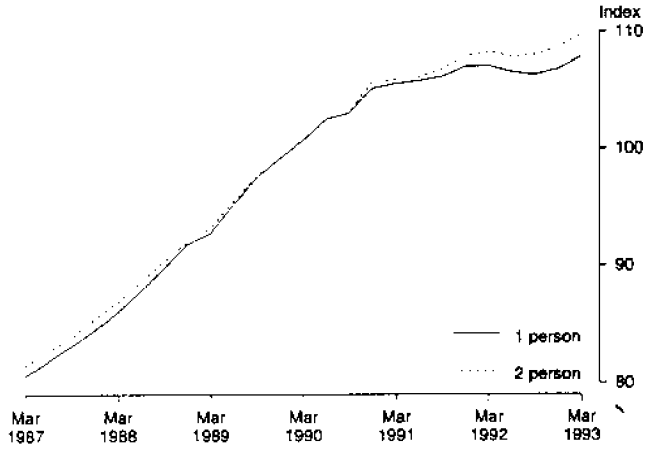
CPI expenditure category	Age pensioner households: 1 person	2 person	Total	Wage and salary earner households
Food	27.43	30.90	29.8	18.18
Clothing	6.94	6.37	6.55	6.28
Housing	19.12	11.61	13.92	17.77
Rents	6.52	3.91	4.71	4.87
Privately owned dwelling rents	5.94	3.56	4.30	4.50
Government owned dwelling rents	0.58	0.35	0.41	0.37
Home ownership	12.60	7.70	9.21	12.90
Mortgage interest charges	0.07	0.21	0.16	8.77
Local government rates & charges	5.25	3.84	4.28	2.01
House repairs & maintenance	6.03	2.58	3.64	1.77
House insurance	1.25	1.07	1.13	0.35
Household equipment	19.73	17.59	18.25	18.32
Transportation	7.31	15.54	13.00	15.62
Private motoring	6.10	14.36	11.81	14.56
Motor vehicles	1.05	3.12	2.48	3.99
Automative fuel	1.99	4.26	3.56	4.61
Vehicle insurance	1.41	2.86	2.41	2.08
Motoring charges	0.35	0.59	0.52	0.78
Tyres & tubes	0.00	0.00	0.00	0.36
Vehicle servicing repairs & parts	1.30	3.53	2.84	2.74
Urban transport fares	1.21	1.18	1.19	1.06
Tobacco and alcohol	4.05	7.73	6.60	6.90
Health and personal care	8.58	4.54	5.79	6.06
Recreation and education	6.84	5.72	6.06	10.87
Total	100.0	100.0	100.0	100.0

between the price movements of different expenditure classes in conjunction with significantly different expenditure weights. This study exemplifies the fact that divergence between price movements of different expenditure classes has not, in general, been significant in the longer term in the Australian CPI over the past fifteen years, although some significant short term differences can be observed. Were more significant divergences to occur in the component price indexes, the index levels for special population groups could differ substantially from that of the CPI "All Groups" index.

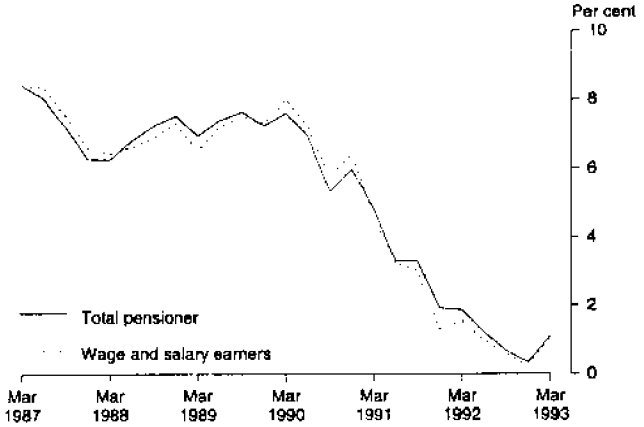
Conclusions

Construction of price indexes for special population groups using price information collected for use with the CPI is unlikely to produce indexes which differ significantly from the CPI. This is consistent with the conclusions reached in the ABS information paper *The Australian Consumer Price Index: Feasibility of Constructing Price Indexes for Special Population Groups.*

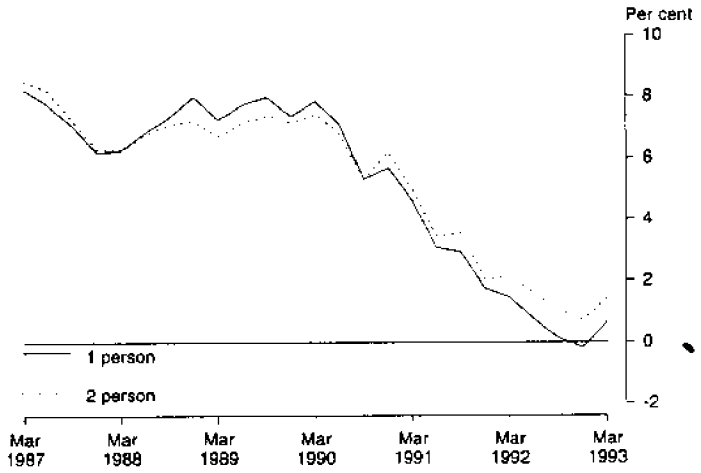
GRAPH 2: EXPERIMENTAL INDEX LEVELS FOR PENSIONER HOUSEHOLDS



GRAPH 3: TOTAL PENSIONER AND WAGE AND SALARY EARNER HOUSEHOLDS
Change from same quarter of previous year



GRAPH 4: PENSIONER HOUSEHOLDS
Change from same quarter of previous year



Major ABS Classifications

INTRODUCTION

Each year the ABS produces nearly two thousand separate statistical bulletins with the data contained therein classified according to a variety of national and international standards.

Classification is one of the cornerstones of statistics. Without the accurate and systematic arrangement of data according to common properties, statistical output can be neither reliable nor comparable.

Over the years, the ABS has expanded greatly the scope and sophistication of its classification systems and methods. Comprehensive classifications now exist in many fields. Regular reviews are conducted to ensure that economic and social changes are reflected in the classifications and, where relevant and possible, Australian statistical classifications are either integrated or closely aligned with international standards.

The ABS wishes to see the highest possible level of coordination of statistical effort across Australia. This article aims to encourage the wider use of common classification systems by all producers of Australian statistics. Unfortunately, through lack of use of common classifications and standards, many public and private sector organisations generate statistics that can not be used in conjunction with the statistical output of the ABS and other bodies.

The lack of coordination is sometimes justified by claims that there are specialist requirements. However, it often arises through lack of knowledge about common statistical standards and the benefits to be gained through their use. Greater use of a common statistical framework throughout Australia not only increases efficiency, but also enriches the data that can be drawn upon by the community in decision-making.

This article provides an introduction to the major classifications developed and utilised by the ABS. These classifications are grouped into four broad areas: area classifications; economic classifications; social classifications; and other classifications. The structure and purpose of each classification is outlined, with a description of the statistical units to which the classification is applied. Statistical units are the units of observation in a statistical series, that is, the basic entities about which data are recorded and classified, and then aggregated to provide the official statistics. Examples of statistical units include businesses, farms, motor vehicles, building sites, persons, households and families.

Apart from the major classifications described in the following pages, many other classifications are used by the ABS. Some have been developed jointly with other agencies and others have been developed by international organisations (e.g. the International Classification of Diseases produced by the World Health Organisation and the Standard International Trade Classification produced by the United Nations). A listing of some of these classifications is contained in a table at the end of the article.

AREA CLASSIFICATIONS

ASGC
Australian Standard Geographical Classification

The Australian Standard Geographic Classification is the principal Australia-wide geographical classification of the ABS. It is widely used in the collection, compilation and provision of statistics by area. The hierarchical main structure of the ASGC is comprised of, at the most detailed level, Collectors Districts, which are only used in a population census, Statistical Local Areas (SLAs) (commonly, one or two SLAs make up a local government area), Statistical Subdivisions and Statistical Divisions (SDs), which may be thought of as the regional components of the ASGC and finally, at the broadest level, the States and Territories. The numbering system of the ASCG is also hierarchical and indicates the level in the Main Structure (i.e. State, SD and so on). At the 1991 Population Census, the ASGC comprised 1354 SLAs, 197 SSDs, 65 SDs and 8 States/Territories.

Statistics collected from households in population censuses and surveys and from establishments (e.g. individual farms, mines, shops and factories) can be classified using the ASGC system and subsequently compiled and published for the appropriate geographical areas.

For further information: *Australian Standard Geographical Classification (ASGC)* (1216.0).

ASCCSS
Australian Standard Classification of Countries for Social Statistics

The Australian Standard Classification of Countries for Social Statistics (ASCCSS) is a classification of countries based on the concept of geographic proximity. It groups countries into progressively broader geographic areas on the basis of similarity in terms of their social, cultural, economic and political characteristics. The ABS uses ASCCSS in its own statistical work and urges its use by other government agencies and private organisations classifying demographic, labour and social statistics by country. For example, the classification should be used when collecting, aggregating and disseminating data relating to personal characteristics such as country of

birth, country of last residence, country of citizenship, etc. The classification is not intended for use in classifying economic statistics by country, nor is it intended for classifying related concepts such as the ethnicity of individuals or the language spoken by individuals.

The base units in the classification are 'country units'. The four types of 'country unit' identified in the classification are:

- independent countries (excluding their dependencies, external territories, etc.);
- overseas dependencies, external territories, bailiwicks, etc., of independent countries;
- units which are recognised geographic areas, the ownership or control of which is in dispute; and
- states and territories of Australia and component countries of the United Kingdom.

All independent countries are identified in the classification. Other 'country' units are identified if they are considered to be significant in terms of the major purposes for which the classification has been developed.

For further information: *Australian Standard Classification of Countries for Social Statistics (ASCCSS)* (1269.0).

ECONOMIC CLASSIFICATIONS

Industry Classifications

ANZSIC
Australian and New Zealand Standard Industrial Classification

The ANZSIC has been produced by the ABS and the New Zealand Department of Statistics for use in the collection and publication of statistics in the two countries. It replaces the Australian Standard Industrial Classification (ASIC) and the New Zealand Standard Industrial Classification (NZSIC).

The ANZSIC is the standard to be applied in both countries for the production and analysis of official industry statistics. Users in both countries have been widely consulted in the development of the ANZSIC to ensure that it adequately reflects the structure of Australian and New Zealand industry, and services user requirements for industry statistics. It was released in 1993 and will be implemented progressively in most relevant annual and sub-annual ABS collections in 1993-94.

The general notion of an industry is that of a group of businesses which do similar things. Industries represented in the ANZSIC are somewhat more qualified in order to address a range of statistical and cost considerations. The ANZSIC industry classes are designed to:

- represent recognisable segments of Australian and New Zealand industry;
- meet user requirements for statistics;
- be homogeneous in terms of industrial activities;
- be economically significant; and
- align as closely as practicable with the International Standard Industrial Classification of All Economic Activities (ISIC).

The ANZSIC employs a 4-level hierarchical structure consisting of divisions (at the broadest level), subdivisions, groups and classes (at the finest level). The following industry divisions are represented at the broadest level of the classification:

Agriculture, Forestry and Fishing
Mining
Manufacturing
Electricity, Gas and Water Supply
Construction
Wholesale Trade
Retail Trade
Accommodation, Cafes and Restaurants
Transport and Storage
Communication Services
Finance and Insurance
Property and Business Services
Government Administration and Defence
Education
Health and Community Services
Cultural and Recreational Services
Personal and Other Services

For further information: *Australian and New Zealand Standard Industrial Classification (ANZSIC)* (1292.0) and associated products currently under development, including an article to be published soon in *Australian Economic Indicators.*

Commodity Classifications

ASCC
Australian Standard Commodity Classification

The Australian Standard Commodity Classification is used to classify commodities (i.e. goods and services) produced by industries. The ASCC, as developed to date, covers only transportable goods produced by the agriculture, mining and manufacturing industries.

The ASCC is aimed at improving:

- comparability between production, import, and export statistics;
- links between commodities and industries; and
- comparability between Australian and international commodity classifications.

The ultimate purpose of the ASCC is to facilitate the use of commodity statistics by governments and private organisations in, for example, the analysis of market shares; the relationship between employment, industry structure and tariff provisions; studies of import competition and replacement; and the conduct of trade and tariff negotiations.

By formally presenting production commodity items in a complete classification, and by showing the links to the underlying international standard classifications and the Australian Standard Industrial Classification (ASIC), the 1989-90 ASCC provides users and suppliers of ABS commodity data with a reference to the definitional basis of the commodities concerned.

The next edition of the ASCC, due for release in 1994, will cover all goods and services and provide links to ANZSIC. Negotiations with the New Zealand Department of Statistics may result in the production of a classification of all goods and services for both countries.

For further information: *Australian Standard Commodity Classification (Revised) - Transportable Goods* (1254.0) 1989-90.

HS
Harmonised Commodity Description and Coding System

On 1 January 1988, Australia adopted a new international classification system, the Harmonised Commodity Description and Coding System (HCDCS) for describing goods involved in international trade. The HCDCS, or Harmonised System (HS) for short, forms the basis for administering Australia's imports and exports and for the collection and presentation of foreign trade statistics.

All import and export transactions are reported to the Australian Customs Service (ACS) according to the following two classifications, which are extensions of the HS:

- import statistics are collected according to the Combined Australian Customs Tariff and Statistical Nomenclature which replaced the old Customs Tariff and the Australian Import Commodity Classification (AICC); and

- export statistics are collected according to the Australian Harmonised Export Commodity Classification (AHECC), which replaced the Australian Export Commodity Classification (AECC).

The HS has been developed to:

- provide international uniformity in classifying and coding goods;

- update the previously used Customs Cooperation Council Nomenclature (CCCN) to reflect technological developments and changes in the pattern of internationally traded goods; and

- simplify the collection, analysis and comparison of foreign trade statistics.

As a signatory to the Harmonised System Convention, Australia is obliged to collect and publish trade statistics classified by the HS, with the exception of confidential data. There is provision to extend the HS to meet the specific needs of local data users where they require finer level data.

For further information: *Australian Harmonised Export Commodity Classification (AHECC)* (1233.0), and *Australian Harmonised Export Commodity Classification Microfiche* (1235.0).

SITC
Standard International Trade Classification

Related to the HS is the Standard International Trade Classification (SITC), which was developed by the United Nations Statistical Office, primarily for economic analysis purposes. As such, it groups commodities to provide aggregates for classes of goods such as foods, raw materials, chemicals, machinery, etc. The hierarchy of the HS, on the other hand, is oriented more towards the requirements of customs administration activity.

The third revision of the SITC, known as SITC (Rev 3), was developed to keep the SITC in step with the HS, and was introduced with the HS on 1 January 1988. SITC (Rev 3) is used by the ABS for the dissemination of broad level import and export statistics. Categories in the SITC (Rev 3) are composed of one or more whole HS items, thereby permitting the direct reclassification of data collected according to the HS.

The SITC is also used in structuring categories of domestically produced goods as detailed in the Australian Standard Commodity Classification (ASCC).

For further information: *Australian Harmonised Export Commodity Classification (AHECC)* (1233.0), and *Australian Harmonised Export Commodity Classification Microfiche* (1235.0).

ATFCC
Australian Transport Freight Commodity Classification

The Australian Transport Freight Commodity Classification (ATFCC) and the Australian Pack Classification (APC) (described below) are related classifications and are often used in conjunction with each other. Both classifications were jointly developed by the Department of Transport and the Australian Bureau of Statistics in consultation with other interested bodies.

The Australian Transport Freight Commodity Classification is a commodity classification which provides

a systematic arrangement of goods which are judged to be important in terms of their impact on Australia's transport network which includes transportation by sea, rail, road, air and pipeline. It has been devised to facilitate standardised classification of goods carried by these modes of transport to and from Australia and within Australia.

Because of the importance of the Standard International Trade Classification (SITC) in relation to the recording of the movement of goods via sea and air (both by overseas and coastal traffic), both the ASCC and the ATFCC are based fundamentally on that classification. Whereas the ASCC is structured broadly according to the 3-digit level of the SITC (Rev 3), the ATFCC is structured broadly according to the 2-digit level of the SITC. At this broad level of aggregation, it would be possible to compare commodities produced, imported and exported, with the movement of these commodities by various transport modes.

This classification may be used in conjunction with other classifications (such as origin, destination and routes of consignment, pack type of cargo defined for example by the Australian Pack Classification, freight handling methods, freight and wharfage charges) and has been designed with these uses in mind.

