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**Experimental Estimates of the  
Distribution of Household  
Wealth, Australia,  
1994–2000**

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# **Experimental Estimates of the Distribution of Household Wealth**

**Australia**

**1994–2000**

**Kristen Northwood, Terry Rawnsley and  
Lujuan Chen**

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# 1 Summary of findings

There is considerable interest in the composition and distribution of wealth across Australian households, and how this is changing over time. However, distributional wealth data has not been collected in Australia on a regular basis in the past. This paper reports the findings of an exploratory study which has constructed experimental distributional wealth data for Australia, for the years from 1994–2000. The paper provides an overview of the types of results which have emerged from the estimates, and details of how they were constructed, to provide a basis for discussion, comment and improvement of the techniques used in this exploratory work.

## Construction of experimental wealth estimates

This study has used the full unit record files available to the ABS, and a range of other data sources, to build on previous studies which have estimated distributional wealth data for Australia. The experimental estimates discussed in this paper are very different to those which the ABS obtains via direct collections (i.e. via surveys or censuses). The estimates have been modelled, rather than directly measured. They have been created by drawing together a range of different data sources, which incorporate data collected at different times, from different parts of the Australian population.

For this study, a household's wealth was defined to equal its net worth— that is the sum of its assets minus the sum of its liabilities. Asset and liability data have been estimated for each household represented in the Surveys of Income and Housing Costs (SIHC) and the Household Expenditure Surveys (HES) conducted between 1993–94 and 1999–2000. These household-level estimates were aggregated and benchmarked to the figures derived from the National Accounts household sector balance sheet. The synthetic data generated by this process allows the assets, liabilities and net worth of the household sector to be dissected by key characteristics such as age ranges, household type, broad geography and income deciles.

## The distribution of wealth between different types of households

Average and median household wealth increased as the age of the household reference person<sup>1</sup> increased, peaked in the 55–64 age group, and then declined. This pattern supports the theory that households build their wealth while householders are working, then draw upon this wealth in retirement. As expected, this pattern is different from the distribution of income across age groups, which falls away more rapidly for older households.

The distribution of wealth is closely related to the distribution of major household assets such as owner-occupied dwellings and superannuation. Growth in the value of these assets between 1994 and 2000 has led to strong increases in the average wealth of households in middle and older age groups (i.e. those where the age of the reference person is over 44).

The distribution of wealth is also related to income levels. Average and median wealth increased slowly across the lower and middle income deciles, which included a mix of older and younger households. However, average wealth was considerably higher for the highest income deciles.

The distribution of wealth between different types of households is closely linked to the effects of both age and income level on wealth accumulation. Couple households had higher average net worth than lone-parent or lone-person households with reference people of a similar age. This is to be expected, as couples may have had access to two incomes for much of their lives.

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<sup>1</sup>The household reference person is an adult from the household's primary family. For further details, see section 3.5.

Average net worth grew in all states and territories between 1994 and 2000. In 2000, average net worth was highest in New South Wales, where average owner-occupied dwelling values were considerably higher than those in other states. The distribution of average annual income between states and territories was different from the distribution of wealth, as the territories had higher average and median household incomes than the states.

The share of total wealth owned by all households in a particular wealth decile is a statistic which is commonly used to examine the concentration of wealth in the household sector. Between 1995 and 2000, the amount of wealth held by the top decile appears to have been quite stable, being either 43% or 44% in each year. The share of total household wealth owned by other wealth deciles has also remained stable over this period.

The distributional patterns outlined above are in broad agreement with data from other sources and with the findings of previous studies. However, average household net worth estimates from the model discussed in this paper are higher than some estimates which have been reported in the past. When interpreting these types of differences it should be remembered that this study has estimated distributional data for some assets and liabilities which have not often been included in past analyses. Also, the estimates have been benchmarked to National Accounts aggregates, and they have been based on more detailed survey data files than those used in earlier studies.

### **Extending the estimates and analysis presented in this paper — future directions**

There are a number of ways in which the estimates could be refined in the future. For example, work is underway to increase the comparability of income statistics which were collected in the SIHC and HES across the 1990s, and this may lead to revised income data to which the model can be applied.

A range of quality indicators has been reported in this paper to assist potential users of the estimates to gain insights into their fitness for specific purposes. Broad dissections of the data will generally yield robust results. However, users of the estimates should only undertake more detailed dissections with caution. If standard errors (or alternative measures of deviance) could be calculated for the estimates, using modelling techniques, this would enhance the suite of quality indicators which has been provided in this paper. The ABS is investigating the feasibility of compiling this type of quality information for the estimates.

Notwithstanding the fact that enhancements could be made to the current experimental estimates, it is suggested that they provide a credible picture of the distribution of wealth across households, for the key dimensions of interest. After considering feedback on the methods and results reported in this paper (and subject to further investigation of the feasibility of refinements to the model, such as those outlined above) the ABS may make more detailed disaggregations of the experimental estimates available to the public.

In addition, the descriptive analysis discussed above is only a fraction of that which could be undertaken using the estimates compiled in this study. Other analyses are being considered for incorporation into the ABS' analytical work program.

Using the model which has been developed in this study, the ABS plans to compile distributional wealth data in years when a SIHC or equivalent is run, i.e. biennially, from 2003–04. Information on wealth may also be directly collected every sixth year, commencing with the 2003–04 Household Income and Expenditure Survey (a combined SIHC and HES).

## 2 Introduction and background

### 2.1 Introduction

The ABS last collected distributional wealth data as part of the 1915 War Census. ABS household expenditure and income surveys were running on a regular basis by the early 1980s. However, due to concerns about the public's willingness to respond to questions about their wealth, and due to competing data collection priorities in the household survey program, distributional wealth statistics have not been collected in ABS household surveys or censuses in recent decades.

The statistical landscape in this area of interest is changing. For some time the ABS has been moving towards a more integrated set of income, consumption, savings and wealth statistics. Questions about a range of household asset and liability values are now being considered for inclusion in the 2003–04 HES. However, the ABS recognises that the data-using community are keen to form a picture of how wealth is distributed among Australian households now, and for the recent past. These types of data are crucial for determining the sustainability of consumption over the longer term (including in retirement), and the sensitivity of different parts of the community to changes in the economy (such as falls in share prices on the stock exchange).

In recent years the ABS has also committed increased energy to the analysis of directly collected and administrative data. The purpose of this work is to gain more value from data which are gathered via existing collections, to reduce the load on data providers, and to increase the comparability of statistics from different parts of the Australian statistical framework. As part of this effort, an analytical project was initiated to construct a set of distributional household wealth estimates for Australia from existing data, for most of the last decade. This working paper reports the results of this experimental work.

This is not the first time that the distribution of wealth has been modelled in Australia. Dilnot (1990), Bacon (1996), Baekgaard and King (1996), Robertson, Grandy and McEwin (2000), Kelly (2001) and others have also compiled distributional wealth estimates for Australia. However, most previous studies have concentrated on a selection of the assets and liabilities owned by households, and have compiled estimates for a particular point (or a selection of points) in time. Thus the ABS has been in a position to extend the work undertaken in this area by other analysts, and make use of more detailed survey unit record data to support this work.

In building this model of the distribution of wealth, the key goal was to construct a set of synthetic wealth data which would allow dissection of the items in the Australian System of National Accounts (ASNA) household balance sheet by household characteristics such as:

- stage of lifecycle (based on information on ages of adults and children within a household)
- a broad level of geography
- other characteristics, where data existed to support such dissections.

The remainder of the paper proceeds as follows. Chapter two focuses on the development of household wealth statistics in Australia, why these statistics are of interest, the types of statistics that are already available, and how the work reported in this paper seeks to fill gaps in the existing set of statistics.

Chapter three provides an overview of the data and techniques used to construct the estimates. Chapter four discusses first-cut experimental results emerging from the study. Chapter five examines data quality issues and indicators of quality for the estimates. Comparisons are also drawn between the estimates from this study and those from other sources, and the feasibility of more detailed dissections of the estimates is examined. Chapter six discusses extensions and upgrades to the model, and future developments which will have an impact on the way in which distributional wealth estimates are compiled.

Chapters seven through thirteen provide technical details of how individual assets and liabilities have been modelled, so that users can make informed judgements about how they may wish to use data from the model, and as a basis for comparison and comment. The data underlying graphs, quality indicators, and an overview of how data have been compiled are included in the appendices.

## 2.2 Why measure the distribution of household wealth?

Wealth, as defined in the context of this paper, is represented by an entity's net worth, which is the sum of its assets minus the sum of its liabilities. Human and social capital may be included in broader definitions of wealth, but are not considered in this study. Net worth may be positive or negative. The wealth of different entities (such as individuals, households, groups of people or nations) is of interest for a number of reasons.

Income and expenditure data measure flows of funds into and out of an entity, but the sustainability of expenditure which exceeds current income can only be gauged if information on an entity's stock of wealth is also known.

In the household dimension, if income levels fall as they generally do in retirement, assets can be run-down to sustain current consumption levels for some length of time. Therefore, knowing the level and distribution of household assets is a key factor in determining the impact of changes to government policy, such as changes to superannuation or pension schemes.

While levels of income, consumption and saving affect the accumulation of wealth, changes in the level of wealth can, in turn, affect spending. It has been suggested that in recent years increased household wealth has allowed consumer spending to grow faster than disposable income. This has been termed the 'wealth effect' on consumption. This effect has arisen, in part, from large capital gains on both investment properties and owner occupied dwellings (*Thompson, 2000*). The level of assets held by a household can also determine the access it has to lines of credit, which can have a further impact on consumption patterns.

But it is not only the level of households' wealth which is of interest. Changes in the composition of household assets have also occurred in recent years; for example, households now own more shares than in times past. Levels of household debt have also increased. These changes can make households more sensitive to external influences such as shifts in interest rates and share price movements on the stockmarket.

In aggregate, changes in the composition and distribution of the wealth of households and other sectors of the economy influence the way in which Australia reacts to external stimuli such as the South-East Asian crisis of the mid-1990s.

There is also a great deal of interest in the concentration of wealth, inequality in its distribution and how these factors change across time. Statistics which summarise this concentration, such as the Gini Coefficient, or the percentage of wealth held by households in the top and bottom deciles of the wealth distribution, are of particular interest to social analysts and policy makers.

It is therefore critical that analysts, policy makers and the wider community have access to data on the distribution of wealth across different types of households. For this reason, many studies have attempted to estimate and/or analyse this type of information.

## 2.3 Existing household wealth statistics

Aggregate statistics on the wealth of the household sector have been compiled for some time. In 1987 Piggot produced estimates of private sector wealth including the dwelling stock, household durables, rural wealth, other business assets and inventories, government bonds, central bank liabilities and foreign sector adjustments. In 1991, Callen refined the methods used by Piggot, particularly by including more comprehensive dwelling price data and by deriving separate estimates for several components of business wealth.

Since the mid-1990s sectoral balance sheets (including a household sector balance sheet) have been available in the ASNA. The household balance sheet provides dissections of household wealth formulated in the same framework as the National Balance Sheet. These data have been compiled for all years back to 1989–90.

The picture of how wealth is distributed between groups of households, rather than broad sectors of the economy, has remained less clearly defined. The only attempts at a comprehensive collection of Australian wealth data were undertaken in 1915, as part of the 1915 ABS War Census, and in 1966–1968, in the Survey of Consumer Expenditure and Finance conducted by Macquarie University and the University of Queensland. However, there have been many studies which have estimated distributional wealth data. Typically these studies have covered a selection of household assets and liabilities. Neville and Warren (1984) give a detailed account of the studies undertaken up to the mid-1980s.

In the last decade further developments have occurred. In 1990 Dilnot used data from the 1986 Income Distribution Survey, and rates of return on investments (i.e. the investment income, or income capitalisation approach) to estimate the composition and distribution of personal sector wealth. These techniques were extended by Baekgaard and King (1996) to estimate owner occupied housing assets and loans, interest bearing and dividend yielding assets, investment in rental properties and superannuation for 1985–86. Once again, these estimates were based on the 1986 Income Distribution Survey. Most recently, Kelly (2001) estimated similar asset groups, and business assets, for the 1997–98 financial year, using the 1997–98 Survey of Income and Housing Costs (SIHC) confidentialised unit record file.

In 1996 Bacon built on Dilnot's techniques, and used the ASNA household balance sheet to provide aggregate data, and income surveys to provide the distributional picture. In 2000 a study by Robertson, Kropman and McEwin of the ABS used similar techniques to dissect groups of assets and liabilities from the household balance sheet into life cycle categories, which incorporated the age of the reference person and the basic structure of the family (lone-parent, couple with, or without, children etc.). This study was based on data from the annual Surveys of Income and Housing Costs over the four year period from 1994–95 to 1997–98.

While this list of previous work in the field of Australian wealth statistics is by no means exhaustive, it serves to illustrate the types of estimates which have been compiled to date, and which have inspired the work reported in this paper.

## **2.4 Development of new experimental estimates of the distribution of household wealth**

Given that most previous studies have concentrated on a selection of the assets and liabilities owned by households, or have compiled estimates for a particular point (or selection of points) in time, the ABS was keen to develop a distributional wealth model which could provide a number of dissections of the assets and liabilities in the household balance sheet household across most of the 1990s. A key reason for undertaking this work was to extend the work done by other researchers via access to all of the full unit record files at the disposal of the ABS. In addition, the study sought to increase confrontation between a number of wealth related data sets coming from different parts of the statistical framework, and to provide a model which could be updated in the future, as new data sources become available.

To achieve all of these goals, a model was constructed to synthesise data at the household level. This technique provides the maximum level of analytical flexibility, by building a data set that can be tabulated by different characteristics, the range of which is limited only by the quality of data used to construct the model.

The Surveys of Income and Housing Costs (SIHCs) and the Household Expenditure Surveys (HESs) provided the core of the distributional data in this study. These surveys provided the means to determine disaggregations of wealth by variables such as stage of life cycle (incorporating information on the ages of the reference person and children), broad geographic region and level of income. The SIHC and HES are the best basis for this type of work, as, for any given year, they contain the largest number of relevant data items in a single unit record file.

Data from other surveys and administrative sources were then used to provide information on assets and liabilities which were not included in the SIHC or HES questionnaires, and to refine estimates where some information had been directly collected. This work builds on the work of Dilnot (1990), Bacon (1996), Baekgaard and King (1996), Kelly (2001) and others. Some of the techniques and data being used to derive the estimates are the same as those used in previous studies (see Section 2.3). In other cases, variations on these techniques have been devised, or new data sources have been used.

A number of problems arise when compiling estimates for items which are not surveyed. The approach used depends on the data available, and this is discussed in more detail in Section 3.4. In some cases, a model can be used to assign synthetic<sup>2</sup> asset or liability values to particular households, based on variables which have been observed to be linked to the variable of interest in other data sources.

However, this approach relies on the existence of both a fairly rich source of data, and an appropriate model which explains most of the natural variation within it. In some cases, such a data set or model will not exist, and in these cases the approach has been to apply average asset or liability values to all members of a particular group of households. The synthetic values may therefore not be robust at the micro level, as individual household values will deviate from the average in all but a few cases. However, when these estimates are benchmarked, group by group, to an existing distribution from another source, the cross-tabulations which are produced will provide the correct group totals. In this way, the data will support distributional analysis at a group, rather than individual household, level.

Following on from the work of Bacon (1996) and Robertson, Grandy and McEwin (2000), the final step in the estimation process was to apply the distributional data generated by the model to the assets and liability aggregates in the household balance sheet. That is, aggregates derived from the survey data were benchmarked to the aggregate figures in the household balance sheet. However, the scope and coverage of the household balance sheet and a household survey such as the SIHC or HES are quite different, as they have been developed to serve different purposes. Adjustments were therefore made to account for these differences. These adjustments are discussed in Section 3.3

The following Chapter provides an overview of the data and methods used to derive the estimates reported in this paper. For full details of how the estimates were constructed, the reader is referred to Chapters 7 to 13.

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<sup>2</sup>Synthetic estimation refers to a sub-population estimation technique often used in small area estimation, or for other small domains. The basic approach involves using detailed survey data to model the relationship between the variables of interest and the related auxiliary variables, and subsequently applying the identified models to other data.

## 3 Overview of data and methods

### 3.1 ABS surveys and administrative data sources

The distributional dimensions of the model are based on data from households surveys and other administrative sources. The following section provides an overview of the key data sources used.

#### The Survey of Income and Housing Costs (SIHC)

Details of the design of the SIHC are provided in the explanatory notes of *Income Distribution, Australia* (cat. no. 6523.0). A selection of these details are reproduced in Appendix 14.8. The following paragraphs outline a few main points.

Surveys of Income and Housing Costs were conducted in 1994–95, 1995–96, 1996–97, 1997–98 and 1999–2000. In these years, the SIHC was conducted on a sub-sample of private dwellings included in the ABS Monthly Population Survey (MPS). Each month, a sample of approximately 650 private dwellings was selected for the income survey from the responding households in the MPS. Non-private dwellings were not included in the SIHC. Over each year, this resulted in approximately 15,500 persons over the age of 15 being included in the sample and of these, about 85% responded. Where there was partial (i.e. not complete) response, donor imputation was used to fill in missing information.

The sample is suitable for producing reliable estimates at the Australian level for the income of residents in private dwellings, classified by different population groups based on household composition (such as couples with, or without, children), and levels and sources of income. Estimates at the state and territory level for broad aggregates are generally reliable although some estimates for Tasmania, the Northern Territory and the Australian Capital Territory should be used with caution.

#### The Household Expenditure Survey (HES)

Details of the design of the HES can be found in *Household Expenditure Survey, Australia: User Guide* (cat. no. 6527.0). A selection of these details are reproduced in Appendix 14.9. The following paragraphs outline a few main points.

The 1998–99 Household Expenditure Survey (HES) collected detailed information about the expenditure, income and household characteristics of a sample of 6,893 households resident in private dwellings throughout Australia. Previous Household Expenditure Surveys were conducted in 1974–75, 1975–76, 1984, 1988–89 and 1993–94.

Information was collected during a personal interview and also from diaries in which survey participants recorded all their expenditure over a two week period. Interviews were equally spread over the financial year beginning July 1998 and ending June 1999.



## The Rental Investors Survey (RIN)

The RIN was conducted in July 1993 and July 1997 as a supplementary topic in the Monthly Labour Force Survey. The RIN collected information on the demographic and financial characteristics of people who invest in residential rental property in Australia, and the characteristics of their most recently acquired rental properties. The survey also sought information on their reasons for investment. The survey covered all persons in Australian private dwellings with much the same exclusions as the SIHC, although the RIN also excluded persons aged less than 18. The final sample for the 1997 RIN was 28,520 private dwellings with a response rate of 89% or about 63,000 persons. (*Household Investors in Rental Dwellings, Australia, 1997*, cat. no. 8711.0)

## ABS superannuation surveys

The ABS ran a superannuation survey as a supplementary survey to the Monthly Labour Force Survey in 1988, 1991, 1993 and 1995. Superannuation data were only collected from wage and salary earners aged 15–74 years, with the most detailed information collected from persons aged 45–74. Persons aged 15–20 still at school were excluded. Persons aged 15–44 were only asked questions relating to whether they had superannuation coverage and the number of superannuation accounts they held. Respondents who were 45 or over were asked for their own, and their employer's rates of contribution. No superannuation account balance information was collected in the survey. The survey included about 30,000 private dwellings or 65,000 persons.

In 2000, much more extensive superannuation data was collected in the Survey of Employment Arrangements and Superannuation (SEAS). Where respondents gave their consent, the ABS contacted superannuation funds to obtain further details of respondents' superannuation account balances. The SEAS collected data from private dwellings in urban and rural areas, excluding remote and sparsely settled areas of the Northern Territory. The survey covered persons aged 15–69 years, and obtained most of its information via personal interview. Households were surveyed between April and June 2000, and superannuation funds provided data between May and October 2000. Further information can be obtained from the publication *Superannuation: Coverage and Financial Characteristics, Australia*, cat. no. 6360.0.

## Data from the Reserve Bank of Australia Bulletin

The Reserve Bank Bulletin provides an array of economic data obtained from a variety of sources. The Bulletin series used in this study were:

- retail deposit and investment rates for transaction and investment accounts and cash management accounts at banks. These series are compiled near the end of each month, and are average rates obtained from the four largest banks
- finance company debenture investment rates, which 'refer to debentures of companies associated with banks'
- Treasury bond yields — which represent 'estimated yields at the close of business for the last day of the month'
- dividend yields which represent end of month Share Price Index-linked dividend yield, from the S&P/ASX200 index
- credit card advances outstanding, which refer to the total debt owing on credit card accounts offered by banks on the last business day of the month
- fixed and revolving lending to persons, which exclude lending to non-residents.

## **Aggregated HECS liabilities data from the Australian Taxation Office**

The ATO supplied the ABS with aggregates of total Australian Higher Education Contribution Scheme (HECS) debts broken down by age ranges, state of residence, and income ranges. The information underlying these data are kept by the ATO as part of its administration of the HECS scheme.

## **The Business Longitudinal Survey (BLS)**

The following information was drawn from the explanatory notes of *Small and Medium Enterprises, Business Growth and Performance Survey, Australia, 1997–98*, cat. no. 8141.0 .

The Business Longitudinal Survey (BLS), also known as the Business Growth and Performance Survey (GAPS) was conducted in 1994–95, 1995–96, 1996–97 and 1997–98. A key feature of the survey was its longitudinal design, which primarily used the same sample for each year of the survey. This enabled firms with similar characteristics to be compared with other firms displaying different characteristics, both at the same time point and over time.

The survey was designed to provide estimates on the growth and performance of Australian employing businesses and to identify selected economic and structural characteristics of these businesses. The scope of the survey was all employing businesses, excluding the following industries: Agriculture, forestry and fishing, Electricity, gas and water supply, Communication services, Government administration and defence, Education, Health and community services, and Libraries, museums and parks and gardens.

Most data items, for example profit or loss, employment details, and characteristics of the major decision maker, were collected in all time periods. However, special topics were also rotated in and out of the survey. In 1997–98 the sample size for GAPS was 5,778 businesses, including 1,782 unincorporated enterprises.

## **Information Technology Surveys**

The Business Use of Information Technology Survey was conducted in 1993–94, 1997–98 and 1999–2000. The sample size of these three surveys ranged between 6,800 and 15,000 business units. Business units in the Agriculture and Education industries were excluded from the survey, as were units in the government sector and all non-employing business. The survey collected data on the type, purpose and level of use of information technology products and internet usage by business. Data are available at Australian and state levels, and by industry classification.

The Use of Information Technology on Farms Survey was conducted in 1998–99, as part of the 1998 and 1999 Agricultural Commodity Surveys. Approximately 35,000 business units with agriculture as their principal activity were included in the survey. Only business units with estimated value of agricultural operations of \$5,000 or more were included in the survey. The data collected by the Use of Information Technology on Farms related to the number of farms which used computers, and which farms had access to the internet. Data are available at Australian and state levels, and at the sub-industry level.

## **Agriculture Finance Survey (AFS)**

The AFS is an annual survey of economic management units which are classified to the Agriculture subdivision of the Australian and New Zealand Standard Industrial Classification (ANZSIC). The industry classification of units is based on their principal activity, and only units which had an estimated value of agricultural operations of \$22,500 or more are included in the survey.

Around 250 items of financial data are collected including income, expenses, debt, interest paid, asset acquisition and asset values. In 1999–2000 the sample selected for the AFS was 2,556 business units. Data are available at Australian and state levels, and by industry classification. (*Agricultural Industries, Financial Statistics, Australia, Preliminary, 1999–2000*, cat. no. 7506.0)

## **Agriculture Commodity Survey (ACS)**

The ACS is conducted annually, for the year ending 30 June. Every fifth year an Agricultural Census is conducted in place of the ACS. The scope of the ACS is all establishments with an estimated value of agricultural operations above \$5,000. The sample size results in approximately 35,000 respondents. Data are collected at the establishment level.

The ACS is primarily designed to collect data about commodities (including area and production for crops, number of livestock and area irrigated). Data are also available on the number of producers for each commodity, and on counts of producers by ANZSIC class. (*Agriculture, Australia, 2000*, cat. no. 7113.0)

## **The National Plantation Inventory (NPI) and the National Farm Forest Inventory (NFFI)**

The NPI and the NFFI are coordinated and managed under Australia's National Forest Inventory (NFI), and conducted by the Bureau of Rural Sciences (BRS).

Key data objectives of the NPI are to:

- develop and maintain a comprehensive national resource database of private and public softwood and hardwood timber plantations, at the national and regional levels
- map the distribution of resources.

The key data objective of the NFFI is to work with regional, state and other stakeholders to facilitate the collection, collation and interpretation of farm forest resource data.

The report, *Plantations of Australia 2001*, provides regional figures on Australia's large industrial and small farm forestry resources. It also includes disaggregations of land and wood ownership of plantations in Australia.

## 3.2 The Australian System of National Accounts and the household balance sheet

While the distributional dimensions of the estimates come from surveys and administrative data sources, aggregate figures come from the Australian System of National Accounts (ASNA). Data from the household balance sheet is the main source of National Accounts data used in this study.

### National Accounts balance sheets

The System of National Accounts 1993 (SNA93) is an international system providing guidelines for the preparation of national accounts, and it forms the basis of the ASNA. SNA93 defines a balance sheet as '... a statement, drawn up at a particular point in time, of the values of assets owned and of the financial claims — liabilities — against the owner of those assets. A balance sheet may be drawn up for institutional units, institutional sectors and the total economy.'

Under SNA93 guidelines, for an asset to be included in the national balance sheets it must be an economic asset:

- over which ownership rights are enforced by institutional units, individually or collectively
- from which economic benefits may be derived by its owner by holding it, or using it, over a period of time.

In general, Australian national balance sheet estimates are consistent with SNA93 recommendations. However, there are three main areas where the ABS has not followed the recommendations of SNA93 with regard to defining the asset boundary — subsoil assets, mineral exploration and ownership transfer costs. For further details of the ASNA treatment of these assets, the reader is referred to *Australian National Accounts: Concepts, Sources and Methods* (cat. no. 5216.0).

This publication also provides the following description of how assets should be valued when constructing a balance sheet:

'Ideally, assets should be valued on the basis of current, observable market prices as this is the basis on which decisions by producers, consumers, investors and other economic agents are made. In the absence of observable market prices, current prices can be approximated for balance sheet purposes in two ways. In some cases, market prices may be approximated by accumulating and revaluing acquisitions less disposals of the asset in question over its lifetime....In other cases, market prices may be approximated by the present, or discounted, value of future economic benefits expected from any given asset; this is the method used for subsoil assets and native forests in the balance sheets. (*Australian National Accounts: Concepts, Sources and Methods*, cat. no. 5216.0, Section 26.11)

These definitions (and many others) provide the basic framework for the balance sheets in the ASNA.

## Sectoral balance sheets

Balance sheets are compiled at a national level, and also for sectors of the economy, which are based on the Standard Institutional Sector Classification of Australia (SISCA). SISCA breaks the economy into the following institutional sectors:

- Non-financial corporations
- Financial corporations
- General government
- Households
- Nonprofit institutions serving households
- Rest of the world

In the ASNA, balance sheets are prepared for the first three of these sectors, and there is a combined balance sheet for households and nonprofit institutions serving households (NPISHs) are grouped together. Another significant point to note is that the assets and liabilities which are owned by unincorporated enterprises are also considered to be part of the household sector. SISCA defines this relationship in the following way:

'The institutional units in [the household] sector are groups of persons who share accommodation, pool some or all of their income and wealth, and collectively consume goods and services, principally housing and food. Although households are primarily consumers of goods and services they also engage in other forms of economic activity through their operation of unincorporated businesses.

Producer units within the household sector are not legal entities separate from their owners. Therefore assets used in unincorporated enterprises belong to the owners of the household, not the enterprise. Sole proprietorships and owners of ordinary partnerships, such as family partnerships and partnerships of individuals, will frequently combine their business and personal transactions. Consequently complete sets of accounts in respect of the business activity will often not be available and such unincorporated enterprises are classified as part of the household sector.'

The assets and liabilities in the household balance sheet are therefore those owned by Australian households, the unincorporated enterprises which they own, and nonprofit institutions serving these households.

## The components of the household balance sheet

The structure of the household balance sheet is shown in table 1, along with a brief definition of each item from the ASNA. For full definitions of each item, and information about how figures in the ASNA are compiled, the reader is again referred to the *Australian National Accounts: Concepts, Sources and Methods* (cat. no. 5216.0).

Consumer durables do not appear in table 1, however, they are listed as a memorandum item to the National Balance Sheet, and their distribution is considered as part of this study.

Valuables are also not shown in table 1, as, due to data limitations, valuables are not currently included within the fixed assets of the ASNA. This type of asset includes precious metals and stones not used as inputs to production, antiques, works of art and other valuables such as collections of jewellery.

Similarly, data limitations result in some intangible non-produced assets not being included in the balance sheet. For example, patents, broadcasting licenses, other transferable contracts and purchased goodwill are excluded.

**Table 1: The assets and liabilities of the household balance sheet**

<b>Component</b>	<b>Definition</b>
<b>Assets</b>	
<b>Non-financial assets</b>	Non-financial assets consist of produced and non-produced assets.
<b>Produced assets</b>	Produced assets are produced as outputs of the production process.
<b>Fixed assets</b>	
<b>Tangible fixed assets</b>	Tangible fixed assets are non-financial assets that are used repeatedly and continuously in production processes for more than one year.
Dwellings	Dwellings, including those under construction, and the value of alterations and additions to dwellings made by owner-builders. Dwellings include houses and other dwellings (flats, home units, villa units, duplexes, mobile homes and caravans used as the principal residence of households etc.).
Other buildings and structures	Non-residential buildings and the fixtures, fittings and equipment that are integral parts of the buildings, other structures, such as highways, railways, bridges, harbours, dams, pipelines, communication and power lines, construction (other than buildings) for sport or recreation purposes, and other buildings and structures yet to be completed.
Machinery and equipment	Includes electrical apparatus, office accounting and computer equipment, furniture, fixtures and fittings not forming an integral part of buildings, durable containers, special tooling etc.
Livestock — fixed assets	Livestock used for breeding, dairy, draught and other purposes which do not result in the death of the livestock. This category includes sheep or other animals used for wool production and animals used for transportation, racing or entertainment.
<b>Intangible fixed assets</b>	Intangible fixed assets include items such as mineral exploration, computer software, and entertainment, literary or artistic originals.
Computer software	Includes the purchase of software and software developed. Large expenditures on the purchase, development or extension of databases are also included.
Entertainment, literary or artistic originals	Includes originals of films, sound recordings, manuscripts, tapes etc. on which drama performances, radio and television programming, musical performances, sporting events, literary and artistic output etc. are embodied.
<b>Inventories</b>	Inventories include materials and supplies intended to be used as inputs to production, work-in-progress, finished goods and goods purchased for resale without further processing.
Private non-farm inventories	Includes inventories owned by non-farm unincorporated enterprises.
Farm inventories	Crops yielding once-only products. Note that fixed horticultural assets (such as fruit trees) are not included in the balance sheet.
Livestock — inventories	Includes the value of livestock raised for the purpose of slaughtering or eventual sale.
Plantation standing timber	Trees under active management, which have been planted for the purpose of once-only harvesting.

**Table 1 (continued): The assets and liabilities of the household balance sheet**

<b>Component</b>	<b>Definition</b>
<b>Non-produced assets</b>	Tangible non-produced assets are non-financial assets that occur in nature and over which ownership may be enforced or transferred. Environmental assets over which ownership cannot be attributed, such as international waters or air, are excluded.
Land	Land, including the value of land underlying dwellings, non-residential buildings and structures, land under cultivation, recreational land and associated surface water and private gardens and plots not cultivated for commercial purposes.
Native standing timber	Native forests available for commercial exploitation.
<b>Financial assets</b>	Financial assets, for the most part, represent a contractual claim on another institutional unit (resident or non-resident) and entitle the holder to receive an agreed sum at an agreed date.
Currency and deposits	Currency, transferable deposits and other deposits.
Securities other than shares	Short and long term securities, i.e. those with an original maturity normally of one year or less or more than one year, respectively. e.g. bonds and debentures.
Loans and placements (receivable)	The counterpart of the loans and placements owed by other sectors, to the household sector.
Shares and other equity	Shares and other equity: Unlike other financial instruments, shares and other equity do not provide the right to a predetermined income. They are instruments or records acknowledging claims to the residual value of incorporated enterprises after the claims of all creditors have been met. This item also includes trusts because 'they have important characteristics of equities, such as entitlement to a share of the profits and (on liquidation) a share of the residual assets of the trust'.
Insurance technical reserves	Insurance technical reserves: consist of net equity of households on life insurance reserves and pension funds, and prepayment of premiums and reserves against outstanding claims. Insurance technical reserves are an asset of policyholders, and liabilities of insurance enterprises and pension funds.
Unfunded superannuation claims	Unfunded superannuation claims are the liabilities of the general government sector to public sector employees in respect of unfunded retirement benefits.
Other accounts receivable	Accounts payable to the household sector, by other sectors. Note that accounts receivable from other unincorporated enterprises or households will not be included in this item, as intra-sectoral claims are not shown in the balance sheet.
<b>Liabilities</b>	Claims against the household sector.
Securities other than shares	Securities other than shares issued by the household sector, the counterpart of securities other than shares assets in other sectors.
Loans and placements	Loans and placements: Loans taken out by the household sector. Other sectors hold the counterpart of this item in their assets. This item includes home loans, personal loans, credit card debt and HECS loans.
Other accounts payable	Other accounts payable (to other sectors). Note that accounts payable from other unincorporated enterprises or households will not be included in this item, as intra-sectoral claims are not shown in the balance sheet.
<b>Net worth</b>	The value of assets less the value of liabilities is known as net worth and is the ASNA's measure of wealth.

### 3.3 Techniques used to produce distributional household wealth data

The preceding sections discussed the SIHC and the HES which were used to build the distributional dimensions of the model, and the household balance sheet which provides aggregate benchmarks. This section provides an overview of how these data sources were melded together to construct the data used to generate the experimental estimates presented in Section 4.

#### Constructing a 'synthetic' data set

Before moving to a discussion of the methods used in this study, it is important to note that there are a range of approaches which could be considered in constructing distributional wealth data. For this study, existing data were used to create synthetic household-level records so that estimates could be generated for a range of key disaggregations.

To develop this type of synthetic data, one can use data from one survey to impute details for each person in another survey (for example the SIHC or HES). To illustrate this technique, consider the record of a farmer in the SIHC. One could consult data from the Agricultural Finance Survey (AFS), and determine, by looking at the characteristics of the farmer on the SIHC, and similar records on the AFS, the value of livestock assets which the SIHC farmer may be likely to own. This approach is a type of static micro-simulation, and is similar to 'donor imputation', a technique often used to impute for non-response on surveys. In this way, one could piece together a matrix of wealth components which have been 'donated' from other surveys, at the household level.

This approach of 'donating' data from various sources to a base data file is now frequently used to generate small area data. However, such work usually involves a base file with very comprehensive coverage of the population, such as a population register or Census data file. In this project, the SIHC and HES were chosen as the basis for the estimates, because they contain the greatest amount of wealth-related information (both a small number of directly measured asset and liability values and a number of related income streams), and this information is available across time.

Donating data at the individual unit record level is a good approach, but it should be remembered that if such an approach was used in this study, when the new SIHC or HES-based wealth estimates were aggregated, the derived totals may not be the same as those from the original surveys which donated their data. This is because the SIHC and HES were not designed to produce estimates with small standard errors for all the dissections that are of interest in this project. In addition, for many asset and liability items, there are insufficient data to formulate a detailed model to predict the amount of an item which a particular household may own.

For these reasons a range of techniques is used. In some cases, data are grafted from one survey to another, at an individual level, but are adjusted in such a way that when population estimates are generated, they will be the same as those generated from the original data source.

In other cases, directly collected data are not available from any survey, and estimates must be determined indirectly, for example, by using related income streams or other information.



What is derived then is not a data file with all the answers people would have supplied about their wealth if they had been individually surveyed. Instead, a very large and detailed matrix is created in which groups of households, when aggregated and weighted by SIHC or HES weights, will provide representative estimates.

A matrix constructed in this way may not support in-depth analysis of all the multidimensional cross-tabulations that might be of interest to users. For example, it will not be possible to use the data generated to assess how the wealth of business owners in a particular industry relates to their educational attainment. It is important to remember that similar kinds of in-depth analyses conducted on wealth survey data would not yield robust results, unless the survey had been designed with such specific questions in mind. The viability of different dissections of the data constructed in this study are discussed in more detail in Section 5.3.

## Overview of techniques used to compile the estimates

The following paragraphs illustrate the general techniques that are used to construct the estimates, with some examples of how these techniques are applied to estimate the distribution of specific assets or liabilities. Estimates for other components of the balance sheet are formulated using similar methods. Details of the estimation methods underlying each type of asset or liability are presented in Chapters 7–13.

All estimates have been compiled on a current-price basis. This is the basis on which SIHC and HES data are collected, and it is also the way in which household balance sheet data are presented. This means that wealth will be affected not only by the changing volumes of household assets and liabilities, but also by changing prices. Future extensions to the current work may include: a) analysis of changes in asset and liability volumes; or b) changes in households' purchasing power. For further details, see Section 6.3.

## Assets and liabilities directly measured in the SIHC or HES

For some assets and liabilities, the SIHC or HES has asked respondents to value their wealth directly. For these directly measured components, one can use the survey data to determine the shape of the distribution, and the ASNA balance sheet to determine the aggregate value.

For example — the SIHC asks questions on the total amount owing on mortgages and unsecured loans taken out to purchase, build, alter or add to the owner occupied dwelling. Owner occupied housing loan estimates are based on these data. These estimates, along with estimates of investment property loans, consumer and other household loans, higher education contribution scheme (HECS) loans and business loans are aggregated, to derive an adjustment ratio which will bring the total of all of these items in line with the ASNA household balance sheet loans and placements item. For the  $i^{\text{th}}$  household, this can be expressed as follows:

Owner-occupied housing loans  $_{Benchmarked}^i =$

$$\text{Own home loans}_{SIHC/HES} \times \frac{\text{Loans and placements}_{ASNA}}{\sum_{i=1}^n \text{All unbenchmarked loan items}_{Derived}^i}$$

**Assets and liabilities for which an income/payment stream is collected in the SIHC or HES, and information about the relationship between this income/payment stream and an asset/liability is available.**

Other asset and liability values are not directly collected in the SIHC or HES, however these surveys have obtained data on an income item which can be related to (or is the result of holding) a particular asset. One can sometimes use another data source to calculate a ratio of asset holdings to income, for a particular class of households. This ratio can then be applied to the income data from the survey, to derive asset values for the household. This is commonly referred to as the income capitalisation technique. In this study, the figures thus derived are then benchmarked to the appropriate ASNA aggregate figure. A similar approach can be used to link expenditure data with liabilities.

For example — this technique was applied to derive figures for 'machinery and equipment' assets. Respondents in the SIHC and HES are asked a number of questions relating to business income. Ratios of machinery and equipment to gross mixed income at the industry division level were calculated, using unpublished ASNA data. This method means that the  $i^{\text{th}}$  household, which controls its own unincorporated business, in industry division  $j$ , will have an estimate of machinery and equipment derived as follows:

$$\text{Machinery and equipment}_{Derived}^{ij} = \text{Business income}_{SIHC}^{ij} \times \frac{\text{Machinery and equipment}_{ASNA}^j}{\text{Gross mixed income}_{ASNA}^j}$$

The household estimates for machinery and equipment are then aggregated, and benchmarked to the ASNA household balance sheet machinery and equipment item. This process can be expressed as follows:

$$\text{Machinery and equipment}_{Benchmarked}^i = \text{Machinery and equip.}_{Derived}^i \times \frac{\text{Machinery and equip.}_{ASNA}}{\sum_{i=1}^n \text{Machinery and equip.}_{Derived}}$$

**Components for which an income/payment stream is measured in the SIHC or HES, but about which no additional data exists (except at the aggregate level).**

In some cases (like those in the previous example), the SIHC or HES has obtained data on an income item which can be related to (or is the result of holding) a particular asset. However, in some cases no other data about the component, or its relationship to income, is available. In such instances it may be possible to assume that the income stream completely captures the distribution of the asset, and distribute the asset in direct proportion to the amount of income earned (*Bacon, 1996*). An additional benchmarking step is not required (unless other adjustments are made), as the sum of individual values will always equal the aggregate figure. A similar approach can be used with expenditure data to generate liability estimates.

This method was used to estimate the distribution of ‘entertainment, literary or artistic originals’ (ELAO).

For the  $i^{\text{th}}$  household, the derived value of ELAO can be expressed as follows:

$$ELAO_{Derived}^i = \text{Royalty income}_{SIHC/HES}^i \times \frac{ELAO_{ASNA}}{\sum_{i=1}^n \text{Royalty income}_{SIHC/HES}}$$

A variant of this technique has been used where yields on assets (or ratios of assets to income) are not available, but additional data exists which allows some dimensions of the distribution of the item to be determined, perhaps by breaking the aggregate benchmark figure into smaller parcels.