The classification is designed to facilitate the use of commodity data by organisations involved in transportation planning and in the design, control and monitoring of the operations of transport facilities.

APC
Australian Pack Classification

The Australian Pack Classification (APC) is used to classify units of freight transported by any transport mode, or moved through any port, depot or freight terminal.

The APC categorises freight in terms of its most immediately discernible units (e.g. freight in bulk, containers, etc), insofar as they have implications for handling, transportation, and administration. This classification is therefore aimed towards the operations side of the transport industry, where the provision of transport and handling equipment and the levying of freight charges is not related to individual commodities, but on a unit load basis.

For further information: *Australian Transport Freight Commodity Classification (ATFCC) and Australian Pack Classification* (APC) (1210.0). *Australian Transport Freight Commodity Classification* (ATFCC) on floppy disk (1256.0).

Institutional Classifications

SISCA
Standard Institutional Sector Classification of Australia

The Standard Institutional Sector Classification of Australia (SISCA) is used to classify institutional units, i.e. enterprises and households, by broad economic sector in national accounts and related statistics.

The main purpose of the classification in national accounts statistics is to classify transactors of the national income and outlay account and the national capital account into sectors according to differences in their financial role and behaviour. This is done to facilitate the provision and analysis of sectoral statistics on the sources and uses of disposable incomes and capital funds.

The classification is also used in other statistical series for such purposes as:

- classifying enterprises to the public and private sectors of the economy;
- determining the scope of Australian Government Finance Statistics (GFS);
- classifying public sector enterprises in Government Finance Statistics (GFS) to relevant sectors and subsectors;
- determining the sector boundaries of the capital expenditure collections; and
- classifying units by sector in the Australian financial accounts.

The classification is based primarily on the institutional sectors recommended by the UN in "A System of National Accounts".

The Sectors and Subsectors of the SISCA are:

Corporate Trading Enterprises
- Private Corporate Trading Enterprises
- Public Trading Enterprises
  - Commodity Marketing Authorities
  - Other Public Trading Enterprises

Financial Enterprises
- Private Financial Enterprises
- Public Financial Enterprises
  - Reserve Bank
  - Other Public Fin Enterprises

General Government Enterprises

Households and Other Private Enterprises
- Households
- Private Unincorp. Trading Enterprises
- Private Non-profit Inst. Serving H'holds

Non-Resident Enterprises in Australia

The SISCA is currently being reviewed in the light of changes made to the economic units model used by the ABS, changes to the SNA, and user requirements.

For further information: *Standard Institutional Sector Classification of Australia (SISCA)* (1218.0) (1987) ; and Classification Manual for Government Finance Statistics, Australia (1217.0).

Government Finance Classifications

CMGFS
Classifications Manual for Government Finance Statistics, Australia

The classifications contained in the Classifications Manual for Government Finance Statistics, Australia (CMGFS) are applied to enterprise units of the non-financial public sector and their transactions. The non-financial public sector consists of general government enterprises such as Commonwealth and State government departments as well as public trading enterprises such as TELECOM and electricity operations of State and local governments.

The statistical unit used in government finance statistics is the enterprise. Each government department, statutory authority and local government authority is generally treated as a separate enterprise. In some cases, however (notably local government authorities), these units have been 'split' to form more than one unit where the original unit engages in a mixture of trading and general government activities.

The CMGFS contains two types of classifications - 'transactor unit' or enterprise level classifications and 'transaction' level classifications.

The main classifications applied to enterprise units are:

- institutional sector (i.e. general government, public trading enterprise);
- level of government (i.e. Commonwealth, State, Local); and
- administrative sector (i.e. budget, non-budget).

The principal classifications applied to transactions data are the Economic Transactions Framework (ETF), the Taxes, Fees and Fines Classification (TFFC) and the Government Purpose Classification (GPC). This brief overview will only outline these three major classifications:

- The ETF is modelled along standards promulgated by the International Monetary Fund. It is designed to group transactions of the non-financial public sector in a manner which facilitates the study of the macro-economic impact of government transactions in the economy. It also provides the basic building blocks to derive the aggregates to be incorporated into the Australian National Accounts.
- The TFFC is used to classify, in detail, all transactions which have been classified by the ETF as either taxes, fees or fines received. It therefore provides a supplementary dissection of these transactions according to the type of tax, fee or fine collected by governments.
- The GPC, which closely follows the United Nations' 'Classification of the Functions of Government' (COFOG), classifies selected government transactions in terms of the purposes for which they are made. In conjunction with the ETF, the GPC provides information on the socio-economic effects of government transactions. It is especially useful in establishing the trends in government outlays on particular purposes over time. The main transactions which are classified by the GPC are current and capital outlays of both general government and public trading enterprises, including grants and advances received by them.

Further information: *Classification Manual for Government Finance Statistics, Australia* (1217.0) (1989).

SOCIAL CLASSIFICATIONS

Occupation Classifications

ASCO
Australian Standard Classification of Occupations

The Australian Standard Classification of Occupations (ASCO) is a skill based classification of occupations developed in Australia as a national standard for the production and analysis of labour force statistics, human resources management, education planning, the listing of job applicants and vacancies, the provision of occupational information and for vocational guidance.

The purpose of ASCO is:

- to identify a set of occupations covering all jobs in the Australian economy;
- to define those occupations in terms of a number of selected attributes; and
- to group those occupations, on the basis of their similarity, into successively broader categories for purposes of statistical description and analysis.

The individual unit of classification is typically a job, which is defined as the set of tasks performed by a given worker in a given establishment. An occupation is then defined as a set of jobs with identical sets of

tasks. In the real world, every job is a little different. In practice, an occupation is a collection of jobs sufficiently similar in their main tasks to be grouped together for classification purposes.

The structure of the ASCO is based on kind of work and defined in terms of two broad criteria - skill level and skill specialisation.

As a result of recent widespread change in the labour market such as multi-skilling and award restructuring, it has become necessary to revise the current structure of ASCO (First Edition). A joint project team comprising staff from the ABS and DEET, has been established to conduct a review of ASCO (First Edition) with the aim of providing a revised edition for use over the ten year period from 1996 to 2005.

For further information: A detailed explanation of all ASCO products is provided in the information paper *ASCO - Australian Standard Classification of Occupations* (1221.0).

Education Classifications

ABSCQ

Australian Bureau of Statistics Classification of Qualifications

The Australian Bureau of Statistics Classification of Qualifications (ABSCQ) was designed for use in the collection and presentation of data on qualifications held by the population. For the purposes of the ABSCQ, an 'educational qualification' is considered to be an award for attainment as a result of formal learning, from an accredited post-school institution.

Qualifications can be classified according to the following elements:

- level of attainment; and
- field of study.

Level of attainment is a function of the quality and quantity of learning necessary to obtain that qualification. Field of study refers to the subject matter taught in the course of study leading to the award of a particular qualification.

The ABSCQ was first used in the 1991 Census of Population and Housing, and is now being progressively introduced into other ABS collections.

For further information: Details about the ABSCQ, including related publications, can be found in *Information Paper: Australian Bureau of Statistics Classification of Qualifications - ABSCQ* (1263.0).

Health Classifications

ICD
International Classification of Diseases

The World Health Organization's International Classification of Diseases (ICD) is used by the ABS for the collection, compilation and publication of disease and injury statistics. The ICD is revised approximately every ten years. The ninth revision is currently in use, and was adopted from 1979. The tenth revision is expected to be available by 1 January 1995.

The ICD enables classification of diseases and injury at fine levels of detail. The ICD is used by the ABS principally in classifying causes of death. It is also applied to occupational health and safety data for occupational diseases and occupational injuries. Other ABS uses have included disease/injury coding for hospital morbidity collections and health surveys.

For mortality coding, the concept of the underlying cause of death is used, which the World Health Organization (WHO) has defined as the disease or injury which initiated the train of events leading directly to death. Accidental and violent deaths are classified according to the external cause, that is, to the circumstances of the accident or violence which produced the fatal injury rather than to the nature of the injury.

For further information: *International Classification of Diseases 1975 Revision Volume 1*, World Health Organization; *International Classification of Diseases 1975 Revision Volume 2 Alphabetical Index*, World Health Organization

These classifications can be obtained from the Australian Government Publishing Service.

Crime Classifications

ANCO
Australian National Classification of Offences

The Australian National Classification of Offences (ANCO) has been developed by the ABS for use in the preparation of statistics by crime and justice agencies in all Australian States and Territories.

The purpose of the ANCO is to provide a framework for classifying offences for statistical purposes, which is able to be applied at various levels of detail by police, courts, legal aid, correction and other agencies involved in crime and justice.

Offences are defined in legislation and in documents of the relevant agency and therefore no attempt is made in the classification to define the elements or circumstance which constitute an offence. In all cases the offence as described in source documents is the offence to be classified.

The main factors taken into consideration in developing the classification were:

- the need to provide a classification usable in different areas of crime and justice;
- differing legislation in individual States and Territories and Federal legislation;
- the homogeneity of groupings in terms of the nature of constituent offences;
- the need to identify separately offences of particular interest; and
- the incidence of particular offences.

For further information: *Australian National Classification of Offences (ANCO)* (1234.0).

Core Social and Labour Variables

A number of standard classifications for core variables in social and labour statistics are currently being developed and will be presented in the following publications:

- *Standards for Statistics on Age and Sex* (1285.0);
- *Standards for Statistics on Family Variables* (1286);
- *Standards for Statistics on Income* (1287.0);
- *Standards for Statistics on Core Labour Force Variables* (1288.0).

OTHER CLASSIFICATIONS

Research Classifications

ASRC
Australian Standard Research Classification

The ASRC is the collective name given to a set of three related classifications developed for use in the measurement and analysis of research and experimental development (R&D) undertaken in Australia, both in the public and private sectors. It aims to facilitate the comparison of R&D data between sectors of the Australian economy (e.g. general government, private non-profit organisations, business enterprises and educational institutions). The three classifications are:

- Type of Activity Classification (TOA), which allows R&D activity to be classified according to the type of research effort (pure basic research, strategic basic research, applied research or experimental development).
- Field of Research Classification (FOR), which allows R&D activity to be classified according to the field of research undertaken. The classification is based primarily on recognised academic disciplines and evolving areas of study.
- Socio-Economic Objective Classification (SEO), which allows R&D activity to be classified according to the purpose of the R&D as perceived by the data provider (researcher). It consists of discrete economic, social, technological or scientific domains for identifying the principal purpose of the R&D. The attributes applied to the design of the SEO classification consists of a combination of processes, products, health, education and other social and environmental aspects of particular interest.

To support international comparisons, the definition, scope and classification of R&D activities have been largely devised in accordance with the Organisation for Economic Co-operation and Development (OECD) Proposed Standard Practice for Surveys of Research and Experimental Development, "Frascati Manual", fifth revision, 1992.

For further Information: *Australian Standard Research Classification (ASRC)* (1297.0).

Other Principal Classifications

An article of this nature cannot cover the full range of classifications used by the ABS. As mentioned in the introduction, only major ABS classifications have been described. Some other principal classifications which may be of interest to users of ABS statistics are presented in the table below.

OTHER PRINCIPAL CLASSIFICATIONS USED BY THE ABS

Classification of Institutional Units
Type of Legal Organisation (TOLO)
Level of Government
Administrative Sector
Source Destination Classification

Classification of Commodities
Classification of Commodities by Broad Economic Categories (BEC)
Input-Output Commodity Classification (IOCC)
Materials Used Classification
Retail Trade Commodity Classification
Agricultural Commodity Classification
Household Expenditure Survey Commodity Code List (HESCCL)

Classification of Buildings
New Functional Classification of Buildings
Dwelling Structure Type

Classification of Financial Assets and Liabilities
Type of Assets and Liabilities
Type of Deposits and Advances

Classification of Travel
Type of Visitor
Type of Consumer
Purpose of Visit

Classification of Road Traffic Accidents
Nature of Accidents
Type of Road
User Involved

Labour Force Classifications
Labour Force Status
Status in Employment
Hours Worked Per Week
Method of Travel to Work
Labour Costs
Full-time/Part-time Status
Duration of Unemployment

Classification of Industrial Accidents
Type of Accident
Nature of Injury
Bodily Location
Agency of Accident

Classification of Industrial Disputes
Cause of Dispute
Duration of Dispute
Method of Settlement

Education Classifications
Type of Student
Type of Institution

Welfare Classifications
Australian Standard Welfare Activities Classification (ASWAC)

Classification of Families, Households and other Social Groups
Household Type
Family Type
Relationship in Household
Marital Status

Income Classifications
Income
Source of Income

The Timeliness of Quarterly Income and Expenditure Accounts: An International Comparison

Philip Smith, Statistics Canada

The timely and accurate production of a complex and interrelated set of accounts such as the quarterly Australian National Accounts inevitably involves compromises and trade-offs. A typical trade-off is the use of preliminary, rather than final, data from a particular collection in order to bring out the accounts in a timely manner. This, however, leaves the accounts subject to revision when the final data become available. New information, such as new or infrequent data collections, becoming available and the introduction of improved compilation methodology may also result in the need for revisions. Each country using the United Nations' A System of National Accounts *as its framework adopts its own practices to deal with these revisions. Details of Australia's practice are included in* Australian National Accounts: Concepts, Sources and Methods *(ABS Catalogue No.5216.0).*

The following article compares the revision practices of several national statistical agencies, including the ABS. It has been prepared by Philip Smith, the Director of the National Accounts and Environment Division of Statistics Canada. It is published here with the kind permission of Philip Smith and Statistics Canada.

This paper reports the results of an international survey of national income and expenditure accounts release date practices in national statistical bureaux. The survey was conducted by the author in January-March 1993 by means of a questionnaire mailed to statisticians of several countries.

Respondents to the survey were asked on what date their preliminary income and expenditure accounts estimates for each of the four quarters of calendar year 1991 were officially released. They were also asked to indicate the dates on which each of the subsequent four revised sets of estimates were released. To avoid the possibility of unwarranted generalizations from a single year's experience, respondents were asked whether the year 1991 was a typical one from this perspective, or there were special circumstances which affected the release dates in this particular period. Finally, general information was sought on each country's official revision policy.

Release lags

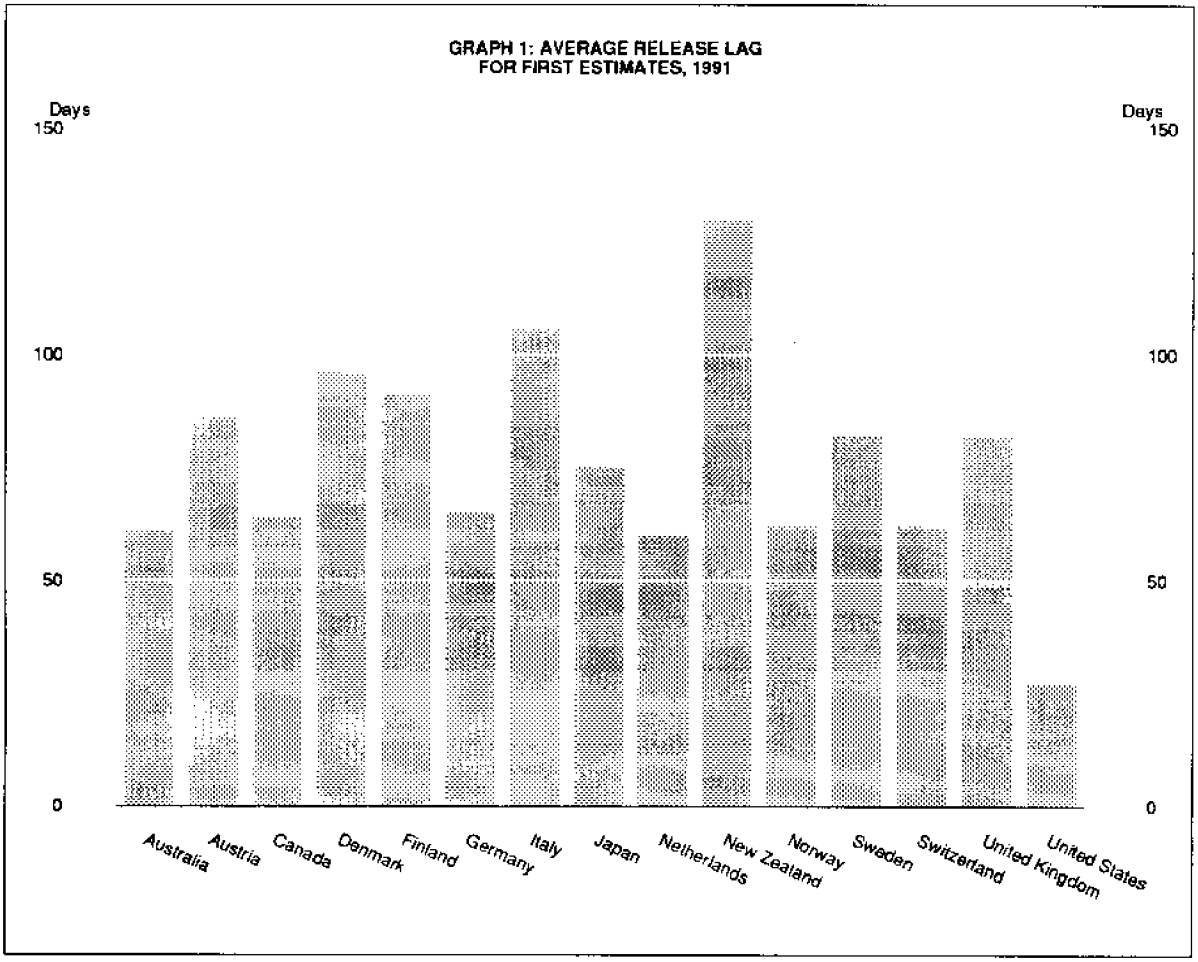
Fifteen countries provided the information which was sought, pertaining to release dates in 1991.[1] Table 1 displays the average lag for each country calculated as the simple arithmetic mean of the release lags for the four quarters of the year.[2] The basic data are reported in Table 2. A slightly different perspective is shown in Table 3, which presents the computed release lags in days.[3] It is common for the release lag to vary over the four quarters of the year.