For example — this technique was applied to derive figures for ‘farm inventories’. Data from the Agricultural Finance Survey was used to determine the proportion of farm inventories in each state or territory. This information was then used to break the aggregate Australian household farm inventory benchmark into a set of approximate state benchmarks. These state totals were distributed across households in proportion to their farm income, so that for the  $i^{\text{th}}$  farm household, in state or territory  $j$ , the derived value of farm inventories can be expressed as follows:

$$\text{Farm inventories}_{Derived}^{ij} = \frac{\text{Farm income}_{SIHC}^{ij}}{\sum_{i=1}^n \text{Farm income}_{SIHC}^{ij}} \times \frac{\text{Total state farm inventories}_{AFS}^j}{\text{Total Australian farm inventories}_{AFS}} \times \text{Farm inventories}_{ASNA}$$

### Components which are grafted from one data source to another, using household characteristics.

In some cases an asset, liability, income or expense item is directly collected, but not in the core survey. Data which are derived from sources other than the SIHC or HES may provide a distributional picture of an asset or liability (either directly, or in some cases, using a modelling approach). Household characteristics which are common to both the ‘external’ data source and the core survey (for example, age of the household reference person, number of children and geographic location) can be used to ‘graft’ information from one data file to another. The finer the splits by household characteristics, the better the mapping between the two files. However, there will be some cases where variables common to the external data source and the core survey are not available at the level of detail desired. In each case, a decision must be made about the level of detail required to provide a reasonable estimate. The number and type of variables used in the mapping of data from an independent data source to the main SIHC or HES data file have been determined on a case by case basis.

An example of where this technique was used is the credit card debt component of consumer and other household loans. Data on credit card interest payments from the HES was dissected into groups based on the age of the household reference person, their state of residence, the type of household, and household's total income. For each group, an estimate of the amount owing on credit cards was derived by applying the RBA credit card interest rate to the interest reported. Average credit card liabilities for each group of households were then calculated, and these values were assigned to households in similarly defined groups on the SIHC. Where the SIHC data did not support such a fine dissection, units in the HES file were dissected by broader splits, and information for these groups was grafted onto households with missing values in the SIHC. For the  $i^{\text{th}}$  income unit, in characteristic group  $j$ , the derived value of credit card debt can be expressed as follows:

$$\text{Credit card debt}_{SIHC}^i = \frac{\text{Total weighted value of credit card debt}_{HES}^j}{\text{Weighted number of income units in group}_{HES}^j}$$

### 3.4 Adjustments required when melding data from different sources

The preceding sections discuss the ways in which data from a range of sources were used to construct synthetic household-level wealth data. However, this discussion has abstracted from a large amount of detail, including the adjustments which have to be made to account for differences in scope and coverage between different data sources. Such adjustments have been made in the estimation of most components of the balance sheet, and are discussed in detail in Chapters 7–13. The following section presents the broad adjustments which were necessary to account for differences between the core distributional data underlying the estimates (the SIHC and HES), and the Australian System of National Accounts. The aggregate estimates of wealth generated from these two parts of the statistical framework are not identical, as balance sheets and household surveys have been developed to serve different purposes. However, it is possible to make adjustments to account for these differences.

#### The assets and liabilities of nonprofit institutions serving households

As discussed in Section 3.2, the household balance sheet includes households, unincorporated enterprises and nonprofit institutions serving households (NPISHs). NPISHs are not covered in household surveys, therefore the first adjustment which was made to the figures in the household balance sheet was to remove the assets, liabilities and net worth of NPISHs. Data was obtained from the Financial Accounts Section of the ABS, and the Economic Activity Survey (EAS) to allow this adjustment to be made.

EAS estimates of NPISH assets are available in two groups: current assets and non-current assets. Current assets and liabilities are those which will generally cease to exist, or will have been used up, within 12 months (e.g. cash at bank). Non-current assets and liabilities will usually appear on a business' books for a longer period (e.g. buildings). In general, assets in these two groups were allocated to NPISHs in the same proportions of total current or non-current assets as those found in the household balance sheet. Exceptions to this rule are outlined in the following paragraphs.

Dwellings and other buildings and structures were adjusted to reflect the fact that NPISHs are likely to own more buildings and structures (such as sports, school and club house facilities), and a smaller proportion of residential dwellings than the rest of the household sector.

Assets such as life insurance technical reserves, consumer durables and superannuation assets were assumed to be zero for the NPISH sector, as these assets only accrue to households.

Data from the Financial Accounts were used to determine the bank deposits of, and bank loans to, NPISHs. These data understate the total deposits of, and loans to, NPISHs as deposits or loans held with other financial institutions are not included. However, this should have a reasonably small effect on the quality of the final household estimates.

NPISH accounts receivable and liabilities other than bank loans, i.e. accounts payable and securities other than shares, were estimated as percentages of the equivalent household balance sheet items. This was a second-best approach, but could not be avoided. EAS NPISH liability data includes accounts payable, but this is measured from the NPISH's point of view, and therefore includes accounts payable to other entities represented in the household balance sheet (i.e. accounts payable to unincorporated enterprises). Such liabilities are not included in the household balance sheet, as intra-sectoral accounts payable and receivable are netted out of sectoral balance sheets.

The assets attributed to NPISHs were aggregated and rebenchmarked to equal the asset totals from EAS. Other insurance technical reserves were added to the NPISH balance sheet after this adjustment, as they are out of scope of the assets surveyed in EAS.

The data described above which were used to construct estimates of NPISH wealth have their limitations. First, EAS NPISH data were weighted using EAS weights, which are representative for Australia, but are not specifically designed to yield high quality NPISH estimates. Second, the methods used to derive the estimates involve a number of assumptions. Notwithstanding these issues, the adjustment is the best that can be made at this time, and since the aggregate wealth of NPISHs appears to be quite small relative to the rest of the household sector, the adjustment does not greatly affect the picture of the distribution of wealth which emerges from the model. The approximate NPISH balance sheet which results from this process is shown in Appendix 14.6.

### **The assets and liabilities of people in non-private dwellings**

The second adjustment required was to account for people living in non-private, or special dwellings (NPDs or SDs). Examples of special dwellings are boarding houses, hotels, nursing homes and institutions. These types of dwellings are not included in the SIHC or HES, and their usual residents are not included in SIHC and HES benchmarks. Therefore estimates generated using survey data do not account for people in these institutions.

The scopes of the SIHC and HES also exclude people in remote or sparsely settled areas of the Northern Territory, and the SIHC excludes people less than 15 years of age. Adjustments for these exclusion were considered, but due to the small number of people involved, they were not attempted for this study.

The best source of data on people in NPDs in the period under consideration in this study was the 1996 Census of Population and Housing, which enumerates all people in Australia on census night. Detailed analysis of tables from both the 1991 and 1996 Censuses suggested that while some NPDs housed people whose opportunities to accumulate wealth would be less than the rest of the community (e.g. usual residents of prisons) some other NPD usual residents earned incomes as high (or higher) than their private dwelling counterparts, and would therefore be likely to have the same opportunities for wealth accumulation across their lifetime. On the basis of this analysis, NPDs types were collapsed into two groups — one for NPDs where usual residents would be expected to have accumulated wealth at much the same rate as the rest of the community (type 1) and another for NPDs where usual residents would be likely to have had more limited wealth accumulation opportunities (type 2).

Tables of NPD usual residents from the full 1996 Census data file were obtained, and these were split by NPD type (1 or 2, as described above), Census income ranges, state and ten year age ranges. Estimated resident population (ERP) data from demography was used to roll forward/backward the number of NPD usual residents for each year between 1994 and 2000.

The synthetic asset and liability estimates generated for private dwelling residents (using SIHC and HES data) were divided by the number of non-dependent adults in the household to arrive at an approximate person-level distribution of wealth. These data were again split by Census income ranges, state and ten year age ranges. The median person-level asset or liability value for each cell was then multiplied by the number of type 1 usual residents + 0.5 times the number of type 2 usual residents. Owner-occupied dwelling assets, the loans on these dwellings, and native standing timber assets were assumed to be nil for people in NPDs. The resulting values were aggregated to account for all usual residents of NPDs.

## **Benchmarking synthetic values to balance sheet totals**

Following the adjustments outlined above, benchmarking ratios were derived to ensure that the sum of synthetic asset and liability values of households, NPDs and NPISHs summed to the aggregates in the household balance sheet. First, NPISH assets and liabilities were deducted from the household balance sheet. Next, estimates of the assets and liabilities of private dwelling (PD), and non-private dwelling (NPD), residents were aggregated for each component.

The ratio of the two resulting sets of aggregates was used to benchmark individual household values, and NPD asset and liability estimates. The benchmarking ratios for each component in each year are shown in Appendix 14.4. The size of each ratio reflects the difference between the total of the synthetic estimates and the household balance sheet aggregate. However, care must be taken in the interpretation of these ratios, and the reader is referred to Section 5.2 for further discussion of benchmarks and other data quality issues.

The approximate NPD balance sheet which resulted from this process is shown in Appendix 14.7. There is some volatility in NPD asset and liability estimates from year to year. This arises from movements in median asset or liability values for particular groups of people, across time. These movements are particularly noticeable for assets which are not owned by a majority of households. Refinements to the way in which NPD assets and liabilities are modelled may resolve some of the movement in these values. However, the assets and liabilities owned by residents of NPDs are very small when compared to the remainder of the household sector (usually between 0 and 1.5% of total asset or liability values), and therefore this adjustment does not have a significant effect on the final distributional picture obtained.

## 3.5 Key variables — adjustments and derivations

### Income units versus households

The SIHC is used as the basis for estimates in 1994–95, 1995–96, 1996–97, 1997–98 and 1999–2000. The HES is used as the basis for estimates in 1993–94 and 1998–99. SIHC data from the 1990s is available at two levels — income units and persons. For most components of the balance sheet, SIHC based estimates were compiled at an income unit level, and income units were then aggregated to produce the household picture.

The HES produces person and household level data files, and so the estimates in these years were largely constructed at the household level directly. The final estimates in both cases are at the household level, and are directly comparable.

In some cases it was necessary to map data from a household-level file to an income unit file. Adjustments were made to account for these differences. For example, in some cases all income units in a household were assigned the appropriate household value divided by the total number of income units in the household. Alternatively, a total value for a group of households was allocated across all income units within households within the matching group. These adjustments ensured that when income unit values were aggregated to the household level, the correct totals would result.

### Income items

All income variables which were used in the wealth model were based on gross income. The income of people aged less than 15 was excluded from HES household income, to more closely match the income data collected in the SIHC.

Many of the income items used as a basis for the estimates in this study are available from the SIHC data file on an annual and weekly basis, and from the HES data file on a current weekly basis. For most of these income items, SIHC and HES respondents were asked to report their total income from the previous financial year. Weekly income figures were then derived by either dividing the annual income figure by the number of weeks in a year (approximately 52.14), or by dividing the annual figure by the related earnings period. For example, previous year's business income is divided by the number of weeks for which the business operated.

For this study, annual income from the previous financial year has been used in almost all cases, and HES current weekly income items were converted into annual values. This means that most of the income items used to derive the estimates in this paper are lagged by one year. While this won't affect the aggregate figures from this study (due to the use of balance sheet benchmarks), it does assume a minimal movement in the distribution of assets over the year in question. The possibility of using the lagged income data items as the basis for estimates in their true reference period (i.e. one year prior to that for which they have been used) was considered. However this was not attempted, as there are significant difficulties with this approach. For example, if links between the lagged income items and other household data are to be retained, moving the data back by one year would artificially advance data on the value of own home and home loans, which are captured on a current value basis. These are two of the highest quality and most significant components of the balance sheet, and the gain in the timeliness of other items would therefore come at a significant cost.

Since some estimates are derived by relating assets to income items, difficulties are also encountered when respondents report nil or negative income flows; this is particularly true in the case of business income, and income from renting residential or non-residential properties. Since a negative income flow is associated with a positive asset value, negative income figures must be adjusted before deriving the distribution of the asset, otherwise negative asset values will result.

Several solutions to this problem were investigated, including allocation of average or median income values to negative income businesses, and analysis of confidentialised, grouped data from the ATO to see if any broad industry patterns in gross and net income could be determined, and used to address the negative income issue.

The approach chosen was to determine the smallest positive income decile from tabulations of business records by industry and age of the reference person, or by industry value alone. This value was assigned to an adjusted business income variable. The benefit of this approach was that the relative ordering of businesses on the income scale was largely retained. However, the asset values generated using the adjusted income item can still be quite small, in some cases. A similar adjustment was made to income from renting non-residential rental properties.

It should be noted that the original business income and non-residential rental income variables were not overwritten at any stage. The adjusted income variables were created in addition to the original values, and used in the derivation of certain asset values.

### **Age of household reference person**

In the HES, the reference person for each household is chosen by applying the selection criteria below to all usual residents aged 15 years and over from the top down until a single appropriate reference person is identified:

- one of the partners in a registered or de facto marriage
- a lone parent
- the person with the highest income
- the eldest person.

For example, in a couple, one family household the partner with the highest income is generally the reference person. However if both partners have the same income, the reference person is the eldest partner.

The reference person for a SIHC household is chosen by using similar selection criteria as those used to derive the reference person in the HES. However, in the SIHC, the male partner of a registered or de facto marriage is considered to be the reference person. This means that in couple families income and age are not used to determine the reference person.

In households containing more than one family, the reference person is selected from the primary family. The primary family is the family which contains dependent children. If there is more than one family with dependent children, or there are no dependent children present in the household, then the primary family is the first family identified during the interview.



When grouping households to allow mapping of data from different sources, a number of age ranges based on the age of the reference person were frequently used. In most cases, where age ranges were used they were defined as follows: reference person aged 15–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84 or 85 and over. Exceptions are highlighted in later sections of the paper. Results are presented using less detailed ranges.

## Household type

A household type variable was used throughout construction of the estimates. It was derived for both SIHC and HES survey files, to provide a classification which was identical between years. The groupings used are shown below.

- Lone person households
- Lone parent households
  - with children aged less than 15 only
  - with dependent students aged 15–24 only
  - with children less than 15 and dependent students aged 15–24 only
- Couple household
  - Couple without dependent children
  - Couple with dependent children
    - with children aged less than 15 only
    - with dependent students aged 15–24 only
    - with children less than 15 and dependent students aged 15–24 only
- Group and other households

Group and other households include households where a couple or lone parent with or without children was present, but family members or other persons were also usual residents. For example, a couple living with their children and the mother's sister.

## Industry of own business

Some of the asset classes used in this study require farm businesses to be split from the other unincorporated enterprises owned by households. In other cases, businesses need to be dissected into a range of industry groups. The best data available to produce the required splits was the industry code of the reference person's main job. However, there was no information captured about the industry of the reference person's main job in the 1993–94 HES. Farm businesses in this year were identified using the occupation of the household reference person.

Analysis of SIHC data indicated that where the industry of the reference person's main job was farming, in the majority of cases either the reference person, their partner or both parties had listed farming as their occupation as well. In a few cases it appeared that people owned farms, but were not managing them themselves. These farms will not be captured in 1994 estimates.

In all cases, the farm businesses identified in SIHC or HES files are assumed to be unincorporated, and therefore in-scope for the household balance sheet. This assumption should hold in the majority of cases, as family farms are still the most common farm unit structure in Australia. (*Farm Surveys Report, 1996*)

For non-farm businesses, where a response for the industry variable was not coded, the occupation code of the reference person's main job was occasionally used. In other cases (for example, if both variables were not stated), average values across all industries were generally applied.

Due to the lack of industry data on the 1993–94 HES, 1994 estimates of business assets and liabilities are generally based on slightly different methods to those used in other years (e.g. values were allocated in direct proportion to income, or by using disaggregations by variables other than industry, such as state).

### **Adjustments to auxiliary data**

The auxiliary data sources used to derive finer disaggregations than those available from the SIHC and HES are not available for some of the years considered in this study. In these cases one of the following alternatives was adopted.

1. Straight-line interpolation was used where the estimation year lay between the two time points for which the additional data was available. For example, if the estimation year was 1996–97, a SIHC was run, but not a superannuation survey. Superannuation surveys were run in 1995 and 2000. Interpolation between data from these two surveys was used to obtain estimates of superannuation balances for 1996–97.
2. The auxiliary data from a given year was adjusted, using a related data item. For example, Agricultural Commodity Survey data was used to adjust farm inventories data for years in which the Agricultural Finance Survey was not run.
3. If the first two options were not feasible, but a clear monotonic trend was visible, extrapolation to the time point in question was used. This technique was used to determine HECS balances for 1994 and 1995, as ATO data was only available for the years from 1996 onwards.
4. When none of the techniques listed above was appropriate, data from the year in which the required information was available was used without adjustment.

### **Timing issues**

There are further timing issues to consider, which relate to the reference point for data in the household balance sheet (30 June), and the collection period for the SIHC and HES, which are conducted over a financial year. Benchmarking survey-based estimates to the 30 June balance sheet reference point aggregates assumes that the distributional picture determined via use of survey data reported during the previous year is relevant to the distribution of the stock of wealth at the end of the period.

It would be possible to merge two adjacent survey data files, thus creating a file with double the sample size, and an average reference point of 30 June. This approach might also provide a solution for small samples in some parts of the data set. However, this approach was not feasible for all years, and to retain comparability with the estimates produced from the income and expenditure surveys across the 1990s, this approach was not used in this study.

## 4 Results

In this Chapter, descriptive analysis based on the experimental estimates generated by the wealth model is discussed. Data underlying the analysis in this Chapter can be found in Appendix 14.2. It should be noted that the results that follow are shown in current prices for any given year. This means that wealth will be affected not only by the changing volumes of household assets and liabilities, but also by changing prices. Future extensions to the current work may include: a) analysis of changes in asset and liability volumes; or b) changes in households' purchasing power. For further details, see Section 6.3.

### 4.1 The composition of Australian household wealth

The composition of wealth in the household sector has been slowly changing over the last decade. Broad trends in asset and liability ownership can be observed in the household balance sheet, and these patterns are unchanged after adjustments are made to account for the assets of NPISHs and people in non-private dwellings.

**Table 4.1.1: Selected assets and liabilities of households, 1994 and 2000**

	30 June 1994 \$b	% of total assets	30 June 2000 \$b	% of total assets
<b>TOTAL ASSETS (a)</b>	1,714	100	2,630	100
Dwellings (b)	816	48	1,197	46
Business assets	103	6	124	5
Currency and deposits (c)	180	10	243	9
Shares and other equity	109	6	210	8
Superannuation	281	16	543	21
<b>TOTAL LIABILITIES</b>	231	13	478	18
<b>NET WORTH</b>	1,483	87	2,151	82

Source : Experimental wealth estimates — total assets after adjustments for NPISHs and persons in NPDs

(a) Includes consumer durables.

(b) This estimate of dwellings includes owner-occupied and rental dwellings, and the land upon which they stand.

(c) Includes loans and placements receivable.

The net worth of the household sector has grown by just over 45% between 1994 to 2000. Dwelling assets have remained the most significant household sector asset, representing 46% of total assets at 30 June 2000. Superannuation assets have increased significantly over the last decade. These assets (which include pension fund reserves and unfunded superannuation claims) accounted for 21% of total assets in 2000, an increase from 1994, when superannuation comprised 16% of total household assets.

Direct household ownership of shares and other equity (i.e. ownership of shares excluding share investments made by superannuation funds) has been another area of growth. In 1994, ownership of shares made up 6% of total assets, while in 2000 they accounted for 8% of total assets. In absolute terms, this means that the value of shares owned by households has increased from \$109 billion in 1994 to over \$210 billion in 2000. Currency and deposits were significant assets in all years. This group of assets accounted for 9% of total assets in 2000.

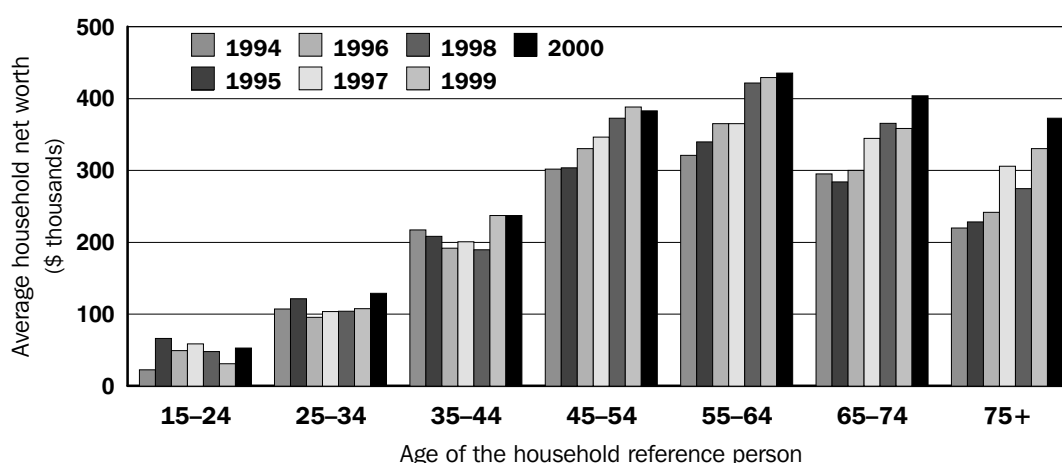
The assets of unincorporated businesses form another component of household wealth. While machinery and equipment, computer software, inventories and accounts receivable grew over the period from 1994 to 2000, as a percentage of total assets they fell slightly between 1994 and 2000.

Liabilities grew significantly over the period from 1994 to 2000. In 1994, total liabilities of households were \$230.4 billion, or 12.8% of the value of total assets. In 2000, total liabilities were \$466.6 billion, which was 16.6% of total assets.

Sections 4.2 to 4.6 will examine dissections of household wealth by a range of household characteristics. The definition of wealth (i.e. net worth) used in the following distributional analysis includes consumer durables and motor vehicles but excludes a) other insurance technical reserves, and b) plantation and native standing timber assets. Other insurance technical reserves are excluded because, although they are an appropriate inclusion in the household balance sheet from a national accounting perspective, they cannot be accessed or traded by households. Plantation and native timber assets are excluded because the distributional data for these components is considered to be of low quality.

## 4.2 The distribution of wealth across age groups

**Graph 4.2.1: Average household net worth by the age of the household reference person, as at 30 June**



Graph 4.2.1 presents average household net worth by the age of the household reference person. In the SIHC and HES, the reference person is selected from the adults in the household's primary family, using data on relationships, gender, income and age. The rules by which this person is selected are discussed in Section 3.5. The reference person is a concept widely used in household surveys, as the reference person's characteristics are often cross-tabulated with other household-level variables. The reference person may not be the oldest adult in a household — for comparison, net worth tabulated by the age of the oldest member of the household is considered later in this section.

Based on the results presented in graph 4.2.1, and as found in previous studies, there appears to be a distinct pattern of lifetime wealth accumulation. Net worth appears to build until retirement, then is slowly reduced as households draw down on their assets in later years. However, as Wolff (1992) points out, cross-sectional asset profiles such as those in graph 4.2.1 can also be related to other factors, which should be borne in mind:

*'In an economy with rising productivity levels, successive cohorts are likely to have rising incomes (and wealth) so that the lower wealth of the very old is a cohort rather than a life-cycle effect. On the other hand, the correlation of mortality rates with wealth among the elderly will result in a higher mean wealth for survivors than would have existed for the entire group.'*

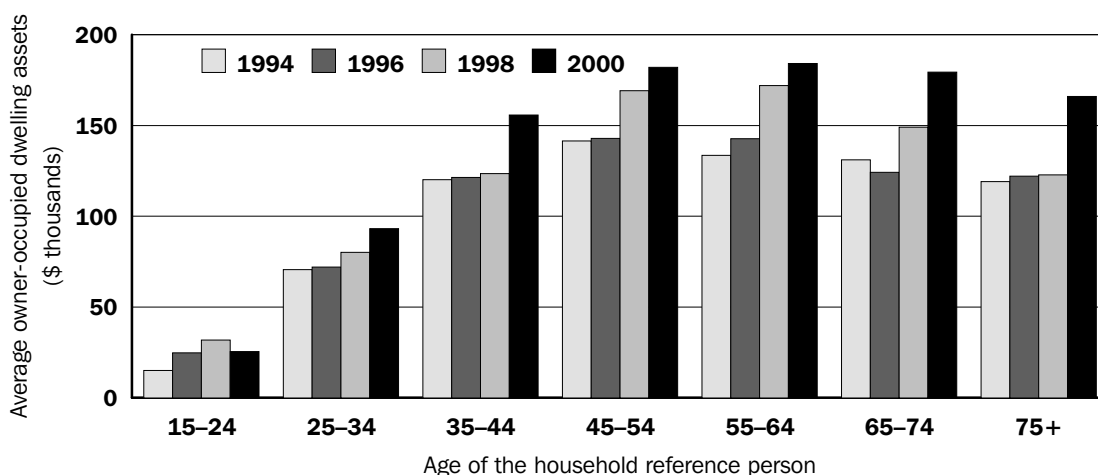
Cohort effects, and a range of other factors related to the accumulation of wealth may be examined in future analyses (for further details see Section 6.3). Such analyses may shed light on the relative importance of different factors in determining the distributional patterns which are discussed in this paper.

In graph 4.2.1, it appears that average net worth has fluctuated from year to year for households where the reference person's age was less than 45, but may have been slowly increasing over time. The average net worth of middle-aged and older households has clearly risen between 1994 and 2000.

Some fluctuations in the estimates from year to year are to be expected, as they are based on sample survey data, and the methods used to generate the estimates are slightly different where data items have not been available in a particular year (e.g. industry of the reference person's main job was not available in the 1993–94 HES). Thus one should concentrate on the main trends in the data, rather than on year-to-year movements.

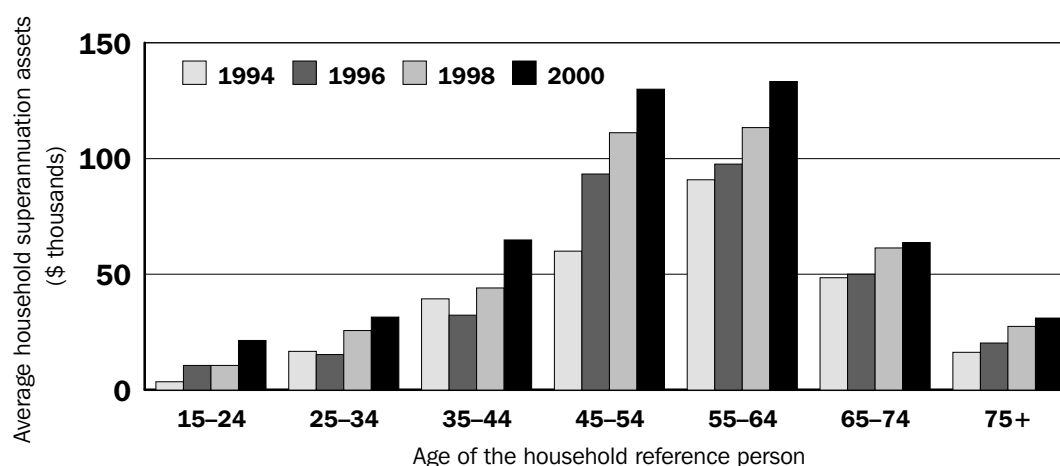
As noted in Section 4.1, dwelling and superannuation assets make up the largest percentage of household sector wealth. Not surprisingly, these assets are also closely linked to the growth in average net worth which can be seen in graph 4.2.1. Rising average dwelling values have been a significant factor in the increase in net worth for middle-aged and older households, as shown in graph 4.2.2.

**Graph 4.2.2: Average owner-occupied dwelling assets by the age of the household reference person, as at 30 June**



Average superannuation assets have also risen significantly between 1994 and 2000 for middle-aged and older households.

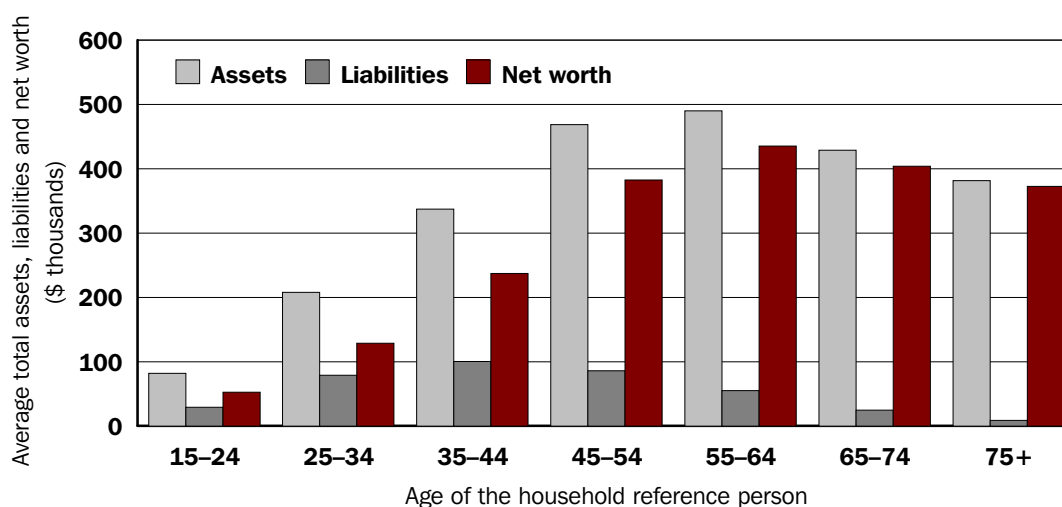
**Graph 4.2.3: Average household superannuation assets by the age of the household reference person, as at 30 June**



The average value of shares owned by older households also rose over the period from 1994 to 2000. However, estimates of shares by age group are more volatile than dwelling and superannuation estimates, owing to the lower proportion of households who own shares (as opposed to housing and superannuation assets), and these results should be interpreted with some caution.

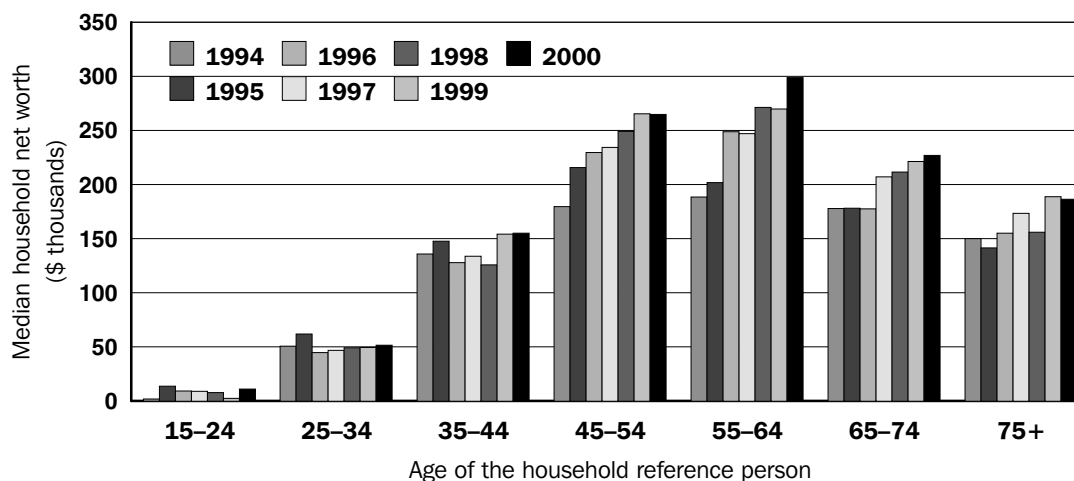
The value of net worth also depends on the liabilities which a household has accrued. Graph 4.2.4 illustrates how average total assets, liabilities and net worth are distributed across reference person age groups, in 2000. Assets and net worth are distributed in very similar ways, while liabilities peak in younger and middle age groups, before households have paid out major loans such as those for their home and/or car. Similar patterns were observed in each of the years studied.

**Table 4.2.4: Average household assets, liabilities (absolute value) and net worth by the age of the household reference person, as at 30 June 2000**



Average and median values are both of interest in distributional analysis, as they present different facets of the same distribution. Graph 4.2.5 shows median household net worth by the age of the household reference person.

**Graph 4.2.5: Median household net worth by the age of the household reference person, as at 30 June**



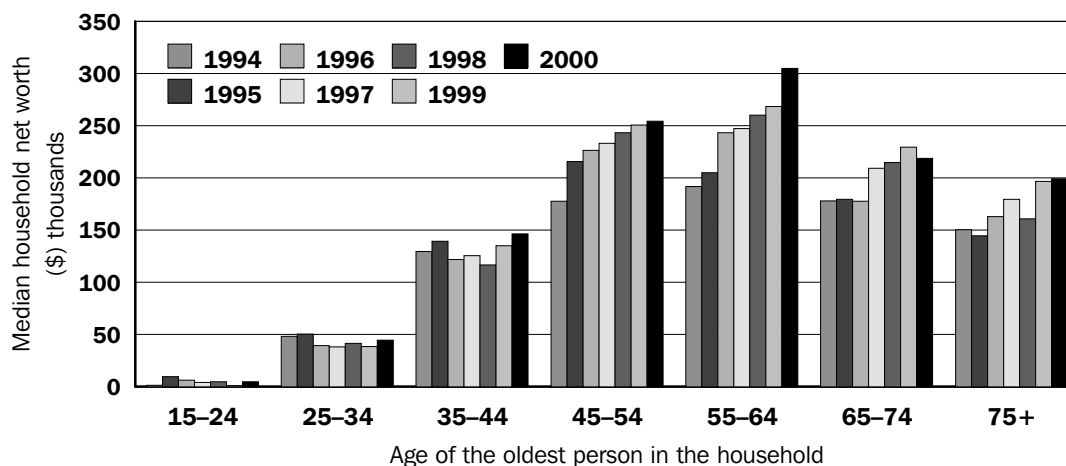
Median net worth values are generally lower than average asset values, suggesting that the distribution of wealth is not symmetric. Nonetheless the distributional pattern shown in graph 4.2.5 is very similar to that which emerges from analysis of average net worth (see graph 4.2.1). Once again, wealth appears to be accumulated as people age, but is run down to some degree in retirement.

Throughout the rest of this Chapter, a range of median and average net worth figures will be discussed. Dissections of the experimental estimates derived by using average and median values are presented in Appendix 14.2, for all breakdowns discussed in this chapter. Overall, the distributional picture that emerges from tabulating averages is very similar in most dimensions to that which is generated using median values. One difference is that average values are sometimes more volatile than medians for small cells. This is to be expected, as one or two very high or low asset values will have a significant affect on the average for small cells, but a much less dramatic effect on the median.

Other factors, such as how age groups are defined, can also affect how a distribution is perceived.

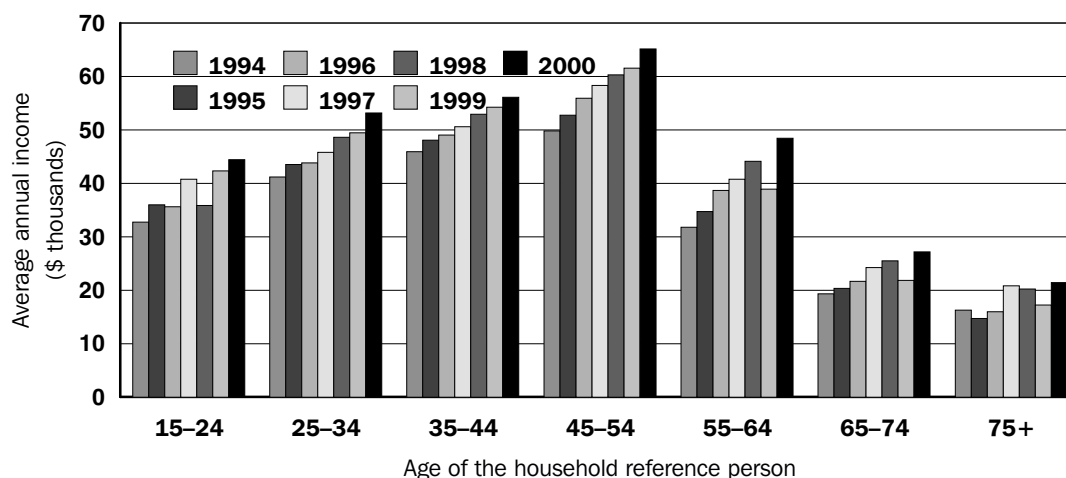
For example, age groups need not be based on the age of the reference person. However, graph 4.2.6 illustrates that use of age groups based on the age of the oldest non-dependent person in the household generates results very similar to those based on the age of the reference person. Disaggregations of net worth based on the average age of adults in the household produce similar results.

**Graph 4.2.6: Median household net worth by the age of oldest person in the household, as at 30 June**



Another key set of comparisons that can be made using wealth estimates involves analysis of differences in the distributions of wealth accumulation and annual income between households. The distribution of average net worth visible in graph 4.2.1 is quite different to patterns of annual income by age group, which are shown in graph 4.2.7. As expected, income in older age groups falls away much more quickly than net worth.

**Graph 4.2.7: Average annual household income by the age of the household reference person, for the year ended 30 June**



Source: SIHC and HES



Several conclusions can be drawn from analysis of the distribution of wealth across household age groups. First, the accumulation of wealth increases as people have more time to accrue it, i.e. as they age. Wealth also appears to be run-down to some degree in retirement, although cohort effects which may also cause lower wealth for older age groups should not be ignored.

Assets and net worth have similar distributions across households, while liabilities peak earlier in life, before household debts are paid-out.

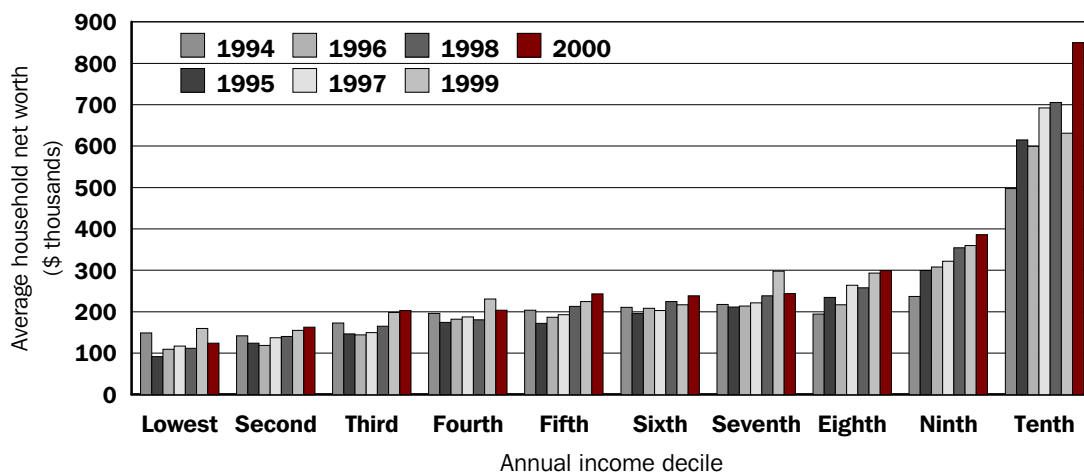
Increases in average wealth between 1994 and 2000 have been greatest in middle and older age groups, where growth appears to have been particularly strong in dwellings assets, superannuation and shares.

Average wealth is distributed quite differently to income, which falls away quite sharply in the age groups in which more people tend to be retired.

### 4.3 The distribution of wealth across income ranges

The relationship between wealth and income was indirectly examined when comparing wealth and income across household age groups. However, the relationship between wealth and income can be analysed more directly, by graphing wealth by income deciles, as graph 4.3.1 illustrates.

**Graph 4.3.1: Average household net worth by annual income decile, as at 30 June**



The distribution shown above increases quite slowly across the first seven income deciles. This is because a range of age groups and household types are represented within most income deciles. For example, the lower income deciles include people who are young and earning their first wage, as well as those who have retired and are living on modest incomes. As seen in the previous section, these groups will have accumulated very different amounts of wealth over their lifetimes.

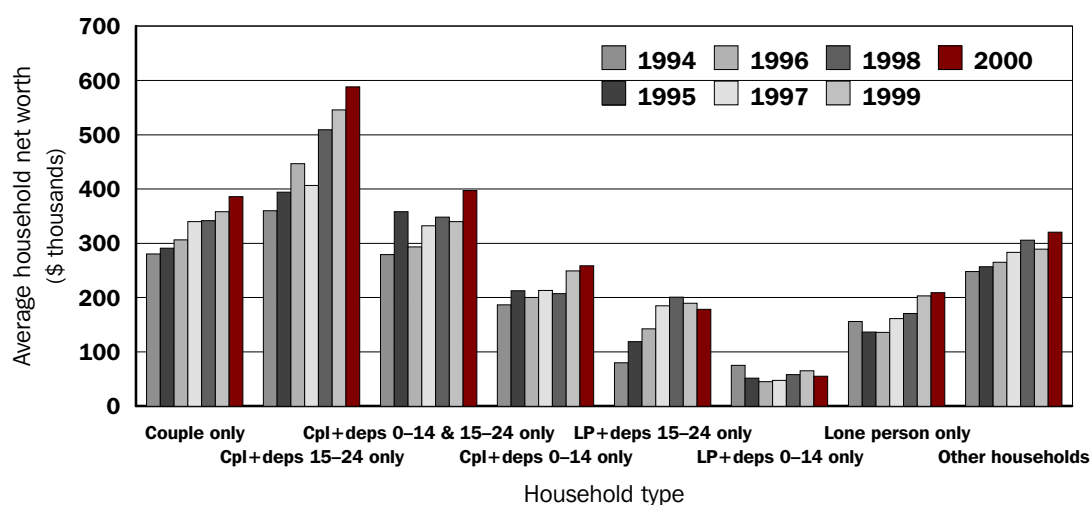
The distribution of wealth between income deciles is of a similar shape in each year between 1994 and 2000, while some minor fluctuations between years are to be expected. However, a somewhat curious pattern is visible in several deciles of graph 4.3.1, where average wealth in 1994 and 1999 appears to be higher than in the same income deciles in adjacent years. The pattern is reversed for the top decile. Median household wealth is also distributed across income deciles in much the same pattern as that shown in graph 4.3.1. Analysis of the underlying distribution of assets and liabilities shows that dwelling values are higher than would be expected in 1994 and 1999 for several income deciles. Yet home values are self-reported in both the SIHC and HES, so this anomaly is unlikely to arise from the dwelling valuations themselves.

The income data collected on the HES is slightly different from that collected on the SIHC, as the two surveys are designed for different purposes. The SIHC is specifically designed to collect income data, whereas income is one element of a wider set of variables collected on the HES. In this study, adjustments have been made to SIHC and HES data to attempt to control for differences between income items from the two surveys (see Section 3.5). However, if small differences remain, such as those caused by different collection procedures or questionnaire designs, this may cause small differences between average wealth estimates for SIHC and HES income deciles. The ABS is currently investigating the comparability of income estimates from these two surveys, across the 1990s, and the results of this work may suggest further adjustments to the wealth model.

#### 4.4 The distribution of wealth across different types of households

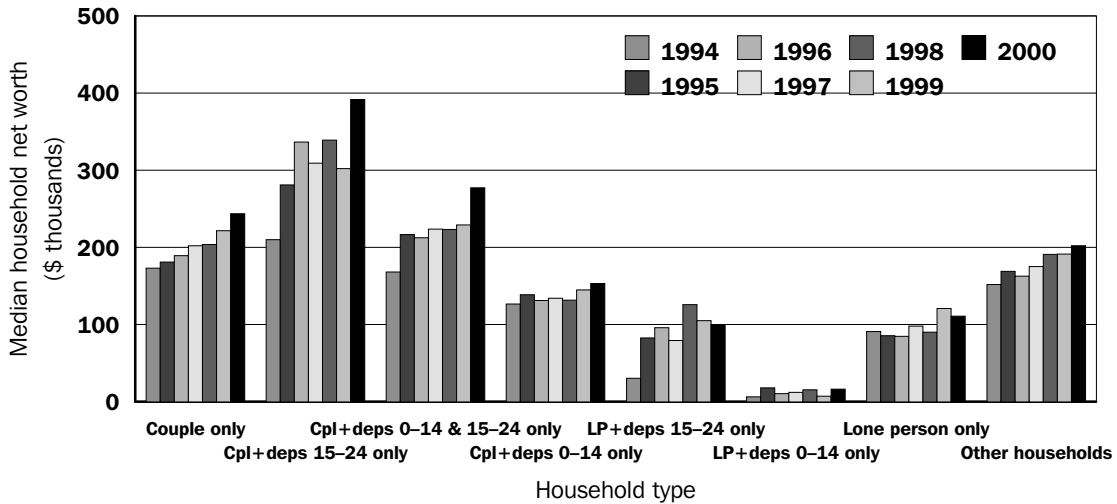
The distribution of wealth also varies across household types. Graph 4.4.1 shows that between 1994 and 2000, couple households with children had higher average net worth than lone parent households with children of a similar age. Couples with dependent students aged between 15–24 had the highest average net worth in all periods. This is likely to be the result of both the effects of couple formation, and the accumulation of wealth in older age groups. As with the distribution of wealth across household age ranges, the wealth of different types of households is closely linked to average dwelling and superannuation assets.

**Graph 4.4.1 Average household net worth — selected household types, as at 30 June**

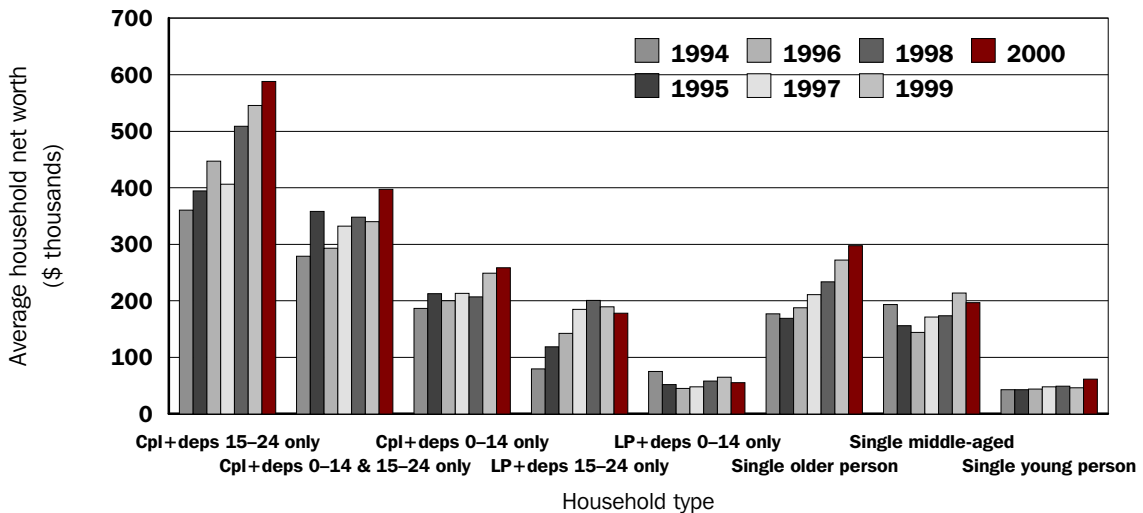


Lone parent households with children aged less than 15 had the lowest average net worth of all household types. Median wealth values tell a similar story (see graph 4.4.2). Again, this will be the result of several factors — including the absence, or dissolution, of partnerships, and the fact that younger children are often a part of younger families, where the parents have not yet accumulated as much wealth as more established households. This is more clearly shown in graph 4.4.3.

**Graph 4.4.2 Median household net worth — selected household types, as at 30 June**

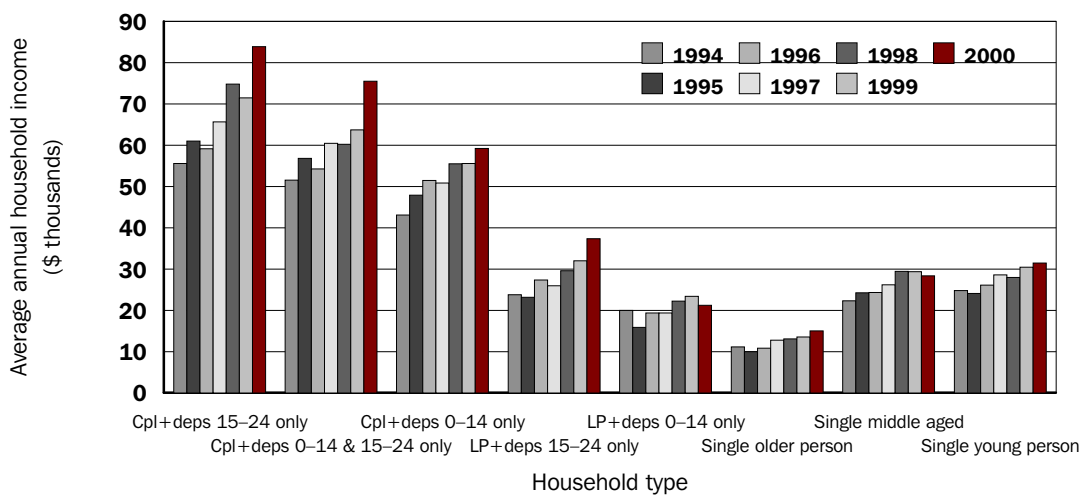


**Graph 4.4.3 Average household net worth — selected household types and ages, as at 30 June**



Younger lone person households, (i.e. those where the reference person is aged 15–35) have similar average wealth levels to lone parent households with young children. Lone person households where the reference person is aged between 35 and 64 (single middle-aged households) have average wealth which is more comparable to lone parent households with older dependants. For any given age range, couples still appear to be able to accumulate wealth more readily than either single parent or lone person households, as would be expected when a household may have access to two incomes. This distribution in graph 4.4.3 is more pronounced than the picture which emerges from analysis of annual income, shown in graph 4.4.4.

**Graph 4.4.4 Average annual household income — selected household types and ages, for the year ended 30 June**

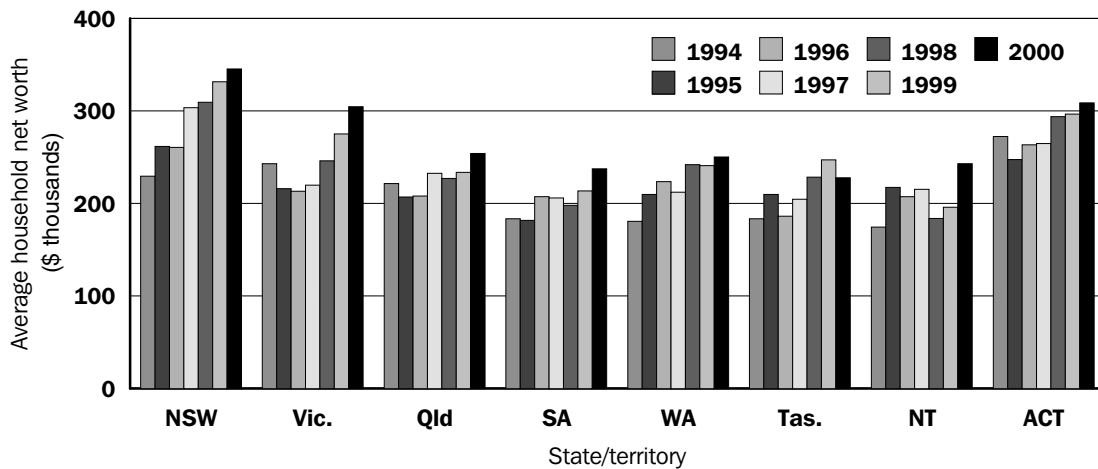


Source: SIHC and HES

Two main conclusions can be drawn from the analysis of wealth by type of household. First, the effects of age on wealth accumulation result in younger households (whether lone person, younger group households or those with younger children present) having lower average wealth than older households. Second, couples appear to accumulate wealth more readily than lone person or lone parent households, which is likely to be the result of couples having access to two incomes for extended intervals of time.

## 4.5 The distribution of wealth across the states and territories

**Graph 4.5.1: Average household net worth by state/territory, as at 30 June**

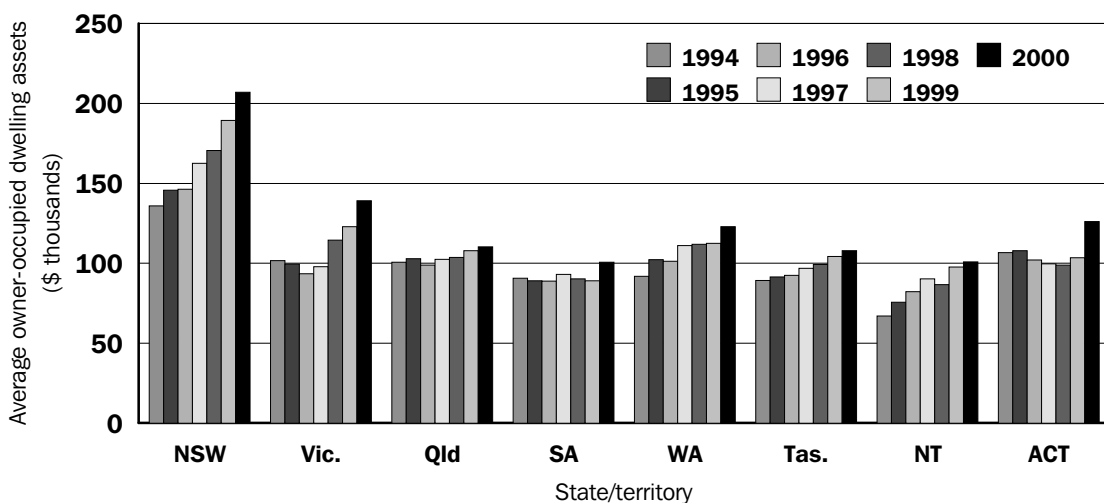


Graph 4.5.1 shows that average net worth grew in all states and territories over the period from 1994 to 2000. Due to smaller sample sizes, values for the Northern Territory should be interpreted with some caution.

In 2000, average net worth was highest in New South Wales (NSW), where average dwelling values were considerably higher than those in other states. Average dwelling and superannuation assets were also relatively high in Victoria (Vic.) and the Australian Capital Territory (ACT).

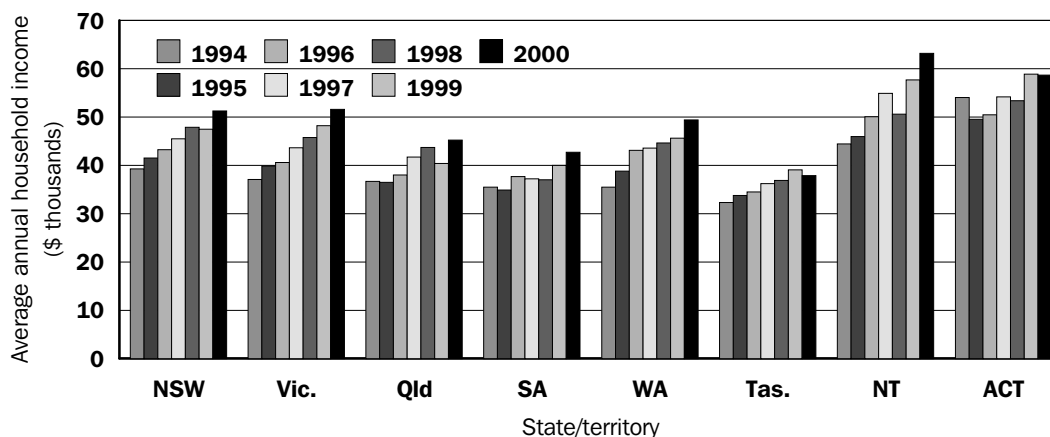
This is shown more clearly by the graph of average owner occupied dwelling values by state, graph 4.5.2.

**Graph 4.5.2: Average owner-occupied dwelling assets by state/territory, as at 30 June**



The distribution of wealth by state was again quite different to the distribution of annual household income. Both mean and median household annual income grew quite steadily between 1994 and 2000. Income was also quite evenly distributed between most states, while the territories has the highest mean and median annual incomes in all periods.

**Graph 4.5.3: Average annual household income by state/territory, for the year ended 30 June**

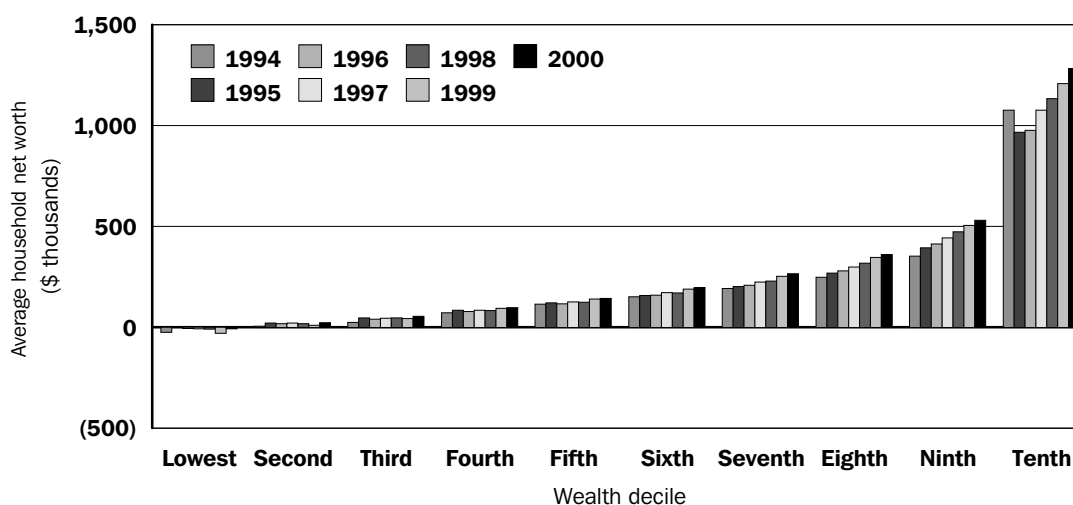


Source: SIHC and HES

## 4.6 The concentration of wealth

In the preceding sections, average and median levels of net worth have been used to illustrate how wealth is distributed across the population. The total value of wealth held by different parts of the population is also of interest, but without knowing the number of households in a particular group, the picture of how wealth is distributed across groups is less clear. In the case of wealth deciles, each decile contains one tenth of the population, therefore the percentages of wealth owned by particular deciles are statistics which are commonly used to examine the way in which wealth is concentrated among groups of households. Average wealth by wealth decile is shown in graph 4.6.1.

**Graph 4.6.1: Average household net worth by wealth decile, as at 30 June**



The relatively high value for wealth in the top decile in 1994 is likely to be due to less detailed data being available for that year, which resulted in estimation methods which were more heavily dependent on allocating business assets in proportion to income.

The table below shows the percentage of total Australian household wealth owned by the top decile and quintile. Once again, the slightly higher concentration of wealth in 1994 should be interpreted cautiously.

**Table 4.6.1: Average household net worth by wealth decile**

Year	Wealth held by the top wealth decile (%)	Wealth held by the top wealth quintile (%)
1994	* 0.49	* 0.64
1995	0.43	0.60
1996	0.43	0.61
1997	0.43	0.61
1998	0.44	0.62
1999	0.44	0.62
2000	0.43	0.61

Source : Experimental wealth estimates

\* 1994 figures may overstate the concentration of wealth, due to different estimation methods which were applied in that year.

As the analysis of wealth and gross annual income in previous sections has shown, wealth is distributed quite differently to income. The total annual income earned by the top wealth decile was between 16% and 20% of income earned between 1994 and 2000.

The concentration of income within income deciles is also lower than the concentration of wealth. The top income decile earned between 22% and 29% of gross annual household income between 1994 and 2000.

Overall, the concentration of wealth appears to have remained fairly stable over the period from 1994–2000.

## 4.7 Comparisons of the estimates in this paper to those from other sources

One of the best ways to test any model is to compare the results it generates to other observed data. There is a range of data sources that allow comparisons to be made for a number of assets and liabilities.

The 1999 Australian Housing Survey collected data on the value of respondents' own homes, their financial assets and superannuation balances. These data were captured in ranges. These person-level data were aggregated for each household, using either the minimum, middle or maximum value for each range, and average household asset values were calculated to allow broad comparisons to be made with data from the wealth model. It was also necessary to set arbitrary values for the top of the highest valuation range.

Comparisons of owner-occupied dwelling assets, financial assets and superannuation were conducted for groups of households based on the age of the reference person, income ranges, household type and state of residence. The patterns which emerged from this analysis can be summarised as follows.

The distribution from the wealth model was generally closest to the AHS distribution generated using the top value in each range. This is not surprising, as values from the wealth model are benchmarked to equal national accounts aggregates, which are generally higher than those derived using survey data. The distribution of dwelling assets was very similar in all dimensions, but average values generated from the wealth model were slightly lower than those from the AHS in each case. This was also the result of benchmarking to the National Accounts (see Section 5.2).

Comparisons by state and household type were broadly consistent for financial assets and superannuation balances. The distribution of financial assets from the wealth model was very similar to the AHS distribution for younger and middle age groups, but had higher financial assets for older age groups. The distribution of average superannuation balances from the model was also similar to that generated by using the 'top' AHS superannuation estimates. However, the distribution from the wealth model was shifted towards older age groups. That is, average balances for younger age groups were lower than AHS data suggested, and balances for older age groups were higher.

The same pattern was observed in comparisons between the distribution of unbenchmarked person-level superannuation assets in the wealth model and estimates from the Treasury RIMGROUP model. For both men and women, the proportion of total Australian superannuation balances attributed to lower age groups was higher in RIMGROUP than in the wealth model. The wealth model also had higher proportions of assets in older age groups. These differences would remain after benchmarking to the ASNA. In addition, the RIMGROUP produces a higher percentage of total superannuation assets attributed to males in 2000 (around 76%) than the wealth model (69%).

While the overall distributions were still quite close, these differences warrant further investigation, as the wealth model may be overestimating superannuation balances for older people, to a small degree. However, it may not be possible to fully account for all differences between the two models, as they are based on different data and methodologies, particularly in the area of unfunded pension annuities.

The figure obtained for the wealth of the top wealth decile in 1998 (44%) is very close to that obtained by Kelly (2001), which was 45%. Small differences will result from differences in estimation methods — in particular the figures for net worth in table 4.6.1 include consumer durables assets, which are one of the most widely dispersed household assets.

Comparisons of the percentage of total household sector wealth by age group (based on the age of the reference person) can also be made between the estimates in this paper and those reported in Harding, King and Kelly (2001). Percentages are very close (within one percent) for most age ranges. The estimates reported in this paper generate a slightly lower percentage for the 35–44 age range, and slightly higher (i.e. 1.2 % to 2.5% higher) values for the 45–54 and 55–64 age groups.

Although extensive comparisons of average household wealth levels have not been made for the results obtained in this study (as other studies have often reported data at the individual level), broad comparisons suggest that average wealth data reported in this paper appears to be higher than in some previous studies. This is to be expected, as additional asset groups (consumer durables, inventories, business deposits) have been included in this study, and all estimates are benchmarked to National Accounts aggregates.



## 5 Data Quality

There are a range of factors which will affect the quality of the estimates produced by this study. The most fundamental is the quality of the input data.

### 5.1 The quality of input data used in the model

#### Surveys and administrative data sources

Most of the distributional data used to generate the estimates in this paper come from sample surveys. All sample surveys are subject to two forms of error: sampling and non-sampling error. Non-sampling error arises from respondent error (i.e. when people mistakenly or deliberately misreport their information), coding errors, and so on. While these errors cannot be quantified, the ABS makes every effort to keep these errors to a minimum, via rigorous questionnaire and systems testing.

Sampling errors arise because survey samples cannot exactly represent the entire population. Error measures are reported for ABS survey data to show the level of accuracy inherent in the estimates published. For further information on standard errors, the reader is referred to *Income Distribution, Australia* (cat. no. 6523.0) and *Household Expenditure Survey, Australia: User Guide* (cat. no. 6527.0). The samples from these surveys are suitable for producing reliable estimates at the Australian level for income or expenditure of residents in private dwellings, classified population groups based on household composition and levels of income. Estimates at the state and territory level for broad aggregates are generally reliable although some estimates for Tasmania, the Northern Territory and the Australian Capital Territory should be used with caution.

Some additional data quality issues relating to ABS income surveys were discussed in the April 2002 edition of *Australian Economic Indicators* (cat. no. 1351.0). The main issue involves the coverage of cash welfare transfers. This type of household income is not a direct input into the model described in this paper, although it will affect total income for some households. It was also noted that revised confidentialised unit record files will be released for all of the SIHC and HES files used in this study when ongoing analysis of the income distribution time-series is complete. Changes to the data underlying the model presented in this paper will have an impact on estimates produced. However, sensitivity analysis has suggested that the effects of revisions to SIHC and HES data files should have a relatively small effect on the broad distributional patterns emerging from the model.

The estimates produced by this study have been based on the main unit record files from the SIHC and HES, without adjustment. Large values reported for some households in small cells can cause volatility in estimates. Examination of these types of records showed that all of the data provided by households appeared to be plausible and consistent. Unusually high values were therefore not outliered (i.e. adjusted by re-weighting or other means), so that the data used to generate the wealth estimates remained consistent with the original survey files. However, some results for very small cells have been suppressed, as they are less reliable than results for larger groups of households.

All survey data files used in this study were treated in this way, with one exception. Wherever BLS data were used, unincorporated enterprises were the population of interest, as these are the enterprises that relate to households. While the BLS deliberately over-sampled small businesses to produce high quality small business estimates, the sample was not specifically designed for production of estimates for unincorporated enterprises.

Some very large values in certain cells were capable of dramatically affecting the estimates, as there were only a relatively small number of businesses captured in the household surveys (between 850 and 1,250 in each year). The top percentile of observations for a variable from the BLS was deleted from the file before the data were used. The use of data from the remaining 99% of BLS records should still allow trends in business asset and liability ownership to be carried across to the wealth estimates.

Administrative data sources were also used in several cases (for example, HECS loans data from the ATO). There are often no data quality statements attached to these types of data. For further details of these data sources, please see Section 3.1, and the data quality sections contained in the technical details chapters.

Overall, while no survey or administrative data source is perfect, the distributional data sources used in this study are believed to be the best available for the years between 1994 and 2000.

## **The household balance sheet**

The household balance sheet determines the size of the final estimates. Appendix 14.3 contains data quality information for all balance sheet items. While the quality of National Accounts data at aggregate levels is generally good, there is often a lack of suitable data for generation of sectoral disaggregations, particularly for the household sector. This means that some household aggregates are derived residually, or by use of experimental methodologies, and the quality of some of these components is less than ideal. However, in many cases, the household balance sheet provides the major source of data for assets and liabilities that are not included in household surveys.

## **5.2 The quality of methods used in the model — sensitivity analysis**

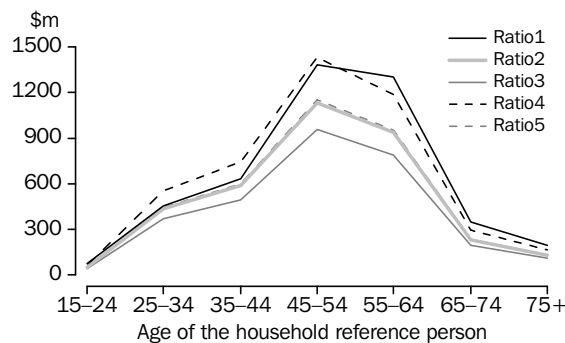
The next major set of factors affecting the quality of the estimates discussed in this paper are the estimation methods.

### **Methods used to estimate the distribution of individual assets and liabilities**

In Chapters 7 to 13, component-specific quality information is reported, including the quality of data used to estimate each component. These chapters also outline any assumptions made in developing the estimates. A variety of estimation methods was tested for all components where one or more methods or data sets were available. In most cases, the differences resulting from these methods lay in the pre-benchmarked level of the estimates, not the distribution between various groups of households. Benchmarking the distributional estimates to the aggregates in the household balance sheet removed much of the difference between different methods.

For brevity, the results of each of the methods tested for each component are not reported in this paper. An example of how the distribution of one asset changed depending on the estimation method used is provided in graph 5.2.1, which shows the results for livestock inventories generated by using five alternative ratios of livestock assets to income, grouped by age, for 1997–98. Regardless of the unbenchmarked levels of the estimates obtained, all methods generated a similar distribution of asset values across key dimensions.

**Graph 5.2.1: Comparison of unbenchmarked livestock inventories estimates constructed using different methods and data sources.**



### Benchmarking distributional data to equal household balance sheet aggregates

The degree to which the data are adjusted by benchmarking provides a measure of the degree of difference between the distributional (survey-based) data and aggregates in the household balance sheet. The benchmarking ratios which are used to align these two sets of estimates are reproduced in Appendix 14.4.

Care must be taken in interpreting these ratios, as they are affected by many factors. Some of the ratios shown in Appendix 14.4 are artificially close to one (suggesting a direct correspondence between ASNA data and the household survey-based estimates). This is due to the methods used to estimate the distribution of these components — if an aggregate asset or liability is distributed in direct proportion to income, the benchmarking ratio will be close to one. However, small deviations from one will sometimes occur even in these cases, owing to the allocation of assets and liabilities to people in NPDs. For business assets and liabilities, the methods used in 1994 are different to those used in other years, due to the absence of industry codes. For these assets and liabilities, benchmarking ratios will be equal to one for 1994, but not in other years.

Nonetheless, some benchmarking ratios do highlight limitations of the model. For example, the ABS dwelling stock series (adjusted to include the land on which dwellings stand) is lower than dwellings aggregates derived from SIHC and HES data. This could be due to optimistic dwelling values being reported by survey respondents, but results obtained in the Australian Housing Survey and other aggregate data sources are similar to the aggregates derived from the SIHC and HES (see Section 7.1). Further investigations into the differences between ASNA dwellings data and other estimates are ongoing, and may lead to revisions in the way dwelling assets are estimated in future updates of the wealth model.

Unbenchmarked superannuation reserves appear to be significantly underestimated by the model, and as discussed in Section 12.6, this is not a surprising result. Even the 2000 Survey of Employment Arrangements and Superannuation (a survey which obtained consent from respondents to approach their superannuation funds for information) had to use withdrawal benefits rather than account balances for people in defined benefit schemes, and therefore obtained aggregate figures which were significantly lower than ASNA aggregates. Given the difficulties which many respondents encounter in understanding their superannuation schemes, the use of a benchmark derived from counterparty sources (such as the superannuation fund data used to derive National Accounts aggregates) would appear to be critical for this item.

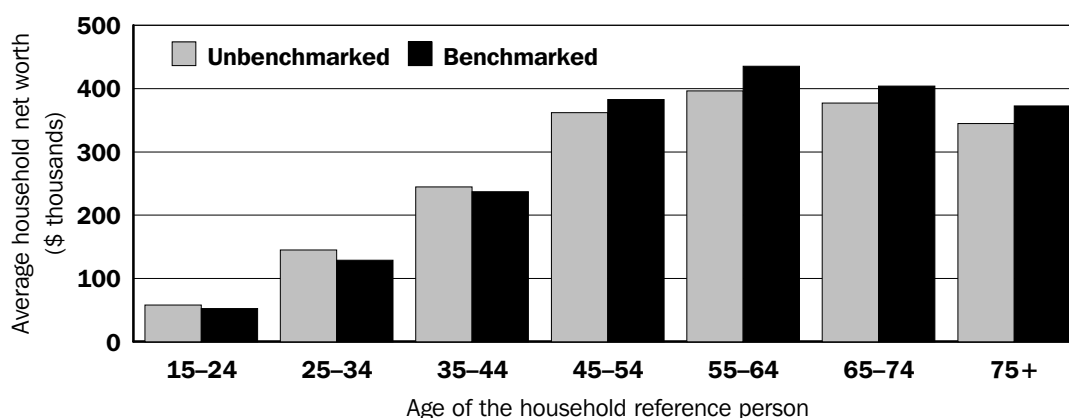
Benchmarking ratios for the consumer durables items (motor vehicles and other household durables) suggest that the match between the experimental ASNA aggregates, and the estimates based on household survey data, is not ideal. As discussed in detail in the technical details for consumer durables (see Chapter 9), the ASNA aggregate seems to be underestimating the stock of consumer durables to some degree. Further investigation in this area may improve comparability between estimates from different sources.

Conversely, the estimates of currency and deposits and shares are benchmarked upwards — suggesting that interest and dividend income may be underreported in household surveys, even after adjustments for business currency and deposits have been made. However, one must remember that some deposits and shares may not result in an income stream (such as where dividends are paid as additional shares). The benchmarking ratios for securities other than shares also vary across time. The smaller number of people who report interest from securities other than shares affects the volatility of this series. National Accounts estimates of household deposits, shares and securities other than shares are thought to be of fair or good quality, and the use of these data to benchmark wealth figures generated by household surveys is likely to increase the accuracy of the resulting aggregates.

Survey items on loans on investment properties and owner occupied dwellings appear to generate figures slightly lower than the national accounts aggregate, as do the estimates of consumer and other household loans. Conversely, the business loans estimates generated by survey data are larger than the benchmark from the National Accounts. Further work in this area may improve the quality of splits of the household balance sheet ‘loans and placements’ item used to benchmark loans items.

While none of the limitations noted above should be overlooked, the net effect of benchmarking all of the assets and liabilities of the balance sheet is illustrated in graph 5.2.2, which shows benchmarked and unbenchmarked wealth split by age of the reference person, for 2000. Benchmarking does affect the level of the estimates, but the distribution of wealth is broadly consistent between benchmarked and unbenchmarked data. Benchmarking does have some effect on estimates of wealth concentration, as some of the assets which are most increased by benchmarking are those which are owned by wealthier households (e.g. financial assets). However, unless the underreporting of income streams from financial assets is more pronounced in less wealthy households, benchmarked estimates should yield more reliable results than unbenchmarked figures.

**Graph 5.2.2: Unbenchmarked versus benchmarked average net worth by age of the household reference person, 2000**



In summary, there are several assets for which aggregates derived from household survey data appear to be too low, and the use of benchmarks from the household balance sheet should improve the quality of estimation for these components. There is also a small number of cases, i.e. motor vehicles and possibly dwellings (including the land on which they stand), where differences between total survey-based estimates and National Accounts aggregates suggest that the National Accounts series require further analysis.

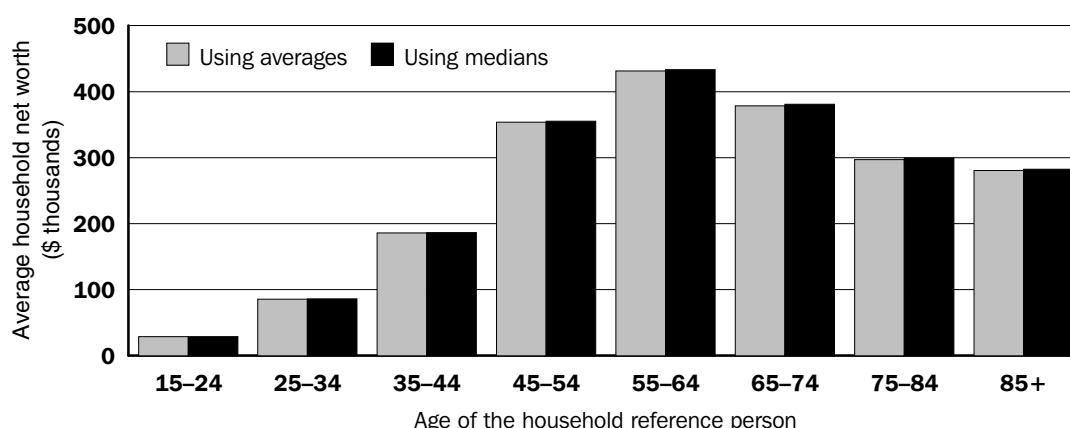
On balance, notwithstanding some imperfections in household balance sheet data, its use should improve the quality of the final estimates. In addition, the continuous improvement of the National Accounts will continue to improve the quality of wealth estimates generated using the model presented in this paper.

### Adjustments for NPISHs and people in NPDs

The main scope and coverage adjustments are another area where quality issues arise. Several assumptions have been made in the calculation of approximate balance sheets for NPISHs and NPDs. Fortunately, the effects of changes to these assumptions are likely to be very small compared to household sector aggregates, that is, the distributional picture presented in this paper will not be highly sensitive to such changes.

For example, graph 5.2.3 shows estimates of household wealth for 1997–98, generated with two different types of NPD adjustment. The first series used median synthetic asset and liability values to impute NPD wealth, and the second was based on average synthetic values. (For further details of the NPD adjustment, see Section 3.4). Graph 5.2.3 demonstrates that even relatively large changes to the assumptions used to generate the approximate NPD balance sheet have little effect on the final distributional estimates.

**Graph 5.2.3 Comparison of wealth estimates compiled using different NPD adjustments**



### Data quality across time

It is also important to note how all of the quality factors considered above change across time. Generally speaking, estimates in those years where most data items have been directly collected will be of higher quality than those years which have relied heavily on interpolated data. For example, HES data were used to derive the estimates for many components, however these data were only available for 1993–94 and 1998–99.

1997–98 is the year with the greatest number of key data sources close to hand; the BLS was run in 1997–98, the HES in 1998–99, and the RIN in 1997. The estimates for 1997–98 should therefore be of relatively high quality. Interpolation and/or extrapolation have been used where data has not been collected in a particular year, to attempt to mitigate the effects of changing data availability over time.

## Conclusions about the quality of the estimates

The quality issues associated with each part of the estimates presented in this paper have been outlined in detail to allow users to make their own judgments about the fitness of the estimates for a variety of purposes. No synthetic data set will ever reproduce reality perfectly, but the estimates discussed in this paper have made use of the best economic and household survey data available at this time, and the methods used to generate the estimates have been chosen after testing a number of alternatives.

Confrontation of data from the National Accounts and household surveys, and comparisons of the model-based estimates to those from other data sources, suggest that there are a range of improvements which could be made to the model. However, sensitivity analysis conducted to date has shown that while changes to estimation methods will change some values, these changes generally have little effect on the overall distribution of wealth across households. In short, it is suggested that the experimental estimates discussed in this paper provide a credible picture of the distribution of wealth across households, for the key dimensions of interest.

## 5.3 The quality of key dissections of individual assets and liabilities

While the estimates should provide robust dissections of net worth, dissections of individual assets and liabilities are also of interest. Table 5.3.1 draws together all the dimensions of data quality discussed in the preceding sections of the paper and quality information from the technical notes in Chapters 7 to 13 to provide a summary of which individual assets and liabilities can be reliably dissected by key characteristics such as age ranges, household type, state and income ranges. This table errs on the side of caution — users will need to consult the Technical Notes to make their own judgments about the use of various estimates for specific purposes. It should be remembered, however, that detailed analysis of any component is best performed on the original data file from which the estimates were derived.

The reliability of the dissections listed in table 5.3.1 can be interpreted as follows:

- A: The model contains very good distributional data for this component, even for individual records. These items were surveyed in the SIHC or HES.
- B: Good distributional data exists for the dissections indicated. Directly collected income data solely related to this component underpin the estimates, or they have been grafted from a reliable survey or administrative data source.
- C: The model provides plausible distributional data for the splits indicated. These data have been estimated using some auxiliary data.
- D: Although the estimates of this item have drawn on auxiliary data, the accuracy of splits of this item are questionable, and should be used with caution.
- E: The quality of disaggregations of this item, in isolation, are poor, and analyses of dissections of this variable should not be undertaken.

Owing to the methods used to compile the estimates reported in this paper, future users of the data are cautioned against creating dissections of individual components of wealth (as opposed to dissections of net worth) by more than one key dimension.

**Table 5.3.1 : Reliability of dissections of individual assets and liabilities**

Component	Dissections of the estimates			
	Age range of reference person	Household type	State	Income range
4.1 Dwellings — owner occupied housing	A	A	A	A
4.2 Dwellings — investment properties <sup>1</sup>	B	B	B	B
4.3 Other buildings and structures <sup>1</sup>	C	C	C	C
5.1 Machinery and equipment <sup>2</sup>	C	C	C	C
5.2 Livestock — fixed assets	D	D	C	D
5.3 Computer software <sup>2,3</sup>	D	D	D	D
5.4 Entertainment, literary or artistic originals <sup>4</sup>	E	E	E	E
6.1 Consumer durables — motor vehicles	C	C	C	C
6.2 Consumer durables — other household durables	C	C	C	C
7.1 Private non-farm inventories <sup>2</sup>	C	C	C	C
7.2 Farm inventories	D	D	C	D
7.3 Livestock — inventories	D	D	C	D
7.4 Plantation standing timber	E	E	E	E
8.3 Land — farmland	D	D	D	D
8.4 Native standing timber	E	E	E	E
9.1 Currency, deposits and loans and placements (receivable) <sup>2</sup>	B	B	B	B
9.2 Securities other than shares <sup>1</sup>	C	C	C	C
9.3 Shares and other equity	B	B	B	B
9.4 Insurance technical reserves — life insurance	C	C	C	C
9.5 Insurance technical reserves — other insurance	E	E	E	E
9.6 Superannuation — pension fund technical reserves and unfunded superannuation claims	B	B	B	B
9.7 Other accounts receivable	E	E	E	E
10.1 Securities other than shares	E	E	E	E
10.2 Loans and placements — owner occupied housing	A	A	A	A
10.3 Loans and placements — investment properties <sup>4</sup>	B	B	B	B
10.4 Loans and placements — consumer and other household loans	B	B	B	B
10.5 Loans and placements — business loans <sup>2</sup>	C	C	C	C
10.6 Other accounts payable	E	E	E	E

<sup>1</sup> The quality of this component is lower in 1994 and 1999.

<sup>2</sup> The relatively low quality of this item is due to the small number of respondents reporting associated income.

<sup>3</sup> Splits of this item for 1993–94 are of lower quality than those for other years.

<sup>4</sup> Splits of this item for 1998 and 2000 are of higher quality than those for other years.

## **6 Future upgrades to the estimates and other extensions**

### **6.1 Refining the experimental estimates for 1994–2000**

There are a variety of ways in which the estimates discussed in this paper could be refined, but improvements to estimates of dwellings and superannuation are likely to have the most positive effect on the quality of the model. Specifically, if the cause of differences between dwellings aggregates from the household balance sheet and other sources can be determined, the benchmarks for dwellings may be improved (see Section 7.1). The estimation of distributional superannuation data may be improved by continuing comparisons to data from the Treasury RIMGROUP model.