The release lags for the first estimates are of special interest since they show how long the public must wait before getting a first picture of the country's economic performance during the quarter. Statistical bureaux face a trade off here between timeliness and reliability, so it is interesting to observe the various choices they make in this regard. The average release lags for the preliminary estimates are highlighted in Graph 1. Countries fall into five groups:

- One country, the *United States*, released its initial estimates within one month of the reference quarter. These estimates were incomplete in that they covered expenditure-based gross domestic product only; initial estimates of corporate profits, net interest, national income and gross national product lagged by an additional month.
- Six countries, *Australia*, *Canada*, *Germany*, the *Netherlands*, *Norway* and *Switzerland*, released their first estimates two months after the reference quarter.
- Three countries, *Japan*, *Sweden* and the *United Kingdom* released their preliminary estimates around the middle of the third month after the reference quarter.[4]
- Four countries, *Austria*, *Denmark*, *Finland* and *Italy*, released their initial estimates approximately three months after the reference quarter.
- Finally, one country, *New Zealand*, released its preliminary estimates about four and a half months after the reference quarter.

The conclusions here, and in the rest of the paper, pertain to income and expenditure based estimates of GDP only. Other components of the System of National Accounts such as the financial flows are ignored. Some countries have more timely estimates of GDP which are based on the measurement of output by industry. These latter measures are not considered in this paper.

The release lags associated with the subsequent revised estimates also vary considerably by country. Once again, the *United States* stands out as a unique case, having released its second estimates about two months after the reference quarter and its third set of estimates one month after that. The *United States* is the only country with twelve, rather than four releases of its quarterly national accounts each year. The



Netherlands also stands apart from other countries, with eight quarterly releases annually, its second estimates coming out 119 days after the reference quarter. Most countries released their second set of estimates, on average, between 145 and 190 days after the reference quarter. *Germany*, *New Zealand* and *Sweden* differ somewhat, with average release lags of 204, 216 and 210 days respectively for their second estimates, and *Austria* and *Switzerland* had the longest such lags at 248 and 289 days. .

The lags applying to the third, fourth and fifth estimates, which are also shown in Table 3, differ even more widely and are best considered within the context of general revision policies, in the next section.

Revision Policies

There are many commonalities to the revision policies of the fifteen countries included in the survey. Most impose fairly strict limitations on when and how frequently revisions are permitted, although two, *Australia* and *New Zealand*, have almost no restrictions. Most close their accounts after three or four years, allowing no further revisions thereafter except on special, infrequent occasions when historical revisions are carried out. The general pattern in the majority of countries is that the estimates for a particular quarter are open for revision when those for each of the other quarters in that same reference year are first released, and then annually thereafter for a period varying from two to four years.

Countries following this general pattern most closely include *Canada*, *Denmark*, *Finland*, *Japan*, *Norway* and *Sweden*.[5] The following paragraphs describe the specific policies of each country, which the reader can also see illustrated for the year 1991 in Table 2.

Canada's revision policy is quite strict. Revisions are permitted for all quarters during the same calendar year. Thereafter, the accounts are open for revision only once per year, at the time of the release of the first quarter estimates in mid-June. They are open for four such annual revisions, after which time they are considered final and are not normally reopened except for historical revisions which typically occur about once per decade. The estimates at constant prices are converted to a new base period at intervals of roughly five years and this transformation is normally accomplished by chain linking, within the usual revision schedule.

In *Australia* there are few limitations on revisions. The annual revisions are generally most significant at the time of the release of the fourth quarter accounts in March and currently can go back as far as financial year 1985-86. At the time the second quarter estimates are released, annual revisions are normally, although not exclusively, limited to the previous four

financial years. The annual revisions at the time when the first and third quarter estimates are released are normally limited to the latest complete financial year. The quarterly estimates are revised in tandem with the annual estimates and, in addition, are open to other revisions each quarter for up to three years.

In *New Zealand* there are no limitations on revisions, in part because the Department of Statistics has been releasing quarterly national accounts estimates for just a few years.

The *United Kingdom* revision policy is unique in that it always permits revisions to the quarters of the previous year as well as those of the current year. Annual revisions normally occur in September, when the second quarter estimates and the annual national accounts "Blue Book" are released, and cover the previous four years. At the time of the other three quarterly releases, normally in June, December and March, revisions are allowed in all quarters within the current and previous years, the "current" year being defined as the one in which the most recent Blue Book was published.

In the *United States* the first estimates, qualified as "advance", are released near the end of the first month after the end of the quarter. The second and third estimates, qualified as "preliminary" and "final", are released near the end of the second and third months respectively. Ordinarily, annual revisions are carried out each July and cover the preceding three years. Comprehensive historical revisions are carried out at about five-year intervals. The revision dates reported by the United States for the 1991 estimates were not fully typical, for two reasons: (1) the fourth estimates for the first and second quarters of 1991 and the second estimate for the third quarter were delayed by 8 days due to the release of a comprehensive revision and (2) the fifth estimates for the third and fourth quarters were delayed by approximately 30 days due to a relocation of the bureau.

In *Germany* the quarterly estimates are open for revision in March, when the fourth quarter estimates are released, and annually thereafter in August or September, at the time of release of the second quarter estimates. They are open for three such annual revisions, after which time they are considered final and are not normally reopened except for historical revisions, which typically occur every 5 to 10 years.

In *Japan* the estimates for each quarter are open for revision when those for the subsequent quarter are released. Thereafter, the quarterly estimates are open for revision annually at the time of release of the third quarter estimates. They are open for two such annual revisions, after which time they are considered final and are not normally reopened except for historical revisions, which typically occur every 5 to 10 years.

In *Denmark* the accounts are normally open for revision in the following two quarters. Thereafter, they are normally open for revision only once a year, in January, following the compilation of the annual accounts in October. The estimates are open for three such annual revisions, after which time they are considered final.

In *Finland* the accounts are open for revision for all quarters during the same calendar year. Thereafter, they are open for revision twice per year, at the time of the release of the first and third quarter estimates. They are open for two years of such revisions, after which time they are considered final and are not normally reopened except in connection with changes in the base year which occur about once every five years.

In *Norway* the accounts are open for revision for all quarters during the same calendar year. Thereafter, they are open for revision only once during the year, in May, following the release of revised annual estimates. They are open for three such annual revisions, plus two more annual revisions after that which are attributable to the method used for adjusting the quarterly estimates to annual bench-mark totals.

In *Sweden* the accounts are open for revision for all quarters during the same calendar year. Thereafter, they are open for revision only once during the year, at the time of the release of the annual national accounts in October or November. They are open for two such annual revisions, after which time they are considered final and are not normally reopened except for historical revisions, which typically occur every 5 to 10 years.

In *Italy*, the revision policy is somewhat analogous to that of the *United Kingdom* in that, for the first three quarters, it allows revisions to the current year as well as the two previous years, provided the annual totals for those two years remain unchanged. At the time of the first quarter in April, just after the release of the annual revisions normally covering the past three years at the end of March, the quarterly estimates are open for revision for a period equal to n + 2 where n is the number of years for which the annual revisions were just carried. In 1991, the adoption of a new base year for the constant price estimates starting in 1970 has caused some delay in the release of the quarterly estimates which normally occurs three months after the end of the reference period.

The *Swiss* approach to revisions is unusual in that it draws a distinction between the original, unadjusted estimates and the seasonally adjusted estimates. Annual revisions to the quarterly GDP estimates normally occur in late November or early December, when the third quarter estimates are released, and cover the previous two years. At the time of the other three quarterly releases the original estimates, without seasonal adjustment, are not open for revision. The seasonally adjusted quarterly estimates are fully open for revision in all quarterly releases.

In *Austria*, the estimates for the first three quarters are first revised with the release of the fourth quarter. All quarters are open for revision annually thereafter in June or July for three years. Comprehensive historical revisions are carried out at about ten year intervals.

In the *Netherlands*, a preliminary estimate of GDP growth is released about two months after the reference quarter. Revised, fully-based results (expenditure, production and income) come out about two months after that. When the fully-based results for the fourth quarter come out around the end of April the other quarters of the same year are also open for revision. The annual accounts are revised in August each year, for the previous three years, and the quarterly estimates are adjusted to the new annual levels with the release of the fully-based second quarter estimates.

Conclusion

Countries have different approaches with respect to timeliness and revision of the national income and expenditure accounts. In part, this is due to varying attitudes about the trade-off between timeliness and reliability, with some countries, such as the *United States*, putting a high premium on timeliness of the initial estimates and others, such as *New Zealand*, putting greater emphasis on their precision. The degree of experience with quarterly national accounting may be another factor accounting for the variance in release timing and revision policies.

The most common pattern is for countries to release their preliminary income and expenditure accounts estimates a little more than two months after the reference quarter, to revise these as the estimates for subsequent quarters of that calendar year are released, and to continue revising them on an annual basis for two to four years thereafter.

Endnotes

1. One other country, Spain, also responded to the survey but since it only started publishing quarterly national accounts estimates in 1992 it was unable to supply the requested information for 1991.

2. The average lags reported in Table 1 are most interesting for the first and second estimates. Those for the subsequent estimates say more about how often the estimates are revised than they do about release lags.

3. The release lag for a particular quarter is defined as the number of calender days elapsed between the first day after the quarter and the release day. Thus, if the first quarter estimates were released on April 30, the release lag would be 29 days.

4. Beginning in 1993, the Central Statistical Office of the United Kingdom has increased the timeliness of its national accounts. A preliminary estimate of GDP, derived from output data, is released three to four weeks after the reference quarter. A second provisional estimate of GDP is released four weeks later, with the main income and expenditure components. A full set of national accounts becomes available twelve weeks after the reference quarter.

5. Information provided by Spain, relating to calendar year 1992, indicates that it too follows the general pattern just described. Spain allows revisions for all quarters in the same calendar year. Thereafter, revisions are permitted once a year at the end of June, with the release of the first quarter estimates. The accounts are closed after three annual revisions.

Table 1: National Income and Expenditure Accounts Average Release Lags for 1991 by Country

	Estimate				
	1st	2nd	3rd	4th	5th
Country			Days		
Australia	61	154	245	335	427
Austria	86	248	407	772	1,092
Canada	64	156	322	555	857
Denmark	96	187	307	614	974
Finland	91	184	298	439	599
Germany	65	204	387	570	799
Italy	106	194	286	376	465
Japan	75	166	384	749	977
Netherlands	60	119	256	483	802
New Zealand	130	216	315	406	497
Norway	62	146	299	519	816
Sweden	82	210	406	546	733
Switzerland	62	289	658	936	..
United Kingdom	82	173	265	356	446
United States	27	60	85	229	548

Table 2: National Income and Expenditure Accounts Release Dates for 1991 by Country

Country	Quarter	Estimate 1st	2nd	3rd	4th	5th
		Date				
Australia	1st	30–05–91	15–08–91	05–12–91	17–03–92	02–06–92
	2nd	15–08–91	05–12–91	17–03–92	02–06–93	13–08–92
	3rd	05–12–91	17–03–92	02–06–92	13–08–92	01–12–92
	4th	17–03–92	02–06–92	13–08–92	01–12–92	18–03–93
Austria	1st	29–06–91	28–03–92	27–06–92	28–06–93	28–06–94
	2nd	28–09–91	28–03–92	27–06–92	28–06–93	28–06–94
	3rd	20–12–92	28–03–92	27–06–92	28–06–93	28–06–94
	4th	28–03–92	27–06–92	28–06–93	28–06–94	..
Canada	1st	20–06–91	30–08–91	29–11–91	28–02–92	22–06–92
	2nd	30–08–91	29–11–91	28–02–92	22–06–92	21–06–93
	3rd	29–11–91	28–02–92	22–06–92	21–06–93	20–06–94
	4th	28–02–92	22–06–92	21–06–93	20–06–94	19–06–95
Denmark	1st	02–07–91	30–09–91	21–01–92	22–01–93	15–01–94
	2nd	30–09–91	21–01–92	30–03–92	22–01–93	15–01–94
	3rd	21–01–92	30–03–92	30–06–92	22–01–93	15–01–94
	4th	30–03–92	30–06–92	22–01–93	15–01–94	15–01–94
Finland	1st	03–07–91	30–09–91	31–12–91	30–03–92	10–07–92
	2nd	30–09–91	31–12–91	30–03–92	10–07–92	29–12–92
	3rd	31–12–91	30–03–92	10–07–92	29–12–92	15–07–93
	4th	30–03–92	10–07–92	29–12–92	15–07–93	29–12–93
Germany	1st	04–06–91	30–08–91	13–03–92	03–09–92	09–03–93
	2nd	30–08–91	13–03–92	03–09–92	09–03–93	07–09–93
	3rd	05–12–91	13–03–92	03–09–92	09–03–93	07–09–93
	4th	13–03–92	03–09–92	09–03–93	07–09–93	07–09–94
Italy	1st	20–07–91	09–10–91	15–01–92	17–04–92	08–07–92
	2nd	09–10–91	15–01–92	17–04–92	08–07–92	08–10–92
	3rd	15–01–92	17–04–92	08–07–92	08–10–92	12–01–83
	4th	17–04–92	08–07–92	08–10–92	12–01–93	08–04–93
Japan	1st	18–06–91	19–09–91	04–12–91	03–12–92	03–12–93
	2nd	19–09–91	04–12–91	03–12–92	03–12–93	..
	3rd	04–12–91	19–03–92	03–12–92	03–12–93	..
	4th	19–03–92	16–06–92	03–12–92	03–12–93	..
Netherlands	1st	30–05–91	25–07–91	30–10–91	27–04–92	27–10–92
	2nd	09–09–91	30–10–91	27–04–92	27–10–92	26–10–93
	3rd	25–11–91	30–01–92	27–04–92	27–10–92	26–10–93
	4th	27–02–92	27–04–92	27–10–92	26–10–93	25–10–94
New Zealand	1st	20–08–91	30–10–91	19–02–92	28–04–92	28–07–92
	2nd	30–10–91	19–02–92	28–04–92	28–07–92	30–11–92
	3rd	19–02–92	28–04–92	28–07–92	30–11–92	16–02–93
	4th	28–04–92	28–07–92	30–11–92	16–02–93	28–04–93
Norway	1st	10–06–91	09–09–91	09–12–91	10–02–92	11–05–92
	2nd	09–09–91	09–12–91	10–02–92	11–05–92	10–05–93
	3rd	09–12–91	10–02–92	11–05–92	10–05–93	10–05–94
	4th	10–02–92	11–05–92	10–05–93	10–05–94	10–05–95
Sweden	1st	25–06–91	24–09–91	16–12–91	23–03–91	18–11–92
	2nd	24–09–91	16–12–91	23–03–92	18–11–92	15–11–93
	3rd	18–12–91	23–03–92	18–11–92	15–11–93	..
	4th	23–03–92	18–11–92	15–11–93	..	..
Switzerland	1st	04–06–91	29–11–91	01–12–92	07–12–93	..
	2nd	30–08–91	29–11–91	01–12–92	07–12–93	..
	3rd	29–11–91	01–12–92	07–12–93	..	..
	4th	06–03–92	01–12–92	07–12–93	..	..
United Kingdom	1st	24–06–91	23–09–91	20–12–91	19–03–92	24–06–92
	2nd	23–09–91	20–12–91	19–03–92	24–06–92	23–09–92
	3rd	20–12–91	19–03–92	24–06–92	23–09–92	21–12–92
	4th	19–03–92	24–06–92	23–09–92	21–12–92	12–03–93
United States	1st	26–04–91	29–05–91	26–06–91	04–12–91	30–07–92
	2nd	28–07–91	28–08–91	26–09–91	04–12–91	30–07–92
	3rd	29–10–91	04–12–91	20–12–91	30–07–92	01–09–93
	4th	29–01–92	28–02–92	26–03–92	30–07–92	01–09–93