Adjustments to consumer durables benchmarks may also have a relatively significant effect. Data from the Survey of Motor Vehicle Usage (SMVU) and Census of Motor Vehicles (CMV) contains some very detailed information on vehicle types, makes and ages, and the SMVU also contains data on the age and sex of registered drivers. If these files could be merged, and appropriate weights attached to the files, a very detailed picture of the distribution of motor vehicles could be determined. If, in addition, detailed vehicle values could be obtained from another source, such as those used by insurance companies to determine vehicle premiums, a very detailed picture of the value of the motor vehicle stock could be developed. A model such as this, or other work which may be undertaken by National Accounts Branch to revise their consumer durables series, would improve the quality of benchmarks for this component.

The business loans benchmark is another part of the model which could be improved. In this study, the benchmark was derived as a residual after deducting other loans items from the total household balance sheet loans and placements item. The benchmarking data for other loans items appears to be sound, yet the business loans benchmark figure is somewhat higher than data for bank loans to unincorporated enterprises would lead one to expect. Further analysis of loans data from a variety of sources may improve splits of the household balance sheet loans and placements item between dwelling, consumer and business loans.

The adjustments for NPISHs could also be refined. The possibility of post-stratifying historical EAS NPISH data to obtain weights which are more representative of the NPISH population could be explored. This may enhance the adjustment for NPISHs. However, historical EAS surveys were not designed to produce figures for NPISHs, so this work would hinge on the quality of the NPISH flag on the business register for the years between 1994 and 2000. The flag may not support the type of post-stratification required. In addition, gains in the quality of the wealth estimates from increasing the quality of the NPISH adjustment may be quite small. The possibility of stratifying for institutional sector in future EAS collections is currently being explored.

Adjustments could also be made for the population in remotely settled areas of the NT, and for the wealth held by people under 15 years of age. However, it is expected that such changes would result in a minor improvement to the overall estimates.

A range of other adjustments which are expected to have a minor effect on the estimates generated by the model are discussed in Chapters 7 to 13.



Finally, it may be possible to augment the quality indicators developed for the model by using simulation techniques to determine standard errors for the estimates. The ABS is investigating the feasibility of compiling this type of quality indicator for the estimates.

After considering feedback on the methods and results reported in this paper, and subject to further investigation of the feasibility of some of the refinements outlined above, the ABS plans to make more detailed disaggregations of the experimental estimates available to the public.

## **6.2 Compilation of estimates for 2001 and beyond**

Using the model described in this paper, the ABS plans to compile distributional wealth data in years when a SIHC or equivalent is run, i.e. biennially, from 2003–04. Information on wealth may also be directly collected every sixth year, commencing with the 2003–04 Household Income and Expenditure Survey (a combined SIHC and HES). If these types of data are obtained, they would greatly enhance the distributional data for any assets and liabilities that are surveyed. In addition, data from the Household Income and Expenditure Survey would serve to rebenchmark modelled estimates every six years.

The Household Survey of Labour and Income Dynamics (HILDA), funded by the Department of Family and Community Services (FaCS) is collecting asset and liability data in the 2002 wave of the survey. The results of this survey could be compared to the model, and, once again, such results could potentially be used to rebenchmark some asset or liability estimates.

New business asset data may also be available in the future if an ABS proposal to develop a business longitudinal database proceeds. If it does, it will be some time before data are available, but the use of Australian Business Numbers (ABNs) could enhance the coverage, and quality, of business asset and liability data obtained in this way.

Superannuation estimates could be improved if unfunded superannuation balances could be benchmarked separately from other pension fund technical reserves, owing to the different rates of undercoverage for different schemes. This would be possible if the pension receipts data collected in the future was flagged to indicate whether the receipts are from a funded or unfunded scheme. More direct comparisons to data from the RIMGROUP model may also be possible if this split could be collected.

The ABS' Financial Accounts Section has been working with the Australian Prudential Regulatory Authority (APRA) to refine and consolidate questionnaires sent to businesses in the financial sector. Improved data on the financial assets and liabilities of NPISHs is likely to result from this exercise, and these data could be incorporated into the model. The ABS' National Accounts Branch is also working to develop a Non-Profit Institution (NPI) satellite account, and this may also result in data which could improve NPISH adjustments in the model.

The greatest challenges that will be faced in the preparation of future estimates will be in areas where data ceases to be collected. For example, if the Rental Investors' Survey (RIN) was not run in the future, another approach to estimation of investment property assets would be needed. If these types of situations arise, estimates may rely more heavily on income capitalisation approaches for assets and liabilities for which data are not directly collected.

### 6.3 Possibilities for future analysis

The analysis presented in Chapter 4 is only a fraction of that which could be undertaken using data from the wealth model which has been described in this paper.

First and foremost, more detailed analyses of individual assets and liabilities across different types of households could be undertaken. One could analyse how the composition of wealth changes across groups of households, for example, does the wealth of couples include the same mix of assets as that of lone person households?

The distribution of wealth across other household groups could also be examined. This type of analysis may shed light on the relationship between wealth accumulation and education levels, or how wealth accumulation differs for people who own their own home as opposed to those who are renting their dwelling. Investigation of the distribution of wealth by equivalised income deciles is already underway, and a range of other analyses are being considered for incorporation into the ABS' future work program.

Analyses in the areas of consumption, savings, income inequality, financial stress, labour force decisions and retirement choices are underway both within the ABS and throughout the broader analytical community. Experimental wealth estimates may be a valuable input into these types of studies.

Analysis of real (as opposed to current-price) changes in household wealth is another area of interest. The estimates reported in this paper have been compiled on a current-price basis. This is the basis on which SIHC and HES data are collected, and it is also the way in which household balance sheet data has been compiled. However, an experimental real/volume National balance sheet, which allows analysis of changes in National wealth over time, free of the direct effects of inflation, has recently been compiled.<sup>3</sup> The experimental balance sheet incorporates volume estimates for non-financial assets, and financial asset and liability data which have been deflated by a price index, in order to measure the purchasing power of the aggregates over a designated numeraire set of goods and services.

Similar types of adjustments to enable: a) analysis of changes in asset and liability volumes; or b) changes in households' purchasing power, are being considered as extensions to the work reported in this paper. However, such adjustments must be undertaken with great care. They should consider spatial effects, as different rates of price change occur in different places. This is particularly important when one considers housing prices. Another issue which will guide the choice of appropriate deflators is the relative fungibility, or liquidity, of different asset groups. In general, the choice of an appropriate deflation technique should be guided by the type of analysis for which the deflated data are to be used.

And finally, once a longer time series of wealth data becomes available (in several years' time), cohort effects on wealth accumulation in Australia could also be analysed. Such analyses may shed light on how membership of a particular birth cohort affects the accumulation of wealth, and the size of the bequests or inter vivos transfers that households make. A longer time series of data would also allow comparison of trends in the distribution of wealth and other social phenomena such as changing trends in family formation or dissolution.

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<sup>3</sup>For further details of this experimental work, see the article 'Real/Volume Balance Sheet for Australia', in the March 2001 edition of Australian National Accounts, National Income, Expenditure and Product, cat. no. 5206.0.

## 7 Dwellings and other structures — technical details

### 7.1 Dwellings — owner occupied housing

#### Definition

Owner occupied dwellings include houses and other dwellings (flats, home units, villa units, duplexes, mobile homes, caravans, houseboats and barges) which are the owner's principal residence. Also included are those dwellings under construction, and the value of any alterations or additions to dwellings made by owner occupiers. The ASNA dwellings estimate does not include the value of the land which dwellings are situated on, as this forms part of the non-produced assets group listed elsewhere in the balance sheet. (*Australian System of National Accounts: Concepts Sources and Methods, 2000*, cat. no. 5216.0) However, in this study, the value of owner occupied dwellings includes the value of the land that dwellings are situated on.

#### Data sources

This is one of only two balance sheet components which are directly collected in both the SIHC and the HES. These surveys provide good quality data on the distribution of owner occupied housing, and this can be dissected by a number of household characteristics. Similar data are available from the 1999 Australian Housing Survey (AHS), however, due to the quality of data available on the SIHC and HES, AHS data was not required.

Benchmarking this component presents some challenges. The ASNA dwellings figure represents all dwellings owned by the household sector, so owner occupied dwellings and investment properties are both included within the one item. Also, as discussed above, the value of dwellings in the household balance sheet does not include the value of the land upon which dwellings are constructed.

#### Methodology

The value of the owner occupied dwellings is used as reported in the SIHC and HES. The weighted sum of individual dwelling values is benchmarked, along with investment properties (see Section 7.2), to equal the ASNA dwellings item plus an estimate of the land on which these dwellings are based. That is, dwellings land is therefore split from rural and other land, and added to the ASNA dwellings figure. For further details of the derivation of the dwellings land component, see Section 7.3. The dwellings benchmark was broken down by state and territory as outlined below.

A simple perpetual inventory model (PIM) was used to estimate the dwelling stock by state and capital city/balance of state. The capital city/balance of state benchmarks were obtained by multiplying the PIM dwelling stock estimate by the appropriate Housing Industry Association/Commonwealth Bank of Australia (HIA/CBA) median house price series, which incorporates dwelling land values. The proportion of the total value of Australian dwelling stock for each state and territory which resulted from this calculation was applied to the ASNA benchmark. Survey estimates were then benchmarked to these regional benchmarks.

The methods outlined above mean that the  $i^{\text{th}}$  household, in region  $j$ , will have a value of owner occupied housing derived as follows:

$$\text{Owner occupied housing}_{\text{Derived}}^i = \text{Own home}_{\text{SIHC/HES}}^i \times \frac{[\text{Dwellings + land :dwellings}]_{\text{ASNA}}^j}{\sum_{i=1}^n \text{Owner occupied and investment dwellings}_{\text{SIHC/HES}}}$$

## Time series estimation

Data on the value of respondents' homes was collected in all SIHCs between 1994–95 and 1999–2000 and by the HES in 1993–94 and 1998–99. The ASNA benchmarks, PIM and HIA/CBA price data were available for all periods. See Section 7.3 for a discussion of time series data availability for the land — dwellings component.

## Data quality

Dwellings are one of the most significant asset groups in the household balance sheet, and therefore the quality of the data used to estimate this component has been examined in some detail.

Non-sampling error may affect any of the survey data discussed in this paper. In 1991, Judith Yates conducted a study into the accuracy of respondents' estimates of the value of their own homes. Yates reviewed comparisons of self-reported valuations by owner-occupiers against professional valuations and sales data. Yates concluded that owner-occupiers' estimates, in aggregate, would differ from professional valuations by no more than 3% on average. There is much larger variation in the accuracy of estimates at the individual level. Yates reviewed the 1986 Income Distribution Survey and found that only 33% of respondents were able to estimate the value of their dwelling within the 6% range (3% either side of the professional valuation). (*Yates, 1991*)

The methods used to derive ASNA benchmarks will also affect the quality of the final estimates. The dwellings estimates in the household balance sheet are considered to be of fair quality. In most of the years considered in this study, dwelling totals were benchmarked down to equal household balance sheet aggregates.

The National Accounts uses the PIM to estimate the stock of dwellings. *Building Activity, Australia* (cat. no. 8752.0) is used to adjust the stock of dwellings for each quarter. This collection obtains data on the number of residential dwellings, and alterations and additions made to existing residential buildings, where the alterations are valued at \$10,000 or more.

Allowances are also made for net expenditure on new dwellings which are not included in the survey. For example, dwellings on rural properties which do not require building approval are included. *Building Approvals, Australia* (cat. no. 8731.0) collects information on building activity with a value between \$5,000 and \$9,999. For building activity less than \$5,000 information from the HES is used.

There are a number of alternative estimates of the value of dwellings, such as those produced by the Reserve Bank of Australia (RBA), Treasury, Real Estate Institute of Australia (REIA), and the HIA/CBA. These series are based on different methodologies and data sources. Some of these are outlined below.

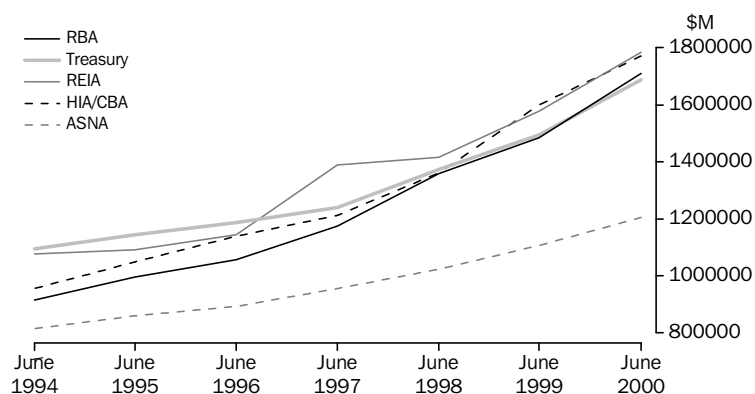
The HIA/CBA median house price series is derived from administrative data from owner occupied dwellings financed by the CBA in metropolitan and non-metropolitan areas. The HIA/CBA data was not stratified by other geographical or physical characteristics of dwellings. (*Treasury File Notes for the TRYM model*)

The REIA median house price series is constructed from sales data supplied by state-based real estate offices and local government agencies. The REIA price series only includes houses in the metropolitan area. The REIA price series does stratify by geography but does not take into account changing physical characteristics of dwellings between periods. (*Treasury File Notes for the TRYM model*)

The Reserve Bank median house price series is constructed by splicing together the quarterly HIA/CBA median price series and the REIA median price series for each state. The eight state median house prices series are then combined using the percentage of dwellings in each state to produce a weighted median price series for Australia. This median house price is then applied to the stock of dwellings for Australia. The stock of dwellings is based on Census data, quarterly building approvals and quarterly demolitions.

The Treasury estimate is based on Census information on the stock of dwellings, quarterly building approvals, quarterly demolitions and the ABS established house price index (cat. no. 6416.0). The ABS house price index is converted to a dollar value by using the REIA and HIA/CBA house price series. When the REIA and HIA/CBA series are at broadly the same level, and growing at a similar rate, their value is used as a base value for the ABS established price index. From that point the ABS established house price index growth rates can be used to obtain a dollar value for each quarter. This dollar value is then applied to the stock of dwellings. (*Treasury File Notes for the TRYM model*)

**Graph 7.1.1: Comparison of Australian dwelling stock estimates**



Graph 7.1.1 shows the RBA and Treasury dwelling stock series, and the ASNA dwelling stock series (as adjusted in this study to include the land upon which dwellings stand). Two further series are also shown — the REIA and HIA/CBA dwelling stock series have been obtained by applying the REIA and HIA/CBA house price series to the stock of dwellings derived in this study (which was to obtain capital city/balance of state benchmarks). As shown in graph 7.1.1, the four alternative measures of the value of the stock of dwellings are considerably higher than the National Accounts estimate.

The differences between the National Accounts and alternative estimates may be due to two factors; the data used to construct price indexes and the stock of dwellings estimates.

The HIA/CBA and REIA indexes may be distorted by the mix of dwellings sold in each period. That is, a higher (lower) proportion of sales in more expensive areas would increase (decrease) the median sale price, even if the price of each dwelling in all areas remained unchanged (*Economic Roundup, 1999*). The stock of dwellings used by National Accounts is constructed independently of Census data. This produces a different estimate of the stock of dwellings than when using the 5 yearly Census as a benchmark.

SIHC and HES estimates for the value of the stock of dwellings (when added to aggregate investment property estimates) produce results quite close to ASNA figures in four of the years considered in this study. The only conceptual difference between the National Accounts estimates and the survey estimates is that the National Accounts include vacant residential land and any dwellings which are not used as a principle residence or as an investment property (e.g. holiday homes). This should make the National Accounts figures higher than the survey aggregates, rather than lower. Further investigation of the differences between dwelling stock estimates coming from different sources may lead to adjustments to the way that this component is benchmarked in the future.

The quality of the 11 regional benchmarks used in this study is largely dependent on the quality of the input data, and this is difficult to gauge. However, a test on the reliability of the model for the stock of dwellings by state/territory can be obtained by observing how well the quarterly building approvals data added to the 1991 Census matches the 1996 Census data.

This test revealed differences with the estimated stock of dwellings in 5 of 11 regions. An adjustment factor was calculated as the amount by which the quarterly building approvals data added to the 1991 Census had to be adjusted to equal the 1996 Census data. The adjustment factors were relatively minor. Sydney required the largest adjustment factor of 0.1%, while Brisbane had an adjustment factor of 0.01%.

## 7.2 Dwellings — investment properties

### Definition

Investment properties include houses and other dwellings (flats, home units, villa units, duplexes) which are rented out and provided long term accommodation to the resident. Holiday and short term accommodation are excluded. (*Household Investors in Rental Dwellings, Australia, 1997.*)

### Data sources

Data for this component is available from the Rental Investors' Survey (RIN). The survey was conducted in 1993 and 1997. Data from the survey contains investment property information which can be cross-classified by household types, age of the reference person (or others in the household), income, and region of residence. The RIN captures the number of residential investment properties owned by the household, and the value of the three most recently acquired properties.

There are a number of ways in which RIN data could be linked to the SIHC. The SIHC collects data on the amount of rent obtained from renting residential properties. These data could be used, along with a ratio of investment property values to rent received, to distribute assets across income units. Alternatively, the value of investment properties held by groups of income units can be matched back to income units which reported ownership of an investment property in the SIHC.

The complexity of estimating the distribution of this component is increased by the benchmarking step. As discussed in Section 7.1, the ASNA dwellings figure includes both owner occupied and investment housing, but does not include the value of the land on which dwellings are based — this comes under the non-produced assets category 'land'.

## **Methodology**

Some preliminary adjustments are made to the RIN, to impute a value for the fourth, fifth and other dwellings owned by income units with more than three rental properties. Values for the additional properties are imputed using the average value of the first three properties owned by the respondent.

The income capitalisation technique was used to estimate the value of rental properties for non-respondents. The average yield from respondents who reported both the value of their rental property and a weekly rent from that property was applied to those who only reported a weekly rent.

The average yield was calculated for groups broken down by household type, rental income, state, and age of the household reference person. The average yield of all donors in each class was used to impute the value of non-respondents' rental properties in that class.

Once these adjustments were completed, the assets captured by the RIN had to be related back to SIHC and HES files. This could be done by using income from residential properties and yields or regressions to impute rental property values. However, this method is complicated by negative returns on some rental properties, and the fact that the number of income units with characteristics of interest in this study (such as household type, state, etc.) varied considerably (in some cases) between the RIN and the SIHC.

The method chosen to link the data was to use the average value of the investment properties reported in the RIN, and map this back to those income units in the SIHC or HES which reported ownership of a rental property, preserving as much detail as possible. This was done by taking weighted average asset values for groups defined by the household's level of profit or loss on the rental property, state of residence, the age of the reference person and the household type variable.

Where such a fine split was not supported by the data, average values were taken at a coarser level. The derived values were rebenchmarking to total values for each cell from the RIN. These calculations were done using weighted data, so that the weighted dissections generated from our SIHC based file mirror the weighted dissections from the RIN at the state and capital city/rest of state level. Other dissections produced results which are broadly consistent between the two files.

Finally, the SIHC based estimates were benchmarked, in conjunction with owner occupied dwellings, to the ASNA dwellings item plus an estimate of the land on which these dwellings are based. For derivation of the 'Land — dwellings' figure, see Section 7.3.

These methods outlined above imply that the  $i^{\text{th}}$  household, in region  $j$ , will have a value of investment properties derived as follows:

Investment properties $_{SIHC}^{ij}$  = Average investment properties $_{RIN}^{ij}$  ×

$$\frac{\sum_{i=1}^n \text{Investment properties}_{RIN}^{ij}}{\sum_{i=1}^n \text{Derived investment properties}_{SIHC}^{ij}}$$

### Time series estimation

The RIN was conducted in 1993 and 1997. Data on the amount of rent obtained from renting residential properties was collected in all SIHCs between 1994–95 and 1999–2000, and by the HES in 1993–94 and 1998–99. HES income data does not differentiate between income from renting residential properties and that from non-residential properties, nor does it include a flag for income units which reported zero rental property income. Thus, the distribution of rental properties will be slightly distorted in these years.

Benchmarking data were available for all periods, see Section 7.1.

### Data quality

The issue of how well respondents can estimate the value of their investment property is similar to that encountered with owner occupied dwellings. For further information see Section 7.1

Discussions with users of RIN data, and those responsible for the survey, have highlighted that the RIN estimate for the total number of rental dwellings is lower than the number of rental dwellings implied by the number of respondents on other surveys who report that they are renting their dwelling. Some part of the discrepancy is due to differences in scope between the RIN and other surveys. For example, the RIN does not survey corporate entities or overseas residents, and these groups will own some part of the Australian rental dwelling stock. If the remaining differences are distributed across most rental property owners, the distribution of this asset should not be dramatically affected by this data quality issue.

The mapping of RIN data to the SIHC and HES will affect some dimensions of the data. The imputed data will mirror exactly the RIN data at the aggregate level and for state and area disaggregations. Estimates for age and household type disaggregations produce results which are very similar to the RIN. However, due to the considerably smaller sample size of the SIHC, SIHC-based files do contain some 'empty' cells for some categories.

At lower levels estimates are still quite consistent between the two data sets. Inconsistency only occurs where the sample sizes between the two data sets differ significantly. For example, in the RIN data there are 423 single person income units in ACT with investment housing while in the SIHC there are none. As a result, the remaining income units in the ACT are scaled up to account for the difference. Information on the quality of the benchmarking step is reported in Section 7.1.



## 7.3 Land — dwellings

### Definition

This component relates to land on which residential dwellings, i.e. owner occupied or investment dwellings, are constructed. The land associated with holiday homes and vacant residential land are also included in this component. Residential land which is not owned by the household sector is excluded.

### Data sources

Several sources of land valuation data were explored to derive estimates for this component. Data on land values is available from the Commonwealth Grants Commission Annual Report. The Australian Valuation Office compiles an annex to this report, which includes average values of residential land by state, values of residential land in metropolitan and non-metropolitan areas by state, and many other statistics.

Some data was also obtained from the Office of the Valuer General of Victoria. These data included unimproved (i.e. vacant) and improved values of land for most regions in Victoria. Data of this kind for other states/territories is thought to be available, but it is not kept in a single location. Since the amount of work required to compile these data would be significant, it has not been pursued at this stage. However, data from Valuers General might be a valuable source of information at a later time.

Data from REIA was also explored, but did not contain the types of disaggregations required for this study.

At the aggregate level, the land component of the ASNA household balance sheet includes farmland and land upon which dwellings and other structures are based. However, the 'Land use by State' table from *Australian National Accounts: National Balance Sheet* (cat. no. 5241.0.40.001), splits land in each state into residential, rural or commercial land. These data are not split by sector of ownership.

### Methodology

An adjustment is made to the residential land figures in the 'Land use by state' table of the National Balance Sheet publication, so that they represent household residential land only. This adjustment involves multiplying dwelling land figures by the ratio of dwellings owned by the household sector (after adjustment for NPISHs) to the total stock of Australian dwellings. The aggregate adjusted value of dwellings land is added to the ASNA dwellings benchmark, and used to benchmark dwellings.

Using the adjusted land use by state estimates and Commonwealth Grant Commission (CGC) splits of the value of residential land by capital city and balance of state, regional land estimates are created. The value of residential land is split into capital city and balance of state for all states except Tasmania, Northern Territory and the Australian Capital Territory.

These values of residential land can be distributed among households in each state/territory according to their proportion of the total state/territory value of dwelling values, as reported in the SIHC/HES, or investment properties which are derived from RIN data (see Section 7.2).

Thus, for the  $i^{\text{th}}$  household in state/territory  $j$ , and metropolitan or non-metropolitan region  $k$ , the value of land—dwellings could be calculated as follows:

*For owner occupied housing:*

$$\text{Land : dwellings}_{SIHC}^{i,j,k} = \text{Value of own home}_{SIHC}^{i,j,k} \times \frac{\text{Value of land}_{Derived}^{jk}}{\sum_{i=1}^n \text{Own home}_{SIHC}^{i,j,k} + \sum_{i=1}^n \text{Investment properties}_{SIHC}^{i,j,k}}$$

*For investment properties:*

$$\text{Land : Investment property}_{SIHC}^{i,j,k} = \text{Investment property}_{SIHC}^{i,j,k} \times$$

$$\frac{\text{Value of land}_{Derived}^{jk}}{\sum_{i=1}^n \text{Own home}_{SIHC/HES}^{i,j,k} + \sum_{i=1}^n \text{Investment properties}_{SIHC}^{i,j,k}}$$

The derivation of a dwellings land aggregate is required for benchmarking, as the aggregate dwelling land value is added to the ASNA dwellings figure to provide a benchmark for owner-occupied dwellings and investment properties.

However, the allocation of land values to individual households was made only for the purpose of determining the land allocated to rental properties for the non-private dwellings adjustment. The value of the land on which dwellings are based is included in home valuations from the SIHC and HES, therefore dwelling land estimates are not reported separately in this paper.

## Time series compilation

Values of residential land by capital city and balance of state are not compiled on a regular basis. Estimates for 1995 and 1997 are the only years considered in this study for which data were available. This is because the CGC is not required to collect information on residential land values other than to help assess movements in commercial and industrial land values. The 1995 split was used for earlier years, while the 1997 split was used for the later years. For 1996 the values for each region were interpolated from the existing 1995 and 1997 data. ASNA figures of land use by state were available for all years between 1990 and 2000.

## Data quality

Land estimates in the household balance sheet are considered to be of good quality.

The splits of dwelling land by state/territory and capital city/balance of state may break down in time periods for which data was not available from the CGC. However, these splits are only used to adjust the assets of people in non-private dwellings, and have a very small effect on the results of the model.

## 7.4 Other buildings and structures

### Definition

Other buildings and structures include assets such as commercial, industrial and non-dwelling residential buildings. Sewage installations, heating, ventilation and other similar equipment (forming an integral part of these buildings or structures), are also included. Roads, bridges, wharfs, harbors and pipelines also fall into this category. (*Australian System of National Accounts: Concepts Sources and Methods, 2000*, cat. no. 5216.0)

### Data sources

Data relating to other buildings and structures is available from the SIHC, which contains a question on rent from non-residential properties. Rental yield data from the RIN is available, but only covers residential rental properties. Data from the Real Estate Institute of Australia was examined, but was too highly aggregated for use in this study.

In 1994–95 and 1995–96, the BLS (also known as GAPS), collected the value of non-current assets — property. This included buildings, land and other tangible assets, and therefore would tend to overestimate the value of non-residential property held by businesses. In later years of the survey, these data were grouped with information on other non-current assets.

Unpublished National Accounts industry data for the household sector provide estimates for the value of other buildings and structures owned by unincorporated enterprises in the agriculture industry.

The household balance sheet ‘other buildings and structures item’, plus an amount of land associated with these structures, is used as the aggregate benchmark for other buildings and structures. For the derivation of the Land — Other Buildings and Structures figure, see Section 7.5.

### Methodology

The estimate for this component is formed in three parts. Using data on rent from non-residential properties from the SIHC, and average annual yields from the RIN (broken down by household type, age of reference person and state) an approximate amount of non-residential rental properties can be derived for income units in the SIHC. However, this does not account for other buildings and structures owned by unincorporated enterprises (i.e., those businesses which own their own business premises).

The second part of the estimate, therefore, used data from GAPS to determine the average value of buildings and structures owned by non-farm unincorporated enterprises. This estimate was derived from average values of non-current property assets split by industry and business income ranges from GAPS. These values were assigned to income units on the SIHC with the same industry and business income. The process was repeated using only a business income range split, to derive average values of other buildings and structures for cells in the SIHC which had no exact GAPS counterpart. The SIHC-based estimates were then benchmarked to the GAPS estimates at the state level.

Since farms are not included in the GAPS sample, the third part of this component involved distributing unpublished National Accounts estimates of agricultural other building and structures to unincorporated farm enterprises on the SIHC or HES. This allocation was made in direct proportion to adjusted business income (the derivation of adjusted business income is discussed in Section 3.5).

Once values for the other building and structures owned by households, and those owned by non-farm unincorporated enterprises, are determined, they are benchmarked. The benchmark includes the ASNA 'other buildings and structures' figure, plus an estimate of the land relating to these structures, less the value of other building and structures owned by farmers, as these estimates are already benchmarked.

This means that for the  $i^{\text{th}}$  household in group  $j$  (defined by household type, age of reference person and income), the value of other building and structures is derived as follows:

*Owners of non-residential properties:*

$$\text{OB and } S_{\text{Derived}}^{ij} = \text{Return on renting non-residential properties}_{\text{SIHC}}^{ij} \times \frac{\text{Total weighted value of investment properties}_{\text{RIN}}^j}{\text{Total weighted return on investment properties}_{\text{RIN}}^j}$$

*Non-farm businesses which own their own business premises:*

For the  $i^{\text{th}}$  business in group  $k$  (defined by industry and business income),

$$\text{OB and } S_{\text{Derived}}^{ik} = \frac{\text{Total weighted value of OB and } S_{\text{GAPS}}^k}{\text{Total weighted number of units}_{\text{GAPS}}^k}$$

This is rebenchmarked to the state distribution of other buildings and structures from GAPS:

$$\text{OB and } S_{\text{GAPS Benchmarked}}^{ik} = \frac{\text{Total state OB and } S_{\text{GAPS}}}{\text{Total state OB and } S_{\text{Derived}}}$$

*Owner occupied farm businesses not collecting rent:*

$$\text{OB and } S_{\text{SIHC}}^i = \text{OB and } S_{\text{ASNA}}^i \times \frac{\text{Business income}_{\text{SIHC}}}{\sum_{i=1}^n \text{Business income}_{\text{SIHC}}}$$

*Benchmarking step:*

$$\text{Total OB and } S_{\text{Benchmarked}}^i = \text{Total OB and } S_{\text{Derived}}^i \times \frac{\text{OB and } S_{\text{ASNA}}}{\sum_{i=1}^n \text{OB and } S_{\text{Derived}}}$$

## Time series estimation

Average annual yields from the RIN are only available for 1993 and 1997. The 1993 data were used for 1993–94 and 1994–95 and the 1997 data for all other years. The SIHC provides information on the income from renting non-residential properties. However, HES income data does not differentiate between income from residential properties and non-residential properties, nor does the HES flag income units which report zero rental income. SIHC data from a year adjacent to the HES is used to determine which income units are receiving income from residential properties or non-residential properties.

The value of property assets from GAPS is only available for two years. This means that these figures need to be used for estimates in all time periods. Movements in relative property asset values between industries, and across regions outside of these two time periods will not be captured.

The National Accounts unpublished estimates of other buildings and structures for the agriculture industry were available for all years, as is the aggregate National Accounts other buildings and structures series.

## Data quality

The income reported on the SIHC from renting non-residential properties provides good data on which income units own, and receive rent, from other building and structures. The income data itself is less than ideal for imputing the value of other buildings and structures, as it is net income rather than gross income. The use of net income to determine the distribution may underestimate the value of the associated asset. Non-residential rental income values were adjusted to account for nil and negative values (see Section 3.5). The assumption that average annual yields from the RIN can be used to approximate the rate of return from other buildings and structures is untested.

GAPS non-current property assets data may also included some other assets other than the buildings and structures owned by unincorporated enterprises. This may lead to an over-estimation of the value of other building and structures owned by unincorporated enterprises.

In imputing asset values from the GAPS to the SIHC it is assumed that the profit or loss made by an unincorporated enterprise is comparable to the business income reported on the SIHC. This assumption may not hold true if some of the profit made by the enterprise is retained by the enterprise and not completely passed on to the owner. However, the categories used to compare the two measures are quite broad which may help reduce this problem.

Benchmarking ratios for this component fluctuate across time, due to changing data from GAPS, changing rental yields from the RIN and changes in the types of business income units which are captured on the HES and SIHC from year to year. Overall, it is likely that the data derived for this component will not yield high quality industry or state disaggregations.

## 7.5 Land — other buildings and structures

### Definition

This component relates to the land upon which industrial, commercial, and non-dwelling residential buildings are constructed. Sewage installations, heating, ventilation and other similar equipment which forms an integral part of buildings or structures, and developments such as roads, bridges, wharfs, harbors and pipelines are also part of other building and structures. The land underlying these structures is therefore included in the land — other buildings and structures category.

### Data sources

Data on the distribution of the land upon which other buildings and structures are located is not extensive.

The Australian Valuation Office annex of the Commonwealth Grants Commission Annual Report provides commercial/industrial property values by state, however, this does not include any sectoral splits (i.e., the data relates to assets owned by households, financial corporations and all other sectors of the economy).

Data from REIA was also investigated, but again did not contain the types of disaggregations required for this study.

At the aggregate level, the 'Land use by state' table from *Australian National Accounts: National Balance Sheet* (cat. no. 5241.0.40.001), splits land in each state into residential, rural or commercial land. However, these data do not contain sectoral splits, and so land used for commercial purposes includes land which is not held by the household sector.

The Financial Corporations Balance Sheet shows the value of other buildings and structures, and land held by the sector. This sector does not own any residential or rural land, and therefore all the land held by this sector is solely related to the other buildings and structures.

### Methodology

Although several methods of arriving at a distribution of this asset were attempted, the method adopted was to derive the ratio of other buildings and structures to land, for financial corporations, and apply this value to the derived values of other buildings and structures owned by households. The sum of the resulting land — other buildings and structures (OBS) values was added to the OBS figure in the household balance sheet to derive the OBS benchmark.

The aggregate of the OBS—land component, farmland and land—dwellings, will equal the household balance sheet 'land' item.

For the  $i^{\text{th}}$  household which owns other buildings and structures, the derivation of a value for land—other buildings and structures, can be expressed as follows:

$$\text{Land : OB and } S_{\text{Derived}} = \text{OB and } S_{\text{Derived}}^i \times \frac{\text{Land}_{\text{ASNA}}^{\text{Financial Corporations}}}{\text{OB and } S_{\text{ASNA}}^{\text{Financial Corporations}}}$$

Once derived values are aggregated, the aggregate can be added to the household balance sheet ‘other buildings and structures’ item, to provide a final benchmark for this component.

The values of other buildings and structures reported in this paper include the land on which those structures are situated. OBS land values are not reported separately, as the combined estimate is considered to be of higher quality.

### Time series compilation

ASNA land use by state data, and balance sheet data for financial corporations, were available for all years from 1990 to 2000. Other buildings and structures estimates were compiled for all years in which a SIHC or HES was run (see Section 7.4).

### Data quality

Land estimates in the household balance sheet are considered to be of good quality.

The use of data from the Financial corporations sector to derive the value of land associated with other buildings and structures is less than ideal, however in the absence of alternatives this was the best option available.

## 8 Other fixed produced assets — technical details

### 8.1 Machinery and equipment

#### Definition

The machinery and equipment owned by unincorporated enterprises in the household sector includes vehicles, aircraft, ships, electrical apparatus, office equipment, furniture, fixtures and fittings not forming an integral part of buildings or structures, durable containers, and special tooling. (*Australian System of National Accounts, Concepts, Sources and Methods*, cat. no. 5216.0) The machinery and equipment used by households for purely domestic purposes are classed as consumer durables (see Chapter 9).

#### Data sources

Business income is available from the SIHC and HES.

Several sources of machinery and equipment data were identified. Unpublished asset, gross mixed income and returns to capital data was provided by National Accounts Branch, broken down by sector (i.e. for households), type of asset (including machinery and equipment) and industry division.

The BLS (also known as GAPS), collected data on business plant and machinery, and derived profit or loss, over a period of four years.

Asset and operating income data from the Economic Activity Survey (EAS) was also investigated.

Twelve ratios of assets to income were compiled from these data sources, using different levels of industry classification and income/returns to capital data. Some industries (such as agriculture forestry and fishing, and electricity, gas and water supply) were not included in the GAPS survey, so ratios for these sectors were based on total assets and business profit/loss data.

#### Methodology

The method which yielded the most robust, and most easily repeatable results was to derive ratios of machinery and equipment to gross mixed income at the industry division level, using unpublished ASNA data. This method means that the  $i^{\text{th}}$  household, which controls its own non-limited liability business or farm, in industry division  $j$ , will have a value for machinery and equipment derived as follows:

$$\text{Machinery and equipment}_{\text{Derived}}^{ij} = \text{Business income}_{\text{SIHC/HES}}^{ij} \times \frac{\text{Machinery and equipment}_{\text{ASNA}}^j}{\text{Gross mixed income}_{\text{ASNA}}^j}$$

All derived household values for machinery and equipment are then summed, and benchmarked to the aggregate ASNA household balance sheet machinery and equipment item. This process can be expressed as follows:



$$\text{Machinery and equipment}_{\text{Benchmarked}}^i = \text{Mach. and equip.}_{\text{Derived}}^i \times \frac{\text{Mach. and equip.}_{\text{ASNA}}}{\sum_{i=1}^n \text{Mach. and equip.}_{\text{Derived}}}$$

## Time series estimation

Business income is available for all of the years between 1993–94 and 1999–2000. SIHC data was used as a basis for the estimates for 1994–95 through to 1997–98, and 1999–2000. HES data was used in 1993–94 and 1998–99. The ASNA data used for this component was also available for all seven years covered in this study.

The methods described in the previous section were used to derive machinery and equipment estimates in all years except 1993–94. Since an industry code was not available in the 1993–94 HES file, the ASNA machinery and equipment aggregate was allocated to households with a business in direct proportion to their business income.

## Data quality

Twelve asset to income ratios from different data sources were examined to determine the best method of estimation for this component. Although the levels of the unbenchmarked estimates varied somewhat between methods, the final distribution generated by most of the methods was quite similar.

Industry splits of machinery and equipment and gross mixed income data from the ASNA are thought to be of fair quality.

Although the technique of using a ratio to derive machinery and equipment estimates will not capture variation across businesses within a particular industry, broad splits of the estimates generated should provide reasonable results.

Benchmarking ratios for this component are reasonably consistent across all years.

## 8.2 Livestock — fixed assets

### Definition

‘Livestock — fixed assets’ includes breeding stocks, dairy cattle, sheep or other animals used for wool production and animals used for transportation, racing or entertainment. In the Australian System of National Accounts, the range of assets measured in this category is restricted to sheep raised for wool, dairy cattle and sheep and cattle kept as breeding stock (*Australian System of National Accounts, Concepts, Sources and Methods*, cat. no. 5216.0).

## Data sources

Farm business income data from the SIHC and HES is available for all years considered in this study. Farm businesses were defined using the industry code of the main job of the reference person. For further details, see Section 3.5.

Data on livestock assets is available from several sources including the ABS' Agricultural Finance Survey (AFS), the Agricultural Commodity Survey (ACS), ABARE's Australian Farm Survey and, at an aggregate level, the ASNA household balance sheet.

The feasibility of using Australian Farm Survey data was seriously considered, as some information on the characteristics of farmers (such as their age, and whether children are part of the household) are available from this data source. This is a very attractive feature when building a data set with lifecycle disaggregations. However, due to restrictions on the scope of the survey, and the small number of farmers this would relate to on the SIHC file, these data were not obtained.

The ACS and AFS have broader scopes than the Australian Farm Survey, however they do not collect data which can be related to lifecycle characteristics. Attempts were made to allocate livestock assets based on data from these sources, broken down by industry and geographic region. However, once again the small number of farmers in the SIHC (around 160), resulted in some types of farms not being represented in the SIHC-based estimates. This forced adjustments to be made which, in effect, are the same as applying data from the AFS in a more aggregated way.

There are other issues to consider when using ACS and AFS data. The ACS collects data from farms with an Estimated Value of Agricultural Operations (EVAO) over \$5,000, which is desirable for compilation of estimates for smaller unincorporated enterprises. The ACS collects data on livestock slaughtering and other disposals and the AFS collects total livestock inventory values.

The final possibility was to use the total ASNA livestock — fixed assets figure and apply this to all farm businesses in proportion to their income. However, this approach would not capture any variation between regions or farm types.

## Methodology

Taking into account all of the factors outlined above, the method chosen was to distribute the ASNA household balance sheet livestock — fixed assets item across farming income units based on their business income and their state/territory of residence. Northern Territory farm businesses were grouped with Queensland farms, due to small Northern Territory farm samples. Farmers in the Australian Capital Territory were grouped with New South Wales farmers for the same reason. State/territory disaggregations of livestock fixed asset values were obtained by subtracting ACS livestock inventories estimates from AFS total livestock figures, for each state. These data were then used to derive state proportions of total Australian livestock ownership, which were then applied to the household balance sheet aggregate figure, thus deriving approximate state/territory benchmarks.

For the  $i^{\text{th}}$  farm household, in state or territory  $j$ , the derived value of livestock — fixed assets can be expressed as follows:

Livestock : fixed assets  $_{Derived}^{ij} =$

$$\frac{\text{Farm income}_{SIHC}^{ij}}{\sum_{i=1}^n \text{Farm income}_{SIHC}^{ij}} \times \frac{\text{Total state livestock}_{AFS/ACS}^j}{\text{Total Australian livestock}_{AFS/ACS}} \times \text{Livestock : fixed assets}_{ASNA}$$

## Time series estimation

AFS total livestock data, which include both livestock inventories and livestock fixed assets for each state, were available from 1995–96 to 1999–2000. Estimates must be made for earlier years. Livestock fixed assets are the difference between total livestock and livestock inventories. ACS livestock slaughterings and other disposals figures for each state were used to approximate livestock inventories. These figures were available from 1993–94 to 1999–2000.

Total 1995–96 livestock figures, together with livestock slaughterings and other disposals reported in *Agriculture, Australia* (cat. no. 7113.0) were used to derive the total livestock values for 1993–94, in each state, as follows:

State total livestock  $_{Derived}^{93/94} =$

$$\frac{\text{State total livestock}_{AFS}^{95/96}}{\text{State livestock slaughtering}_{ACS}^{95/96}} \times \text{State livestock slaughtering}_{ACS}^{93/94}$$

Estimates of total livestock for 1994–95 are obtained in a similar manner.

## Data quality

The possibility of using ratios of assets to income was investigated. The AFS collects cash operating surplus (with or without depreciation), total agriculture turnover and livestock values. Livestock values include livestock fixed assets and livestock inventories.

Cash operating surplus or total turnover could be used to approximate business income data, and livestock values could be used to approximate the asset values. All possible ratios were examined, including:

- livestock values to cash operating surplus without depreciation;
- livestock values to cash operating surplus with depreciation;
- livestock values to total turnover; and
- livestock values to the average of cash operating surplus with and without depreciation and total turnover.

The estimates for this component were not highly sensitive to changes in the methods used to derive them.

The estimates from AFS or ACS data are based on information obtained from samples drawn from the total farm population in scope for the collections, and are subject to sampling variability; that is, they may differ from the figures that would have been produced if all farms or farm businesses had been included in the ACS or AFS respectively. For further details, see the explanatory notes in *Agriculture, Australia* (cat. no. 7113.0).

Prior to 1997–98 the ACS was conducted as a census and therefore the estimates for that period are not subject to sampling error. State disaggregations of livestock asset values are obtained by subtracting ACS livestock slaughterings and other disposals from AFS total livestock values of each state.

The statistics on livestock slaughterings and other disposals used to estimate livestock inventories are published in *Agriculture, Australia* (cat. no. 7113.0). They are based on a monthly collection from abattoirs and other major slaughtering establishments and include estimates of animals slaughtered on farms and by country butchers and other small slaughtering establishments. Apart from some states with limited production of certain commodities, most published estimates in *Agriculture, Australia* (cat. no. 7113.0) have relative standard errors (RSEs) less than 5%.

A large range of data sources were used to estimate the livestock items in the household balance sheet. A primary data source was the ACS. As the survey is conducted on a 31 March basis, data on livestock slaughterings (*Livestock Products, Australia* (cat. no. 7215.0)) are used to estimate the numbers on a 30 June basis. These data are based on the same data source as that in *Agriculture, Australia* (cat. no. 7113.0). Price data for animals are generally obtained from industry publications and sources.

## 8.3 Computer software

### Data

Computer software includes both software purchased off the shelf and software developed in-house by business enterprises. Large databases which are purchased or developed, and which are expected to be in use for a period of one year or more, are also included in the ASNA definition of computer software. It should be noted that the computer hardware owned by unincorporated enterprises is included in machinery and equipment, and computers and the computer software used by households for non-business purposes are part of the consumer durables category. (*Australian System of National Accounts: Concepts Sources and Methods, 2000*, cat. no. 5216.0)

### Data sources

The main sources of data related to computer software are the Business Use of Information Technology Survey, the Farm Use of Information Technology Survey and, at the aggregate level, the ASNA computer software component of the household balance sheet. However, not all of these data sources provide the type of data needed to estimate this component.

Unpublished splits of computer software by industry were also obtained from National Accounts Branch. Some industries are not included in the estimates, such as Property and business services, Education, Government administration and defence and Health and community services.

## Methodology

Adjusted business income from the SIHC and HES was used as the basis for estimating the distribution of this asset. Unpublished data from National Accounts Branch provided splits of household sector computer software across selected industries.

Where possible, computer software use data, split by industry and state/territory, were derived using the Business Use of Information Technology Survey and the Farm Use of Information Technology Survey. These state by industry splits were distributed to businesses in direct proportion to their adjusted business income.

The industry of businesses on the SIHC/HES was determined by the industry of the reference person's main job, therefore some businesses did not have an industry code, or had an industry classification such as Education or Government administration, which were out of scope for the IT surveys. These businesses were assigned the residual of the household balance sheet computer software item less the total value of software assets derived for other industries, in direct proportion to their adjusted business income. State totals were derived for the residual amount of computer software using the proportion of observations from the SIHC/HES in each state.

This method means that the  $i^{\text{th}}$  household, which owns a non-limited liability business or farm, in industry division  $j$ , and state  $k$ , will have a value for computer software estimated as follows:

$$\text{Computer software benchmark}^{j,k} = \text{Computer software}_{ASNA}^j \times \frac{\text{No. of firms}^{j,k}_{\text{BUI/FUI}}}{\text{Total no. of firms}^j_{\text{BUI/FUI}}}$$

$$\text{Computer software}_{\text{Derived}}^{i,j,k} = \text{Computer software}_{\text{Benchmark}}^{j,k} \times \frac{\text{Business income}_{\text{SIHC/HES}}^{i,j,k}}{\sum_{i=1}^n \text{Business income}_{\text{SIHC/HES}}^{i,j,k}}$$

## Time series estimation

Business income is available for all years in which there was a SIHC or HES. ASNA computer software by industry splits were available for all the years being investigated in this study.

Business Use of Information Technology (IT) survey data files were available for 1997–98 and 1999–2000. The Farm Use of IT Survey was conducted in 1997–98. In years where an IT usage survey was not conducted, the National Accounts industry estimates were distributed in direct proportion to the adjusted business income, i.e. with no adjustment for state.

## Data quality

The estimates of this component for 1998 and 2000 are based on the assumption that if a firm uses a computer, it is likely to own the computer software associated with it. This assumption may not hold in cases where firms lease computer hardware and the associated software. This may affect the distribution of computer software between industries and states to some degree, but such effects are likely to be small.

The Business Use of IT Survey is a stratified random sample of the businesses recorded on the ABS Business Register. The register includes all group employers except for agricultural businesses (Division A of ANZSIC), education organisations (Division N of ANZSIC), and businesses classified to the General Government sector. Non-employing businesses in all industries were also excluded. The Business Use of IT sample size ranged from 6,800 in 1997–98 to 15,000 in 1999–2000.

The 1997–98 Business Use of IT Survey had a relative standard error for estimates of businesses who use a personal computer of 2%. For 1999–2000 the relative standard error was reduced to 1%.

The Farm Use of IT is a probability sample survey drawn from the 145,000 farm units in Australia. It surveys farms with an estimated value of agricultural operations (EVAO) of \$5,000 or more. The Farm Use of IT relative standard error for farms using computers was 1.0% for Australia. The sample size for the Farm Use of IT was 35,000.

## 8.4 Entertainment, literary or artistic originals

### Definition

Entertainment, literary or artistic originals (ELAO) includes originals of films, television programs, music products, and books. (*Australian System of National Accounts: Concepts Sources and Methods, 2000*, cat. no. 5216.0)

### Data sources

Royalty income from the SIHC/HES was used as the basis for estimating the distribution of this asset, as this was the income item most closely related to ELAO. This income item may also include royalties from mining operations and similar enterprises, however, it is unlikely that a large amount of this type of income is flowing directly to the income units in the survey.

Data from the BLS (also known as GAPS), was also investigated, as this survey collected data on a number of asset items, including ‘non-current assets, other’, which included capitalised interest, goodwill and brand names. Industry disaggregations are available, however, these data are only available for two years, 1994–95 and 1997–98.

### Methodology

Given the lack of detailed data available for this item, the method adopted was to distribute the ASNA household balance sheet ELAO item across income units in direct proportion to their royalty income. For the  $i^{\text{th}}$  household, the derived value of ELAO can be expressed as follows:

$$ELAO_{Derived}^i = \text{Royalty income}_{SIHC/HES}^i \times \frac{ELAO_{ASNA}}{\sum_{i=1}^n \text{Royalty income}_{SIHC/HES}}$$

## **Time series compilation**

Royalty income is available on all SIHC and HES data files, and ASNA ELAO values were available for all time periods. It should be noted that this component was rounded to zero in the household balance sheet until 1997. A more detailed series was obtained from the National Accounts Branch to allow values for this asset to be allocated to households.

## **Quality**

The number of income units on the HES and the SIHC which report royalty income is extremely small, the number of observations ranging between 11 and 30 in any given year. This results in an unstable and volatile distribution of this asset over time, and the distribution of this component may not be of high quality.

## 9 Consumer durables — technical details

### 9.1 Consumer durables — motor vehicles

#### Definition

The consumer durables — motor vehicles item includes cars, motor cycles and other motorised vehicles which are used for private purposes. Similar vehicles which are used for business purposes are part of the ‘machinery and equipment’ component of the balance sheet.

#### Data sources

The machinery and equipment acquired and consumed by households are not treated as fixed assets in the household balance sheet, due to the production boundaries which have been defined for the household sector in SNA93. However, these assets are included in the National Balance Sheet memorandum item ‘consumer durables’. Memorandum items are used to show ‘assets that are not separately identified in the central national accounting framework, but are of more specialised analytical interest’. The ASNA consumer durables memorandum item includes private motor vehicles and other household durables, which are discussed in Section 9.2. The series is compiled from two separate series from the ABS’ NIF10 model — one for motor vehicles and another for consumer durables. These series have been used to obtain benchmarks for motor vehicles and consumer durables in this study. (*Australian System of National Accounts; Concepts, Sources and Methods*, cat no. 5216.0).

Data on the number of motor vehicles garaged at a household was collected in the 1991 and 1996 Census, the 1992 and 1997 Time Use Surveys and the 1993–94 and 1998–99 Household Expenditure Surveys.

The Household Expenditure Surveys also collected the purchase or sale price of any vehicles the household bought or sold over the 12 months preceding the survey. Details of the vehicle type, and whether purchased vehicles were new or old were also collected. However, the 1993–94 data have some limitations as sales data was netted from purchases, to provide ‘net expenditure’, as part of the detailed expenditure data collected by the HES. This means that if a household purchased a \$25,000 vehicle and sold their old \$10,000 vehicle, the expenditure is reported as \$15,000 (although this is converted to a weekly expenditure value in the survey data file). The 1998–99 file was treated in the same way, however the ABS’ Living Conditions Section was able to re-derive the original purchase and sales values for use in this study.

The Motor Vehicle Census (MVC) collected information on the number, and characteristics, of registered motor vehicles as at the 31 March 1991, 1993, 1995, 1996, 1997, 1998, 1999 and 2001. The postcode of the registered owner of the vehicle was also collected.

The MVC is also used as the frame for the Survey of Motor Vehicle Usage (SMVU). Data items collected in the SMVU include the number of vehicles owned or operated by the household, the type of vehicle use (private/business), and the age and sex of drivers. A SMVU was conducted in 1995, 1998, 1999, 2000 and 2001.



While some files from the SMVU were obtained, no weights were stored with the files, so that population estimates cannot be calculated. These weights could be obtained, using the ABS' GENEST system. Undertaking this work was not feasible in the context of the current project. However, in the future, merging SMVU and CMV data may provide an alternative means of modelling the total number of Australian vehicles. If data from the SMVU could be obtained with survey weights, and if a detailed set of price data could also be obtained, a very detailed picture of the distribution of motor vehicle assets could potentially be derived, by using vehicle and owner characteristics from the survey and merging this with other household survey data.

## **Methodology**

Owing to restrictions on CMV and SMVU data, the method used to derive the distribution of motor vehicle assets has been based on household survey data.

For the 1999 estimates, the average value of all vehicles traded (i.e. purchased or sold) by the household was derived. The median traded vehicle price was derived for groups of households defined by the age of the reference person, household type and ranged income. Since not every household traded a vehicle in the year of the survey, the appropriate group median was multiplied by the number of vehicles garaged at each dwelling, to produce an approximate distribution of vehicles values.

The value of vehicles obtained by the steps above was benchmarked to the motor vehicle series from the NIF10 model (this being one of two series used to derive the National Accounts Balance Sheet consumer durables item).

## **Time series estimation**

2000 estimates were based on data from the 1998–99 HES file. For non-HES years, interpolation was used between data from the 1993–94 and 1998–99 HES files.

As noted above, the value of household expenditure on motor vehicles in the 1993–94 HES was net of any income received from sales of a vehicle in the reference period. This expenditure value could be negative (if the value of vehicles sold exceeded that of vehicles purchased, including cases where only a sale was made in the reference period). Therefore the absolute value of net expenditure on vehicles was derived for each household.

Analysis of net and actual expenditure data for 1998–99 showed that, as expected, net vehicle values tended to underestimate the true value of vehicles traded. However, using average net expenditure produced very similar results to median actual expenditure. This is because the difference between net and actual expenditure was less than might be expected, as a large number of households only purchased, or sold, a vehicle in the reference period, but did not do both. That is, for many households their net expenditure values equal their actual expenditure.

Therefore for groups of households, total vehicles counts, and the average net household expenditure on motor vehicles were derived from both HES files. Interpolation was used to derive values for the intervening years. Interpolated values were merged back to the SIHC file. Those units in the SIHC which fell into an age, household type and income group which did not appear in the HES were allocated values from interpolation between cells which were only defined by household type and income range.

The weighted number of income units in each group was determined from the SIHC file. This number was divided into the total number of vehicles estimate (to obtain an average number of vehicles per income unit). For each income unit, the estimate of the average number of vehicles per income unit was multiplied by the estimate of average net motor vehicle expenditure. For non-HES years, this means that each income unit in a particular age, household type and income group was allocated the same value for motor vehicle assets. The resulting distribution was benchmarked to the motor vehicle series from the NIF10 model.

## Data quality

HES expenditure data are collected using very detailed commodity codes, and as such the expenditure data captured are thought to be of sound quality. However, as discussed above, the method of aggregating data for purchases and sales of vehicles results in a series which does underestimate vehicle values to some degree. However, this problem was not as serious as might have been expected, and median actual expenditure and average net expenditure produced very similar distributions.

The number of vehicles garaged at dwellings, as captured in the HES in 1993–94 and 1998–99, is of the same magnitude as the number of vehicles captured in the Census in 1996, although the latter includes vehicles garaged at dwellings out of scope in the HES, some of which are accounted for in other adjustments.

The overall pattern observed in the final motor vehicles distribution is mirrored by the series of motor vehicle insurance expense from the HES (although, of course, this series is much smaller in value than total expenditure on vehicles).

The NIF10 motor vehicles series is regarded as experimental, and would appear to underestimate vehicle values significantly. The benchmarking ratio for this component ranges from 0.34 to 0.39 over the years considered in this study, which shows that the unbenchmarked series is considerably higher than the NIF10 series. As a form of validating these results, the total NIF10 figure was divided by the number of vehicles from the HES and Census, and this resulted in average vehicle values rising from \$3,600 in 1994 to \$3,950 in 1999. Notwithstanding the fact that motor bikes and older vehicles are included in this item, this average would seem to be too low, considering new vehicle prices over the last decade. Results from this study, further analysis using SMVU data and related work being undertaken by National Accounts Branch, may lead to revisions to the NIF10 motor vehicles series in the future.

## 9.2 Consumer durables — appliances and other household durables

### Definition

The consumer durables — appliances and other household durables item includes furniture and high-value, long-lasting household appliances, but excludes dwellings. Examples of consumer durables include floor coverings, linen and other furnishings, fridges, freezers, televisions and other appliances, tableware, utensils and garden tools. Clothing and footwear are not classed as consumer durables.

## Data sources

The machinery and equipment acquired and consumed by households are not treated as fixed assets in the household balance sheet, due to the production boundaries which have been defined for the household sector in SNA93. However, they are included in the National Balance Sheet memorandum item 'consumer durables'. Memorandum items are used to show 'assets that are not separately identified in the central national accounting framework, but are of more specialised analytical interest'.

The national accounts consumer durables memorandum item includes private motor vehicles (which are discussed in Section 9.1) and other household durables. This series is compiled from two series from the ABS' NIF10 model — one for consumer durables and another for motor vehicles. The NIF10 model consumer durables series is determined by a perpetual inventory model (PIM), which is based on an ASNA household final consumption series. Put simply (and abstracting from issues of price deflation), a PIM takes the value of durables at the start of a period (e.g. a year or quarter), depreciates that value, adds in new expenditure on durables over the period, and produces a new end-of-period estimate. (*Australian System of National Accounts; Concepts, Sources and Methods*, cat. no. 5216.0).

Data on ownership of selected appliances was collected by the Population Survey Monitor from November 1997 to February 1998, and from May 1999 to August 1999. These data were also collected for South Australia in two other periods (New South Wales was also included in the second of these periods). The 1997 Time Use Survey collected similar data. However, these data sources do not contain durable ages or values.

The 1993–94 and 1998–99 Household Expenditure Surveys collected very detailed expenditure data, including data on purchases of consumer durables. This includes disaggregations by type of durable, such as refrigerators, washing machines, glassware, cutlery, kitchen utensils, lawnmowers and other gardening tools. The HES also collected data on contents insurance payments, which should be related to the amount of contents in the household.

There are several sources of data on the asset lives of consumer durables, however most of these have been generated outside Australia. It is possible that consumer durables manufacturers have additional data on Australian asset lives, however while the ABS is interested in this line of inquiry, owing to other data restrictions, these data have not been obtained for this project.

## Methodology

Several different models were tested for this component. It may be possible to use some of the data identified above to build a much more complex model of consumer durables ownership, however, due to data restrictions at this time, a simple model has been adopted for forming the estimates.

Total expenditure on contents insurance was obtained from HES expenditure files. These data were summed for each household, and merged back to the HES household file. A ratio of contents insurance to house and contents insurance was used to split insurance values where households had reported house and contents insurance together. The NIF10 consumer durables series was then allocated to households in proportion to their share of expenditure on contents insurance.

Contents insurance expenditure was chosen as the means of determining the distribution rather than HES consumer durables expenditure data. This was due to the patterns emerging from the two distributions, which showed that purchases of durables peak in the middle age groups, and decline thereafter, whereas contents insurance grows in younger age groups, but then remains reasonably constant. There is no doubt that some of the durables of older Australians have depreciated to a greater extent than those of younger households. However, to distribute this item in proportion to consumer durables expenditure would appear to misrepresent the overall distribution of consumer durables assets.

### **Time series estimation**

The 1993–94 and 1998–99 HES files were used to obtain weighted total contents insurance expenditure, for cells defined by age of the household reference person, household type and income range. Interpolation/extrapolation was used to obtain approximate values for contents insurance for non-HES years. These data were merged back to the SIHC file. Those units in the SIHC which fell into an age by household type by income group which did not appear in the HES were allocated values from interpolation between cells which are only defined by household type and income range.

The weighted number of households in each group was determined from the SIHC file. Each household in the SIHC was allocated an amount of contents expenditure equal to the estimate of total expenditure for that cell, divided by the number of households in that cell. For non-HES years, this means that each household in a particular age, household type and income group was allocated the same value of consumer durables assets. The resulting distribution was benchmarked to the consumer durables series from the NIF10 model.

### **Data quality**

HES expenditure data are collected using very detailed commodity codes, and as such the consumer durables and contents expenditure data captured are thought to be of sound quality.

The NIF10 consumer durables series is regarded as experimental, and it would appear to underestimate consumer durables values to some extent. The benchmarking ratio for this component is artificially close to one due to the methods used to obtain the estimates (i.e. spreading the aggregate figure across households in proportion to expenditure). As a form of comparing HES and NIF10 data, the NIF10 consumer durables aggregate was divided by the total weighted number of households. In each year this produced an average value of consumer durables of between \$10,000 and \$11,000, which would seem quite low.

A very rough estimate of total consumer durables could be obtained by grossing up contents insurance premiums — i.e. by dividing total premiums by the average value of contents insurance as a percentage of the sum insured. Without accurate insurance premium figures to use in this calculation, a conservative estimate would be that people pay one percent of their sum insured in insurance premiums (in reality it is likely to be less than this). Even with this conservative method, average contents values are in the order of \$13,000. The results from this study, further analysis using HES, TUS and PSM data and related work being undertaken by National Accounts Branch, may lead to revisions to the NIF10 consumer durables series in the future.

## 10 Inventories — technical details

### 10.1 Private non-farm inventories

#### Definition

In the National Accounts, private non-farm inventories include the book value of inventories for mining, manufacturing, wholesale trade, retail trade, electricity and gas, accommodation, cafes and restaurants and some non-farm industries which have only minor inventory holdings. The changes in inventories of former public marketing authorities which have been privatised are also included. (*Australian System of National Accounts; Concepts, Sources and Methods*, cat. no. 5216.0)

#### Data sources

Business income for non-farm businesses from the SIHC and HES can be used as the basis for estimating the distribution of this asset. Several sources of inventories data were examined; the quarterly Survey of Inventories, Sales and Services (SISS), the annual Economic Activity Survey (EAS), the BLS (also known as GAPS), and, at the aggregate level, the private non-farm inventories component of the household balance sheet.

As is commonly the case for business surveys, the BLS did not collect information for all industry divisions. The industries not included in the survey were Education, Government administration and defence, Electricity, gas and water supply, Health and community services, Agriculture, forestry and fishing, and Communication services. This should not affect the estimates greatly, as agriculture is accounted for in the farm inventories component, and the industries excluded from the BLS are not ones in which the bulk of unincorporated enterprises are expected to operate. The BLS did collect inventory and income data for the industries surveyed.

Data from the SISS covered six industry groups but did not contain information which allowed this to be linked to income. Data from the Economic Activity Survey (EAS) can provide income statistics for reasonably equivalent industry groups. Splits of gross mixed income from National Accounts Branch could not be used in conjunction with SISS data due to differences in the scope between SISS and national accounts figures.

EAS data includes operating income and total assets from all industry divisions, but inventory data are not available.

Several inventories to income ratios were calculated from these data sources, both at an aggregate level and split by industry division.

#### Methodology

The method chosen was to use SIHC/HES non-farm business income in each industry division as the basis for the estimate. BLS non-farm inventories figures were mapped back to households in the SIHC or HES which reported income from a non-farm business, on a group basis, preserving as much detail as possible.

Non-farm inventory data from the BLS was dissected by industry division and the level of profit or loss. The average asset for each group was then calculated, and this value was mapped to the income units in similarly defined groups on the SIHC. Where industry divisions reported in the SIHC/HES did not exist in the BLS, average non-farm inventories were computed for each profit/loss group and grafted onto the income units in the SIHC with missing inventory values.

Once the values of non-farm inventories were grafted onto the SIHC, they were grouped by state using SIHC weights and benchmarked to BLS state total inventory values. The derived non-farm inventory assets were then summed and benchmarked to the aggregate ASNA household balance sheet private non-farm inventories item.

For the  $i^{\text{th}}$  non-farm business household, in group  $j$ , the derived value of private non-farm inventories can be expressed as follows:

$$\text{Private non-farm inventories}_{\text{Derived}}^{ij} = \frac{\text{Total weighted non-farm inventories}_{\text{BLS}}^j}{\text{Number of income units in group}_{\text{BLS}}^j}$$

For units in state  $k$ , these derived values were benchmarked to the BLS state total:

Private non-farm inventories<sub>BLS Benchmarkd</sub><sup>i,k</sup> =

$$\text{Private non-farm inventories}_{\text{Derived}}^i \times \frac{\text{Total state private non-farm inventories}_{\text{BLS}}^k}{\sum_{i=1}^n \text{Private non-farm inventories}_{\text{Derived}}^{i,k}}$$

Finally, the derived assets were benchmarked to the aggregate figure in the household balance sheet:

Private non-farm inventories<sub>Benchmarked</sub><sup>i</sup> =

$$\text{Private non-farm inventories}_{\text{BLS Benchmarkd}}^i \times \frac{\text{Private non-farm inventories}_{\text{ASNA}}}{\sum_{i=1}^n \text{Private non-farm inventories}_{\text{BLS Benchmarkd}}^i}$$

## Time series estimation

Data from the BLS is only available for the years 1994–95 to 1997–98. The 1994–95 figures are used to estimate 1993–94 and 1994–95 non-farm inventories and the 1997–98 values were used in the estimates for 1998–99 and 1999–2000. No industry information was available from the 1993–94 HES. In this year, estimates were obtained by allocating the ASNA aggregate across all businesses, in proportion to business income.

## Data quality

Seven methods were examined in determining the best way to derive estimates for this component. Benchmarking of the estimates to the ASNA aggregate removed much of the differences between these methods.

The estimates are subject to several sources of error apart from the methods used to generate them: sampling and non-sampling errors from the SIHC, errors arising from estimation of data in years when a BLS was not run, and sampling and non-sampling errors in the BLS.

As noted above, the BLS was only run from 1994–95 to 1997–98, and the use of these data for other time periods would introduce some additional errors.

Benchmarking ratios for this component fluctuate somewhat across the seven years for which estimates were compiled, due to differences in the types of businesses identified in each household survey, and fluctuations in BLS data across time. The allocation in direct proportion to farm income results in a benchmarking ratio for 1993–94 which is equal to one.

## 10.2 Farm inventories

### Definition

Farm inventories includes changes in (i) inventories held on farms (including wool, wheat, barley, oats, maize, sorghum, hay, fertiliser, produce such as fruit, and livestock); (ii) wool held in store awaiting sale; and (iii) produce (e.g. vegetables) held in cold store where ownership remains with the primary producer. Farm inventories do not include inventories held by marketing authorities (e.g. wheat held by the Australian Wheat Board), which are included under either 'Public authorities' or 'Private non-farm inventories'. (*Australian System of National Accounts, Concepts, Sources and Methods*, cat. no. 5216.0)

### Data sources

Farm business income data from the SIHC and HES can be used as the basis for allocating this asset to the income units in the survey. Farm business were defined using the industry code of the reference person's main job. For further details, see Section 3.5.

As with other farm assets, the small number of farmers in the SIHC (around 160) does not support highly detailed disaggregations such as those by industry and state/territory.

Limited data are also available on farm inventories from other sources. The Agricultural Finance Survey (AFS) collected data on closing inventories for 1989–99 and 1999–2000 these were the first years in which this information was captured.

The Agricultural Commodity Survey (ACS) collects data on the production of commodities, however an inventories item is not available.

The possibility of using ratios of assets to income was investigated. The AFS collects cash operating surplus, total agriculture turnover and farm inventories. Cash operating surplus (with or without depreciation) or total turnover could be used as income data. A range of ratios were examined.

The ACS collects information for the production and area of wheat, oats, barley etc., but information about the prices of these commodities is not available. Therefore, these figures could not be converted into farm inventories. In addition, the ACS does not collect information about income, therefore the use of ratios of assets to income was not possible.

The feasibility of using Australian Farm Survey data was seriously considered, as some information on the characteristics of farmers, such as their age and whether children are part of the household, are available. This is a very attractive feature when building a data set with lifecycle disaggregations. However, due to restrictions on the scope of the survey, and the small number of farmers this would relate to on the SIHC file, these data was not obtained.

## Methodology

Taking into account all of the factors outlined above, the method chosen was to distribute the ASNA household balance sheet farm inventories item across farm income units, based on their business income and their state/territory of residence. Northern Territory farm businesses were grouped with Queensland farms, due to small Northern Territory farm samples. Farmers in the Australian Capital Territory were grouped with New South Wales farmers for the same reason. State/territory disaggregations of farm inventory values were obtained from the 1998–99 and 1999–2000 AFS. Commodity production values from the ACS were used to derive farm inventories for the years where farm inventories were not collected by the AFS. For the  $i^{\text{th}}$  farm household, in state or territory  $j$ , the derived value of farm inventories can be expressed as follows:

$$\text{Farm inventories}_{Derived}^{ij} = \frac{\text{Farm income}_{SIHC/HES}^{ij}}{\sum_{i=1}^n \text{Farm income}_{SIHC/HES}^{ij}} \times \frac{\text{Total state farm inventories}_{AFS}^j}{\text{Total Australian farm inventories}_{AFS}} \times \text{Farm inv.}_{ASNA}$$

## Time series estimation

AFS farm inventories data were only available for 1998–99 and 1999–2000. The 1998–99 farm inventory figures were used to estimate data for 1997–98, then they were adjusted with commodity production figures from Agriculture Commodity Survey (ACS) to obtain farm inventories for 1993–94, 1994–95, 1995–96 and 1996–97. This approach assumed that production figures were highly correlated with, and proportional to, farm inventories.

For each state, the adjusted farm inventory value for 1996–97 is given by:

$$\text{State farm inventories}_{AFS}^{96/97} = \frac{\text{State farm inventories}_{AFS}^{98/99}}{\text{State commodity production}_{ACS}^{98/99}} \times \text{State commodity production}_{ACS}^{96/97}$$

The same method was used to generate farm inventory values for 1993–94, 1994–95 and 1995–96. The commodity production values used were the gross value of crops (including pastures and grasses) plus the gross value of livestock products as reported in *Agriculture, Australia* (cat. no. 7113.0), which were the closest available items to the National Accounts farm inventories definition.

## Data quality

The AFS did not collect farm inventories before 1998. As described in the previous section, they were evaluated by adjusting 1998–99 farm inventories data. This process would introduce some errors to the estimates obtained. In most cases, the commodity values used to adjust 1998–99 farm inventories have relative standard errors less than 5%. The estimates based on the AFS and ACS were also subject to sampling and non-sampling errors.



## 10.3 Livestock — inventories

### Definition

In the National Accounts, ‘Livestock—inventories’ includes the value of livestock raised for the purpose of slaughtering, eventual sale or other one-off products (e.g. leather). (*Australian System of National Accounts, Concepts, Sources and Methods*, cat. no. 5216.0).

### Data sources

Farm business income data from the SIHC and HES can be used as the basis for allocating this asset to income units in the survey. Farm businesses were detected by using the industry code of the reference person’s main job. For further details, see Section 3.5.

The data available to estimate this component was the same as that identified for ‘livestock — fixed assets’ (see Section 8.2). Data on livestock assets is available from several sources including the ABS’ Agricultural Finance Survey (AFS), the Agricultural Commodity Survey (ACS), ABARE’s Australian Farm Survey and, at an aggregate level, the ASNA household balance sheet.

The possibility of using a ratio of assets to income to derive this component was investigated.

### Methodology

After consideration of each of the data sources available, the method chosen was to distribute the ASNA household balance sheet livestock — inventories item across farming income units based on their business income and their state/territory of residence. State/territory disaggregations of livestock slaughterings and other disposals from *Agriculture, Australia* (cat. no. 7113.0), were used to estimate disaggregations of the aggregate livestock inventories figure by state/territory.

For the  $i^{\text{th}}$  farm household, in state or territory  $j$ , the derived value of livestock inventories can be expressed as follows:

Livestock : inventories  $_{Derived}^{ij} =$

$$\frac{\text{Farm income}_{SIHC/HES}^{ij}}{\sum_{i=1}^n \text{Farm income}_{SIHC/HES}^{ij}} \times \frac{\text{Total state livestock}_{ACS}^j}{\text{Total Australian livestock}_{ACS}} \times \text{Livestock : inventories}_{ASNA}$$

### Time series estimation

State disaggregations of livestock slaughterings and other disposals data were available for all years covered in this study.

## Data quality

Several ratios of assets to income were considered before determining the final method for estimating the distribution of this component. Regardless of the method used, benchmarked results were very similar across all key dimensions.

The statistics on livestock slaughterings and other disposals used to estimate livestock inventories are published in *Agriculture, Australia* (cat. no. 7113.0). They are based on a monthly collection from abattoirs and other major slaughtering establishments and include estimates of animals slaughtered on farms and by country butchers and other small slaughtering establishments. Apart from some states with limited production of certain commodities, most published estimates have the relative standard errors (RSEs) less than 5%. Prior to 1997–98 the ACS was conducted as a census and therefore the estimates for that period are not subject to sampling error. A range of data sources are used to estimate ASNA livestock, including numbers of sheep and beef cattle collected from the ACS, and prices from the Australian Bureau of Agricultural and Resource Economics (ABARE).

## 10.4 Plantation standing timber

### Definition

Plantation standing timber includes trees that have been planted for the purpose of once-only harvesting. In the National Accounts, they are valued using insurance schedules provided by the insurance industry. The schedules show the insured value of each hectare of forest according to tree age and are determined by the Australian Forest Growers' Association. (*Australian System of National Accounts, Concepts, Sources and Methods*, cat no. 5216.0).

### Data sources

There is less distributional data available for standing timber components than for any of the other components of the balance sheet. Although enquiries were made with the Bureau of Rural Science, a number of State Forestry Departments and the Timber Industry Manufacturing Association (TIMA), there is currently no data which allows one to determine which of the units on the SIHC or HES are more likely to own this type of asset.

According to the National Forest Inventory (NFI), prepared by the Bureau of Rural Sciences (BRS), there are approximately 1.5 million hectares of managed plantation forests in Australia (*Plantations of Australia, 2001*). Five percent of total plantation resources are reported as farm forestry by the National Farm Forest Inventory and ninety-five per cent is reported by industrial growers through the National Plantation Inventory. The majority of plantation growers are either industrial companies or private forest management agencies (e.g. Boral, Bunnings). The second largest class of growers is state government forestry management agencies (e.g. Queensland Department of Primary Industry), followed by individual owners.

Households have an interest in plantation timber through three main channels:

- operation of their own plantations
- timber they have planted on their own farm/ other land which is mainly being used for another purpose
- investment in prospectus financed plantation timber.

Data about the distribution of ownership of these types of plantation assets could not be located. While the first two types of investment may be more closely related to the rural sector, anecdotal evidence suggests that prospectus financed plantations have a wide base of investors. In some cases, investors may be city dwellers who invest annually as an alternative to traditional superannuation schemes. Other investors can be higher income earners looking for a tax-friendly investment. Tables of Plantation Standing Timber by state and land tenure are provided in *Australian National Accounts: National Balance Sheet* (cat. no. 5241.0.40.001), however, these do not include splits for the household sector, or distributional data.

The wide range of households who have the potential to invest in plantation timber, and the lack of data, both at the micro and macro level, makes it difficult to distribute this asset between households.

## Methodology

State/territory disaggregations of privately owned plantation timber from the National Plantation Inventory (NPI) and National Farm Forest Inventory (NFFI) were used to distribute the ASNA household balance sheet plantation standing timber item across all income units, in proportion to total income. That is, every household was allocated a small amount of plantation timber, in proportion to their income and the percentage of Australian plantation timber being grown in their state. This is not a method that will yield robust individual household values, it merely serves to provide a balancing item for generating totals equal to the household balance sheet. For the  $i^{\text{th}}$  household, in state/territory  $j$ , the derived value of plantation standing timber can therefore be expressed as follows:

$$\text{Plantation standing timber}_{Derived}^{ij} = \frac{\text{Total income}_{SHC}^{ij}}{\sum_{i=1}^n \text{Total income}_{SHC}^{ij}} \times \frac{\text{Total state plantation timber}_{NPI}^j}{\text{Total Australian plantation timber}_{NPI}} \times \text{Plantation standing timber}_{ASNA}$$

## Time series estimation

National Forest Inventory (NFI) data are available for 1993 and 1995 from *Quarterly Forest Product Statistics*, and for 1997 from the 1997 NPI Comprehensive Report. Data for 1998 and 1999 are included in the 1999 and 2000 NPI Tabular Updates, and 2000 figures were sourced from *Plantations of Australia 2001*. For other years, interpolation was required to generate plantation values.

## Data quality

The state/territory disaggregations of privately owned plantation timber are based on information from the NPI and NFFI, administered by the Bureau of Rural Sciences (BRS). While the NPI and NFFI appear to present the most reliable regional plantation data currently available, the main quality issue for this component is the lack of data relating to ownership of the assets, regardless of where they are physically located. As a result, it is recommended that this asset not be included in distributional wealth analysis until distributional data can be obtained. Fortunately, household plantation timber assets form a relatively small part of the household balance sheet.

# 11 Non-produced assets — technical details

## 11.1 Land — farmland

### Definition

Farmland is the value of land under cultivation. The value of farm land, plus the value of dwellings land and land—other buildings and structures, sum to the household balance sheet land figure.

### Data sources

Distributional data for this component is scarce. The value of farmland in the 'Land Use by State' table in the *Australian National Accounts: National Balance Sheet* (cat. no. 5241.0.40.001), splits land in each state into residential, rural or commercial land. However, these data do not contain sectoral splits, and therefore rural land values include land which is not owned by the household sector.

The Agricultural Commodity Survey (ACS) collects data on the area of farm holdings, from farms with an Estimated Value of Agricultural Operations (EVAO) over \$5,000. However, land values are not included in these data.

### Methodology

The method adopted was to subtract land—dwellings and land—other buildings and structures from the household balance sheet land figure, to derive a residual value for farmland. This value was then allocated to farm income units in direct proportion to their farm business income. See Section 3.5 for discussion of adjustments made to business income.

Using this method, the value of farmland, for the  $i^{\text{th}}$  farm household, was derived as follows:

$$\text{Land : Farmland}_{Derived}^i = \frac{\text{Farm business income}_{SIHC/HES}^i}{\sum_{i=1}^n \text{Farm business income}_{SIHC/HES}^i} \times \left\{ \text{Land}_{ASNA} - \sum_{i=1}^n \text{Land:Dwellings}_{Derived}^i - \sum_{i=1}^n \text{Land : Other buildings and structures}_{Derived}^i \right\}$$

### Time series estimation and data quality

The SIHC/HES and ASNA data used to estimate this component were available for all years, and are considered to be of good quality. See Sections 7.3 and 7.5 for more information about the estimation of land associated with dwellings and other buildings and structures.

## 11.2 Native standing timber

### Definition

The native standing timber item of the ASNA includes only those native forests which are available for commercial exploitation. The definition of forests used by Australia's National Forest Inventory (NFI) includes Australia's diverse native forests, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands (*NFI, 1998*).

### Data sources

As with plantation standing timber, data on native standing timber is scarce. Based on the forest definition of NFI, the total area of native forest as at 30 June 2001 was estimated at 164.4 million hectares (ha), which is about 21% of Australia's land area. Of this area, 124.4 million ha (76%) was on public land and 37.3 million ha (23%) was on private land (*NFI, 2001*). Taking forested leasehold land together with private freehold forest, some 68% or 111.8 million ha of Australia's forests were under private management.

A table of Native Standing Timber by state and land tenure is provided in *Australian National Accounts: National Balance Sheet* (cat. no. 5241.0.40.001), however, this does not include splits for the household sector.

Enquiries were made through the Bureau of Rural Sciences and a number of State Forestry Departments, but they did not yield any survey or administrative data which would allow one to determine which households are more likely to own this type of asset. However, anecdotal evidence from State Forestry Departments suggests that, unlike plantation standing timber, most of this asset is owned by households in rural areas. Privately owned native standing timber may occur in large tracts, or may occur in smaller areas of uncleared land on farms and other properties.

There are a number of issues which must be considered when valuing native timber assets, one being how far the timber is degraded (due to partial clearing, grazing and so on). Another consideration is the legislation governing timber in a particular area. In some areas, legislation may prevent native timber owners from harvesting their native timber, thereby preventing them from deriving income from it. This will affect the market value of native timber assets in different regions.

Several different allocations of this asset were tested, including allocating the asset exclusively to farms. The sample of farms was too small to support this methodology in the Northern Territory, which, according to the National Forest Inventory, contains almost one quarter of privately owned native standing timber

### Methodology

Considering all of these issues, the method chosen was to use state/territory splits of privately owned native timber from the National Forest Inventory (NFI) to distribute the ASNA household balance sheet native standing timber item in proportion to the percentage of privately owned Australian native timber in each state. These state benchmarks were distributed evenly across all non-capital city households.

For the territories, the number of income units was too small to support this method, and so all income units were grouped together. Therefore, all income units were allocated a small amount of native timber assets. While this method will not yield robust values for individual income units, it does provide a balancing item with the household balance sheet and could be used, with caution, for state-based wealth comparisons.

For the  $i^{\text{th}}$  household, in state  $j$ , the derived value of native standing timber can be expressed as follows:

$$\text{Native standing timber}_{Derived}^{ij} = \frac{\text{Total privately owned native timber}_{NFI}^j}{\text{Total Australian privately owned native timber}_{NFI}} \times \frac{\text{Native standing timber}_{ASNA}}{\text{Number of non-capital city income units in state } j_{SIHC/HES}}$$

Note that for the territories, where the number of income units in the SIHC is so small that native standing timber is distributed across all income units, the final line of the above expression will be the 'Number of income units in territory  $j_{SIHC}$ '.

### Time series estimation

National Forest Inventory (NFI) data on privately owned native timber, with disaggregations by state/territory, is available for 1993, 1997 and 2001. The figures of other years were estimated using straight-line interpolation between the available data points. Therefore, the native timber figures for years 1994, 1995, and 1996 were estimated by interpolating between 1993 and 1997 NFI native timber data, and 1998, 1999 and 2000 figures were obtained by interpolating between 1997 and 2001.