Table 3: National Income and Expenditure Accounts Release Lags for 1991 by Country

		Estimate				
		1st	2nd	3rd	4th	5th
Country	Quarter	Days				
Australia	1st	59	136	248	351	428
	2nd	45	157	260	337	409
	3rd	65	168	245	317	427
	4th	76	153	225	335	442
Austria	1st	89	362	453	818	1,183
	2nd	89	271	362	727	1,092
	3rd	80	179	270	635	1,000
	4th	87	178	544	909	..
Canada	1st	80	151	242	333	448
	2nd	60	151	242	357	721
	3rd	59	150	265	629	993
	4th	58	173	537	901	1,265
Denmark	1st	92	182	295	662	1,020
	2nd	91	204	273	571	929
	3rd	112	181	273	479	837
	4th	89	181	387	745	1,110
Finland	1st	93	182	274	364	466
	2nd	91	183	273	375	547
	3rd	91	181	283	455	653
	4th	89	191	363	561	728
Germany	1st	64	151	347	521	708
	2nd	60	256	430	617	799
	3rd	65	164	338	525	707
	4th	72	246	433	615	980
Italy	1st	110	191	289	382	464
	2nd	100	198	291	373	465
	3rd	106	199	281	373	469
	4th	107	189	281	377	463
Japan	1st	78	171	247	612	977
	2nd	80	156	521	886	..
	3rd	64	170	429	794	..
	4th	78	167	337	702	..
Netherlands	1st	59	115	212	392	575
	2nd	70	121	301	484	848
	3rd	55	121	209	392	758
	4th	57	117	300	664	1,029
New Zealand	1st	141	212	324	393	484
	2nd	121	233	302	393	518
	3rd	141	210	301	426	504
	4th	118	209	334	412	483
Norway	1st	70	161	252	315	406
	2nd	70	161	224	315	679
	3rd	69	132	223	587	952
	4th	40	131	495	860	1,225
Sweden	1st	85	176	259	357	597
	2nd	85	168	266	506	868
	3rd	76	174	414	776	..
	4th	82	322	684	..	..
Switzerland	1st	64	242	610	981	..
	2nd	60	151	519	890	..
	3rd	59	427	798	..	..
	4th	65	335	706	..	..
United Kingdom	1st	84	175	263	353	450
	2nd	84	172	262	359	450
	3rd	80	170	267	358	447
	4th	78	175	266	355	436
United States	1st	25	58	86	247	486
	2nd	25	58	87	156	395
	3rd	28	64	80	303	701
	4th	28	58	85	211	609

The Australian and New Zealand Standard Industrial Classification

Closer Statistical Relations

Introduction

The Australian Bureau of Statistics (ABS) and the New Zealand Department of Statistics (NZDOS) have released jointly the first edition of the Australian and New Zealand Standard Industrial Classification (ANZSIC) - ABS Catalogue Number 1292.0.

The ANZSIC has been developed as the standard industrial classification for use in the production and analysis of industry statistics in both countries. It replaces the Australian Standard Industrial Classification (ASIC) and the New Zealand Standard Industrial Classification (NZSIC) which have been used in their respective countries as the standard classifications for many years.

The new ANZSIC classification represents a significant undertaking and it is anticipated that its implementation will be equally significant.

The purpose of this article is to describe:

- the background to the development of the ANZSIC classification;
- the process of development;
- the major differences between the old ASIC and the new ANZSIC;
- how and when the ANZSIC will be implemented in ABS statistical series;
- the kinds of products and services that will follow the implementation of the ANZSIC;
- how the ANZSIC will be maintained;
- how and when it might be reviewed in the future.

The ABS has published an information paper *Introducing the Australian and New Zealand Standard Industrial Classification (ANZSIC)* ABS Catalogue No.1298.0. It provides further detail on the differences between the ASIC and the ANZSIC.

An information paper on the ANZSIC has also been produced by the NZDOS. This paper includes information on the implementation of the ANZSIC in New Zealand statistical series.

Background

The objective in developing any national industrial classification is to identify groupings of businesses which carry out similar economic activities and which satisfy conditions such as economic significance. These groupings can be used to define an industry. An individual business can then be assigned to an industry on the basis of its predominant activities.

The term 'business' is used in its widest sense to include any organisation which provides goods or services and includes companies, non-profit organisations, government departments and enterprises.

The ABS has used industrial classifications for over thirty years. In the late 1960s, when it was known as the Commonwealth Bureau of Census and Statistics, it used several distinct industrial classifications across its many collections. The ABS developed the original 1969 edition of the ASIC and it became the first standard industrial classification to be used throughout the ABS.

Although essentially based on the International Standard Industrial Classification (ISIC), the other classifications in use were drawn upon to produce the first ASIC. This allowed for some element of comparability with those previously used classifications. Extensive investigations were undertaken into activity mixes that were typical of Australian business at the time. The information gathered contributed to the inclusion of an Australian dimension in the determination of the finer level composition underlying the broad international (ISIC) structure.

Revised editions of the ASIC were released in 1978 and 1983. The first revision took about three years to complete and resulted in numerous changes, mostly at the lowest (Class) level. This meant that the integrity of the classification at the three higher levels, (Division, Subdivision and Group) remained virtually intact. The second revision was focused entirely on the Transport and Storage Division of the classification and, apart from this area, the classification remained unchanged.

In 1985, a comprehensive review of all aspects of the ASIC began. This coincided with the review of the ISIC being undertaken by the UN Statistical Commission. Drafts of this third revision of the ISIC indicated

that it would be more in tune with the Australian industrial situation than previous versions.

While the ASIC had been revised as described above, the basic structure and content of the classification had not been fundamentally reviewed since its inception in 1969. Consequently, the principal objectives of the review were to align the revised ASIC with ISIC Revision 3 and to reflect the changed characteristics of Australian business. The revision concentrated on enhancing the statistical treatment of the services sector. It included the effects of technological progress and reflected the changing structure of Australian industry.

The review of the ASIC began with the collection of information, together with the issue of an invitation for submissions from the statistical user community. The ASIC was then divided into a number of segments and at least two reports were compiled on each segment. These analysed the existing classification and proposals submitted for changes in the light of the principles established for the review (see below). Recommendations were made and the reports circulated for comment as widely as possible, both inside and outside the ABS.

In New Zealand, the first New Zealand Standard Industrial Classification (NZSIC) had been based on the 1948 version of ISIC. Three revisions of the NZSIC were produced. The first was in 1970, the second was in 1975 and contained a more detailed classification in some areas. The third edition was produced in 1987.

The Australia New Zealand Closer Economic Relations Trade Agreement (ANZCERTA) came into effect on 1 January 1983. It is the most recent of the economic agreements that have operated between the two countries since 1922.

The statistical agencies of both countries have, for a number of years, monitored the progress of economic relationships. They have shared experiences and explored common interests. Joint working relationships have been arranged to harmonise statistics wherever possible.

In May 1990, the NZDOS and the ABS considered the possibility of developing a common industrial classification for use by both countries. New Zealand endorsed the principles being followed in the ASIC Review, with the proviso that a Class would be established in the classification if it was economically significant in either country and satisfied the other criteria listed below. An agreement on a strategy for developing a new, single classification was formulated and work began in 1991.

Principles employed in the review

The principles applied in the review which resulted in the production of the ANZSIC included the requirement that the Classes in the ANZSIC (the finest level of the hierarchy) should:

- represent recognisable segments of Australian and/or New Zealand industry;
- meet user requirements for statistics;
- be relatively homogeneous in terms of industrial activity (defined by specialisation and coverage ratios described later);
- be economically significant;
- align as closely as practicable with the International Standard Industrial Classification of all Economic Activities (ISIC Rev.3).

The first principle relates to the need to represent realistically the way activities are actually organised within establishments, which are the statistical units upon which the ANZSIC classification is based. In the Australian statistical system, businesses are represented by a hierarchy of units reflecting differing complexity in the operating structures. The lowest level unit in this hierarchy for which business accounts are kept is referred to as the establishment. The establishment is made up of one or more locations from which the business operates.

The homogeneity requirement reflects the need to form Classes which are made up of units that undertake similar economic activities. Homogeneity of Classes is measured by specialisation and coverage ratios.

The specialisation ratio measures the extent to which units belonging to a particular Class engage in the activities designated as primary to that Class. The coverage ratio measures the extent to which the activities designated as primary to a particular Class are undertaken by units belonging to that Class. For individual Classes to be recognised in the ANZSIC, it was generally required that specialisation and coverage ratios exceed 70 per cent.

The economic significance threshold was set at a minimum of $200 million turnover for Australia or $40 million for New Zealand, or employment of 3,500 for Australia or 700 for New Zealand. 1989-90 was used as the reference period for assessing significance, with no maximum conditions applying.

Alignment with the ISIC was considered to be highly desirable, but this was not followed strictly where it was considered to be inappropriate for local conditions and requirements.

ANZSIC structure and numbering

The ANZSIC, like the ASIC, has a four level hierarchical structure, made up of Divisions (the broadest level), Subdivisions, Groups and Classes (the finest level).

The Division provides a broad overall picture of the economy and is suitable for the classification of data published in summary tables in official statistics.

There are 17 Divisions in the ANZSIC, each identified by an alphabetical character as shown in **Table 1**. This compares with 13 Divisions in the current ASIC. The Subdivision, Group and Class provide increasingly detailed dissections of the broader categories. Each Subdivision is represented by a two digit code, each Group by a three digit code and each Class by a four digit code.

Table 1: The ANZSIC Divisions

Division	*Division Title*
A	Agriculture, Forestry and Fishing
B	Mining
C	Manufacturing
D	Electricity, Gas and Water Supply
E	Construction
F	Wholesale Trade
G	Retail Trade
H	Accommodation, Cafes and Restaurants
I	Transport and Storage
J	Communication Services
K	Finance and Insurance
L	Property and Business Services
M	Government Administration and Defence
N	Education
O	Health and Community Services
P	Cultural and Recreation Services
Q	Personal and Other Services

A completely new numbering system has been employed in the ANZSIC. Any matches with ASIC codes are coincidental.

Changes from ASIC to ANZSIC

There have been significant changes in the world economy during the last twenty years. The development of ANZSIC reflects this situation in general, but it also acknowledges particular circumstances in Australia and New Zealand. Specifically, the ANZSIC is based on recognition of:

- a shift away from goods producing industries to service industries;
- the desire for closer alignment of the ANZSIC to the ISIC;
- rapid technological development;
- user requirements for provision of separate industry categories.

Shift in emphasis from goods producing to service industries

There has been a significant shift from goods producing industries to service industries in terms of Class movements. The goods producing industries include most of the Classes in Divisions A to E inclusive (Agriculture, Forestry and Fishing; Mining; Manufacturing; Electricity, Gas and Water Supply; and Construction). The service industries include most Classes in the remaining Divisions.

The number of Divisions in the service industries has increased from 8 in the ASIC to 12 in the ANZSIC. This increase is reflected in the more detailed levels of the classification, with the number of Classes in the service industries showing a net increase from 237 in the ASIC to 256 in the ANZSIC. Correspondingly, the number of Classes in the goods producing industries showed a net decrease from 229 to 209. The number of Classes in Manufacturing in particular decreased, from 173 to 153.

Implementation of the ANZSIC in ABS Collections

The ANZSIC will be implemented progressively into ABS collections.

When the ANZSIC is introduced it will result in breaks to some industry time series. Information in the form of back-cast series and conversion matrices will be provided to allow users to link the series.

Table 2 Provides indicative information on the timing of selected statistics to be released on an ANZSIC basis. The table includes:

- the name of the statistical collection (in alphabetical order);
- the frequency of the collection;
- the reference period to which the first ANZSIC statistics relate;
- the expected release date for these statistics.

ANZSIC products and services

The ANZSIC (publication) includes the following sections:

- a description of the classification;
- a full list of the ANZSIC titles and codes
- the detailed classification;
- concordances with the ASIC, NZSIC and the ISIC (Rev.3);
- an alphabetic index of primary activities.

Following the release of the ANZSIC, a range of related products will be made available. These will include:

- the **ANZSIC** (electronic form). This will contain the same information as the ANZSIC publication but is designed to be accessed through an IBM PC or compatible. The electronic form is available for those users who wish to reference and search the ANZSIC electronically; for example, via a proprietary word processor. The ANZSIC in electronic form will be available as a whole, or as individual sections as listed above.

- the **ANZSIC Coding Index** (publication). This will be an expanded version of the basic index of primary activities contained within the ANZSIC, and will be similar to the existing ASIC Vol.2 (ABS Catalogue No.1202.0).

- the **ANZSIC Coding Index** (electronic form). The electronic version of the ANZSIC Coding Index is designed to be accessed through an IBM PC or compatible. In combination with proprietary software, it will enhance manual matching of ANZSIC codes and activity descriptions. It is intended that the electronic version of the index will be periodically updated.

- the **ANZSIC Concordances - detailed**. These will be more detailed than the concordances contained in the ANZSIC publication in that they will provide comparisons of primary activities between concorded categories.

- a **Concepts and Methods** publication. This will describe the concepts and methods employed in industry classification and coding, and will cover the kind of information provided in Chapters 2 to 6 of the existing ASIC Volume 1.

- the **ANZSIC Computer Assisted Coding System**. This will be an electronic package, designed to be accessed through an IBM PC or compatible. It will automatically allocate the correct four digit ANZSIC code when the user enters an industry description, or will assist the user in allocating a code when the description is not precise. Release 1 of this system will be similar to the current ASIC Coder (ABS Catalogue No.1276.0).

Classification advice, training and consultation.

Assistance can be provided in many ways, from general advice on classification and coding through to use of computer assisted coding systems. As part of the advisory services function, a procedure of ANZSIC Determinations will be instituted, providing clarification of the treatment of existing activities and recommended treatment for activities not already identified in the ANZSIC.

Further information on the above products and services can be obtained by contacting Frank Nizynski, Assistant Director, Industry Classification by phone (06)252 5204 or fax (06)252 7788.

Future reviews of the ANZSIC

Industrial classifications such as the ANZSIC tend to be revised infrequently, to allow maximum consistency and comparability in statistical series over time.

The next revision of the ANZSIC is not planned to occur until the next century. Factors that will influence the timing of the next review include shifts in the structure of the Australian economy, future revision plans relating to the ISIC and the need to take account of timing and implementation plans for major statistical activities such as the Population Census and the National Accounts.

Conclusion

The success of the ANZSIC project has already led to planning for a joint Australian and New Zealand Commodity Classification. Australia's participation in the Asia Pacific Economic Cooperation (APEC) initiative has recently opened up further opportunities for regional statistical cooperation. In collaboration with other APEC members, Australia is providing statistical expertise to make a range of data, particularly data relating to international trade and investment, more comparable between member countries.