### Data quality

The ABS has valued native standing timber using a net value-of-production approach over the estimated rotation cycle of forests. The cost of borrowing to the forest industry was chosen to represent the forest industry's nominal discount rate. The ABS estimated the cost of borrowing by deriving a five-year lagged moving average of the Reserve Bank's average indicator rate for large business loans. To derive a real rate of discount, an index was constructed to reflect changes in prices of forest industry inputs. The household balance sheet native standing timber figures which result from this process are therefore regarded as experimental.

National Forest Inventory (NFI) data on native timber is the most reliable data source currently available. However, the interpolation required between available data points would introduce some errors.

The method used to derive the distribution of native standing timber does not produce reliable values for individual households, or even for groups of households. It does provide a balancing item with the household balance sheet and could be used, with caution, for state-based wealth comparisons.

## 12 Financial assets — technical details

### 12.1 Currency, deposits and loans and placements receivable

#### Definition

Currency includes both notes and coins in circulation. Deposits are customers' account balances with domestic and non-resident deposit-taking institutions. Units in cash management trusts and the withdrawable share capital of building societies are also included in the cash and deposits item. (*Australian National Accounts: Concepts, Sources and Methods*, cat. no. 5216.0).

In the household balance sheet, currency and deposits are not grouped with loans and placements receivable. The latter comprises loans and placements borrowed by other sectors, from the household sector. It should be noted that loans made by households to other households are not captured in the ASNA, as these are intra-sectoral transactions.

In *Finance Australia* (cat. no. 5611.0), currency and deposits are further broken down into loans and placements borrowed by (a) life insurance companies and (b) financial intermediaries not elsewhere classified (n.e.c.). Loans and placements borrowed by life insurance corporations have been close to zero for most of the last decade. The ABS' Financial Accounts Section have suggested that most of the loans and placements borrowed by financial intermediaries n.e.c. are made up of deposits in Victorian retail institutions — i.e. small deposits of householders into small, bank-like retail institutions. Differences between states in the way these institutions are set-up has resulted in these types of deposits in other states being included in currency and deposits. Therefore, the currency and deposits and loans and placements receivable items have been grouped together in this study, to allow consistent estimates to be obtained for all states.

#### Data sources

The SIHC and HES collect interest from financial institutions, loans to persons outside the household, and trusts. Due to the wording of the SIHC and HES questionnaires, the latter item would appear to be most likely to capture interest income from cash management trusts, rather than income from public unit trusts. The value of interest from trusts therefore relates most closely to this component.

The possibility of using other ABS, RBA or ABA data to estimate deposits was investigated. The only source of data apart from that reported on the SIHC or HES was interest rate information published in the RBA bulletin (see table F4: Retail Deposit and Investment Rates). These data are not available by type of household, but does provide average annual interest rates for different account types and balances, and for various points in time.

## Methodology

First, the ANSA currency and deposits item was split into two sections: currency, and deposits (deposits also including loans and placements receivable for reasons outlined above). An initial arbitrary allocation of \$80 currency was made to each non-dependent adult in each household, and \$800 was allocated to each business owner (to represent cash at hand). These figures were aggregated, and the total subtracted from the total ASNA currency item. The remaining unallocated currency was distributed to households in proportion to total income. Total currency was aggregated and rebenchmarked to the ASNA currency item.

Next, household interest income from the SIHC or HES for financial institutions, loans to persons outside of the household and trusts was capitalised to arrive at a distribution of household deposits. While no data exists on interest rates received by people of different ages, or with different amounts of wealth, RBA bulletin data was used to try to account for the different yields that people will obtain on the basis of different principal sums. This approach was very similar to that used by Bacon (1996). A hybrid set of ranges was compiled from the annual series for transaction/investment and management accounts.

A set of hybrid account balance ranges was derived, in which the average annual rates for lower balances are drawn from the transaction and investment account series, and the rates for higher balances reflect cash management account yields. This was based on the assumption that investors are rational and well informed, and move their funds to cash management accounts to obtain higher rates of interest than those available for equivalent sums in transaction accounts. Overall this is probably a reasonable assumption. The ranges used were less than \$2,000, \$2,000 to <\$5,000, \$5,000 to <\$20,000, \$20,000 to <\$100,000 and \$100,000 and over.

Using SIHC/HES interest income figures and RBA data on interest rates, principal sums were estimated for all income units reporting an interest income. That is, for the  $i^{\text{th}}$  household, an estimate of cash and deposits was generated as follows:

$$\text{Deposits}_{\text{Derived}}^i = \text{Interest income}_{\text{SIHC/HES}}^i \div \text{Average annual interest rate}_{\text{RBA}}$$

If the resulting estimate was larger than the threshold value for the next range of principal sums, the process was repeated with the higher interest rate applicable to that range. While this method captures as much variation between individuals as possible, it cannot account for the deposits of people who have accounts which do not earn any interest.

Having derived household deposits, an estimate of business deposits was derived from Business Longitudinal Survey (BLS) data. This approximation used the 'total current assets' item, less closing stock. Average values for each state by income by industry group were then grafted back to households with their own business, and any cells without a value were allocated a value from a broader dissection of the BLS data. Business deposits estimates were then benchmarked to the Financial Accounts 'business deposits at banks' series, adjusted by the ratio of total household deposits to household bank deposits.

All derived deposits values are then aggregated, and benchmarked to the aggregate deposits figure in the household balance sheet as follows:

$$\text{Deposits}_{\text{Benchmarked}}^i = \frac{\text{Deposits}_{\text{ASNA}}}{\sum_{i=1}^n \text{Deposits}_{\text{Derived}}^i}$$



## Time series estimation

While the HES collects, and reports, interest income from a variety of sources, the SIHC amalgamates interest income from different sources, and attaches a series of flags to these data. These flags allow users to determine which sources of interest (e.g. banks, other financial institutions, debentures, bonds, trusts and personal loans to persons not in the household) have contributed to the total interest income figure. In SIHC years, the interest income flag was used to distribute total interest income between all the sources nominated. If a respondent had only one source of interest income, it was all attributed to that source. If there were multiple sources of interest income, the total figure was split evenly between the sources indicated.

The annual and weekly interest income items on the SIHC and HES are derived from a question on the total amount of interest income earned in the previous financial year. It is assumed that changes in the distribution of these assets from year to year are small.

## Data quality

The household balance sheet deposits and currency items are considered to be of good and fair quality respectively, as they come from counterparty information provided by banks and other financial institutions.

SIHC and HES interest income data are likely to provide a good distributional picture for this asset, as it directly captured along with all of the key demographic splits of interest in this study. However, interest income would appear to be somewhat underestimated in both the SIHC and HES. Even after making adjustments for business deposits, benchmarking ratios for deposits range from 0.95 to 1.44 (which includes some of the higher ratios shown in Appendix 14.4).

Further errors will be introduced by the process of splitting SIHC interest income by source. The methods used to derive the split could be refined by aggregating HES interest data and comparing modelled splits against the real observations.

The assumptions made to allocate currency and business deposits are likely to introduce the greatest amount of error into the estimates. However, an allocation of these items must be made, otherwise the distribution of currency and deposits is entirely dependent on interest income. Although this approach has been used in some previous studies, it is likely to seriously skew the distribution of assets towards older age groups, who report the largest amount of interest income. Further analysis of the sensitivity of the estimates to changes in the assumptions listed above is ongoing.

## 12.2 Securities other than shares

### Definition

*Finance Australia* defines securities other than shares as ‘bills, bonds, certificates of deposit, commercial paper, debentures, tradeable (or offsetable) financial derivatives, and similar instruments normally traded in the financial markets’.

## Data sources

Data sources which can be used to determine the distribution of the 'securities other than shares item' are:

- income from bonds and debentures, which is captured in the SIHC and HES
- average monthly yields for finance company debentures (two and three year maturity) and Treasury bond rates (for bonds with three, five and ten year maturity), from the RBA bulletin (tables F4 and F2 respectively)
- the ASNA household balance sheet securities other than shares item.

Several other potential data sources were explored (such as the Australian Bankers Association and the Australian Stock Exchange), however no additional data was discovered.

## Methodology

To develop consistent estimates across HES and SIHC years, the SIHC interest income flag was used to distribute total interest income between different sources. This allowed interest income from bonds and debentures to be calculated. If a respondent had only one source of interest income, it was all attributed to that source. If there were multiple sources of interest income, the total figure was split evenly between the sources indicated.

Average annual yields for finance company debentures and average annual Treasury bond rates were calculated using RBA bulletin data. For finance company debentures, the average yield was calculated across each financial year, and two maturity terms. Similarly, an average financial year bond yield was calculated for three bond maturity terms, and these three rates were averaged.

Each household's income from debentures was divided by the average yield on finance company debentures. Average Treasury bond rates were similarly applied to bond income. Finally, individual household data was weighted and aggregated, and the totals benchmarked to the ASNA household balance sheet securities other than shares item. For the  $i^{\text{th}}$  household, the derived value of securities other than shares can be expressed as follows:

Securities other than shares<sup>*i*</sup><sub>Benchmarked</sub> =

$$\left[ \frac{\text{Income from debentures}_{SIHC}}{\text{Average annual debenture yield}_{RBA}} + \frac{\text{Income from bonds}_{SIHC}}{\text{Average annual bond yield}_{RBA}} \right] \times \frac{\text{Securities other than shares}_{ASNA}}{\sum_{i=1}^n \text{Bonds and debentures}_{Derived}^i}$$

## Time series estimation

Interest income from bonds and debentures is available from both the 1993–94 and 1998–99 HES files on an individual basis, and as part of total interest income on SIHC unit record files. The ASNA securities other than shares item is available for all years in the 1990s.

## Data quality

The ASNA securities other than shares item is derived as a residual figure, and is thought to be of fair quality.

The data underlying this component in HES years is likely to be of good quality. However, the method used to split SIHC interest income will introduce some errors, and the benchmarking ratios for this component (which vary quite considerably in different time periods), suggest that it is difficult to split SIHC interest income accurately after it has been aggregated. This has a greater effect on this component than other financial assets, as there are relatively few people with debenture or bond income.

Financial Accounts Section have suggested that they may be able to provide weighted average bond yields which would take account of both Commonwealth and State bonds. This would be an improvement on the series currently used to derive bond asset values, and should be pursued for future updates.

## 12.3 Shares and other equity

### Definition

The Australian Financial Review Dictionary of Investment Terms defines a share as ‘the ownership of part of a company’. A share is ‘a contract between the issuing company and the owner of the share which gives the latter an interest in the management of the corporation, the right to participate in profits and, if the company is dissolved, a claim upon assets remaining when all debts have been paid’. While the term ‘equity’ can relate to the amount of an asset which is owned outright (i.e. that portion of an asset against which there is no debt), in this context equity is used as a synonym for a share. (*Australian Financial Review Dictionary of Investment Terms, 2002.*)

In the financial accounts and national accounts, ‘shares and other equity’ also include units in public unit trusts. This is because trusts ‘have important characteristics of equities, such as entitlement to a share of the profits and (on liquidation) a share of the residual assets of the trust’. Shares traded on an organised stock exchange, shares in unlisted companies, convertible notes after conversion, preference shares and units issued by both listed and unlisted trusts are all included in this asset group (*Finance Australia, 1999–2000*). This asset group does not include shares which are owned by the superannuation schemes in which households have invested.

### Data sources

Data from the ABS, RBA and ASX were investigated for this item. Data from the ABS includes dividend income on the SIHC and HES, the ASNA household balance sheet ‘shares and other equity’ item, and disaggregations of this item by issuing corporation (as reported in *Australian National Accounts: Financial Accounts* (cat. no. 5232.0)).

The questions relating to dividend income on the SIHC collect dividends on shares, and dividends from all of a respondent’s limited liability businesses or trusts. Only the respondent’s share of income from joint investments is included. Total dividend income is derived by summing the answers to these questions. HES dividend income questions are essentially the same as those on the SIHC.

Dividend yield data are available from the ASX, and monthly average dividend yields are tabulated in the RBA Bulletin (see table F6).

## Methodology

All dividend data from the HES and SIHC relate to income earned over the previous financial year. It was assumed that these data were broadly representative of the distribution of income for the current period.

Monthly ASX dividend yields were averaged to determine an approximate average annual dividend yield for each financial year. This average yield was applied to both dividend and trust income. The value of shares at 30 June was determined by using the identity:

$$\text{Value of shares} = \text{Dividend income} \div \text{Dividend yield}$$

This assumes that dividends are received in the form of cash, and are not issued as extra shares. However, advice from Financial Accounts Section suggested that many public unit trust dividends are distributed as additional trust units. These will not be captured by the methodology proposed for this component. For the  $i^{\text{th}}$  household, the derived value of shares and other equity can therefore be expressed as follows:

$$\text{Shares and other equity}_{\text{Derived}}^i = \text{Dividend income}_{\text{SIHC/HES}}^i \div (\text{Dividend yield}_{\text{RBA/ASX}})$$

The values derived were benchmarked as follows:

$$\text{Shares and other equity}_{\text{Benchmarked}}^i = \text{Shares and other equity}_{\text{Derived}}^i \times \frac{\text{Shares and other equity}_{\text{ASNA}}}{\sum_{i=1}^n \text{Shares and other equity}_{\text{Derived}}^i}$$

## Time series estimation

The data items used to estimate the distribution of shares and other equity were available for all of the years between 1993–94 and 1999–2000. HES data were used in 1993–94 and 1998–99. SIHC data were used as a basis for the estimates for 1994–95 through to 1997–98, and 1999–2000.

## Data quality

One limitation of the method applied to derive estimates for shares and other equity is that shares and trusts which do not provide an income stream in a particular financial year will not be captured in the estimates generated.

Financial accounts estimates of share ownership are derived from data from a variety of sources, such as ABS surveys (e.g. the Survey of Financial Information and the Survey of International Investment), the ASX and administrative data sets. The basic principle underlying the estimates is that, in any given period, the total holdings of listed shares by the different sectors of the economy must equal the total market capitalisation of shares. However, 'stocks for the household sector are derived as a residual, and therefore contain the net errors and omissions in all source data used'. (*De, 2001*) For this reason, aggregates of unlisted shares are thought to be of poor quality and it is suggested that these data 'should be used with caution'. Aggregates of listed shares are thought to be of fair quality.

Data from the ASX shareowners survey could not be used in the estimation of this item, as the figures obtained indicate the distribution of share owners, but not the distribution of share assets.

## 12.4 Insurance technical reserves — life insurance corporations

### Definition

The household balance sheet contains a single item for all insurance technical reserves. This item is further dissected in *Australian National Accounts: Financial Accounts* (cat. no. 5232.0), to show household net equity in life insurance corporations or pension funds, and pre-payment of premiums to, and reserves in, other insurance corporations.

The insurance technical reserves of households in life insurance companies represent 'households' net equity in, or claims on, reserves of registered life insurers and friendly societies'. According to *Finance Australia* (cat. no. 5611.0), this 'equates with the net policy liabilities of life offices to households'.

Friendly societies mainly provide insurance products to households, but also provide other services such as health insurance and funeral benefits. Life insurance offices also provide a range of services, including termination benefits (payable on the death of the insured) and endowment insurance (payable at maturity or on death). Splits of life office and friendly society business into these kinds of items are not presently available for the household sector.

### Data sources

The reserves of insurance offices relate to claims which have not yet been paid — in some cases, claims for events which have not yet occurred.

The Household Expenditure Survey (HES) collected data on lump sum payments from life insurance over the past two years. On receipt, lump sum payments would be used by households to purchase other types of assets, spent on other forms of consumption, or used for debt reduction. However, one could assume that the distribution of payments across groups of the population remains fairly constant over time, and use the distribution of lump sum life insurance payments to model the distribution of technical reserves.

The HES also collected detailed expenditure data for life insurance premiums, among other commodities. This item was collected in both 1993–94 and 1998–99. Premiums can also be related to life office technical reserves, as not only are they the main source of the reserves, but at least to some extent the risk of a particular policy being paid out should be reflected in the premium.

No other distributional data related to life insurance technical reserves has been located at this time.

## Methodology

Notwithstanding the issue that some small portion of the ANSA life office technical reserves item will not relate to life insurance policies (i.e. those reserves relating to health or funeral benefits), in the absence of alternative data, this item was treated as if it consisted entirely of life insurance-related reserves.

Total expenditure on life insurance was obtained from HES expenditure files. These data were summed for each household, and merged back to the HES household file. Total receipts from lump sum payments for life insurance for the past two years were divided by two, to gauge the approximate annual figure for life insurance receipts.

Total receipts from life insurance were subtracted from the ANSA life insurance figure, to obtain a 'residual' figure. This figure was allocated across all households in proportion to their life insurance expenditure. The final value of life insurance technical reserves, for each household, was equal to their receipts plus the technical reserve 'residual' allocation.

This method was adopted in an attempt to account for receipts from termination policies, and for equity in reserves of policies which can provide a return at maturity.

## Time series estimation

The 1993–94 and 1998–99 HES files were used to obtain weighted total annual life insurance expenditure and receipts, for cells defined by age of the household reference person, household type and income range. Interpolation/extrapolation was used to obtain approximate values of life insurance for non-HES years. These data were merged back to the SIHC file. Those units in the SIHC which fell into an age by household type by income group which did not appear in the HES were allocated values from interpolation between cells which were only defined by household type and income range.

The weighted number of income units in each group was determined from the SIHC file. Each income unit in the SIHC is allocated an amount of life insurance expenditure and receipts equal to the estimate of total expenditure for that cell, divided by the number of income units in that cell. For non-HES years, this means that each income unit in a particular age by household type by income group will have the same value of life insurance assets.

## Data quality

This item should be used in analysis of the distribution of wealth with some caution. While the methods used to estimate the distribution of this asset are likely to produce reasonable results, it is not yet clear what proportion of life office technical reserves relate to termination benefits or other types of life insurance products. Financial Accounts Section is looking at the possibility of obtaining these types of splits for future updates of this model. In addition, the aggregate ANSA figure for life insurance technical reserves is thought to be of poor quality. Recent ABS and APRA work to improve collections of financial corporations data may result in improvements to this item in the future.

## 12.5 Insurance technical reserves — other insurance corporations

### Definition

The household balance sheet contains a single item for all insurance technical reserves. However, pre-payment of premiums to, and reserves in, other insurance corporations, is shown separately in table 15 of *Australian National Accounts: Financial Accounts* (cat. no. 5232.0), 'Financial Assets and Liabilities of Households'. This item represents household policy holders' net equity in, or claims on, the reserves of general insurance offices. This equates to prepayments of premiums and reserves held to cover outstanding claims. General insurance offices include all corporations that provide insurance other than life insurance. Included are general, fire, accident, employer liability (i.e. workers' compensation), household, health and consumer credit insurers. (*Finance Australia*)

### Data sources

The reserves of all insurance offices relate to claims which have not yet been paid — in some cases, claims for events which have not yet occurred.

In 1993–94 and 1998–99, the Household Expenditure Survey (HES) collected data on lump sum payments over the past two years, and weekly income from, worker's compensation and accident/ sickness insurance. The 1998–99 HES also collected detailed expenditure data for a range of insurance products, such as:

- house and contents insurance
- personal belongings insurance
- hospital, medical and dental insurance
- ambulance insurance
- sickness and personal accident insurance
- compulsory insurance of motor vehicles (other than motor cycles)
- other insurance of motor vehicles (other than motor cycles)
- compulsory insurance of motor cycles, caravans and trailers
- other insurance of motor cycles, caravans and trailers
- insurance for other property
- household appliance repairs insurance
- travel insurance.

There are also some items where registration of vehicles and compulsory third party insurance are grouped together.

The 1993–94 HES collected commodity expenditure under a different classification system, and some of the items available in the 1998–99 file cannot be obtained for 1993–94.

However, even the detailed HES data from 1998–99 does not relate to all reserves of other insurance offices, as the unincorporated enterprises within the household sector would also pay premiums for industrial special risks policies, and for workers compensation. There is no distributional data available for this part of the balance sheet, save for an item on the BLS (also known as GAPS), which collected workers compensation premiums.

No other distributional data related to other insurance technical reserves has been located at this time.

## Methodology

Total expenditure on the types of insurance listed above is obtained from HES expenditure files. These data were summed for each household, and merged back to the HES household file. The ASNA 'other insurance technical reserves' figure is allocated across all households in proportion to their expenditure on other insurance.

## Time series estimation

The 1993–94 and 1998–99 HES files are used to obtain weighted annual total annual expenditure on other insurance, for cells defined by age of the household reference person, household type and income range. Interpolation/extrapolation is used to obtain approximate values of insurance expenditure for non-HES years. These data were then merged to the SIHC file. Those units in the SIHC which fall into an age by household type by income group which did not appear in the HES are allocated values from interpolation between cells which are only defined by household type and income range.

The weighted number of income units in each group is determined from the SIHC file. Each income unit in the SIHC is allocated an amount of insurance expenditure equal to the estimate of total expenditure for that cell, divided by the number of income units in that cell. For non-HES years, this means that each income unit in a particular age by household type by income group will have the same value of other insurance reserve assets.

## Data quality

It is recommended that this item not be used in analysis of the distribution of wealth. While the distribution of this asset is likely to produce reasonable results, and its inclusion in the balance sheet is entirely appropriate from a national accounting perspective, insurance technical reserves are not something householders can draw upon, unless they suffer a loss (which, in the case of other insurance, would be the loss of home contents, personal belongings, a car and so on). This is a probabilistic event, the distribution of which cannot be well gauged from the insurance receipts of households, as the HES and SIHC only obtain data on insurance payments from accident, sickness and worker's compensation insurance. In addition, unincorporated enterprises own some part of other insurance technical reserves, as they pay premiums for the insurance connected to their business. It has not been possible to estimate this component of the distribution of this asset.

## 12.6 Superannuation — pension fund technical reserves and unfunded superannuation claims

### Definition

The household balance sheet shows a single item for all insurance technical reserves. However, net equity in reserves of pension funds and life and other insurance corporations are shown separately in table 15 of *Australian National Accounts: Financial Accounts* (cat. no. 5232.0). The pension fund technical reserves item represent householders' net equity in, or claims on, the reserves of pension plans. These reserves are held/invested by pension funds to meet future pension payments to households (*Finance Australia*, cat. no. 5611.0).



Unfunded superannuation claims represent the liabilities of the general government sector to public sector employees in respect of unfunded retirement benefits. Unfunded retirement schemes are those where the employer is the Federal government, or one of the state governments. Employers in this sector are not required to hold funds for future pension payments in reserve; they need only make them available when the liability falls due (i.e. as someone retires). However, the amount owed on this item has been imputed on the same basis as that which would apply to non-government pension plans, so that it can be included in the ASNA.

## **Data sources**

The possibility that group data from the Treasury RIMGROUP model would allow this item to be split into pension fund and unfunded superannuation claims was considered, as this could potentially provide good benchmarking data at quite a small group level. Unfortunately, this was not possible for the current study, as pensions cannot be split by superannuation fund type.

The RIMGROUP model is itself based, in part, on data from household surveys. In 2000 the ABS conducted the Survey of Employment Arrangements and Superannuation (SEAS), which was a very detailed survey collecting data both from respondents and their superannuation funds (where respondent permission was given for funds to be contacted). Account balances for people aged between 15–69 were obtained, along with demographic data. Account balances for people in defined benefit superannuation schemes were thought to be underestimated by the survey to some degree, as withdrawal benefits were used as an approximation for balances for these types of schemes. Rates of contribution by respondents and their employers were also collected.

Superannuation surveys were also run as Labour Force Supplementary surveys in 1995, 1993 1991 and 1988. The 1995 survey file was available for this study. The 1995 survey collected data on whether respondents aged 45 to 74 were covered by a superannuation scheme (or several schemes), how long they had been in these schemes and what their rate of contribution was, for the main scheme to which they contributed to personally. However, account balances were not obtained.

In 1998–99 and 1993–94 the HES collected data on weekly and lump sum income from superannuation. The SIHC collected data on the last payment received from a superannuation fund or annuity, and this was reported as superannuation/annuity income from the previous financial year.

## **Methodology**

The method chosen to model the distribution of this component required average fund balances to be calculated from the 2000 SEAS. This was first done for cells of the person level data set, defined by five year age ranges, 11 income ranges, labour force status, sex, industry of employment (division level), state and marital status. Averages were then obtained for groups defined by the first five variables listed above, and finally averages were obtained for groups broken down only by age, income and labour force status.

To obtain similar average balance data from the 1995 survey, respondents' own contributions, the number of years they had been contributing, and compound interest rate of four percent p.a. were used to model the first part of fund balances. The length of time employers had been contributing to funds was also captured in the 1995 survey, but the rate of contribution was not. Average employer contribution rates from the 2000 SEAS were obtained for groups determined by age, sex, income (11 ranges) and industry division of employment. These data were adjusted to account for changes in the Superannuation Guarantee Charge between 1995 and 2000. The adjusted employer contribution rates were then used, along with reported income, to approximate employer superannuation contributions. These data were combined with the number of years employers had been contributing, and a compound interest rate of four per cent, to model the second half of fund balances.

Average derived 1995 balances were then obtained for the same groups defined for the 2000 data, i.e. for five year age ranges, 11 income ranges, labour force status, sex, industry of employment (division level), state and marital status. Once again, average balances were also calculated for coarser disaggregations of the data.

Next, the scope differences of the two surveys had to be accounted for. Total balances from the surveys for those aged between 45 and 69 were calculated, as this was the only age range common to both surveys. The ratio of these two totals was used to adjust data from one survey to impute approximate balances for those not included in the other survey. For example, the distribution of balances for 25 to 29 year olds in 1995 was approximated by scaling back 25 to 29 year olds' balances from 2000.

For 2000 and 1995 estimates, each person in the SIHC was allocated an average superannuation balance based on the seven variable disaggregation. If this value was missing (as values can be for such small cells), a value was imputed from the five variable disaggregation, or if this too was missing the three variable average was used.

Next, the net present value of superannuation receipts was calculated for those persons who had already retired. Income from superannuation captured on the SIHC/HES was combined with life expectancy data from *Deaths, Australia* (cat. no. 3302.0), and a compound interest rate of 4% p.a., to derive the value of an annuity payable for the recipient's expected future lifetime at the current rate of payment.

Finally, fund balances for those contributing, and the net present value of pensions for those already receiving superannuation payments were aggregated for each household. These values were benchmarked to the sum of the ASNA items for 'net equity in pension fund reserves' and 'unfunded superannuation claims'.

### **Time series estimation**

Interpolation was used to derive average fund balances between 1995 and 2000, and extrapolation was used to obtain average 1994 balances. This was also done at three levels of detail (i.e. for figures derived using a seven variable split, a five variable split, and a three variable split, as detailed above). Average balances were imputed to person records in the same way in all years, and balances were aggregated for each household.

Household receipts from pensions, and ASNA aggregates, were available in every year from 1994 to 2000.

## Data quality

The SEAS marked a significant step forward in the measurement of retirement fund balances, with the dual approach of obtaining information from people and their funds. However, undercoverage remains an issue in these data, particularly for the defined benefit superannuation schemes. This is due to the fact that withdrawal benefits had to be used in place of account balances for many of these types of funds.

The imputation of balances using data from the 1995 Superannuation survey would also have introduced some errors, since, among other assumptions, 2000 employer contribution rates were used. However, these rates need only capture relativities in contribution rates to arrive at a reasonable distributional picture. Encouragingly, when the 1995 imputation was complete, the aggregate balances obtained represented a similar proportion of balance sheet aggregates as their 2000 SEAS counterparts.

Imputation of balances back to the SIHC or HES would introduce further errors, however even the most coarse disaggregation (using three variables) had 572 cells, allowing a large amount of the heterogeneity in the data to be retained.

Analysis of the way in which estimates responded to changes in the interest rate used to estimate the net future value of pension receipts showed that the choice of interest rate did not seriously affect the distributional results.

Comparisons were also made with data from RIMGROUP and the Australian Housing Survey (for full details see Section 5.3). In short, the distributions which emerged from these comparisons were very similar. There is some evidence that superannuation assets in the wealth model may have been slightly overestimated for males over 50 years of age, and the assets of younger men may have been slightly underestimated. A similar pattern was observed for women.

The estimates discussed above have been compiled using different data sources and methods, and so it may be some time before a definitive answer on the cause of discrepancies in the estimates is obtained. However, work currently being undertaken by the ABS and the Retirement and Income Modelling Unit of the Treasury, and further comparisons between data sources in the future, may lead to enhancements to the way superannuation assets are calculated in the wealth model.

## 12.7 Other accounts receivable

### Definition

Other accounts receivable cover any other claims that entities in one sector hold over entities in other sectors, which do not fit into the other financial asset categories. For the household sector, this item includes trade credit extended to other parties, and accrued interest and tax refunds.

## Data sources

The only data sources related to this item which were located were business income from the SIHC, and the ASNA household balance sheet other accounts receivable item. Data from GAPS, EAS and QEWS was investigated, but these sources did not include information which could be used in the allocation of this component.

## Methodology

The method used was to distribute the ASNA household balance sheet other accounts receivable item between income units who own their own non-limited liability business or farm, in direct proportion to business income. For the  $i^{\text{th}}$  business household, the derived value of other accounts receivable can be expressed as follows:

$$\text{Other accounts receivable}_{\text{Derived}}^i = \text{Business income}_{\text{SIHC}}^i \times \frac{\text{Other accounts receivable}_{\text{ASNA}}}{\sum_{i=1}^n \text{Business income}_{\text{SIHC}}^i}$$

## Time series estimation

The data items used to estimate the distribution of accounts receivable were available for all years in which a SIHC was run.

## Data quality

The distribution of this item is unlikely to be of high quality for several reasons. First, not all of the accounts receivable of households relate to businesses, and there is currently no way of obtaining distributions of items such as accrued tax refunds. Second, this item does not include intra-sectoral accounts receivable, i.e. those accounts between households and unincorporated enterprises, or between unincorporated enterprises and NPISHs. The NPISH adjustment for this item was therefore a second-best approach, as NPISHs were simply allocated a percentage of total household balance sheet accounts receivable. In a true NPISH balance sheet, those accounts receivable from households would be shown, and this figure would have a counterpart in the household balance sheet accounts payable item.

Finally, the National Accounts aggregate for accounts receivable in the household sector is noted to be of poor quality. However, the quality of the overall distribution of household assets and liabilities, is unlikely to be affected by this issue, as the accounts receivable item is a relatively small part of household wealth.

## 13 Liabilities — technical details

### 13.1 Securities other than shares

#### Definition

In the ASNA, securities other than shares consist of bills, bonds, certificates of deposit, commercial paper, debentures, tradeable (or offsetable) financial derivatives, and similar instruments normally traded in financial markets. However, for the household sector, this item basically equates to drawings of bills of exchange.

A bill of exchange is an unconditional order drawn (issued) by one party, sent to another party for acceptance and made out to, or to the order of, a third party, or to bearer. It is a negotiable instrument with an original term to maturity of 180 days or less. Although merchant banks were the promoters of the bill market in Australia, today almost all bills are bank accepted. Acceptance of a bill obliges the acceptor to pay the face value of the bill to the holder upon maturity. (*Finance Australia*)

#### Data sources

Like several other financial assets and liabilities, the only data relating to this item comes from the ASNA household balance sheet securities other than shares figure. The most closely related item on the SIHC or HES derived estimates of business loans.

#### Methodology

The method used to estimate the distribution of this liability was to distribute the ASNA household balance sheet 'securities other than shares' item across households in direct proportion to their derived business loan liabilities (these loans are discussed in Section 13.5). For the  $i^{\text{th}}$  household, the derived value of securities other than shares can be expressed as follows:

$$\text{Securities other than shares}_{Derived}^i = \text{Business loans}_{Derived}^i \times \frac{\text{Securities other than shares}_{ASNA}}{\sum_{i=1}^n \text{Business loans}_{Derived}^i}$$

#### Time series estimation

The business loans used to derive the distribution of securities other than shares were estimated using BLS and AFS data. See Section 13.5 for further discussion of the availability and quality of these data.

#### Data quality

The assumption that securities other than shares are most closely related to business loans may not result in an ideal distribution for this liability. However, the distribution which resulted from allocating this item in proportion to business income was very similar. Given the size of this component, the total net worth of households should not be greatly affected by any errors inherent in this component.

## 13.2 Loans and placements — owner-occupied housing

### Definition

Loans and placements are included in the household balance sheet, but these liabilities are not split by purpose of loan. For this study, loans and placements — owner-occupied housing refers to loans and placements which are secured by an owner-occupied dwelling. These loans may be taken out to purchase/construct or make additions to the dwelling. Loans which are secured on the owner-occupied dwelling, but are used for another purpose, are included in 'Consumer and other household loans', see Section 13.4.

### Data sources

This is the second component which is directly measured in the SIHC and HES, via questions on the total amount owing on mortgages and unsecured loans taken out to purchase, build, alter or add to an owner-occupied dwelling.

While the ASNA household balance sheet 'loans and placements' item does not include splits by purpose of loan, figures derived from counterparty information on the value of mortgages taken out by households are available from *Australian National Accounts: Financial Accounts* (cat. no. 5232.0).

APRA data published in the Reserve Bank Bulletin provides estimates of bank lending to persons for owner-occupied housing. This estimate does not include loans for the purchase of residential land where a dwelling is expected to be constructed, or loans made by non-bank lending institutions. However, APRA data published in the Reserve Bank Bulletin provides estimates of lending to persons for 'other housing finance'. This series includes loans for investment properties and loans for the purchase of residential land where a dwelling is expected to be constructed.

### Methodology

Owner-occupied housing loan estimates are used as reported in the SIHC and HES. These estimates, along with estimates of investment property loans were benchmarked to the total mortgage loans figures published in *Australian National Accounts: Financial Accounts* (cat. no. 5232.0). This process can be expressed as follows:

Owner-occupied housing loans  $^i_{Benchmarked} =$

$$\text{Own home loans}_{SIHC/HES} \times \frac{\text{Housing finance}_{Financial\ Accounts}}{\sum_{i=1}^n \text{Own home loans}_{SIHC/HES}^i + \sum_{i=1}^n \text{Loans on investment properties}_{Derived}^i}$$

### Time series compilation

Distributional data for this component is available in all years between 1993–94 to 1999–2000 from the SIHC or HES. The data required for benchmarking is also available in all years.

## **Data quality**

This liability was directly reported in the SIHC and HES and therefore can be viewed with some confidence. To ensure that housing loan estimates were accurate, respondents were encouraged to refer to their mortgage records. National accounts estimates of home loans are considered to be of good quality.

## **13.3 Loans and placements — investment properties**

### **Definition**

This item refers to loans and placements which are secured by an investment property. These loans may be used to purchase/construct or to make additions to an investment property.

### **Data sources**

The distribution of loans taken out to fund the purchase of, or additions to, investment properties can be obtained from the 1997 Rental Investors' Survey (RIN), which collected details of loans on investment properties. The 1993 survey did not collect loans data.

1997 RIN loans data can be cross-classified by reference person characteristics household type, and region of residence. The information on the RIN included the number of loans on residential investment properties owned by the household, and the amount outstanding on loans on the three most recently acquired properties.

Data from REIA could not be used to assist compilation of these estimates, however, information from this source did assist in determining factors which were linked to the distribution of this asset.

The data available for benchmarking dwellings loans components are discussed in Section 13.2.

### **Methodology**

RIN data on investment properties was dissected into groups of households based on the amount of profit or loss on the household's rental property, the state or territory of residence of the owner(s), household type, the age of the reference person, and their total income.

The average value for each cell was then assigned to individual households in similarly defined groups on the SIHC or HES. Where the SIHC/HES data did not support such a fine dissection, coarser disaggregations (i.e. without state splits, or split by state and area only) were grafted onto an equivalent group of households in the SIHC or HES. Only households that reported income from renting a non-residential property were allocated this liability.

Derived figures were aggregated for each group, and benchmarked to the original RIN group totals. This means that the  $i^{\text{th}}$  household, in group  $j$ , will have a value of loans on investment properties derived as follows:

$$\text{Loans on investment properties}_{Derived}^{ij} = \text{Average loan on investment properties}_{RIN}^j \times \frac{\sum_{i=1}^n \text{Investment property loans}_{RIN}^{ij}}{\sum_{i=1}^n \text{Derived investment property loans}_{SIHC/HES}^{ij}}$$

Investment property loans, and loans on owner-occupied dwellings, were then benchmarked to housing loan totals:

$$\text{Loans on investment properties}_{Benchmarked}^i = \text{Loans on investment properties}_{Derived}^i \times \frac{\text{Housing finance}_{Financial\ Accounts}}{\sum_{i=1}^n \text{Own home loans}_{Derived}^i + \sum_{i=1}^n \text{Loans on investment properties}_{Derived}^i}$$

## Time series estimation

Distributional data for this component is only available from the 1997 RIN, as no questions about loans on investment properties were asked in 1993. 1997 RIN rental property loans data were used to estimate the level of investment property loans in all other years. Aggregate dwelling loans benchmarks were available for all years.

## Data quality

This component is directly reported on the RIN and therefore can be viewed with some degree of confidence. Where possible, respondents used mortgage documentation to ensure that their estimate of the level of the debt was as accurate as possible. The imputation of RIN data to the SIHC and HES will affect some dimensions of the data. However, the imputed data will mirror the RIN data at the aggregate level and for state and area disaggregations.

Estimates dissected by the age of the reference person (age) or household type produce a distribution very similar to that obtained from the RIN. However, given the considerably smaller sample size of the SIHC when compared to the RIN, the SIHC does contain some 'empty' cells for some categories. At lower levels of dissection, for example for splits by state, age and household type, estimates will be relatively consistent between the two data sets. Inconsistency will only occur for cells where the sample sizes between the two data sets differ greatly.

The 1997 RIN provides a good insight into the distribution of loans and placements for investment properties in 1997. However, 2000 investment housing loan estimates are based on data which is three years out of date. During this time there may have been shifts in the distribution of investment housing. The HES and SIHC provide some information on changes occurring to rental properties and rental income. However, without the comprehensive information provided by the RIN (or another survey collecting data similar data) the reliability and quality of investment housing estimates may decay over time.

The quality of dwellings loans benchmarks is discussed in Section 13.2.



## 13.4 Loans and placements — consumer and other household loans

### Definition

This component of loans and placements consists of four sub-components; loans secured on an owner-occupied dwelling but used for 'other purposes', loans for other purposes which are not secured by a dwelling, credit card debt and debts arising from tertiary study via the Higher Education Contribution Scheme (HECS).

Loans for other purposes not secured by a dwelling includes loans without security, and loans which are secured by an asset other than a dwelling (such as a motor vehicle). Credit card debt relates to all amounts owing on credit cards offered by banking institutions. It does not include charge cards such as American Express, Diners Club or retailer cards. (*Survey of Income and Housing Costs, Australia, 1998; Reserve Bank of Australian Bulletin, 2001.*)

### Data Sources

The SIHC collects data on loans secured on the house of residence, which have been taken out for 'other purposes'. Unsecured loans for other purposes are not captured.

The HES captures information on secured and unsecured loans for other purposes, the number of respondents who have a credit card or charge account, whether they are paying interest on that credit card, and how much their interest payments are. Some information on Higher Education Contribution Scheme (HECS) debts is also captured in the HES, however this takes the form of the amount incurred in the reference period, not the total liability outstanding.

The Reserve Bank of Australia (RBA) publishes aggregate credit and debit card statistics in their monthly Bulletin (see RBA Bulletin tables C.1 and C.2). The Bulletin also includes bank lending to persons, which is split into housing finance and other fixed and revolving loans (see table D.5).

Counterparty information is used to compile aggregate data on finance commitments made by significant lenders in *Lending Finance, Australia* (cat. no. 5671.0). These data cover commitments made for a number of purposes, which include personal finance.

The Australian Taxation Office (ATO) has information relating to all HECS liabilities, as it administers the HECS scheme. The ATO provided aggregate data on HECS liabilities, broken down by state and capital city/balance of state and age ranges. The age ranges had greater definition in younger age groups, where most HECS liabilities have accrued to date.

An aggregate series on loans made to households by general government (which equates to HECS loans) is available from the Financial Accounts from 1995 onwards.

## Methodology

The distribution of this component of the balance sheet is estimated in five sections.

Data on 'loans for other purposes' (which are secured on the residential dwelling) from the SIHC and the HES form the first section of the estimate. This item was directly reported on both the SIHC and the HES.

Next, data on credit card interest payments from the HES was dissected into groups based on the age of the household reference person, their state of residence, the type of household, and household's total income. For each group, an estimate of the amount owing on credit cards was derived by applying the RBA credit card interest rate to the interest reported.

Average credit card liabilities for each group of households were then calculated, and these values were assigned to households in similarly defined groups on the SIHC. Where the SIHC data did not support such a fine dissection, units in the HES file were dissected by broader splits, and information for these groups was grafted onto households with missing values in the SIHC. Derived figures were then benchmarked to the RBA aggregate credit card figure.