Table 2: Anticipated Dates for the First Release of Statistics using ANZSIC

ABS Collection	*Frequency*	*Reference Period for First Release*	*Expected Date of First Release*
Agricultural Commodity Census	Annual	1991–92	October 1993
Agricultural Finance Survey	Annual	1992–93	January 1994
Average Weekly Earnings	Quarterly	3 months to August 1994	October 1994
Award Coverage	4–5 Yearly	May 1995	May 1996
Capital Expenditure, New, Survey of	Quarterly	June quarter 1994	October 1994
Commercial Finance	Monthly	July 1994	September 1994
Company Profits, Survey of	Quarterly	September quarter 1994	November 1994
Construction Industry Survey	5 Yearly	1994–95	June 1996
Economic Activity Survey	Annual	1993–94	December 1994
Employee Earnings and Hours, Survey of	Annual	May 1994	November 1994
Employment and Earnings, Survey of	Quarterly	September quarter 1994	January 1995
Engineering Construction Survey	Quarterly	September quarter 1994	December 1994
Exports and Imports, Merchandise	Monthly	July 1993	September 1993
Foreign Investment Survey	Quarterly	September quarter 1994	January 1995
	Annual	1993–94	May 1995
Industrial Disputes	Monthly	January 1995	April 1995
	Annual	1994	April 1995
International Trade in Services Survey	Annual	1993–94	May 1995
Job Vacancies and Overtime	Quarterly	3 months to August 1994	September 1994
Labour Costs, Major, Survey of	2 Yearly*	1993–94	June 1995
Labour Force Survey	Monthly/Quarterly	August 1994	September 1994
Lease Finance	Monthly	July 1994	September 1994
Manufacturing Census	Annual	1991–92	September 1993
Mining and Utilities Census	Annual	1991–92	October 1993
National Accounts	Quarterly	December quarter 1994	March 1995
Population and Housing, Census of	5 Yearly	1996	1997–98
Research and Experimental Development, Survey of	Annual	1992–93	June 1994
Retail Activity Survey	Irregular	1991–92	November 1993
Retail Business Survey	Irregular	July 1994	September 1994
Service Industries Surveys – varying industries	Irregular	1991–92	December 1993
	Irregular	1992–93	December 1994
Stocks and Manufacturers Sales, Survey of	Quarterly	September quarter 1994	November 1994
Wholesale Industry Survey	Irregular	1991–92	November 1993

Note: This is not a comprehensive listing of all ABS collections producing ANZSIC based statistics. Dates listed may be subject to change.

* Annual from 1985–86 to 1991–92. To be conducted biennially from 1994–95.

POPULATION CHANGES AND HOUSING DEMAND

John Cornish

INTRODUCTION

Changes in the composition and location of the population and the structure of households have a major impact on the housing requirements of Australian society. However, housing factors can influence demographic changes. For example, reduced affordability and availability of housing may necessitate the change to dual income households or cause a decline in household formation and even birth rates. As well, there are other factors of importance to the demand for housing, such as household income and public housing waiting lists, which are outside the scope of this paper, hence studies of demographic changes and resulting projections need to be supplemented by further analysis to confidently predict future demand for housing.

This paper summarises the main demographic changes which have occurred in Australia, particularly over the past decade or so, which have an impact on the demand for housing. It also contains some results from recent surveys on people's preferences for types of housing and location, and their attitudes to housing and residential development, which give some insight into why people move residence.

POPULATION GROWTH

In the 1980s, Australia's population rose from just under 15 million to just over 17 million. The average rate of growth was 1.5 per cent per year, three quarters of the average rate of growth of 2 per cent per year for the period 1945 to 1980.

The source of population growth is important in anticipating housing needs. For example, resident families with new babies generally have very different needs from those of new immigrants. A baby becomes part of an existing household, even though it can affect the housing needs of that household. An immigrant is more likely to form a new household on arrival and require additional housing.

The main source of Australia's population growth since the turn of the century has been natural increase (the excess of births over deaths), which has contributed two-thirds of the overall growth in the last 90 years. Net overseas migration gain made up the other one-third and has been an important influence in shaping the character of today's Australia.

Natural increase

The rate of natural increase has been decreasing since about 1960, and continued to decline slowly but steadily throughout the 1980s and into the 1990s (from 0.9 per cent in 1981 to 0.8 per cent in 1992). Although the number of women of child bearing age increased over this period, the number of children per woman (fertility rate) has been falling, from over 3 in the 1960s, to less than 2 in 1992. The crude birth rate (births per 1,000 population) has consequently been falling since peaking during the period 1947 to 1960; the so called 'baby boom' era. The crude death rate (deaths per 1,000 population) has been declining steadily for a long time, with a greater rate of decline since the 1970s.

Overseas migration

With the exception of colonial times, the increase in the population of Australia due to immigration has historically been less than that due to natural increase. However, in the 1980s the increase in the population due to net migration accounted for nearly 1.1 million, just below the natural increase of 1.3 million, and was greater in some years than the natural increase.

Immigration levels are dependent on variations in immigration policy, which changes according to the political and economic climate in Australia and overseas. The effect of net immigration is more unpredictable than natural increase in the estimation of future population and hence housing requirements.

Despite a recent increase in the median age of settlers (ie the age that half of the settlers were younger than, and half older), largely due to an increase in the proportion of settlers in the family migration category, the age composition of new arrivals has been younger than that of the total Australian population. The relatively high proportions of immigrants in the 0-9 and 20-34 years age groups reflect the large proportion of young families migrating.

AN AGEING POPULATION

Age structure is an important factor in determining the housing requirements of a population, as different age groups have varying housing needs. For example, the elderly are the group most likely to live in one person households (in the 1991 Census, 41 per cent of all persons who lived alone were at least 65 years old) and one person households are more likely than other households to live in dwellings other than separate houses (56 per cent of persons who lived alone were in dwellings other than separate houses).

In the first half of the 20th century, the median age of the population rose steadily, from 22.5 years in 1901 to 30.7 years in 1947. It then decreased during the 1950s and 1960s because of both the high fertility and high level of immigration during the period. It then resumed its steady increase in the 1970s.

In 1992, the median age of the population was 32.7 years. Reflecting the 'baby boom' of the post-war period to the mid 1960s, 31 per cent of the population

were 25-44 years old. The proportion of the population aged 65 and over increased from 4 per cent in 1901 to 11 per cent by 1992, whereas those aged under 15 have decreased from 35 per cent to 22 per cent.

Throughout this century there has been a constant increase in life-expectancy. For males, the life expectancy at birth has changed from 55.2 years at the start of the century to 74.5 in 1992. For females, life expectancy at birth has increased from 58.8 to 80.4 years over the same period. Females can expect to live longer than males, and this is one of the reasons for an increase in the proportion of one person households mentioned earlier.

POPULATION DISTRIBUTION

Australia's population is concentrated in coastal areas, especially in the south east corner of the continent. The two States involved, New South Wales and Victoria, are the most populous, accounting for 60 per cent of the population in 1992.

While the population of each State and Territory continues to increase, there have been variations in the rate of growth with Queensland, Western Australia and the Australian Capital Territory growing the fastest in recent years. The contribution to growth rates from interstate migration was greatest in Queensland and the ACT, with the majority of arrivals coming from NSW and Victoria (see Table 1); the contribution to growth rates from overseas migration was greatest in Western Australia.

Internal Migration

People who move within the same State or Territory (intrastate migration) as well as people who move between States affect the growth of cities, towns and local regions. Of the people who were counted at the 1991 Census who were resident in Australia in 1986, 6.1 million had changed their place of usual residence since 1986. Hence, when arrivals from overseas are taken into account, 40 percent of the population change dwellings at least once every five years - a large potential market for those providing the various services required.

In general, since 1981 interstate migration has been northwards on the east coast and westwards to the west coast. Queensland has consistently recorded relatively high net gains (arrivals less departures) from all States and Territories with most of its gains coming from NSW and Victoria. WA and the ACT have consistently recorded net interstate gains (although the WA net flow was negative in 1991-92). NSW and Victoria have both recorded consistently high net losses, while SA and Tasmania have recorded fluctuating patterns (positive flows in some years and negative flows in other years). The NT recorded net gains up to the mid- 1980s but since then it has recorded net losses.

Urbanisation

Urbanisation is a strong characteristic of Australian settlement. In 1991, 85 per cent of the population lived in urban areas (settlements with a population of 1,000 and over).

The dominant urban areas in Australia have always been the capital cities, with 11 million people in 1991 (or 63 per cent of Australia's population) living in the six State and two Territory capital cities (see Table 2). Over the decade 1981 to 1991, Brisbane, Perth, Canberra and Darwin grew at rates significantly higher than the national average, although Darwin grew very little in the last few years of the decade.

As well as a pattern of different growth across the capital cities, there are different patterns of growth within these cities. One pattern which has been evident in the larger cities, especially Sydney and Brisbane, is the slowing of the population decline in the inner city suburbs. These areas were where growth occurred in earlier times, but children as they grew older, left to make their own households. Later on, the parents vacated the homes, either through death or through moving to a retirement home. The decline in population was slowed when the cost of renovation or redevelopment was seen as being

Table 1: Components of Population Growth (a)
1981–91

State/Territory	Population growth ('000)	% Points of 1981–91 Growth Attributed to: Natural increase	Net overseas migration	Net interstate migration	Total increase
NSW	663.8	8.1	8.3	–3.5	12.7
Vic	473.5	7.9	7.1	–2.7	12.0
Qld	615.7	9.7	5.4	11.0	26.3
SA	127.5	6.9	4.4	–1.0	9.7
WA	336.0	11.4	11.1	2.6	25.8
Tas	39.6	8.0	1.8	–0.4	9.3
NT	42.9	21.3	7.6	–2.9	35.0
ACT	61.7	14.3	4.4	5.7	27.1
Aust	**2,360.8**	**8.7**	**7.2**	**0**	**15.8**

(a) Differences between the total increase and the sum of the natural increase, net overseas migration and net interstate migration reflect the intercensal discrepancy.

Table 2: Population of Capital Cities

Capital city (statistical divisions)	Estimated resident population ('000) 1981	1991	10 year growth (per cent)
Sydney (a)	3,279.5	3,672.9	12.0
Melbourne (a)	2,806.3	3,156.7	12.5
Brisbane (a)	1,096.2	1,358.0	23.9
Adelaide (a)	953.7	1,057.2	10.8
Perth	922.0	1,188.8	28.9
Hobart	171.1	187.0	9.2
Darwin (a)	56.4	76.7	36.1
Canberra (a)	226.4	288.2	27.1
All capital cities	**9,511.6**	10,985.5	**15.5**

(a) Minor boundary changes have occured between 1981 and 1991.

offset by the advantages of inner-city living, and new families were attracted into the area.

Urban centres other than capital cities have increased their share of the population, indicating a shift in the focus of growth from metropolitan centres to regional cities and towns, and rural areas. This growth is mainly concentrated in the New South Wales and Queensland coastal areas. Escalating housing prices in the capital cities, particularly Sydney, policies of decentralisation in both the public and private business sectors, and improved public transport, along with a desire for a better quality of life (especially for people who have retired), have probably contributed to this shift to smaller urban areas.

Although the proportion of population counted by the census in rural areas (areas outside of urban centres of 1,000 or more people) increased slightly between 1981 and 1991, settlement mainly occurred in areas adjacent to urban centres. Although small, the increase in the rural population was common to most States (only in Western Australia and the two Territories were there decreases). The largest increase was in Queensland, where the population in rural areas rose 30 per cent, concentrated in the coastal areas (particularly those areas adjacent to the Gold Coast, the Sunshine Coast, Cairns, Townsville, Rockhampton and Bundaberg). Growth in the rural population of New South Wales was also high in areas around popular growth centres on the coast.

POPULATION PROJECTIONS

According to the latest available projections made by the ABS (which are based on several combinations of assumptions reflecting past trends in births, deaths and migration), the total population of Australia is likely to increase to between 19.5 and 19.8 million in 2001, and between 21.0 and 22.1 million in 2011.

The projected population increases at a declining rate. The average annual growth rate is between 1.2 and 1.4 per cent until 2000, and between 0.8 and 1.1 during 2001-2010. Without overseas migration, the projected total population would peak at about 19 million around 2025, and then start to decline marginally.

Age distribution

The projected population ages progressively due to the increasing proportion of the elderly (aged 65 years or more) and the decreasing proportion of children (aged 0-14 years). In brief, the number of persons aged 0-14 years is projected to be between 3.7 and 4.1 million in 2011; the population of working age (15-64 years) is projected to increase to between 14.4 and 15.0 million in 2011; and the number of persons aged 65 years or more is projected to increase to between 2.94 and 2.98 million in 2011. The projections also show significant increases in the number of persons aged 80 years or more.

State/Territory distribution

The populations of Western Australia, Queensland and the ACT are projected to grow at rates higher than the national average, while for New South Wales, Victoria, South Australia and Tasmania the projected rates are lower. For the Northern Territory the growth rate is either higher or lower than the national average, depending on which assumptions are used.

FAMILY AND HOUSEHOLD COMPOSITION

Over the last two decades or so, the pattern of formation of Australian families has changed substantially. The age at first marriage has continued to rise, and the teenage marriage rate is now at its lowest level. Fewer people are opting for formal marriage and the number of defacto unions has risen. The divorce rate has also risen, as has the proportion of remarriages. The average number of children a woman of child bearing age could be expected to give birth to in her lifetime remained reasonably steady throughout the 1980's, at 1.9. This is currently well below the long-term population replacement level (ie without overseas migration, Australia's population will at some stage start to decline). These factors, along with the changing age composition of the population, are resulting in changes to the structure and size of households and families.

Changing household composition

In 1991, 73 per cent of the 5.9 million households counted in the census were family households. Of the 1.5 million non-family households in Australia, over 1.1 million were one person households, nearly 260,000 were group households, and there were about 110,000 visitor only households.

The number of non-family households increased in the 1980s to make up 25 per cent of all households by 1991. One person households are more likely to consist of elderly persons, while most group households consist of young people. This growth in non-family households is likely to continue because

Table 3: Number of Census Households by Household Size, Australia

	1981		1991		
Number of Persons	*Number of Households*	*Per cent of total households*	*Number of Households*	*Per cent of total households*	*Per cent change since 1981*
1	839,300	18.0	1,216,255	21.6	44.9
2	1,361,530	29.2	1,765,182	31.3	29.6
3	788,915	16.9	965,948	17.1	22.4
4	890,769	19.1	993,427	17.6	11.5
5	488,145	10.5	478,682	8.5	−1.9
6	191,451	4.1	167,463	3.0	−12.5
7	65,763	1.4	34,542	0.6	−47.5
8+	43,036	0.9	20,821	0.4	−51.6
Total	**4,668,908**	**100.0**	5,642,320	**100.0**	**38.6**

of the projected increase in persons aged 65 years and over and the consequent increase (assuming mortality differentials between the sexes are maintained) in widows.

Increasing numbers of the population are surviving through to older ages, either as one or two person households, and this has important implications for the future mix of dwelling stock required in Australia.

Notwithstanding the faster increases in non-family households, the dominant family type still contains two parents. In 1991, 53 per cent of all families were two parent families. Couples with dependent children accounted for 36 per cent of all families, couples with dependent children and an adult family member accounted for 8 per cent,and couples with non-dependent children comprised the remaining 9 per cent. Thirty-one per cent of all families were couples without children living at home. One parent families made up 13 per cent of all families, and families of related adults made up the remaining 2 per cent.

While between 1981 and 1991, the average number of children a woman could be expected to give birth to in her lifetime remained at 1.9, changes are occurring at different age groups. Fertility is rising among women aged 30-44 but this is being offset by falling rates amongst younger females.

Declining household size

Between 1981 and 1991 the number of households increased by 18 per cent, while the population only increased by 16 per cent. This indicates that average household size has declined; in fact, by 1991 it had fallen to 2.5 persons per dwelling from an average of 3.9 persons in 1947.

There are some differences between States which are largely due to the different age structures in each State or Territory. South Australia has the oldest population, and in 1991, had the lowest average number of persons per dwelling at 2.4; the Northern Territory and the ACT, with the youngest populations, had the highest averages at 3.0 and 2.7 respectively; while the other States had either the national average or close to it.

The number of households with five or more people decreased between 1981 and 1991, especially in the largest size categories. Households with less than five people increased, and the smaller the size of the household, the greater the increase. The very large increase in one person households (of nearly 45 per cent over the decade) is worth highlighting. Two member households remained dominant between 1981 and 1991. Table 3 shows that in 1991, 27 per cent of all households had two persons in them.

These changes in household size (other things being equal), may be expected to point to a demand for smaller size dwellings. But, other than a growing demand for a more diverse housing stock, the average size of houses has continued to increase. This is shown by progressive rises in the size distribution of occupied private dwellings counted in the censuses as measured by the number of rooms, as well as an increase in the floor space of new private homes (eg from 130 square metres in 1970 to 187 in 1989).

DWELLINGS

Between 1947 and 1991, the number of dwellings counted in the census more than tripled, from 1.9 million to 6.5 million. Of these 6.5 million dwellings, 9.3 per cent were unoccupied.

Type of dwellings

About three quarters of Australian dwellings are separate houses. However, other residential dwellings such as flats and townhouses have formed an increasing proportion of the total dwelling stock since the 1950's, when separate houses accounted for around 85 per cent of all dwellings.

In major urban areas (centres with a population of 100,000 or more), separate houses in 1991 accounted for 72 per cent of all dwellings, only slightly fewer than in 1981. In other urban areas (centres with a population of 1,000 to 99,999) separate houses accounted for 85 per cent of dwellings in 1981, and 80 per cent in 1991, while in rural areas nearly 90 per cent of all dwellings were separate houses.

ATTITUDES AND PREFERENCES

There have been several surveys conducted in recent years which shed some light on why people move residence, their preference for location or type of dwelling, and their attitudes to housing development. These surveys relate to residents of Sydney, Adelaide, Perth, Brisbane and Canberra. Some of the more interesting results relevant to population movements follow.

Housing decisions taken by recent movers

In general, the reasons for moving were consistent in all cities but differed according to tenure. Private renters mainly moved because of family or work changes, first home buyers moved to purchase homes, and changeover buyers mainly moved to increase the size or quality of their home. Movers in Canberra were more likely to cite work related influences than in other cities.

Movers in Sydney and Melbourne placed much more importance on the neighbourhood than on the dwelling. In Canberra, the reverse was reported, while Adelaide movers placed equal importance on neighbourhood and dwelling.

Sydney stands out, in that affordability is the most important reason for choosing the area (overwhelmingly for first home buyers). For changeover buyers in Sydney, while affordability is still important, 'neighbourhood characteristics' become more important, suggesting that many people get into housing first then look to buy a home in an area that they like or know. In the other cities, 'neighbourhood characteristics' are the most important reason for choosing an area. Private renters in all cities stated that proximity to work was the most important reason in choosing the area.

Price was more likely to be an issue in choosing a particular dwelling in Sydney and Melbourne than Adelaide and Canberra, even though it was still an important consideration reported in the latter cities.

Housing intentions of intending movers

In general, households intending to move prefer separate houses, consistent with the overall distribution of dwellings in Australia, although those in separate houses are much more likely to expect to move to another separate house than are those currently in other types of dwellings. The expectation to remain in a 'separate house' is strongest in Canberra, and weakest in Sydney.

Of those who plan to move into housing other than a separate house, the great majority intend to move into a one or two storey town house or similar dwelling, or a one or two storey flat or apartment building. In Sydney there is a relatively high number of persons intending to move into dwelling structures with two or more storeys.

Attitudes to housing

A survey of Queensland households conducted by the ABS in October 1991 asked some questions on attitudes to housing. While there was a very high level of agreement with statements on the need for a variety of dwelling types and sizes, there was significant disagreement with the statement "there should be no increase in the number of dwellings in this (the respondent's) area" and a majority disagreeing with statements "urban sprawl should be stopped", "I would consider living in a dwelling other than a separate house", and "I am in favour of smaller residential blocks". With all of these latter statements, there was less disagreement from households in the inner suburbs of Brisbane.

SUMMARY

Study of population changes and movements and the pattern of formation of families and households can be summarised as follows:

- Fertility is continuing to decline, reducing population growth and household size.
- Overseas migration is an important contributor to population growth and without further migration Australia's population would start to decline from around 2025.
- The population is ageing, with an increasing percentage of persons aged 65 years or more and a decreasing percentage of persons aged 0-14 years. The life expectancy of males and females has increased, and females are continuing to live longer than males.
- The proportion of family households is declining and the proportions of one person and group households are increasing. This is reflected by the fall in the number of persons per household, which means the demand for housing is rising faster than the population is growing.
- Queensland, WA and the ACT have been growing faster than the national average, lifting the demand for housing in these states and territory.
- Brisbane, Perth, Canberra and Darwin have been growing over the past decade at rates significantly higher than the national average, although Darwin has grown very little in the past few years.
- Urban centres other than capital cities and adjacent rural areas increased their share of the population - this growth is mainly concentrated in NSW and Queensland coastal towns and surrounding areas.
- Interstate migration has been northwards on the east coast and westwards to the west coast.

- Residential dwellings other than separate houses, such as flats and townhouses are forming an increasing proportion of the total dwelling stock.

DATA SOURCES AND REFERENCES

Australian Bureau of Statistics, *Australian Demographic Statistics* (Catalogue No. 3101.0)

Australian Bureau of Statistics, *Social Indicators: Australia,* Number 5 1992 (Catalogue No. 4101.1)

Australian Bureau of Statistics, *Housing Australia: A Statistical Overview* (Catalogue No. 1320.0)

Australian Bureau of Statistics, *Housing Characteristics and Decisions: A Comparative Study of Sydney, Melbourne, Adelaide and Canberra 1991* (Catalogue No. 8710.0)

Australian Bureau of Statistics, *Housing Intentions, Preferences and Attitudes:* Queensland, October 1991 (Catalogue No. 8710.3)

Australian Bureau of Statistics, *Census 86: Population Growth and Distribution in Australia* (Catalogue No. 2504.0)

Australian Bureau of Statistics, *Census 86: Australia in Profile* (Catalogue No. 2502.0)

Australian Bureau of Statistics, *Projections of the Populations of Australia, States and Territories* (Catalogue No. 3222.0)

Understanding Labour Costs

by Geoff Neideck

Introduction

Employers face a range of costs that arise as a direct result of employing labour. These costs are collectively referred to as labour costs, and will generally be a significant component of a firm's total operating costs. This article defines labour costs and then details the structure and composition of total labour costs in Australia. The focus then turns to the concept of "on-costs", or additional outlays incurred by the employer in engaging labour. The article will outline the relevant statistical information available from the ABS, and present some of the recently published results from the 1991-92 Survey of Major Labour Costs.

Components of Labour Costs in Australia

Labour costs are defined as all costs incurred by employers in the employment of labour, and can be broken down into the following components:

Wages and salaries, which are payments for ordinary time, overtime, shift and other penalties as well as payments for time not worked (paid leave and public holidays) and allowances and bonuses.

Fringe benefits, the non-cash remuneration paid to employees.

Termination payments, which are lump sum payments made to employees on termination of employment, for unused leave, early retirement packages and redundancy.

Superannuation contributions, which are in this context employer funded contributions to superannuation funds.

Workers' compensation, which include premiums paid to insurers, costs not covered by premiums (e.g. excess payments) and costs incurred by self insurers.

Payroll tax, which is tax paid in relation to employees under payroll tax legislation, net of rebates.

Fringe benefits tax, which is tax paid in relation to employees under fringe benefits tax legislation.

Training, which includes costs associated with vocational training of employees, excluding wages and salaries paid to employees providing or undertaking training.

Other costs, which include recruitment costs, the cost of transporting workers, work clothing and welfare services for employees.

These costs can be grouped into a number of categories[1]. The first is employee earnings made up of wages and salaries, fringe benefits and termination payments. These labour costs are income from the perspective of the employee. The second group are items of a social security nature that provide some future or contingent benefit to employees. The two items that fall into this category are superannuation, which provides a benefit to the employee in retirement, and workers' compensation, which provides for medical expenses and loss of earnings of employees resulting from industrial injury. While they are recorded as labour costs when the expense is borne by the employer, they are not recognised as income to the employee until resulting benefits are paid.

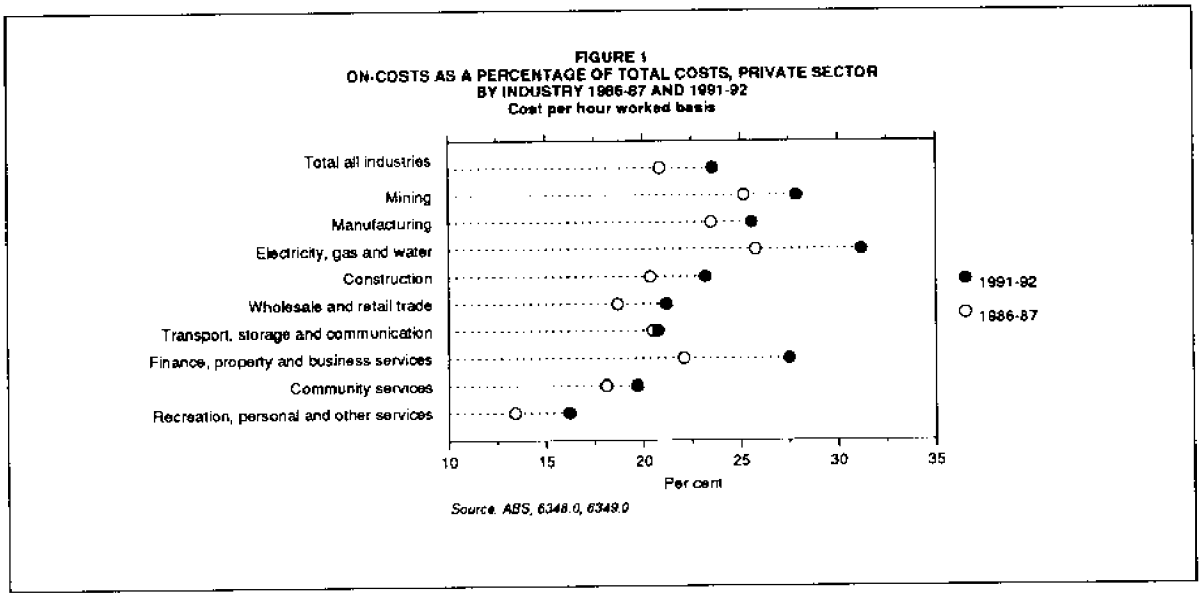
Payroll tax and fringe benefits tax fall into the third category of taxes associated with employment. With the exception of training, the value of the remaining items is generally considered to make a relatively small contribution to total labour costs.

The Concept of Employer On-costs

In examining labour costs, an important issue is the additional costs employers incur beyond direct payments for work done by employees. These costs are referred to as "on-costs" and can be considered as those costs for which the employer receives no direct productive return on its human capital investment. An alternative term used to describe the same concept is "non-wage labour costs"[2].

Labour costs other than wages and salaries are clearly considered by employers as on-costs. However, wages and salaries are made up of payments for time worked (direct wages and salaries) as well as a number of payments which are considered as "on-costs" from the perspective of the employer. For purposes of statistical measurement, time actually worked includes paid breaks during working hours. So, tea breaks, standby and washup time would be included as productive time. The on-cost items included in wages and salaries are remuneration paid to employees for time not worked, such as for leave and public holidays, infrequent bonuses and annual leave loading.

The importance of this concept lies in the fact that on-costs are generally subject to different influences than those affecting direct wages and salaries. On-costs are largely viewed by employers as involuntary outlays, as the most significant costs are imposed by statutory requirements or required under collective bargaining agreements. Employers are taxed on their



payroll and for fringe benefits provided to employees. They are obligated to cover employees for workers' compensation and to meet minimum requirements for superannuation and training expenditure. Under the awards system, minimum requirements are stipulated for leave entitlements, leave loading and redundancy payments. As they represent a significant proportion of labour costs, increases in on-costs have the potential to affect investment decisions and ultimately, business profitability.

Labour on-costs as a percentage of total labour costs for the private sector are shown in figure 1. Over the period 1986-87 to 1991-92, labour on-costs grew as a percentage of total costs across all domestic industry groups. This is largely a result of the rise in superannuation costs resulting from centralised wage agreements and federal legislation. The sharpest increases ocurred in the electricity, gas and water, and the finance, property and business services sectors. This reflects the characteristics of the labour force in these sectors as there are fewer casual workers employed than in most other sectors. The recreation, personal and other services sector, where much of the labour is not employed under award conditions, had the lowest level of on-costs relative to total costs in both 1986-87 and 1991-92,

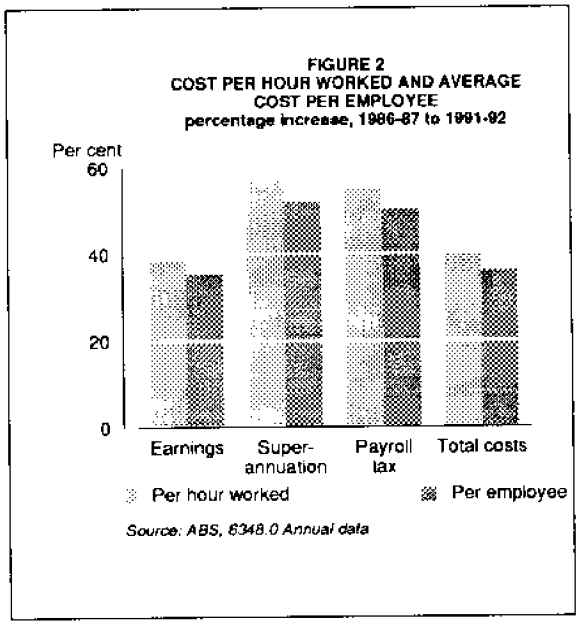
Uses of Labour Costs Statistics

The level of, and changes in, labour costs are important factors in a number of areas of economic and social concern. At a micro-economic level, labour costs affect employment practices and price structures. They are crucial considerations in issues of industry productivity and restructuring. At a broader economic level, labour costs are considered in wages, employment and industrial relations policy, prices and income policy, and social welfare policy. Labour costs are also essential in evaluating industry and international competitiveness.

The level and composition of labour costs are primarily viewed as structural data relating to the labour market. Where used for this purpose, the collection of labour costs data is required less frequently than other labour statistics, such as employment and average weekly earnings. However, movements in labour costs in the short term are of some interest in measuring inflationary trends affecting businesses.

Measuring and Presenting Labour Costs Statistics

For statistical purposes, labour costs are measured from the perspective of the employer. So, for example in measuring fringe benefit costs, valuation is on the basis of costs to the employer, rather than the benefit value to the employee. Costs are measured on a cash payments basis. As a result, some discrepancies may exist between costs reported in statistical collections and those presented in company or public sector accounts. Where possible, labour costs are recorded



net of any reimbursements, subsidies or rebates.

There are a number of ways of presenting labour costs. Total dollar costs is one form of presentation. Costs presented this way are important in examining the magnitude of labour costs, for example, in assessing the impact of government policy changes on employer costs or government revenues. For purposes of the comparison of labour costs between industries, sectors or countries, in measuring relative efficiency, average costs are more useful. Labour costs averages are presented per employee and per hour worked. While labour costs per hour worked are more difficult to produce than costs per employee, they are used by many analysts as a preferred comparative measure. In using costs per hour worked, the mix of different hours of work, for example part time versus full time, is eliminated. This basis is the international standard recommended by the International Labour Organisation (ILO) for inter-industry and inter-country productivity comparisons.

Statistics on Labour Costs Produced by the ABS

Prior to the introduction of the Survey of Major Labour Costs there was little data available on labour costs other than employee earnings. Since 1985-86, labour costs statistics have been collected via the Survey of Major Labour Costs. From its inception the survey has collected total costs and costs per employee of employee earnings, superannuation, payroll tax, workers' compensation and fringe benefits tax. In the most recent (1991-92) survey the costs of fringe benefits have been included to provide a more complete view of the costs of labour. The survey collects data from a sample of several thousand employers selected from the ABS's Register of Businesses. Data from the survey can be classified by sector, industry, States or Territories, and size of employer.

Supplementary data to determine costs per hour worked and to measure the on-cost component of employee earnings have been collected twice, in the 1986-87 and 1991-92 Surveys of Wage Costs. The surveys provide a breakdown of of gross wages and salaries paid to employees. Employers report the costs of paid leave (annual, sick, maternity, long service and other leave), public holidays, annual leave loading and infrequent bonuses. These components are subtracted from total wages and salaries paid, to derive payments for time worked.

While the Survey of Major Labour Costs does not cover training expenditure, it should be noted that these data are collected by the ABS Training Expenditure Survey. This survey has been conducted in reference to the September quarter 1989 and the September quarter 1990, and is currently being conducted for the September quarter 1993. Costs measured in this survey are for formal training provided by employers.

Other data on labour costs are available from the ABS's industry surveys. Wages and salaries, superannuation contributions and workers' compensation costs are often separately identified in these surveys. Other costs, however, are generally subsumed in other expenses. Recent economy wide industry surveys conducted by the ABS have collected labour costs along with other data across all industries. Data from these industry surveys provide a basis for analysing the ratio of selected labour costs to total business costs.

Composition and Structure of Labour Costs

Table 1 below shows labour on-costs (other earnings plus other labour costs) accounting for 25.4 per cent of total labour costs. Since 1986-87 (the last time these figures were available), on-costs (as a percentage of total labour costs) have increased by 1.7 percentage points. Figure 3 indicates changes in the relative composition of on-costs in the private sector over this period. Significant increases can be seen to have occurred in the relative importance of superannuation, termination payments and fringe benefits tax. By contrast, workers' compensation costs have decreased as a proportion of total on-costs.