The same method was used for loans for other purposes not secured by a dwelling. HES data was dissected into groups based on the age of the household reference person, their state of residence, the type of household and the household's total income. Average unsecured loans for other purposes for each group of households were then calculated for each group, and this value was assigned to income units in similarly defined groups on the SIHC. Where the SIHC data file did not support such a fine dissection, units in the HES file were dissected by broader splits, and information for these groups was grafted onto income units with missing values in the SIHC.

Secured and unsecured loans were aggregated and benchmarked to RBA data on non-housing bank lending to persons. Since this lending data does not include lending to persons by non-bank lending institutions, total bank and non-bank lending was estimated by multiplying the bank lending series by the ratio of total household sector mortgages to bank provided mortgages.

Finally, total HECS loans for small cells defined by age, income and state of residence were distributed across all people who indicated that they had undertaken further study in the SIHC or HES files. HECS debts were aggregated to the household level, and merged back to the household file. Total HECS debts were benchmarked to the Financial Accounts HECS aggregate.

The process described above can be expressed in several stages. In years in which the SIHC was run, the  $i^{\text{th}}$  household in characteristic group  $j$ , unsecured loans are derived as follows:

Loans for other purposes not secured by a dwelling =

$$\text{Loans for other purposes}_{SIHC}^{ij} = \frac{\text{Total weighted value of unsecured debt}_{HES}^j}{\text{Weighted number of households in group}_{HES}^j}$$

Secured loans for other purposes are reported on the HES and SIHC. Unsecured and secured loans for other purposes are aggregated and benchmarked to the adjusted RBA series for non-housing lending to persons.

Next, credit card debt was derived using HES interest payments and RBA interest rates. In SIHC years, estimates were then derived as follows:

$$\text{Credit card debt}_{SIHC}^i = \frac{\text{Total weighted value of credit card debt}_{HES}^j}{\text{Weighted number of income units in group}_{HES}^j}$$

Derived values for credit card debt were then benchmarked using RBA credit card debt aggregates:

$$\text{Credit card debt}_{Benchmarked}^{ij} = \text{Credit card debt}_{SIHC}^i \times \frac{\text{Credit card debt}_{RBA}}{\sum_{i=1}^n \text{Credit card debt}_{SIHC}^i}$$

Finally, HECS debt values were obtained. For the  $i^{\text{th}}$  person in group  $j$  (based on their age, state and income):

$$\text{HECS loans}_{SIHC}^{ij} = \frac{\text{Total HECS debt}_{ATO}^j}{\text{Number of persons who have undertaken further study}_{SIHC}^j}$$

Estimates of personal HECS loans were aggregated within each household, and the result is benchmarked to the Financial Accounts HECS series.

## Time series estimation

Secured loans for other purposes are collected on both the SIHC and the HES.

Loans for other purposes not secured by a dwelling, and credit card payments, were only available when a HES was conducted. After credit card debt was estimated using interest rate data, average values for credit card debt and unsecured loans were derived from 1993–94 and 1998–99 data. Interpolation/extrapolation was used to obtain averages for other years. Benchmarks for these items were available for each year.

Distributional data on HECS loans were available from 1996 to 1999. The 1996 distribution was used for 1994 and 1995, and the 1999 data was used for 2000. The aggregate HECS series from the Financial Accounts was available from 1995 onwards. Figures for 1994 were extrapolated from these data.

## Data quality

Data on 'loans for other purposes' (which are secured on the residential dwelling) are directly reported on both the SIHC and the HES. The distribution of this item should therefore be reliable.

Reserve Bank data on credit card interest rates refer only to cards which have an interest free period. This may lead to under-estimation of the level of credit card debt for some households. In addition, households which have a credit card with an interest free period may not report interest on the HES. As a result, they will not be assigned any credit card debt.

Credit cards and unsecured loans for other purposes data which were grafted from the HES onto the SIHC will mirror the HES for dissections by household type. Estimates for these dissections should be reliable. Analysis using other disaggregations such as age and state should be undertaken with more caution, however disaggregations at these levels appear to be stable and consistent when comparing the grafted SIHC data with the original HES. Estimates for finer dissections may not be as robust.

The quality of adjustments to the series for lending for non-housing purposes is hard to gauge, as comparative statistics are not available. However, not to adjust this series would result in an underestimation of loans for other purposes. The assumption that banks lend the same proportion of total housing and non-housing loans was the best adjustment that could be made at this time.

Distributional HECS data should be of good quality, as it has been obtained as a by-product of administering the HECS scheme. The ATO has advised the authors that data quality in this area has been steadily improving since the mid-1990s. The HECS liability series from the financial accounts is somewhat higher than totals generated using the ATO data, as the former series comes from finance statistics relating to the education sector. Revisions to adjust for differences between these aggregates may be undertaken in the future.

## **13.5 Loans and placements — business loans**

### **Definition**

Business loans are defined as the finance taken out by the household sector to operate unincorporated enterprises. They are part of the ASNA household balance sheet loans and placements item which also includes owner-occupied housing loans, investment property loans and consumer and other household loans.

### **Data sources**

Data on business loans is available from the BLS (also known as GAPS). This survey collected the value of current and non-current liabilities, and percentage disaggregations of these liabilities, which showed whether debts were in the form of loans, overdrafts, outstanding claims and so on. The BLS did not collect information for all industry divisions. The industries not included in the survey were Education, Government administration and defence, Electricity, gas and water supply, Health and community services, Agriculture forestry and fishing, and Communication services. With the exception of Agriculture, forestry and fishing, these are not industries in which the majority of unincorporated enterprises would be expected to operate.

Data for farm businesses is available from another source. The Agricultural Finance Survey (AFS) collects data on current and non-current bank finance and the amount outstanding to trade creditors, for businesses with an Estimated Value of Agricultural Operations (EVAO) of over \$22,500.

## Methodology

Estimates of the distribution of this liability are formed in three parts. First, non-farm business loans data from the BLS are dissected by industry and level of business profit or loss. The average liabilities for each group of businesses are then calculated, and this value is assigned to income units in similarly defined groups on the SIHC or HES. Where the SIHC/HES data does not support such a fine dissection, another set of estimates are grafted onto the SIHC/HES, based on disaggregations of the data by industry division only.

Next, estimates of bank finance from the AFS are dissected by industry and level of total farm profit or loss. Once again, the average liabilities for each group of farms is calculated, and this value is assigned to income units in similarly defined groups on the SIHC or HES. Where the SIHC or HES data does not support such a fine dissection, values are grafted to the survey file using a disaggregation based on the level of farm profit or loss only.

In this way, nearly all business income units in the SIHC are assigned a value of business loans.

The derived values of business loans are then grouped by state. Weighted state totals are calculated using SIHC or HES weights for farm and non-farm business loans respectively. These values are then benchmarked to total state liabilities for non-farm businesses from the BLS, and to state total bank finance for farm business loans, from the AFS.

These estimates are benchmarked to an estimate of aggregate business loans, which is derived as the residual from deducting all other loans benchmarks from the household balance sheet loans item. For the  $i^{\text{th}}$  non-farm business household in group  $j$ , located in state  $k$ , this process can be expressed as follows:

$$\text{Business loans}_{\text{Non-farm}}^{i,j,k} = \text{Average weighted value of non-farm business loans}_{\text{BLS}}^{j,k}$$

These values are grouped by state and then benchmarked to the BLS state total:

$$\text{Business loans}_{\text{Derived}}^{i,j,k} = \text{Business loans}_{\text{non-farm}}^{i,j,k} \times \frac{\text{Total state non-farm business loans}_{\text{BLS}}^k}{\sum_{i,j} \text{Business loans}_{\text{non-farm}}^{i,j,k}}$$

Similarly, for farm businesses:

$$\text{Business loans}_{\text{Farm}}^{i,j,k} = \text{Average weighted value of farm business loans}_{\text{AFS}}^{j,k}$$

$$\text{Business loans}_{\text{Derived}}^{i,j,k} = \text{Business loans}_{\text{farm}}^{i,j,k} \times \frac{\text{Total state farm business loans}_{\text{AFS}}^k}{\sum_{i,j} \text{Business loans}_{\text{farm}}^{i,j,k}}$$

Benchmarking to the ASNA is the last step in the process:

$$\text{Business loans}_{\text{Benchmarked}}^i = \text{Business loans}_{\text{Derived}}^i \times \frac{\text{Business loans}_{\text{ASNA}}}{\sum_{i=1}^n \text{Business loans}_{\text{Derived}}^i}$$

## Time series estimation

AFS loans data are available from 1996 onwards. 1995–96 AFS data was used for 1993–94 and 1994–95 estimates. Farm industries were dissected at subdivision levels with some subdivisions grouped together due to a lack of information at this level. Northern Territory farm businesses were grouped with Queensland farms, due to small Northern Territory farm samples. Farmers in the Australian Capital Territory were grouped with New South Wales farmers for the same reason.

The BLS was only run from 1994–95 to 1997–98. Estimates of non-farm business loans for 1993–94 used 1994–95 data, while 1997–98 BLS data was used in 1998–99 and 1999–2000 estimates.

## Data quality

The estimates of the distribution of business loans are subject to several sources of error; sampling and non-sampling errors from the SIHC or HES, errors arising from estimating data for years in which the required information was not available, and sampling and non-sampling errors in the BLS and AFS.

The total loans and placements item in the household balance sheet is thought to be of good quality. However, the aggregate business loans benchmark may be slightly overestimated, as this benchmark is derived as a residual after other loans items have been deducted from the household balance sheet loans total. Comparisons between this residual and the series from financial accounts on bank lending to unincorporated enterprises show that, even after an adjustment has been applied to account for non-bank lending, the residual business loans benchmark is higher in each year. However, in each year unbenchmarked business loans figures are higher than the benchmark value. Further analysis of loans data may find improved ways to split the loans and placements total between different types of loans. Sensitivity analysis suggests that such revisions would not have a large effect on the overall results of the model.

## 13.6 Other accounts payable

### Definition

Other accounts payable cover claims that other sectors hold over the household sector, which do not fit into other financial liability categories. This item includes trade credit extended to unincorporated enterprises, and the accrued interest and tax debts of individuals and unincorporated enterprises which have not yet been paid.

### Data sources

The only distributional data sources relating to this item appear to be business income from the SIHC/HES, and the ASNA household balance sheet 'other accounts payable' item. Data from GAPS, EAS and QEWS was investigated, but these data sources did not include information which could be used in the allocation of this component.

## Methodology

The method used was to distribute the ASNA household balance sheet other accounts payable item between income units who owned their own non-limited liability business or farm, in direct proportion to business income. For the  $i^{\text{th}}$  business-owning household, the derived value of other accounts payable can be expressed as follows:

$$\text{Other accounts payable}_{Derived}^i = \text{Business income}_{SIHC/HES}^i \times \frac{\text{Other accounts payable}_{ASNA}}{\sum_{i=1}^n \text{Business income}_{SIHC/HES}^i}$$

## Time series estimation

The data items used to estimate the distribution of loans and placements payable were available for all years in which a SIHC or HES was run.

## Data quality

The distribution of this item is unlikely to be of high quality for several reasons. First, not all of the accounts payable of households relate to businesses, and there was no way of obtaining distributions of items such as accrued tax payments, or other bills at the time of this study. Second, this item does not include intra-sectoral accounts payable, i.e. those accounts between households and unincorporated enterprises, or between unincorporated enterprises and NPISHs. The NPISH adjustment to the balance sheet for this item was therefore a second-best approach, as NPISHs were simply allocated a percentage of total household balance sheet accounts payable. In a true NPISH balance sheet, those accounts receivable from households would be shown, and this figure would have a counterpart in the household balance sheet accounts payable item.

Finally, the National Accounts aggregate for accounts receivable in the household sector is noted to be of poor quality. However, this component is relatively small, so the quality of the overall distribution of household assets and liabilities should not be greatly affected by the distribution of this component.

## 14 Appendices

### 14.1 Summary of data sources and methods

#### Data availability

Calendar year	1993	1994	1995	1996	1997	1998	1999	2000
Financial year	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	
Survey of Income and Housing Costs								
Household Expenditure Survey								
Rental Investors Survey								
Growth and Performance Survey								
2000 SEAS/ 1995 Superannuation Survey								
Reserve Bank Bulletin Series (a)								
Agricultural Finance Survey								
Agricultural Commodity Survey/Census								
National Forest Inventory								
National Plantation Inventory								

(a) The RBA retail deposit and investment rates series has been reported on a new basis from May 2001. For consistency, tables on the previous basis were obtained from the RBA for all periods considered in this study.



## Summary of estimation methods

Component	Input data source	Estimation method before benchmarking
7.1 Dwellings — owner occupied housing	SIHC/HES: Value of own home	Directly collected in the SIHC/HES. Benchmarked, with rental properties, to dwellings plus a component of land.
7.2 Dwellings — investment properties	RIN: Value of rental properties	Small cell averages grafted from the RIN to the SIHC/HES, and totals rebenchmarked to the RIN distribution.
7.3 Other buildings and structures	SIHC: Income from renting non-residential properties RIN: Average rental property yields BLS: Non-current assets ASNA: Farm buildings and structures	Mixed — Ratios of assets to income applied to SIHC/HES non-rental property rent. BLS cells grafted to SIHC/HES files and rebenchmarked to BLS values.
8.1 Machinery and equipment	SIHC/HES: Business income ASNA: Ratios of machinery and equipment to gross mixed income.	Income capitalisation — ASNA ratios of assets to income applied to SIHC/HES business income to derive asset values.
8.2 Livestock — fixed asset	SIHC/HES: Farm income AFS and ACS : State disaggregations of farm inventories	Approximate state disaggregations of the ASNA aggregate distributed in proportion to SIHC/HES farm income.
8.3 Computer software	SIHC/HES: Business income ASNA: Disaggregations of computer software by industry Business use of IT: State computer usage disaggregations Farm use of IT: State computer usage disaggregations	State by industry totals distributed in proportion to SIHC/HES business income.
8.4 Entertainment, literary or artistic originals	SIHC/HES: Royalty income ASNA: Household ELAO item	ASNA aggregate distributed in proportion to SIHC/HES royalty income
9.1 Consumer durables — motor vehicles	HES : Net expenditure on motor vehicles, and number of vehicles garaged ASNA: Experimental motor vehicle assets series	HES years: Small cell averages of expenditure multiplied by the number of vehicles garaged. SIHC years: imputed small cell total number of vehicles distributed across all households, and multiplied by small cell averages of expenditure on motor vehicles.
9.2 Consumer durables — other household durables	HES: Expenditure on contents insurance ASNA: Experimental consumer durables series	HES years: ASNA aggregate distributed in proportion to contents expenditure. SIHC years: Small cell proportion of the ASNA aggregate distributed across all income units in each cell.
10.1 Private non-farm inventories	SIHC/HES: Non-farm income BLS: Closing inventories	Cell averages grafted from the BLS to the SIHC/HES, and rebenchmarked to the BLS distribution.
10.2 Farm inventories	SIHC/HES: Farm income ASNA: Farm Inventories ACS/AFS: Farm Inventories	Approximate state disaggregations of the ASNA aggregate distributed in proportion to SIHC/HES farm income.
10.3 Livestock — inventories	SIHC/HES: Farm income ASNA: Livestock Inventories ACS: Livestock inventories	Approximate state disaggregations of the ASNA aggregate distributed in proportion to SIHC/HES farm income.

## Summary of estimation methods (continued)

Component	Input data source	Estimation method before benchmarking
10.4 Plantation standing timber	SIHC/HES: Total income NPI/NFI: Privately owned plantation timber ASNA : Plantation standing timber	Approximate state disaggregations of the ASNA aggregate distributed equally across all households.
11.1 Land — farmland	SIHC/HES: Farm income ASNA: Derived total farm land	Derived total farmland distributed in proportion to SIHC/HES farm income.
11.2 Native standing timber	SIHC/HES: Total income (non-capital city only) NFI: State totals privately owned native timber	Approximate state disaggregations of the ASNA aggregate distributed equally across all non-urban households
12.1 Currency, deposits and loans and placements (receivable)	SIHC/HES: Interest income RBA: Interest rate data BLS: Current assets data	Mixed — Income capitalisation — yields applied to interest income. Cell averages of the BLS approximate deposits data grafted to SIHC/HES businesses, and rebenchmarking to the BLS.
12.2 Securities other than shares	SIHC/HES: Interest income RBA: Bond yields and trust interest rates	Income capitalisation — bond yields applied to bond income, trust interest rates applied to trust income.
12.3 Shares and other equity	ASX: Dividend yields SIHC/HES: Dividend income ASNA: Shares and other equity	Income capitalisation — dividend yield applied to dividend income.
12.4 Insurance technical reserves — life insurance	HES: Expenditure on life insurance, and receipts from life insurance ASNA: Life insurance aggregate	Payments aggregated, subtracted from reserves, and remaining reserves distributed in proportion to expenditure on life insurance.
12.5 Insurance technical reserves — other insurance	HES: Expenditure on other insurance, and receipts from other insurance ASNA: Other insurance aggregate	Payments aggregated, subtracted from reserves, and remaining reserves distributed in proportion to expenditure on other insurance.
12.6 Superannuation — pension fund technical reserves and unfunded superannuation claims	SEAS: Superannuation balances 1995 Superannuation Survey: years of contribution, own contribution amounts SIHC/HES: Superannuation receipts	Modelled 1995 balances and SEAS balances for contributors interpolated and grafted to households. Receipts from superannuation used to determine the current value of future payments for retirees.
12.7 Other accounts receivable	SIHC/HES: Business income ASNA: Other accounts receivable	ASNA aggregate distributed in proportion to business income.
13.1 Securities other than shares	ASNA: Securities other than shares Derived Business loans	ASNA aggregate distributed in proportion to total business loans.
13.2 Loans and placements — owner occupied housing	SIHC/HES: Value of loan on owner occupier housing	Directly collected in the SIHC/HES. Benchmarked, with all other loans items, to the ASNA loans and placements aggregate.
13.3 Loans and placements — investment properties	RIN: Value of rental properties loans	Small cell averages grafted from the RIN to the SIHC/HES, and totals rebenchmarking to the RIN distribution.
13.4 Loans and placements — consumer and other household loans	HES: Value of consumer and other households loans	Small cell averages grafted from the HES to the SIHC, totals rebenchmarking to the HES distribution.
13.5 Loans and placements — business loans	SIHC/HES: Business income and industry AFS and BLS: Business loans	Cell averages grafted from the AFS and BLS, and totals rebenchmarking to AFS and BLS distributions.
13.6 Other accounts payable	SIHC/HES: Business income ASNA: Other accounts payable	Aggregate distributed in proportion to business income.

## 14.2 Results — detailed tables

The results in this appendix have all been generated from the model described in this paper, unless otherwise noted. Results are shown in whole dollars and current prices. Net worth figures presented as at 30 June, annual household income data are presented for financial years ended 30 June.

Average and median values have been calculated across all households, therefore median values can be zero where 50 per cent (or more) of households in a particular group do not own a certain type of asset (e.g. dwellings).

**Table 14.2.1: Average household net worth by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
1994	22,490	107,281	217,077	301,961	321,117	295,367	219,700
1995	66,081	121,528	208,267	303,536	339,824	284,132	228,475
1996	49,183	95,568	191,707	330,618	365,116	299,947	241,913
1997	58,598	103,686	200,548	346,364	365,322	344,763	305,891
1998	48,012	103,912	189,483	372,878	422,004	365,631	274,808
1999	31,182	107,444	237,460	388,472	429,560	358,588	330,494
2000	52,620	128,823	237,077	382,824	435,402	403,855	372,894

**Table 14.2.2: Median household net worth by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
1994	1,837	50,655	135,939	179,675	188,573	177,989	150,119
1995	13,736	62,088	147,800	215,802	201,838	178,306	141,544
1996	9,276	44,767	127,824	229,594	248,893	177,794	155,076
1997	8,951	47,024	133,749	234,511	247,172	207,129	173,543
1998	7,917	49,405	125,976	249,274	271,573	211,831	156,065
1999	2,652	49,586	154,346	265,537	270,027	221,312	189,032
2000	11,143	51,677	155,079	264,965	299,050	226,984	186,650

**Table 14.2.3: Average owner-occupied dwelling assets by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
1994	15,044	70,560	120,279	141,525	133,514	131,053	119,162
1996	24,761	72,019	121,469	142,930	142,803	124,240	122,205
1998	31,806	80,210	123,506	169,260	172,069	149,113	122,827
2000	25,513	93,170	155,799	182,101	184,142	179,496	165,972

**Table 14.2.4: Median owner-occupied dwelling assets by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
1994	0	42,955	110,780	126,391	115,042	118,693	102,773
1996	0	49,469	110,687	124,415	119,607	108,757	98,938
1998	0	51,649	111,906	135,940	131,540	120,542	104,066
2000	0	1,762	126,834	145,619	140,962	135,893	125,392

**Table 14.2.5: Average superannuation assets by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
<b>1994</b>	3,488	16,623	39,347	59,952	90,828	48,554	16,309
<b>1996</b>	10,633	15,247	32,370	93,272	97,567	50,009	20,215
<b>1998</b>	10,526	25,621	44,022	111,253	113,443	61,309	27,460
<b>2000</b>	21,327	31,515	64,825	129,963	133,289	63,772	31,001

**Table 14.2.6: Median superannuation assets by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
<b>1994</b>	354	4,848	9,488	4,519	850	0	0
<b>1996</b>	1,826	7,686	17,025	37,438	27,783	606	0
<b>1998</b>	2,353	10,696	22,753	52,767	41,186	943	0
<b>2000</b>	5,098	20,185	40,826	72,771	57,799	7,633	0

**Table 14.2.7: Average household assets, liabilities (absolute value) and net worth by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
<b>Assets 1994</b>	44,155	154,778	265,476	343,403	352,133	303,987	224,022
<b>Assets 2000</b>	81,671	207,791	337,394	468,946	490,303	428,739	381,848
<b>Liabilities 1994</b>	21,666	47,497	48,399	41,442	31,016	8,619	4,322
<b>Liabilities 2000</b>	29,051	78,968	100,317	86,122	54,901	24,885	8,954
<b>Net Worth 1994</b>	22,490	107,281	217,077	301,961	321,117	295,367	219,700
<b>Net Worth 2000</b>	52,620	128,823	237,077	382,824	435,402	403,855	372,894

**Table 14.2.8: Median household assets, liabilities (absolute value) and net worth by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
<b>Assets 1994</b>	9,033	122,806	180,941	214,694	202,599	180,566	150,374
<b>Assets 2000</b>	19,392	137,896	259,193	347,986	339,719	241,549	192,681
<b>Liabilities 1994</b>	4,731	18,949	22,451	17,981	152	0	0
<b>Liabilities 2000</b>	6,087	18,959	66,175	38,082	4,976	854	263
<b>Net Worth 1994</b>	1,837	50,655	135,939	179,675	188,573	177,989	150,119
<b>Net Worth 2000</b>	11,143	51,677	155,079	264,965	299,050	226,984	186,650

**Table 14.2.9: Average household net worth by the age of oldest person in the household (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
<b>1994</b>	20,709	96,772	214,246	300,359	320,321	289,061	235,524
<b>1995</b>	36,227	109,270	189,496	306,666	338,762	284,247	240,017
<b>1996</b>	19,470	82,080	185,116	316,145	359,951	301,252	264,730
<b>1997</b>	15,347	83,774	189,274	342,654	369,605	341,382	307,283
<b>1998</b>	28,890	84,848	184,138	346,847	423,374	370,326	288,436
<b>1999</b>	13,035	88,193	219,469	363,110	418,197	359,970	346,331
<b>2000</b>	19,276	109,771	221,122	365,682	455,062	392,889	382,163

**Table 14.2.10: Median household net worth by the age of oldest person in the household (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
1994	1,388	48,204	129,561	177,696	191,916	177,989	150,547
1995	9,527	50,314	139,431	215,807	205,011	179,586	144,516
1996	6,187	39,299	121,844	226,623	243,337	177,794	163,125
1997	4,037	38,231	125,595	233,157	247,283	209,371	179,713
1998	4,656	41,498	116,714	243,345	260,365	214,810	160,879
1999	998	38,428	135,019	250,766	268,636	229,478	196,662
2000	4,738	44,570	146,501	254,420	305,156	218,893	199,300

**Table 14.2.11: Average annual household income by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
1994	32,780	41,187	45,916	49,863	31,794	19,336	16,262
1995	36,002	43,561	48,075	52,778	34,710	20,348	14,710
1996	35,625	43,856	49,037	55,921	38,684	21,661	15,960
1997	40,771	45,823	50,621	58,331	40,811	24,252	20,845
1998	35,876	48,659	52,942	60,344	44,115	25,527	20,243
1999	42,322	49,464	54,279	61,593	38,929	21,838	17,251
2000	44,427	53,184	56,139	65,155	48,458	27,176	21,398

Source: Tabulation of income data from the HES and SIHC.

**Table 14.2.12: Median annual household income by the age of the household reference person (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
1994	30,554	37,645	40,096	43,693	23,254	14,860	12,409
1995	30,245	39,503	44,098	46,621	25,863	14,894	10,276
1996	31,720	39,565	43,006	49,060	30,200	15,514	11,920
1997	35,660	42,000	44,846	49,668	29,500	15,835	14,550
1998	31,090	43,971	45,305	52,780	30,690	17,470	14,401
1999	38,362	43,128	47,187	55,205	27,516	16,685	13,774
2000	36,500	48,000	49,760	55,100	38,000	17,082	15,000

Source: Tabulation of income data from the HES and SIHC.

**Table 14.2.13: Average household net worth by gross annual income decile (\$)**

	Lowest	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
1994	149,101	141,650	172,571	195,828	204,086	210,457	217,562	194,715	237,015	497,252
1995	92,004	123,915	146,755	174,487	172,081	195,639	211,179	234,335	299,441	614,766
1996	109,167	119,033	143,978	181,830	186,597	208,255	213,582	216,678	308,416	599,370
1997	116,869	137,420	149,925	187,393	192,820	203,284	221,741	264,329	321,843	692,286
1998	111,972	140,105	165,068	180,608	212,704	224,334	238,832	257,935	354,415	705,236
1999	159,422	155,149	198,577	230,455	224,343	216,766	297,960	293,390	359,625	631,197
2000	123,725	163,007	203,067	203,431	243,321	238,594	243,991	299,926	386,181	849,970

**Table 14.2.14: Median household net worth by gross annual income decile (\$)**

	Lowest	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
<b>1994</b>	97,865	94,717	133,223	122,104	119,801	128,970	127,775	140,555	177,164	246,020
<b>1995</b>	73,075	97,532	119,616	94,056	113,496	142,203	141,077	162,613	208,792	382,100
<b>1996</b>	84,913	100,681	117,224	104,375	121,587	114,318	138,831	154,725	205,577	407,644
<b>1997</b>	82,271	109,538	122,328	117,037	110,176	125,378	147,007	174,199	235,192	445,813
<b>1998</b>	75,638	102,592	120,009	116,144	119,087	134,490	146,872	169,442	243,158	446,579
<b>1999</b>	118,243	123,109	143,303	143,151	126,250	122,711	187,874	185,060	234,751	380,418
<b>2000</b>	83,081	112,425	158,220	110,157	126,908	141,351	172,271	212,681	285,792	529,430

**Table 14.2.15: Average household net worth by household type (\$)**

	Couple (cpl) only	Cpl with dep's 0-14 only	Cpl with dep's 15-24 only	Cpl with dep's 0-14 & 15-24 only	Lone person only	Lone parent with dep's 0-14 only	Lone parent with dep's 15-24 only	Other households
<b>1994</b>	280,260	186,762	360,259	279,010	155,914	75,144	79,681	247,784
<b>1995</b>	291,096	212,402	394,443	358,488	136,562	51,847	118,632	257,046
<b>1996</b>	306,209	200,111	446,849	293,124	136,043	45,025	142,324	265,326
<b>1997</b>	339,793	213,175	406,603	332,069	161,199	47,664	184,638	283,356
<b>1998</b>	341,568	207,256	509,057	348,269	170,468	58,186	200,759	305,846
<b>1999</b>	358,180	249,091	545,552	340,151	203,225	65,018	189,702	289,354
<b>2000</b>	385,853	258,786	588,268	397,265	209,287	55,019	178,128	320,384

**Table 14.2.16: Median household net worth by household type (\$)**

	Couple (cpl) only	Cpl with dep's 0-14 only	Cpl with dep's 15-24 only	Cpl with dep's 0-14 & 15-24 only	Lone person only	Lone parent with dep's 0-14 only	Lone parent with dep's 15-24 only	Other households
<b>1994</b>	173,416	126,631	210,220	168,178	91,232	6,352	30,387	152,059
<b>1995</b>	181,125	138,667	280,958	216,695	85,794	17,927	82,640	168,936
<b>1996</b>	189,265	131,135	336,638	212,665	84,673	10,430	96,137	162,763
<b>1997</b>	202,223	134,288	309,170	223,657	97,960	12,247	79,490	175,134
<b>1998</b>	203,814	131,760	339,352	223,537	90,317	15,609	125,853	190,923
<b>1999</b>	221,770	144,928	302,482	229,442	120,768	7,340	105,350	191,612
<b>2000</b>	243,912	153,477	392,106	277,439	111,014	16,449	100,174	202,146

**Table 14.2.17: Average household net worth for selected household types and ages (\$)**

	Cpl with dep's 0-14 only	Cpl with dep's 15-24 only	Cpl with dep's 0-14 & 15-24 only	Lone parent with dep's 0-14 only	Lone parent with dep's 15-24 only	Single young person	Single middle-aged person	Single older person
<b>1994</b>	186,762	360,259	279,010	75,144	79,681	42,824	193,505	177,048
<b>1995</b>	212,402	394,443	358,488	51,847	118,632	43,040	156,174	169,160
<b>1996</b>	200,111	446,849	293,124	45,025	142,324	43,796	144,361	187,746
<b>1997</b>	213,175	406,603	332,069	47,664	184,638	48,109	171,582	210,891
<b>1998</b>	207,256	509,057	348,269	58,186	200,759	49,110	173,455	233,764
<b>1999</b>	249,091	545,552	340,151	65,018	189,702	46,252	213,985	272,300
<b>2000</b>	258,786	588,268	397,265	55,019	178,128	61,717	196,658	297,798

**Table 14.2.18: Median household net worth for selected household types and ages (\$)**

	Cpl with dep's 0-14 only	Cpl with dep's 15-24 only	Cpl with dep's 0-14 & 15-24 only	Lone parent with dep's 0-14 only	Lone parent with dep's 15-24 only	Single young person	Single middle-aged person	Single older person
<b>1994</b>	126,631	210,220	168,178	6,352	30,387	7,343	91,493	126,801
<b>1995</b>	138,667	280,958	216,695	17,927	82,640	14,582	95,450	117,772
<b>1996</b>	131,135	336,638	212,665	10,430	96,137	13,155	89,112	130,425
<b>1997</b>	134,288	309,170	223,657	12,247	79,490	16,036	104,867	136,639
<b>1998</b>	131,760	339,352	223,537	15,609	125,853	15,894	102,467	131,783
<b>1999</b>	144,928	302,482	229,442	7,340	105,350	17,649	134,107	161,720
<b>2000</b>	153,477	392,106	277,439	16,449	100,174	24,444	112,499	153,434

**Table 14.2.19: Average gross annual household income for selected household types and ages (\$)**

	Cpl with dep's 0-14 only	Cpl with dep's 15-24 only	Cpl with dep's 0-14 & 15-24 only	Lone parent with dep's 0-14 only	Lone parent with dep's 15-24 only	Single young person	Single middle-aged person	Single older person
<b>1994</b>	43,104	55,590	51,551	19,949	23,752	24,823	22,272	11,112
<b>1995</b>	47,932	60,991	56,868	15,877	23,140	24,089	24,245	9,953
<b>1996</b>	51,490	59,157	54,247	19,378	27,360	26,125	24,306	10,827
<b>1997</b>	50,821	65,639	60,448	19,351	25,972	28,559	26,197	12,773
<b>1998</b>	55,486	74,864	60,250	22,208	29,627	27,935	29,472	13,051
<b>1999</b>	55,603	71,470	63,748	23,393	32,039	30,450	29,356	13,530
<b>2000</b>	59,246	83,940	75,540	21,205	37,328	31,439	28,346	15,049

Source: Tabulation of income data from the HES and SIHC.

**Table 14.2.20: Median gross annual household income for selected household types and ages (\$)**

	Cpl with dep's 0-14 only	Cpl with dep's 15-24 only	Cpl with dep's 0-14 & 15-24 only	Lone parent with dep's 0-14 only	Lone parent with dep's 15-24 only	Single young person	Single middle-aged person	Single older person
<b>1994</b>	38,219	50,472	47,343	16,737	22,942	22,889	16,737	9,281
<b>1995</b>	43,466	56,005	49,750	14,008	23,031	23,497	20,000	8,666
<b>1996</b>	44,620	57,409	50,520	15,080	28,080	24,440	21,020	9,290
<b>1997</b>	45,160	62,780	52,690	15,530	21,785	26,026	23,000	9,640
<b>1998</b>	47,706	64,387	52,355	17,329	27,605	27,231	24,002	9,614
<b>1999</b>	49,196	65,540	56,311	18,770	26,307	29,968	22,868	10,546
<b>2000</b>	51,886	71,869	63,648	18,660	35,650	29,500	26,041	10,200

Source: Tabulation of income data from the HES and SIHC.

**Table 14.2.21: Average household net worth by state/territory (a) (\$)**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
<b>1994</b>	229,585	243,012	221,772	183,704	180,963	183,711	174,731	272,628
<b>1995</b>	261,734	215,998	207,132	181,898	209,770	209,862	217,434	247,500
<b>1996</b>	260,575	213,167	208,128	207,375	223,828	186,196	207,565	263,385
<b>1997</b>	303,620	219,808	232,529	205,949	212,242	204,502	215,394	264,824
<b>1998</b>	309,398	246,052	227,132	198,095	242,158	228,387	183,940	294,117
<b>1999</b>	331,583	275,405	233,609	213,576	240,913	247,346	196,135	296,774
<b>2000</b>	345,441	304,601	254,235	237,538	250,186	227,717	243,037	308,965

**Table 14.2.22: Median household net worth by state/territory (a) (\$)**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
<b>1994</b>	155,334	131,557	129,913	114,870	106,060	107,753	92,478	127,326
<b>1995</b>	164,587	129,741	138,458	112,068	108,183	132,433	111,615	132,903
<b>1996</b>	166,527	125,023	130,591	122,351	119,863	134,771	102,752	114,783
<b>1997</b>	187,179	139,543	132,024	123,487	135,000	130,340	166,752	126,151
<b>1998</b>	184,584	147,358	128,743	113,371	122,901	136,501	111,846	127,930
<b>1999</b>	203,851	169,578	144,528	118,465	132,347	126,354	93,179	163,563
<b>2000</b>	210,820	181,927	130,766	129,769	135,788	150,081	126,042	181,390

**Table 14.2.23: Average owner-occupied dwelling values by state/territory (a) (\$)**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
<b>1994</b>	135,886	101,590	100,748	90,627	91,807	89,297	66,933	106,762
<b>1995</b>	145,727	99,514	102,911	89,024	102,242	91,543	75,639	107,908
<b>1996</b>	146,377	93,528	98,874	88,934	101,332	92,479	82,233	102,040
<b>1997</b>	162,583	97,788	102,498	92,968	111,055	96,943	90,277	99,747
<b>1998</b>	170,569	114,403	103,721	90,310	111,803	99,198	86,738	98,888
<b>1999</b>	189,477	122,811	107,959	89,121	112,425	104,192	97,703	103,451
<b>2000</b>	207,051	139,115	110,294	100,673	122,935	107,776	100,850	126,200

(a) Estimates for smaller states/territories (particularly the Northern Territory), are based on small sample sizes, particularly where estimates have been based on SIHC data. These estimates are therefore prone to higher sampling errors than other estimates, and should be used with caution.



**Table 14.2.24: Median owner-occupied dwelling values by state/territory (a)(\$)**

	NSW	Vic.	Qld	SA	WA	Tas.	NT (b)	ACT
<b>1994</b>	126,960	97,343	101,113	88,642	84,087	80,219	89,044	124,850
<b>1995</b>	132,180	94,719	103,483	90,159	93,608	91,597	0	121,404
<b>1996</b>	125,234	92,666	96,030	86,117	88,533	89,696	0	110,673
<b>1997</b>	142,000	91,016	104,562	95,182	102,219	95,520	0	104,747
<b>1998</b>	141,168	107,723	98,220	86,691	94,690	98,284	0	111,920
<b>1999</b>	157,927	111,558	102,736	81,655	102,595	104,848	45,884	107,951
<b>2000</b>	159,498	121,776	101,239	98,169	104,493	107,886	102,850	123,279

**Table 14.2.25: Average gross annual household income by state/territory (a) (\$)**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
<b>1994</b>	39,308	37,095	36,674	35,483	35,468	32,335	44,433	54,080
<b>1995</b>	41,519	39,901	36,513	34,927	38,784	33,771	45,968	49,567
<b>1996</b>	43,262	40,632	38,048	37,704	43,112	34,520	50,077	50,475
<b>1997</b>	45,524	43,671	41,755	37,229	43,559	36,232	54,928	54,216
<b>1998</b>	47,922	45,755	43,717	37,004	44,651	36,891	50,599	53,394
<b>1999</b>	47,525	48,247	40,400	40,036	45,619	39,094	57,730	58,883
<b>2000</b>	51,250	51,595	45,246	42,715	49,387	37,904	63,174	58,697

Source : Tabulation of income data from the HES and SIHC.

**Table 14.2.26: Median gross annual household income by state/territory (a) (\$)**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
<b>1994</b>	32,066	29,824	30,658	26,748	29,511	25,236	38,949	44,632
<b>1995</b>	32,812	32,290	31,412	29,202	33,619	28,267	40,003	44,966
<b>1996</b>	34,301	33,848	32,363	30,736	35,570	29,278	48,976	49,872
<b>1997</b>	37,000	35,880	35,040	30,110	36,080	29,935	46,010	44,864
<b>1998</b>	38,000	36,504	34,370	29,733	38,000	30,300	46,800	47,000
<b>1999</b>	38,766	39,124	33,677	31,858	36,933	28,331	51,073	52,126
<b>2000</b>	41,000	41,248	36,600	35,000	42,000	32,645	57,102	49,000

Source: Tabulation of income data from the HES and SIHC.

(a) Estimates for smaller states/territories (particularly the Northern Territory), are based on small sample sizes, particularly where estimates have been based on SIHC data. These estimates are therefore prone to higher sampling errors than other estimates, and should be used with caution.

(b) A median dwelling value of zero indicates that (at least) half of the sample for a particular cell did not own their own home.

**Table 14.2.27: Average household net worth by wealth decile (\$)**

	Lowest	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
<b>1994</b>	-22,870	5,537	25,080	72,756	115,424	151,774	192,125	248,502	353,373	1,076,995
<b>1995</b>	838	21,930	46,600	85,366	121,204	157,432	201,955	268,556	393,828	967,073
<b>1996</b>	-3,306	17,718	39,977	77,937	117,140	158,961	208,738	279,410	413,904	977,425
<b>1997</b>	-5,238	20,998	45,205	84,782	126,139	171,501	224,905	299,835	443,613	1,076,738
<b>1998</b>	-6,489	18,814	46,064	83,244	124,804	170,321	229,086	317,932	473,613	1,134,716
<b>1999</b>	-27,454	10,338	43,251	94,881	140,737	189,841	253,518	347,136	505,189	1,208,903
<b>2000</b>	-5,423	23,782	54,653	97,980	144,225	198,144	265,127	361,075	530,543	1,284,126

**Table 14.2.28: Median household net worth by wealth decile (\$)**

	Lowest	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
<b>1994</b>	-2,808	5,032	23,145	73,116	115,932	151,623	191,501	247,525	347,190	683,808
<b>1995</b>	6,574	21,837	45,837	86,340	120,674	156,793	200,978	265,305	387,254	748,202
<b>1996</b>	4,055	16,936	38,895	77,398	116,346	158,158	207,281	277,111	408,546	783,434
<b>1997</b>	5,115	20,529	43,561	83,259	125,946	171,487	224,349	297,262	433,385	828,347
<b>1998</b>	4,225	18,266	45,303	83,029	124,880	169,442	228,135	314,591	463,581	873,818
<b>1999</b>	-8,917	9,494	41,536	95,165	141,166	189,207	252,488	344,062	496,319	924,889
<b>2000</b>	5,640	23,240	53,378	97,262	143,802	197,008	263,883	355,282	518,893	982,449

**Table 14.2.29: Benchmarked and unbenchmarked average net worth by the age of the household reference person, 2000 (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
<b>Unbenchmarked</b>	58,174	144,850	244,452	361,879	396,522	377,140	344,783
<b>Benchmarked</b>	52,620	128,823	237,077	382,824	435,402	403,855	372,894

**Table 14.2.30: Benchmarked and unbenchmarked median net worth by the age of the household reference person, 2000 (\$)**

	15-24	25-34	35-44	45-54	55-64	65-75	75+
<b>Unbenchmarked</b>	14,269	74,932	168,585	255,642	282,579	227,449	186,270
<b>Benchmarked</b>	11,143	51,677	155,079	264,965	299,050	226,984	186,650

### 14.3 Quality indicators — quality of household balance sheet items

The table below provides a summary of the quality of the elements of the household balance sheet. This information was prepared by the ABS' National Accounts Branch. The descriptions below focus on the proximity of an estimate to its notional true value, and do not attempt to address all dimensions of quality such as the extent of revisions to series, timeliness, relevance, accessibility and comparability.