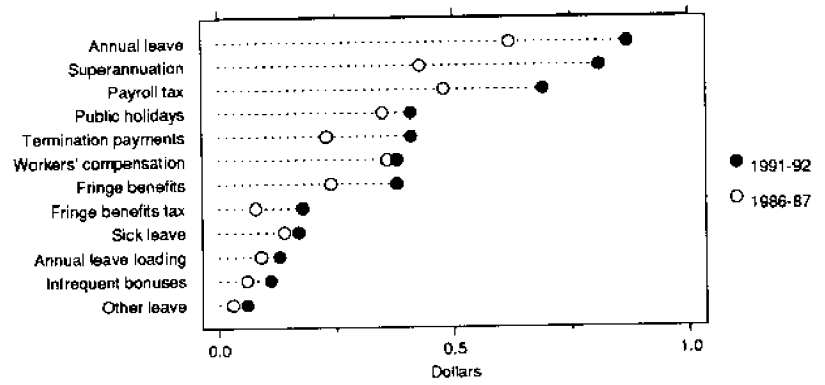
Table 1
Composition of Labour Costs, 1991-92

Component	*Cost per employee $*	*Per cent of total costs*
Earnings	27,581	89.0
Payments for time worked	*23,126*	*74.6*
Other earnings	*4,455*	*14.4*
Paid leave	2,121	6.8
Public holidays	711	2.3
Annual leave loading	228	0.7
Infrequent bonuses	118	0.4
Termination payments	798	2.6
Fringe benefits	478	1.5
Other labour costs	*3,413*	*11.0*
Superannuation	1,516	4.9
Payroll tax	1,086	3.5
Workers' compensation	586	1.9
Fringe benefits tax	225	0.7
Total labour costs	**30,995**	**100.0**

The structure and composition of labour costs differ markedly between the private and public sectors. Employment varies considerably, as does the occupational composition of the workforce. Superannuation, payroll tax and workers' compensation costs in each sector are affected differently by legislation and administrative arrangements. Total labour costs per hour worked in 1991-92 were $19.52 in the private sector and $24.20 in the public sector. Private sector on-costs were $4.60 per hour worked or 23.6 per cent of total labour costs.

Figure 4 shows the mining industry had clearly the highest total labour costs per hour worked at $33.80. It also had the highest average number of hours worked per employee. It was followed by the electricity, gas and water industry at $27.04 and

FIGURE 3
ON-COSTS PER HOUR WORKED, PRIVATE SECTOR, 1986-87 AND 1991-92



Source: ABS, 6348.0

transport, storage and communication industry at $23.90 both of which have a high proportion of public sector employees. The recreation, personal and other services industry had the lowest total labour costs per hour worked at $15.62. Notably, it also had lowest average number of hours worked per employee.

The wholesale and retail trade and recreation, personal and other services industries had the lowest earnings and on-costs per hour worked. This can be attributed to the high proportion of casual, part-time and junior employees in these industries.

New South Wales and Victoria displayed higher than average payments for time worked in a number of industries including the three highest employing industries - wholesale and retail trade, manufacturing, and finance, property and business services. This contributed to New South Wales having the highest total private sector labour costs of $20.56 per hour, followed by Victoria with $20.26. Tasmania at $16.66 recorded the lowest costs.

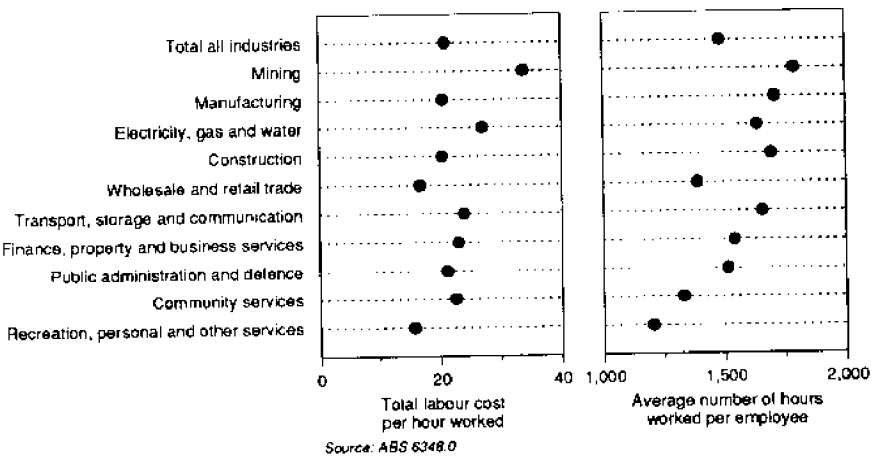
Analysis and Comments on Selected Labour Costs

This section presents some of the more interesting results relating to individual labour costs items, and some analysis of the effects of government policy and legislation.

Direct Wages and Salaries

The impact of government policy on wages is complex. Detailed consideration of the issues involved is beyond the scope of this article. Broadly however, federal government influence using the centralised wage fixing mechanisms, via the Industrial Relations Commission has been a key factor influencing labour costs in the domestic economy, with the prices and incomes Accord setting the framework within which wage agreements are reached. For example, in 1990 the agreement provided for small income tax cuts to compensate wage and salary earners for cost-of-living increases, rather than a general wage increase. The current development of enterprise bargaining is likely to be a key determinant in wage outcomes in the

FIGURE 4
COMPARISON OF LABOUR COSTS AND HOURS WORKED BETWEEN INDUSTRIES, 1991-92



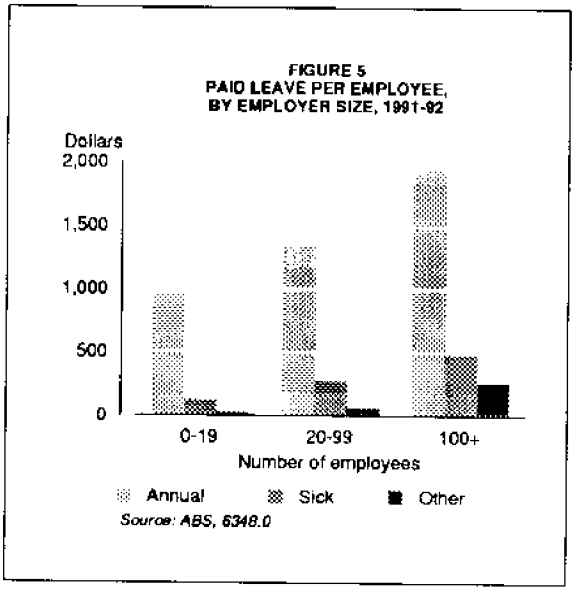
Source: ABS 6348.0

foreseeable future. In addition, less direct effects result from initiatives in industry restructuring, efforts to control inflation and policies on international trade, particularly in relation to tariffs.

The 1991-92 Survey of Major Labour Costs highlighted some interesting features of on-cost components of wages and salaries.

Paid leave

In 1991-92, paid leave (annual, sick and other leave) accounted for 6.8 per cent of total labour costs or $2,121 per employee. It therefore represented the largest component of costs to employers other than payments for time worked. For the same year the average hours of paid leave per employee was 144. Averages for the States ranged from 129 hours in Queensland to 162 hours in the Northern Territory, where it is common for employees to receive additional annual leave entitlements.



Industry comparisons of hours of paid leave show considerable variation. The industries with the highest hours of paid leave were electricity, gas and water (221 hours) and mining (208 hours). In contrast only 64 hours of paid leave were recorded on average for employees in the recreation, personal and other services industry. These variations predominantly reflect relative employment conditions and the proportion of casual employees (who are not entitled to leave) within industries.

Paid leave per employee also varied significantly with the size of the employer. Small employers (less than 20 employees) paid for 86 hours of leave per employee, compared to 176 hours for employers with 100 or more employees.

Annual leave loading

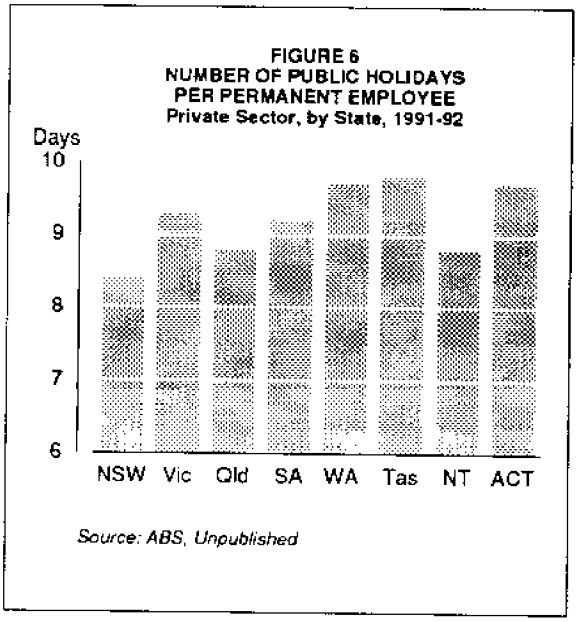
Annual leave loading is available to most employees who are entitled to annual leave, especially those covered by awards. Leave loading is generally paid at a rate of 17.5 per cent of annual leave, up to a maximum dollar limit. Some employees receive a higher rate (for example, some mining industry employees), while others may receive additional leave entitlements in lieu of leave loading.

In 1991-92, annual leave loading payments totalled $1,308 million (14.4 per cent of total payments for annual leave), or $283 per permanent employee.

Public Holidays

In 1991-92, employees were paid for an average of 48 hours (7.6 days) of public holidays. Paid public holidays are not available to casual employees. Permanent employees were paid 59 hours of public holidays, which is equivalent to 9.3 days. In the private sector permanent employees received the equivalent of 9.0 public holidays, while public sector permanent employees received 9.8 days, reflecting an additional public sector holiday available to most employees.

As shown in figure 6, averaged across all employees Tasmania had the highest number of public holidays per permanent employee, closely followed by Western Australia and the Australian Capital Territory. These figures reflect the varying levels of casuals in the States - those States with lower levels of casuals recorded higher average hours and vice versa.



A similar effect is evident across industries, where the recreation, personal and other services and wholesale and retail trade industries with traditionally high proportions of casuals recorded the lowest hours for public holidays. The mining and electricity gas and water industries on the other hand were high. The public administration and defence industry also recorded high hours of public holidays per employee.

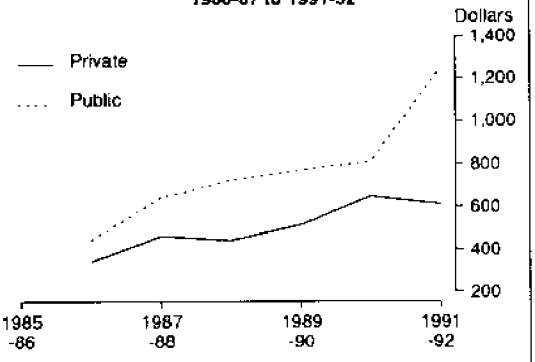
Termination Payments

In 1991-92, termination payments accounted for 2.6 per cent of total labour costs. This represented an average of $798 per employee, up 14.3 per cent on 1990-91.

The effect of decisions by employers to shed staff during the recent recession can be seen in figure 7. In the private sector, termination payments dropped 5.5 per cent, after peaking at $650 per employee in 1990-91.

In contrast to the private sector, the public sector recorded an increase of 52.8 per cent in 1991-92, after relatively little movement since 1988-89. The increase stemmed from a significant rise in termination payments for the Commonwealth Government. Notable increases also occurred for State governments in Victoria and Western Australia.

FIGURE 7
TERMINATION PAYMENTS PER EMPLOYEE
1986-87 to 1991-92



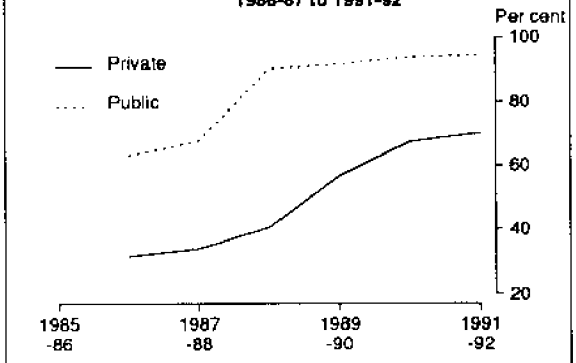
Source: ABS, 6348.0 Annual data

Superannuation

Significant changes to employer liabilities for superannuation have occurred since the mid-1980s. When the 1986 National Wage Case awarded a productivity linked pay rise to be paid as superannuation contributions, it provided for a minimum level of superannuation for employees covered by awards. This produced an immediate jump in superannuation coverage in the public sector to over 90 per cent. In the private sector, coverage expanded progressively through awards over the subsequent four years, with the growth in coverage slowing in 1991-92 to reach a level of 70.3 per cent. The Superannuation Guarantee Charge, introduced from 1 July 1992, is expected to increase coverage and contribution levels further as superannuation extends to non-award employees not previously covered and minimum contribution levels are increased.

The effect of changes up to the end of 1991-92 can be seen in the rise in private sector superannuation contributions, from $2,969 million in 1987-88 to $4,849 million in 1991-92. Superannuation contributions per employee rose from $707 to $1,196 over the same period.

FIGURE 8
SUPERANNUATION COVERAGE
1986-87 to 1991-92



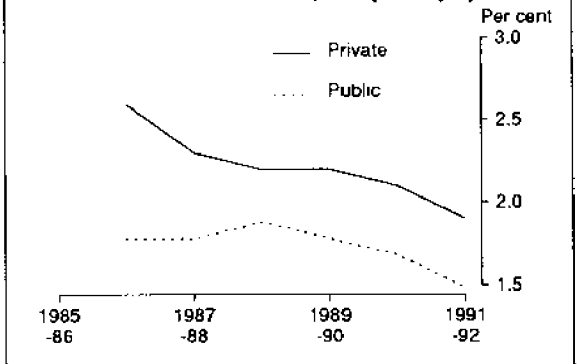
Source: ABS, 6348.0 Annual data

Workers' Compensation

Workers' compensation insurance is compulsory for all employers.

Due to an increasing burden on governments and the community, there has been pressure in recent years to reform workers' compensation arrangements in Australia. This has resulted in improved workplace safety and an increasing acceptance of the need for effective rehabilitation of injured workers. Increased efforts by governments to reduce costs have led to more efficient administration of workers' compensation schemes. As figure 9 shows, workers' compensation costs expressed as a percentage of total labour costs, has been falling for both the private and public sectors.

FIGURE 9
AVERAGE WORKERS' COMPENSATION COSTS
AS A PERCENTAGE OF TOTAL LABOUR COSTS
Private and Public Sectors, Cost per Employee

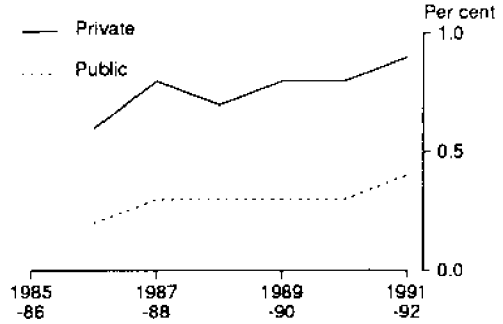


Source: ABS, 6348.0 Annual data

Fringe Benefits Tax (FBT)

Taxation of fringe benefits was introduced by the Commonwealth Government in 1986 to increase tax revenue on non-cash remuneration paid to employees. Fropm 1986-87 to 1991-92, the proportion of employers' total labour costs expenditure has risen from 0.6 per cent to 0.9 per cent in the private sector and from 0.3 per cent to 0.4 per cent in the public sector.

FIGURE 10
AVERAGE FRINGE BENEFIT TAX COSTS AS A PERCENTAGE OF TOTAL LABOUR COSTS
Private and Public Sectors, Cost per Employee

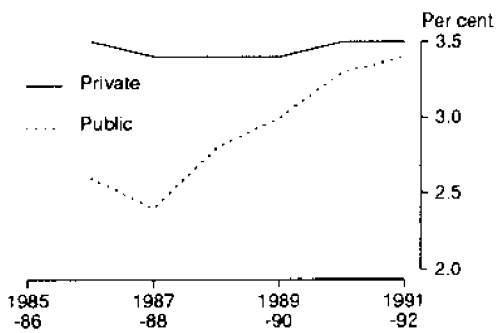


Source: ABS, 6348.0 Annual data

Payroll Tax

Every State and Territory in Australia collects payroll taxes. State payroll taxes are subject to the policy priorities of individual States, and therefore differences exist in their application in each State. Payroll thresholds from which payroll taxes apply, and the rates at which the taxes are paid, vary in each State. Payroll tax rebates and concessions are used in some as an incentive to develop selected industries.

FIGURE 11
AVERAGE PAYROLL TAX COSTS AS A PERCENTAGE OF TOTAL LABOUR COSTS
Private and Public Sectors, Cost per Employee



Source: ABS, 6348.0 Annual data

From 1990-91 to 1991-92 State Government revenues from payroll tax paid by private sector employers increased 4.1 per cent to $4,154 million. The most significant increase occurred in the Australian Capital Territory, which rose 34.2 per cent. New South Wales and Victoria recorded rises of 6.0 per cent and 6.2 per cent respectively; while in Tasmania payroll tax payments fell 9.9 per cent.

As payroll tax is levied above a prescribed payroll threshold in each State, the incidence of payroll tax increases with the size of employer. Only 5.3 per cent of employers in the 0-19 employees size group paid payroll tax in 1991-92, while 88.7 per cent of employers with 100 or more employees paid payroll tax. Most employers not paying payroll tax in this group would be organisations exempt from the tax such as religious institutions and non-profit organisations.

Conclusion

The article has examined the concept of labour costs, with a focus on the "on-costs" incurred by employers, and has noted the effect of government policy and charges on some of these costs. It has been pointed out that the different components of total of labour costs are subject to differing influences, for example over recent years superannuation has assumed a major role in Australian industrial relations and government labour and social welfare policy.

Footnotes

1. The grouping of labour cost items used here is based on the ILO International Standard Classification of Labour Costs.

2. The terms "on-costs" and "non-wage labour costs" are sometimes used to refer to labour costs other than total employee earnings, rather than all labour costs other than payments for time worked.

References

Australian Bureau of Statistics, *1991-92 Labour Costs*, Australia (Catalogue No. 6348.0)

Australian Bureau of Statistics, *Business Operations and Performance*, Australia (Catalogue No. 8140.0)

Australian Bureau of Statistics, *Employer Training Expenditure*, Australia (Catalogue No. 6393.0)

Hart, Robert A., *The Economics of Non-Wage Labour Costs*, George Allen and Unwin (London, 1984)

International Labour Office, *An Integrated System of Wages Statistics, A Manual on Methods* (Geneva, 1979)

Composite Leading Indicator

September quarter 1993

The CLI is a single time series produced by aggregating eight individual economic indicators. It is calculated as a simple average of the short-term movements in the indicators listed in table 2. The observed average lead of the CLI is two quarters. It led the 1991 September quarter turning point in GDP(A) by two quarters.

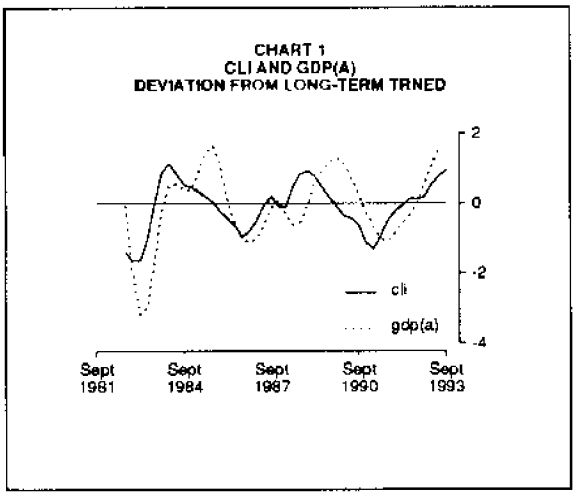
The main features of the September quarter 1993 CLI were: **no turning point was detected by the index, which registered nine quarters of growth since the 1991 trough, suggesting a continuation of a cyclical recovery for at least the next two quarters; the underlying long-term trend in GDP(A) in the last few quarters was about 0.2 per cent**, reflecting the relatively subdued economic activity over the past four years. Therefore, the continued growth in the CLI indicates that the published (short-term) trend in GDP(A) is likely to be greater than 0.2 per cent in each of the next two quarters.

Chart 1 shows constant price GDP(A) and the CLI expressed as deviations from the long-term trend of GDP(A). Chart 2 shows trend GDP(A) compared with its long-term trend. Table 1 provides details of the values of the CLI and the corresponding quarter to quarter changes. Table 1 also shows the recent values of the short-term trend in GDP(A) and its long-term trend, along with the percentage deviation of trend GDP(A) from its long-term trend.

The contributions to quarterly changes in the CLI from its components, expressed as deviations from the long-term trend, show that the basis of the change in the CLI remained weak (see Table 2). In the September quarter 1993, the main positive contributions continued to be from the All industrials index and from Job vacancies data (see Charts 7 and 6 respectively). Negative contributions were registered in the trade factor, and housing finance commitments. Contributions from the remaining four components were weak, but positive. Graphs 3 to 10 show the deviation from the long-term trend for each component for recent quarters.

The CLI summarises the early signals contained in a selection of economic indicators and is designed to help in detecting turning points between successive expansions and slowdowns of economic activity. The direction of its growth indicates the likelihood of an expansion or a slowdown, **relative to the long-term trend in GDP(A)**, for the next two quarters. It is important to note that it is not designed to predict the level of, or the actual percentage change between quarters in, GDP(A). Details of the compilation of the index can be found in *An Experimental Composite Leading indicator of Australian Economic Activity* (ABS Cat. No. 1347.0), June 1993 and in the feature articles published in *Australian Economic Indicators* in August and October 1992 and May 1993.

The CLI is still considered to be experimental and it will be updated in *Australian Economic Indicators* each quarter during the experimental period.



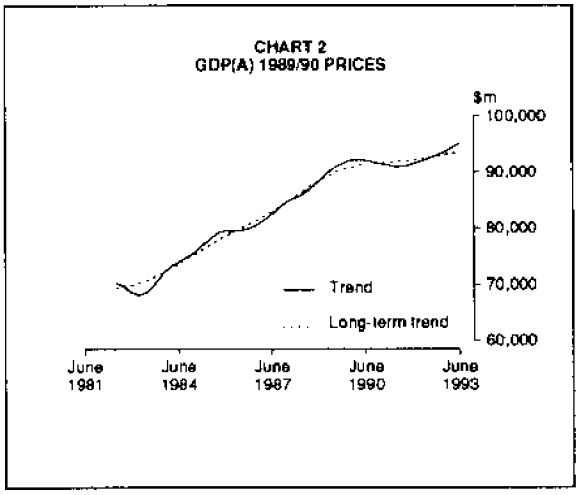
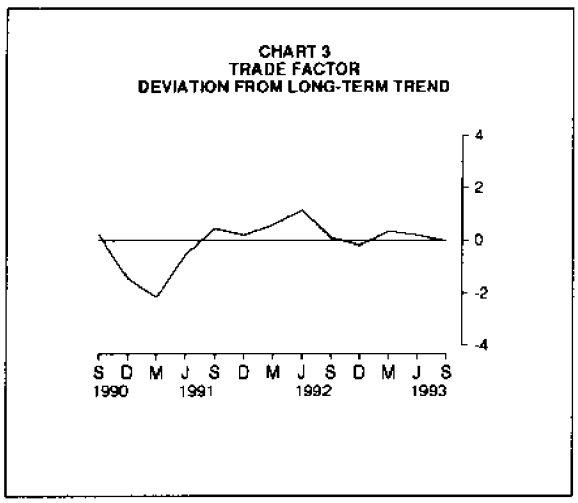


Table 1
CLI September quarter 1993 - growth rates

	1992. Jun	1992. Sep	1992. Dec	1993. Mar	1993. Jun	1993. Sep
CLI Deviation from long-term trend	**0.14**	0.13	**0.19**	**0.52**	**0.79**	0.95
Change from previous quarter		**–0.01**	**0.06**	**0.33**	**0.27**	**0.17**
GDP(A) Trend	92375	92880	93567	94336	94948	N/A
Percentage change from previous quarter		0.5	0.7	0.8	0.6	N/A
GDP(A) Long-term trend	92669	92909	93131	93348	93521	N/A
Percentage change from previous quarter		0.3	0.2	0.2	0.2	N/A
GDP(A) Deviation from long-term trend	–0.32	–0.03	0.48	1.06	1.53	N/A
Change from previous quarter		0.29	0.51	0.58	0.47	N/A

Table 2
Contributions to the quarterly changes in CLI deviation from long-term trend

	1992. Sep	1992. Dec	1992. Mar	1993. Jun	1993. Sep
Trade factor	-0.14	–0.04	0.07	–0.02	–0.02
United States GDP	0.10	0.06	0.02	0.01	0.01
Housing finance commitments	0.05	-0.04	–0.01	0.02	–0.01
Job vacancies	0.08	0.09	0.08	0.13	0.06
All industrials index	–0.10	–0.09	0.10	0.09	0.10
Real interest rates (inverse - lagged four quarters)	–0.05	0.00	0.04	0.03	0.02
Production expectations (lagged one quarter)	0.04	0.05	0.04	0.02	0.00
Business expectations (lagged one quarter)	0.01	0.01	0.00	0.00	0.01



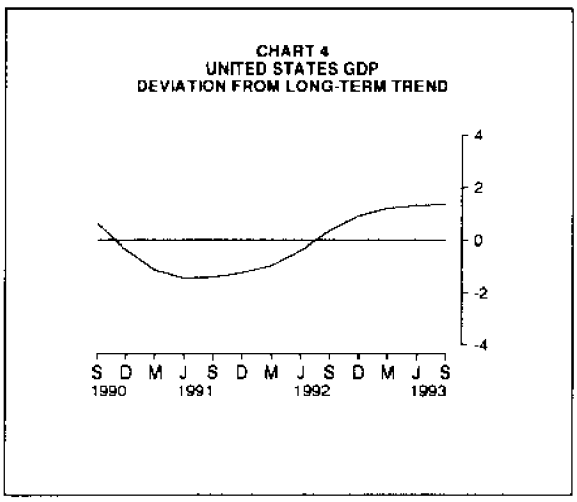


CHART 5
SECURED HOUSING FINANCE COMMITMENTS
DEVIATION FROM LONG-TERM TREND

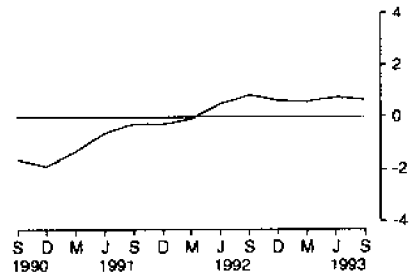


CHART 6
JOB VACANCIES
DEVIATION FROM LONG-TERM TREND

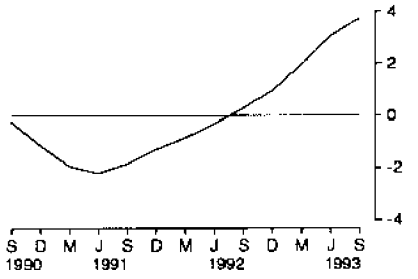


CHART 7
ALL INDUSTRIALS INDEX
DEVIATION FROM LONG-TERM TREND

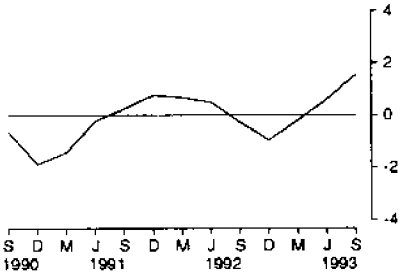


CHART 8
REAL INTEREST RATE
DEVIATION FROM LONG-TERM TREND

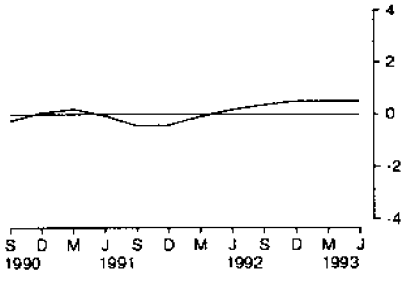


CHART 9
PRODUCTION EXPECTATIONS
TREND

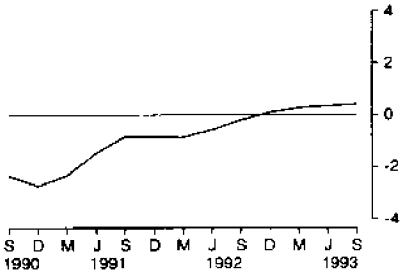
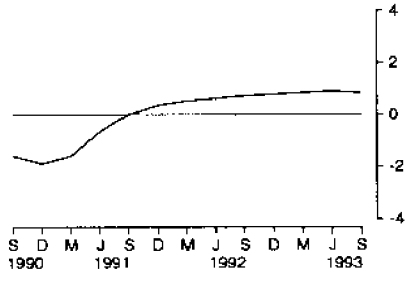
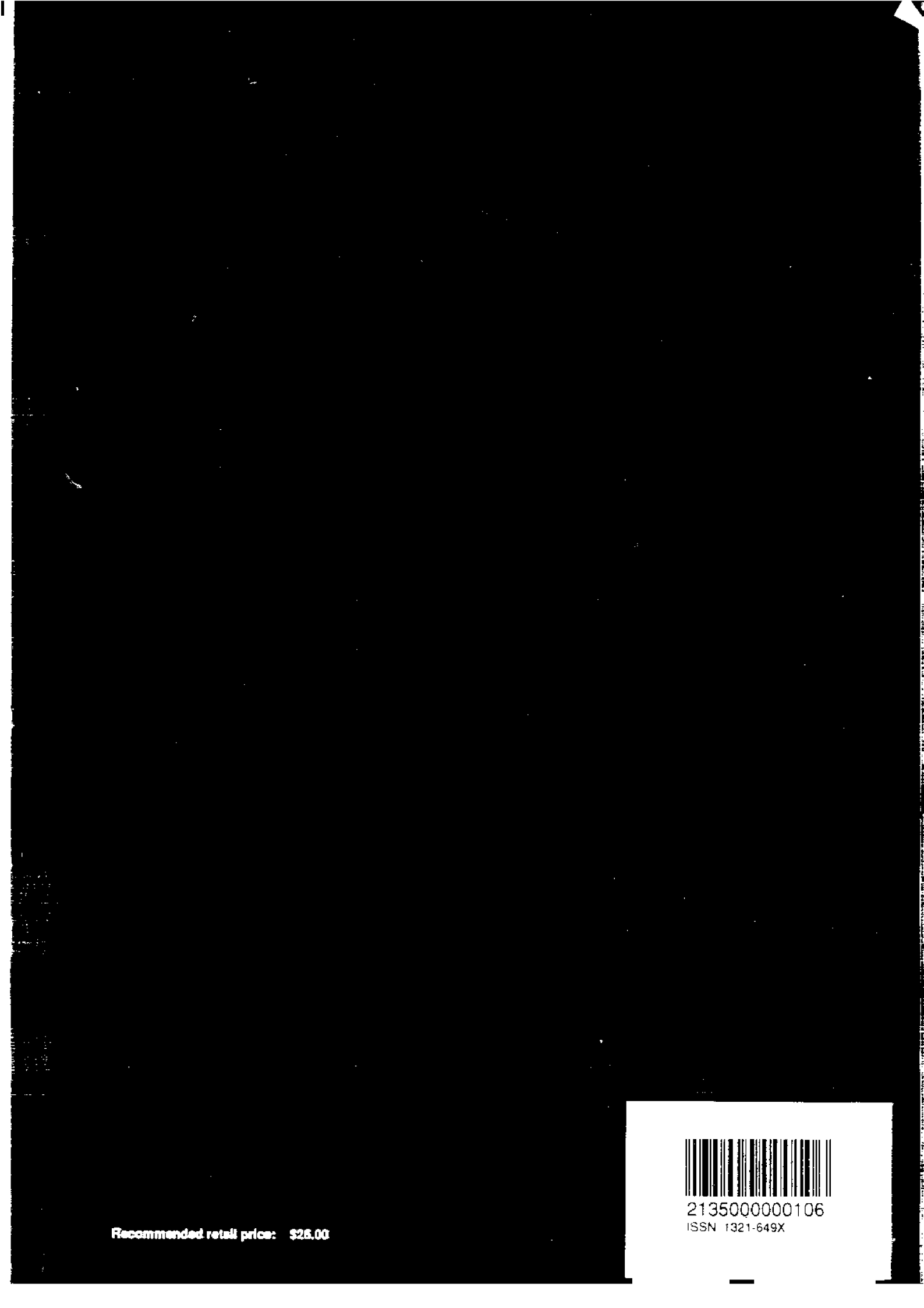


CHART 10
BUSINESS EXPECTATIONS
TREND

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