There are four descriptions of quality; good, fair, poor and experimental.

These quality measures should be used with caution, as sampling variability and other factors may affect the quality of particular estimates at a given point in time.

Component	Data construction/sources	Quality
Dwellings	A perpetual inventory model based on: <ul style="list-style-type: none"> <li>•Building Activity, Australia, cat. no. 8752.0</li> <li>•Building Approvals, Australia, cat. no. 8731.0</li> <li>•Household Expenditure Survey (HES)</li> </ul>	Fair
Other buildings and structures	A perpetual inventory model based on data from: <ul style="list-style-type: none"> <li>•Building Activity, Australia, cat. no. 8752.0,</li> <li>•Engineering Construction Activity, Australia, cat. no. 8762.0,</li> <li>•Agriculture Industries, Financial Statistics, Australia, Preliminary, cat. no. 7506.0,</li> <li>•Private New Capital Expenditure and Expected Expenditure, Australia, cat. no. 5625.0, and</li> <li>•the Agricultural Finance Survey (AFS)</li> </ul>	Fair
Machinery and equipment	A perpetual inventory model based on expenditure data from: <ul style="list-style-type: none"> <li>•the Survey of Private New Capital Expenditure (SPNCE), and</li> <li>•the Economic Activity Survey</li> </ul>	Fair
Livestock — fixed assets	Agriculture, Australia, cat. no. 7113.0. Livestock Products, Australia, cat. no. 7215.0	Good
Computer software	Information Technology, Australia, cat. no. 8126.0	Poor
Entertainment, literary or artistic originals	The Australian Record Industry Association Prices Surveillance Authority, Balance of Payments and International Investment Position, Australia, cat. no. 5302.0, Book Publishers, Australia, cat. no. 1363.0, the Australian Book Publishers Association, Information Technology, Australia, cat. no. 8126.0, and the Australian Film Finance Corporation.	Poor
Consumer durables — motor vehicles	A perpetual inventory model based on household final consumption expenditure.	Poor
Consumer durables — appliances and other household durables	A perpetual inventory model based on household final consumption expenditure.	Poor
Private non-farm inventories	Inventories and Sales, Selected Industries, Australia, cat. no. 5629.0	Fair
Farm inventories	Model-based estimate using ABARE data.	Fair
Livestock — inventories	Livestock Products, Australia, cat. no. 7215.0	Fair
Plantation standing timber	Australian Bureau of Agricultural and Resource Economics (ABARE) data	Experimental

## Quality of household balance sheet items - continued

Component	Data construction/sources	Quality
Land	Data are sourced from the State and Territory Government Valuers General	Good
Native standing timber	Australian Bureau of Agricultural and Resource Economics	Experimental
Currency	Estimates based on the issuance from the RBA (holding of notes) and Commonwealth Government (holding of coins).	Fair
Deposits	Institutional counterparty sources from the Survey of Financial Information and APRA compliance data.	Good
Loans and placements (receivable)	Institutional counterparty sources from Survey of Financial Information.	Good
Securities other than shares	Estimates based on the Survey of Institution's Issuances less counterparty holdings data from Survey of Financial Information, APRA Survey of Superannuation and APRA compliance data.	Fair
Listed shares	Residual listed shares sourced from ASX less surveyed institutional holdings from Survey of Financial Information, APRA Survey of Superannuation and APRA compliance data.	Fair
Unlisted shares and other equity	Unlisted shares from various sources (financial press etc.).	Poor
Insurance technical reserves — life insurance	Estimates based on surveyed balance sheet data for life insurance from the Survey of Financial Information and APRA Survey of Superannuation. See Australian National Accounts : Financial Accounts, cat. no. 5232.0.	Poor
Insurance technical reserves — other insurance	Data from APRA compliance forms and the Survey of Financial Information.	Fair
Superannuation — pension fund technical reserves	Estimates based on surveyed balance sheet data for superannuation funds from the Survey of Financial Information and APRA Survey of Superannuation.	Poor
Unfunded superannuation claims	Data from the Department of Finance (for Commonwealth Government) and the respective State and Local governments (obtained via the ABS' Public Finance Section).	Fair
Other accounts receivable	Residual estimates based on data from the Survey of Financial Information, APRA Survey of Superannuation and APRA compliance data.	Poor
Loans and placements —	Institutional counterparty sources from Survey of Financial Information and APRA compliance data.	Good
Other accounts payable	Residual estimates based on data from the Survey of Financial Information, APRA Survey of Superannuation and APRA compliance data.	Poor

Source: Quality statements provided by National Accounts Branch, ABS.

## 14.4 Quality indicators — benchmarking ratios

	Benchmarking ratios						
	1994	1995	1996	1997	1998	1999	2000
<b>ASSETS</b>							
Dwellings	0.84	0.86	1.00	0.87	0.94	0.98	0.91
Other buildings and structures	1.21	1.27	1.19	0.92	0.95	0.98	1.16
Machinery and equipment	1.00	1.03	1.02	0.97	0.93	1.08	0.89
Livestock — fixed assets	0.99	1.00	1.00	1.00	1.00	0.99	1.00
Computer software	1.00	1.13	1.05	1.05	1.00	1.06	0.96
Entertainment, literary or artistic originals	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Consumer durables — motor vehicles	0.39	0.39	0.36	0.35	0.35	0.35	0.34
Consumer durables — appliances and other household durables	0.98	0.99	0.99	0.99	0.98	0.94	1.00
Private non-farm inventories	1.00	1.15	0.98	1.03	1.01	1.07	1.16
Farm inventories	0.97	1.00	1.00	1.00	1.00	0.99	1.00
Livestock — inventories	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Plantation standing timber	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Land — farmland	1.00	1.00	0.99	1.00	1.00	0.99	1.00
Native standing timber	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Deposits and loans and placements (receivable)	0.95	1.44	1.59	1.21	1.15	1.31	1.22
Currency	0.98	0.98	0.99	0.99	0.99	0.98	0.99
Securities other than shares	1.81	2.29	2.33	1.72	1.94	1.69	2.41
Shares and other equity	1.88	1.55	1.39	1.11	1.42	1.52	1.06
Insurance technical reserves — life insurance	1.00	1.01	1.01	1.00	1.00	1.02	0.99
Insurance technical reserves — other insurance	0.99	1.00	0.99	1.00	0.98	0.94	1.00
Superannuation — pension fund technical reserves and unfunded superannuation claims	1.18	1.37	1.29	1.47	1.46	1.40	1.72
Other accounts receivable	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<b>LIABILITIES</b>							
Securities other than shares	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Loans and placements — dwelling loans	1.39	1.14	1.25	1.32	1.26	1.15	1.36
Loans and placements — consumer and other household loans	1.58	1.94	1.94	1.71	2.13	2.61	1.61
Loans and placements — credit card debt	1.39	1.64	1.75	1.83	2.04	1.89	2.75
Loans and placements — HECS debt	1.25	1.58	2.10	2.18	2.46	1.87	2.21
Loans and placements — business loans	0.72	0.74	0.74	0.65	0.83	0.76	0.84
Other accounts payable	-	1.00	1.00	1.00	1.00	1.00	1.00

Source: Derived as discussed in Section 3.5.

Note: Benchmarking ratios greater than one indicate that survey estimates were lower than ASNA aggregates, and have been increased in the benchmarking phase. Benchmarking ratios less than one indicate the survey based estimates were scaled down to equal ASNA aggregates.

Ratios can be artificially close to one (suggesting direct correspondence between survey-based and ASNA estimates, depending on the estimation methods used. Any component where the total ASNA figure has been distributed across households in direct proportion to income will have a benchmarking ratio very close to one.

## 14.5 The Household balance sheet, as at 30 June

	1994	1995	1996	1997	1998	1999	2000
	\$b	\$b	\$b	\$b	\$b	\$b	\$b
<b>TOTAL ASSETS</b>	1652.1	1744.3	1825.8	2005.2	2149.6	2342.5	2557.0
<b>Non-financial assets (a) (b)</b>	986.4	1038.0	1067.3	1135.8	1210.7	1303.1	1409.5
Dwellings	396.4	419.9	436.1	449.7	471.0	506.8	551.8
Other buildings and structures	37.2	39.1	41.2	43.3	45.8	48.7	51.4
Machinery and equipment	72.1	74.2	72.2	71.2	72.5	73.6	74.7
Livestock — fixed assets	10.1	10.9	8.8	9.0	11.1	11.5	12.0
Computer software	1.5	1.6	1.6	1.8	2.0	2.4	2.9
Entertainment, literary or artistic originals	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Private non-farm inventories	6.6	7.0	6.9	7.0	7.1	7.5	8.2
Farm inventories	5.2	5.8	6.1	6.2	6.3	6.0	6.1
Livestock — inventories	2.7	2.6	2.3	2.2	2.3	2.7	3.1
Plantation standing timber	1.4	1.4	1.5	1.5	1.6	1.7	1.7
Land	452.9	475.2	490.3	543.4	590.6	641.8	697.2
Native standing timber (c)	0.3	0.3	0.3	0.4	0.3	0.3	0.3
<b>Financial assets (d)</b>	665.7	706.2	758.5	869.5	939.0	1039.4	1147.5
Deposits	173.6	178.2	191.7	206.6	220.2	229.4	237.7
Currency	8.9	9.3	9.6	9.9	10.5	10.4	11.1
Securities other than shares	17.9	20.7	21.4	22.1	22.5	20.1	21.0
Loans and placements	7.5	6.0	7.0	8.8	9.8	11.0	11.2
Shares and other equity	111.0	100.1	97.9	134.3	152.7	195.5	213.8
Insurance technical reserves — life insurance	43.6	61.9	63.0	64.3	60.3	66.4	60.5
Insurance technical reserves — other insurance	13.6	16.2	19.3	21.6	24.0	24.8	27.1
Insurance technical reserves — pension funds	181.0	186.8	218.0	266.7	311.9	353.3	441.2
Unfunded superannuation claims insurance	101.1	108.8	115.6	117.0	118.5	112.1	104.3
Other accounts receivable	7.4	18.0	15.0	18.2	8.7	16.3	19.6
<b>TOTAL LIABILITIES (d)</b>	232.9	266.9	298.9	329.5	377.5	415.6	481.6
Securities other than shares	3.8	3.8	2.9	2.3	2.5	2.9	2.9
Loans and placements (e)	229.1	256.9	288.6	318.6	359.6	403.2	467.9
Other accounts payable	n.a.	6.2	7.3	8.6	15.4	9.5	10.8
<b>NET WORTH</b>	1419.2	1477.4	1526.9	1675.7	1772.1	1926.9	2075.4

na not available

(a) Source: Reproduced from *Australian System of National Accounts, 2000–01*, (cat. no. 5204.0)

(b) Note that consumer durables are not published as part of the household balance sheet. — they appear as a memorandum item in the National Balance Sheet.

(c) Experimental, see *Australian National Accounts, National Balance Sheet 1999–2000* (cat. no. 5241.040.001) Explanatory Notes, paragraph 25.

(d) Source: *Australian National Accounts: Financial Accounts, March 2002* (cat. no. 5232.0). Series break at 30 June 1995. See the information paper titled *Upgraded Australian National Accounts: Financial Accounts 1998* (cat. no. 5254.0).

(e) Splits of the household balance sheet 'Loans and placements' item were derived for the compilation of the estimates in this paper.

## 14.6 Adjustments for nonprofit institutions serving households — an approximate NPISH balance sheet, as at 30 June

	1994 \$b	1995 \$b	1996 \$b	1997 \$b	1998 \$b	1999 \$b	2000 \$b
<b>TOTAL ASSETS</b>	<b>30.0</b>	<b>31.5</b>	<b>36.0</b>	<b>42.5</b>	<b>36.9</b>	<b>42.8</b>	<b>39.9</b>
<b>Non-financial assets (a)</b>	<b>19.5</b>	<b>20.6</b>	<b>23.9</b>	<b>26.6</b>	<b>19.8</b>	<b>23.4</b>	<b>21.0</b>
Dwellings	0.8	0.9	1.1	1.1	0.8	1.0	0.9
Other buildings and structures	7.6	8.1	9.5	10.3	7.5	8.9	8.0
Machinery and equipment	1.4	1.5	1.6	1.6	1.2	1.3	1.1
Livestock — fixed assets	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Computer software	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Entertainment, literary or artistic originals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private non-farm inventories	0.2	0.2	0.3	0.3	0.2	0.2	0.3
Farm inventories	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Livestock — inventories	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Plantation standing timber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land (b)	8.9	9.3	10.9	12.6	9.6	11.4	10.3
Native standing timber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Financial assets</b>	<b>10.4</b>	<b>11.0</b>	<b>12.1</b>	<b>16.0</b>	<b>17.2</b>	<b>19.4</b>	<b>18.9</b>
Deposits	6.8	7.1	7.8	10.3	13.0	13.9	13.5
Currency	0.3	0.4	0.4	0.5	0.5	0.5	0.5
Securities other than shares	0.4	0.4	0.5	0.5	0.4	0.4	0.3
Loans and placements	0.3	0.2	0.3	0.4	0.3	0.3	0.4
Shares and other equity	2.2	2.0	2.2	3.1	2.5	3.5	3.1
Insurance technical reserves — life insurance (c)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Insurance technical reserves — other insurance	0.2	0.3	0.4	0.5	0.4	0.4	0.4
Insurance technical reserves — pension funds (c)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unfunded superannuation claims	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other accounts receivable	0.3	0.6	0.6	0.7	0.2	0.5	0.6
<b>LIABILITIES</b>	<b>1.3</b>	<b>1.7</b>	<b>2.2</b>	<b>2.9</b>	<b>2.4</b>	<b>2.8</b>	<b>2.7</b>
Securities other than shares	0.1	0.1	0.1	0.0	0.0	0.1	0.0
Loans and placements	1.3	1.5	2.0	2.7	2.1	2.5	2.4
Other accounts payable (d)	0.0	0.1	0.1	0.2	0.3	0.2	0.2
<b>NET WORTH</b>	<b>28.6</b>	<b>29.9</b>	<b>33.7</b>	<b>39.6</b>	<b>34.5</b>	<b>40.1</b>	<b>37.3</b>

Source: Derived using methods discussed in Section 3.4.

(a) Consumer durables were not allocated to NPISHs. The machinery and equipment acquired and consumed by NPISHs is shown under the machinery and equipment item.

(b) The land figure in this balance sheet includes all NPISH land, (i.e. the land on which dwellings and other buildings and structures are built, and farm land.

(c) Life insurance technical reserves and superannuation assets were not allocated to NPISHs, as these assets only accrue to households.

(d) NPISH other accounts payable were estimated as proportions of the household balance sheet accounts receivable item. They do not include accounts payable between NPISHs, households and unincorporated enterprises, as these are intra-sectoral transactions which do not appear in the household balance sheet, and therefore are not calculated for the NPISH adjustment.

## 14.7 Adjustments for people in non-private dwellings — an approximate NPD balance sheet, as at 30 June

	1994 \$m	1995 \$m	1996 \$m	1997 \$m	1998 \$m	1999 \$m	2000 \$m
<b>TOTAL ASSETS</b>	<b>7111.64</b>	<b>9567.69</b>	<b>9436.42</b>	<b>8061.75</b>	<b>9142.28</b>	<b>9652.1</b>	<b>9313.63</b>
<b>Non-financial assets</b>	<b>2339.08</b>	<b>2551.04</b>	<b>2790.72</b>	<b>1867.23</b>	<b>1902.45</b>	<b>3387.61</b>	<b>2055.12</b>
Dwellings (a)	191.98	144.49	661.57	154.74	145.78	909.88	117.63
Other buildings and structures	132.66	622.03	149.99	63.65	92.34	239.27	119.23
Machinery and equipment	214.34	121.96	192.44	96.25	81.39	179.6	34.7
Livestock — fixed assets	67.11	11.26	39.73	4.71	3.85	86.53	5.91
Computer software	4.45	1.51	2.71	2.37	2.03	3.06	0.76
Entertainment, literary or artistic originals	0.02	0.08	0.01	0	0	0	0.17
Consumer durables — motor vehicles	360.21	318.3	315.38	293.84	315.02	362.11	404.78
Consumer durables — appliances and other household durables	1287.70	1278.39	1259.64	1200.39	1223.55	1439.65	1339.26
Private non-farm inventories	18.93	26	11.22	12.6	9.33	15.18	5.02
Farm inventories	15.05	3.79	17.73	5.69	1.62	35.1	3.98
Livestock — inventories	11.88	2.11	8.72	1.22	0.72	20.82	1.4
Plantation standing timber	18.21	17.41	16.82	16.86	18.43	18.44	18.7
Land (b)	16.54	3.71	114.76	14.91	8.39	77.97	3.67
Native standing timber	0	0	0	0	0	0	0
<b>Financial assets</b>	<b>4772.56</b>	<b>7016.65</b>	<b>6645.7</b>	<b>6194.52</b>	<b>7239.83</b>	<b>6264.49</b>	<b>7258.51</b>
Deposits (c)	2914.47	2586.04	3865.03	2523.40	3080.93	2673.87	2830.43
Currency	122.88	120.34	118.65	116.63	123.18	124.28	127.12
Securities other than shares	82.95	477.24	161.34	346.48	233.07	232.64	192.41
Shares and other equity	86.14	1,992.39	309	879.93	1,042.78	764.98	1,089.41
Insurance technical reserves — life insurance	90.83	369.17	364.96	340.3	333.91	75.32	263.95
Insurance technical reserves — other insurance	183.13	231.28	266.37	281.84	316.4	331.09	342.27
Superannuation (d)	1270.51	1208.80	1523.97	1680.63	2098.43	2025.46	2400.73
Other accounts receivable	21.65	31.39	36.38	25.31	11.13	36.85	12.19
<b>LIABILITIES</b>	<b>606.82</b>	<b>288.14</b>	<b>420.58</b>	<b>402.1</b>	<b>385.27</b>	<b>1251.97</b>	<b>476.21</b>
Securities other than shares	12.01	10.2	6.79	3.39	3.18	15.99	9.96
Loans and placements — dwelling loans (a)	0	0	0	0	0	0	0
Loans and placements — consumer and other household loans	128.8	65.48	175.02	76.23	126.57	520.21	56.91
Loans and placements — credit card debt	357.55	108.03	117.87	242.1	165.56	387.99	195.19
Loans and placements — business loans	108.46	93.42	102.86	68.08	69.94	306.01	207.61
Other accounts payable	0	11.01	18.04	12.3	20.02	21.77	6.81
<b>NET WORTH</b>	<b>6504.82</b>	<b>9279.55</b>	<b>9015.84</b>	<b>7659.65</b>	<b>8757.01</b>	<b>8400.13</b>	<b>8837.42</b>

Source: Derived using methods discussed in Section 3.4.

(a) Owner occupied dwellings were not allocated to people in NPDs. The dwellings and loans and placements — dwellings items in this balance sheet therefore only refer to rental properties.

(b) The land figure in this spreadsheet relates only to farmland. The land associated with dwellings and other buildings and structures is included in those items.

(c) Includes loans and placements receivable.

(d) Includes pension fund technical reserves and unfunded superannuation claims.



## 14.8 The household balance sheet — after adjustments, as at 30 June

	1994 \$b	1995 \$b	1996 \$b	1997 \$b	1998 \$b	1999 \$b	2000 \$b
<b>TOTAL ASSETS</b>	1713.51	1804.68	1884.68	2062.35	2216.18	2407.57	2629.81
<b>Non-financial assets</b>	1063.02	1116.45	1144.93	1215.00	1301.69	1393.90	1508.48
Dwellings	395.45	418.92	434.65	448.49	470.09	505.39	550.85
Other buildings and structures	29.47	30.60	31.58	33.00	38.22	39.65	43.35
Machinery and equipment	70.47	72.62	70.41	69.46	71.24	72.11	73.57
Livestock — fixed assets	9.84	10.68	8.56	8.79	10.92	11.21	11.82
Computer software	1.47	1.57	1.56	1.76	1.97	2.35	2.86
Entertainment, literary or artistic originals	0.04	0.05	0.04	0.05	0.06	0.08	0.08
Consumer durables — motor vehicles	31.56	33.02	34.14	35.90	39.23	42.44	43.93
Consumer durables — appliances and other household durables	65.25	66.90	68.57	70.27	71.91	73.37	76.43
Private non-farm inventories	6.35	6.74	6.63	6.70	6.91	7.27	7.92
Farm inventories	5.00	5.60	5.86	5.94	6.14	5.80	5.90
Livestock — inventories	2.59	2.51	2.21	2.11	2.24	2.60	3.00
Plantation standing timber	1.35	1.36	1.45	1.45	1.56	1.65	1.66
Land (a)	443.87	465.60	478.98	530.70	580.92	629.69	686.84
Native standing timber	0.29	0.29	0.29	0.39	0.30	0.29	0.30
<b>Financial assets</b>	650.49	688.22	739.75	847.35	914.50	1013.67	1121.33
Deposits	163.90	168.52	180.00	193.74	204.08	212.89	221.39
Currency	8.44	8.80	9.08	9.35	9.85	9.78	10.45
Securities other than shares	17.47	19.82	20.77	21.23	21.91	19.54	20.53
Loans and placements	7.24	5.85	6.73	8.44	9.52	10.68	10.85
Shares and other equity	108.74	96.17	95.41	130.33	149.19	191.26	209.53
Insurance technical reserves — life insurance	43.55	61.57	62.60	63.97	59.93	66.33	60.25
Insurance technical reserves — other insurance	13.21	15.68	18.67	20.85	23.28	24.04	26.33
Insurance technical reserves — pension funds	181.00	186.80	218.00	266.70	311.90	353.30	441.20
Unfunded superannuation claims insurance	99.83	107.64	114.04	115.35	116.42	110.08	101.87
Other accounts receivable	7.12	17.37	14.45	17.39	8.42	15.77	18.93
<b>TOTAL LIABILITIES</b>	230.97	264.92	296.22	326.20	374.72	411.58	478.45
Securities other than shares	3.72	3.71	2.87	2.24	2.42	2.84	2.87
Loans and placements — dwelling loans	152.47	175.43	195.62	217.22	242.37	273.68	318.24
Loans and placements — consumer and other household loans	33.43	35.19	36.70	41.13	46.80	54.22	63.74
Loans and placements — credit card debt	5.16	5.76	6.89	7.90	9.72	11.89	15.41
Loans and placements — HECS debt	2.60	3.10	3.55	4.25	5.09	5.36	6.22
Loans and placements — business loans	33.59	35.63	43.42	45.00	53.18	54.27	61.39
Other accounts payable	0.00	6.09	7.17	8.46	15.13	9.32	10.58
<b>NET WORTH</b>	1482.54	1539.75	1588.46	1736.15	1841.47	1995.99	2151.36

Source: Derived using methods discussed in Section 3.4 — i.e. by subtracting estimates of the assets and liabilities of NPISHs and people usually resident in NPDs (shown in Appendices 14.6 and 14.7 respectively) from household balance sheet aggregates (shown in Appendix 14.5) to which consumer durables data and additional disaggregations for loans have been added.

(a) The land figure in this balance sheet includes all land, (i.e. the land upon which dwellings and other buildings and structures are based, and farm land.

## 14.9 Survey of Income and Housing Costs — survey design and questions

### Survey design

The following material is reproduced from *Income Distribution Australia, 1997–98*, (cat. no. 6523.0).

#### *Sample design*

The sample for the income survey is a sub-sample of private dwellings included in the ABS Monthly Population Survey (MPS). The MPS is a multistage sample of private dwellings and a list sample of other dwellings. The sample is suitable for producing reliable estimates at the Australian level for income of residents in private dwellings, classified by different population groups based on income unit composition (such as couples with children), levels and sources of income. Estimates at the state and territory level for broad aggregates are generally reliable although some estimates for Tasmania, the Northern Territory and the Australian Capital Territory should be used with caution.

Each month a sample of approximately 650 dwellings is selected for the income survey from the responding households in the MPS. Over the year, this results in approximately 15,500 persons over the age of 15 being included in the sample and of these, about 85% respond.

#### *Partial response and imputation*

Partial response occurs when:

- some items of data in a schedule are missing because a person is unable or unwilling to provide the data
- for a household, not every person over 15 residing in the household responds but at least half of these persons provide data.

In the first case above, the data provided are retained and the missing data imputed by replacing each missing value with a donor value, that is, a value reported by another person who is known as the donor. For the second type of partial response the data for the persons who did respond are retained and all the data for each missing person are provided by reusing the data of a fully responding person (donor).

Imputation using donor records is also applied as an extra non-response adjustment for fully non-responding one person households. Information about the household composition is obtained from the MPS. Donors are selected by matching information on sex, age and labour force characteristics of the person with missing information. As far as possible, the information they provide is an appropriate proxy for the information that is missing. Depending on which values are to be imputed, donors are chosen from the pool of individual records with complete information for the block of questions where the missing information occurs.

### *Final sample*

The sample on which estimates are based, or the final sample, is composed of persons for which all necessary information is available. The information may have been wholly provided at the interview (fully responding persons) or may have been completed through imputation for partially or non-responding persons. The final sample consists of 8,289 income units and includes information for 402 income units which have had all income information imputed for at least one of the persons in the income unit.

### *Weighting*

Estimates of numbers of persons and income units with particular characteristics are derived from the survey by a complex estimation procedure. This procedure ensures that the survey estimates conform to independently estimated distributions of population characteristics. These estimated population statistics (benchmarks) are specified at both the person and household level.

Expansion factors, or weights, are values by which information for the sample is multiplied to produce estimates for the whole population. From this survey, estimates are produced referring to persons, to income units and to households, and the weights are calculated so that each person in an income unit or household has the same weight and that weight is also used for the income unit and household.

The SIHC weights are calculated through an iterative procedure. Inputs to this procedure are initial person weights, which are equal to the inverse of the probability of selection for each person in the MPS. This probability is the same for all people in a household. The initial household weight, which is also required, is set to the weight of each person in the household. These weights are adjusted for the probability of selection in the Income Survey. Non-response is accounted for when calibrating to the benchmarks.

### *Benchmarking*

The final weight common to the household and the person is then calculated by calibrating to both person and household benchmarks. Person benchmarks are estimates of the number of people in each state and territory, by age and sex, the number of people in each state and territory by labour force status and the number of people in each state and territory living in the Capital City or the Balance of the state. Household benchmarks for household composition (based on the number of adults and children) are used for each of the states and territories except Northern Territory where a household count by the number of households in the Capital City and the Balance of the state is used.

The person and household benchmarks are based on estimates of numbers of persons and households in Australia. The benchmarks are adjusted to include persons and households residing in private dwellings only and therefore do not, and are not intended to, match estimates of the Australian resident population published in other ABS publications.

### *Estimation*

Estimates produced from the survey are usually in the form of averages (e.g. average weekly income of couples with dependent children), or counts (e.g. total number of income units which own their dwelling). For counts, the estimate is obtained by summing the weights of all income units in the required group (e.g. those owning their dwelling). Averages are obtained by adding the weighted income values, and then dividing by the estimated number of income units. For example, average weekly income of couples in which the age of the reference person is 65 and over is the weighted sum of the income of each couple in which the age of the reference person is 65 and over divided by the estimated number of couples in which the age of the reference person is 65 and over.

## **Survey of Income and Housing Costs — Questions used to collect the data used in this analysis**

### *Superannuation*

Q55: 'How much was the last payment you received from superannuation/annuity? What period did that cover?'

### *Total income*

Q64: 'Last financial year, what was your total income from all jobs before any tax was deducted?'

### *Business income*

Q69: 'In the last financial year, what was your total share of profit or loss from your non-limited liability business or farm before tax, but after deducting business expenses?'

### *Interest income*

Q 87: 'In the last financial year, did you receive interest income from any of these sources? Please exclude income already reported as business income.'

1. Interest from banks
2. Interest from any other financial institution
3. Interest from debentures
4. Interest from bonds
5. Interest from trusts (e.g. Property management, cash management and other trusts)
6. Interest from personal loans to persons not in the household
7. None of these

Q 88 'Including only your share of interest from joint accounts or investments, what was the total amount of interest you received from that/those source(s)?'

### *Dividend and royalty income*

Q 71: 'Including only your share, what was your total income from dividends from your (main) limited liability company?'

Q 80: 'Including only your share, what was your total income from dividends from (all) your other limited liability companies and trusts?'

Q 90: 'What was the amount of income you received in the form of dividends on shares, including only your share of income from any joint investments?'

1. Dividends on shares
2. Royalties

### *Income from renting residential properties*

Q93: 'What was your total income from renting residential properties in the last financial year, after expenses were deducted? Please exclude rent already included in business income.'

### *Income from renting non-residential properties*

Q95: 'What was your total income from renting non-residential properties in the last financial year, after expenses were deducted? Please exclude rent already included in business income.'

### *Value of the owner-occupied dwelling*

Q120: 'What would you estimate the sale price of this/the house to be if you sold it tomorrow?'

### *Liabilities — the owner-occupied dwelling*

Q126/131/135: 'What amount is still owing on (this/these) mortgage(s) or secured loan(s)?'

## **14.10 Household Expenditure Survey — survey design and questions**

### **Survey design**

The following material is reproduced from the 1998–99 Household Expenditure Survey Australia User Guide, (cat. no. 6527.0).

#### *Sample design*

The sample was designed to produce reliable estimates for households resident in private dwellings aggregated for Australia, for each state and for the capital cities in each state and territory.

### *Responding households*

Of the 8,908 selected dwellings after sample loss (i.e. units which have been selected in the sample but are out of scope in the survey), there were 2,015 which did not contribute to the values of HES expenditure or income. Such households included those who could not be contacted, had language problems, refused to participate, or were affected by death or illness of a household member. Also excluded were those in which the reference person or spouse did not respond to key questions in the survey such as income. Thus, there were 8,908 dwellings in the scope of the survey, of which 6,893 (77%) were included as part of the final estimates.

### *Imputation*

Of the households which provided most of the required HES information but were unable, or unwilling, to provide all of it, some were able to be retained in the sample and their missing values deduced or imputed. For some of these households, missing information could be deduced using additional information supplied on the questionnaire (such as prices for given quantities and types of bread and milk purchased from given types of outlets). In the remainder of cases, the missing information was imputed.

Imputation is the process of replacing missing values with substitute values during processing. Imputation was carried out at two levels:

- where a value was missing for a particular item, the missing value was replaced with a value which had been reported by another person or household with similar characteristics
- where questionnaires or diaries were missing for a person in the household (other than the reference person or spouse) the missing information was replaced with whole questionnaires or diaries of another individual from a household with similar composition and characteristics.

In either case, the record providing the missing information is known as the *donor* record. Donors were selected so that, as far as possible, the information they provided would be an appropriate proxy for the information that was missing.

Depending on which values were being imputed, donors were taken from the pool of complete households or individual records with complete information for the block of questions in which the missing information was located. To better match donors to recipient records, both sets of records were ordered according to characteristics (such as number of adults and children present) associated with the blocks of variables being imputed. Recipients with missing information were matched with donors who fell into the same classes as themselves. Edits were applied before and after imputation took place, to ensure that errors were not introduced through the addition of donor information.

### *Final sample*

The sample on which estimates were based, or the final HES sample, is composed of households for which all necessary information is available. The information may have been wholly provided at the interview or may have been completed through imputation for partially responding households. The 1998–99 HES final sample included approximately 600 households which had at least one imputed value. Over 40% of these households had only a single value missing.

### *Weighting*

Expansion factors, or weights, are values by which information for sample households is multiplied to produce estimates for the whole population. Initial weights, based on the sample design, are equal to the inverse of the probability of selection. Weights for each member of the household are the same as the weight for the household itself. In previous surveys, these initial weights have been adjusted to account for non-response. For the 1998–99 HES the demographic and geographic information available for non-respondents was analysed to determine whether a strong relationship existed between household non-response and its demographic and geographic characteristics. No strong relationship was detected so no adjustment to the initial weights to account for non-response was required.

### *Benchmarking*

To adjust for underenumeration and to align survey estimates with independent population estimates, the weights were calibrated against person and household benchmarks. Using an iterative procedure, the weights were adjusted so that person and household estimates conformed with external person and household benchmarks. The two person benchmarks which were used in 1998–99 were: state/territory population estimates by eight age categories; and labour force status estimates (from Labour Force Survey data) by capital city/balance of state or territory by sex by five age categories. The two household benchmarks were: nine categories of household composition by capital city/balance of state or territory; and state by capital city/balance of state or territory. See the Section on comparability between the 1998–99 HES and the 1993–94 HES in Chapter 5 for further details of benchmarks used. The household benchmarks were based on provisional estimates of numbers of households in Australia. The benchmarks were adjusted to include households and persons residing in private dwellings only and therefore do not, and are not intended to, match estimates of the total Australian resident population published in other ABS publications. The benchmarks do not include people living in sparsely settled areas in the Northern Territory.

### *Estimation*

Estimates produced from the survey are usually in the form of averages (e.g. average weekly household expenditure on clothing and footwear), or counts (e.g. total number of households who own their dwelling). For counts, the estimate is obtained by summing the weights of the responding households in the required group (e.g. those households owning their dwelling). Averages are obtained by adding the weighted household values, and then dividing by the estimated number of households. For example, average weekly expenditure on clothing and footwear by Victorian households is the weighted sum of the average weekly expenditure of each selected household in Victoria who reported such expenditure, divided by the estimated number of households in Victoria. Note that the denominator is the total number of households and not just the number of households which have reported expenditure on the particular item.

### *Sampling error*

The HES estimates are based on a sample of possible observations. Hence, they are subject to sampling variability and estimates may differ from the figures that would have been produced if information had been collected for all households.

A measure of sampling variability, and the extent to which an estimate may vary from the true figure, is the standard error (SE). The standard error measures the likely difference between an estimate based on a sample and a true estimate that would have been derived had all the population households been surveyed. There are two major factors which influence a standard error.

1. *Sample size* — The larger the sample size, the more accurate the estimate and the smaller the standard error. Thus one expects more accurate estimates at the Australia level than at state level due to the larger sample size involved.

2. *Variability of item values between households* — If the reported values for all households are similar, then the likely difference between the estimate based on a sample and the true figure is small and this is reflected by a small standard error. For example, the standard error for weekly expenditure on bread is very low relative to the estimated expenditure, because most households have reported expenditures of a similar value. Estimates of average expenditure on bread produced from the HES are therefore considered to be very reliable. Standard errors for the purchase of motor cycles are, however, quite high relative to average expenditure, reflecting the fact that despite the longer recall period, households reported highly variable values for expenditure on motor cycles (many reported no expenditure, while a small number reported high amounts). HES estimates of motor cycle expenditure are therefore less reliable and so are subject to higher relative standard error.

There are about 2 chances in 3 that a sample estimate will differ by less than one standard error from the figure that would have been obtained if all households had been surveyed, and about 19 chances in 20 that the difference will be less than two standard errors. The relative standard error (RSE) is the standard error expressed as a percentage of the estimate. Only estimates with relative standard errors of 25% or less are considered sufficiently reliable for most purposes. However, estimates with higher relative standard errors are included in some HES publications, because they are the best estimates available. In HES publications, estimates with an RSE of 25% to 50% are preceded by an asterisk (e.g. \*3.4) and those with an RSE of more than 50% are preceded by a double asterisk (e.g. \*\*6.1) to indicate that they should be used with caution.

## **Household Expenditure Survey — questions used to collect the data used in this analysis**

### *Superannuation*

Q3.8.1: 'Are you receiving regular payments from any of these sources?'

1. Superannuation
2. Workers' Compensation
3. Accident Compensation
4. Maintenance/Alimony
5. None of the above

Q3.8.2: 'How much was the last payment received?'

Q3.8.3: 'What period did it cover?'



*Business income*

Q3.2.3: 'During this period, what was your share of profit or loss from your business or farm before tax but after deducting business expenses?'

*Dividend, royalty and interest income*

Q3.6.3: 'During the last financial year did you receive interest from any of these sources?'

1. Interest from debentures
2. Interest from bonds
3. Interest from trusts
4. Interest from personal loans to persons not in this household
5. Interest from other investments

Q3.6.6: 'What was the total amount of income you received from these sources, including only your share of interest from any joint investments?'

Q3.6.7: 'During the last financial year, did you receive any income from these investments?'

1. Dividends from own limited company
2. Dividends from shares
3. Royalties

Q3.6.8: 'What was the amount of income you received in the form of (specify each source in Q3.6.7), including only your share of interest from joint investments?'

*Income from renting properties*

Q3.7.2: 'What was your share of total profit or loss from renting properties in the last financial year after expenses were deducted?'

*Value of own dwelling*

Q2.2.2.24: 'What would you estimate the sale price of this dwelling to be if you sold it tomorrow?'

*Liabilities — the owner-occupied dwelling and consumer and other household loans*

Q10.2.2: 'What was the purpose of this loan?'

1. To buy or build this property
2. To buy or build other property
3. For alterations and additions to this property
4. For alterations and additions to other property
5. To buy motor vehicles
6. For a holiday
7. For another purpose

Q10.2.1.1.4: 'How much was the closing balance?'

*Credit Card debt*

Q10.3.4: 'What was the total interest charge on that statement?'

*Motor vehicles*

Q7.2.7: 'What was the full purchase price before any trade-in excluding registration, insurance and transfer fees?'

Q7.2.14: 'Excluding trade-ins and any vehicles used solely for business purposes, in the last 12 months has anyone in this household sold any vehicles?'

Q7.2.18: 'How much did you sell the vehicle for?'

*Consumer durables*

Q2.4.1: 'Does anyone in this household pay for any of these types of insurance for this dwelling?'

1. Combined building and contents insurance
2. Building insurance
3. Contents insurance
4. Personal belongings insurance

Q2.4.2: 'How much was the last payment?'

Q2.4.3: 'What period did it cover?'

## 14.11 Glossary

*Asset*: Any entity over which ownership rights can be enforced, either individually or collectively, and from which economic benefits can be derived by their owners from holding/using them over a period of time.

*ACS*: Agriculture Commodity Survey

*AFS*: Agriculture Finance Survey

*ASNA*: Australian System of National Accounts

*BLS*: Business Longitudinal Survey (also known as the Business Growth and Performance Survey, or GAPS).

*Consumer durables*: Durable goods (floor coverings, linen and other furnishings, fridges, freezers, televisions and other appliances, tableware, utensils and garden tools etc.) acquired by households for final consumption. These assets are not used by households as a store of value. Appliances or other equipment used by unincorporated enterprises for the purpose of production are not included in this item.

*GAPS*: See BLS

*HES*: Household Expenditure Survey

*Household balance sheet*: The household balance sheet is a statement, drawn up at the end of each financial year, of the value of all assets and liabilities owned by the household sector.

*Household reference person — HES*: The reference person for each household in the HES is chosen by applying the selection criteria below, from the top down, to all usual residents aged 15 years and over, until a single appropriate reference person is identified:

- one of the partners in a registered or de facto marriage;
- a lone parent;
- the person with the highest income; and
- the eldest person.

For example, in a couple, one family household the partner with the highest income is generally the reference person. However if both partners have the same income, the reference person is the eldest partner. In households containing more than one family, the reference person is selected from the primary family. The primary family is the family which contains dependent children. If there is more than one family with dependent children, or there are no dependent children present in the household, then the primary family is the first family identified during the interview.

*Household reference person — SIHC*: The reference person for a SIHC household is chosen by using similar selection criteria as those used to derive the reference person in the HES. However, in the SIHC, the male partner of a registered or de facto marriage is considered to be the reference person. This means that in couple families income and age are not used to determine the reference person.

*Income capitalisation*: The technique whereby a ratio of assets to income is applied to an income stream to derive an asset value.

## Glossary (continued)

*Insurance technical reserves:* Insurance technical reserves represent households' net equity in, or claims on, reserves of registered life insurers and friendly societies.

*Liability:* A financial instrument which is created when creditors lend funds directly to debtors.

*Median:* The median observation for a distribution is the observation which lies in the middle of the distribution when it is ordered by size. For example, 50% of households in a distribution will have net worth above the median value, and 50% will have net worth below that value.

*Net worth :* The sum of an entity's assets minus the sum of its liabilities. This study has used household net worth to define household wealth.

*NPDs:* Non-private dwellings include hotels, motels, nurses quarters, staff quarters, boarding houses, private hotels, boarding schools, residential colleges, public and private hospitals, psychiatric hospitals or institutions hostels for the disabled, nursing homes, accommodation for the aged or retired (cared facilities), hostels for the homeless, night shelters, refuges, childcare institutions, corrective institutions for children, other welfare institutions, prisons, corrective and detention institutions for adults, convents and monasteries. Non-private dwellings are also known as special dwellings.

*NPISHs:* Non-profit institutions serving households. NPISHs are legal or social entities created for the purpose of producing goods and services, but whose status does not permit the good or service to be a source of income, profit or other financial gain for the units that established, control, or finance them.

*PIM:* Perpetual inventory model. In Australia this type of model is used to generate capital stock estimates in the National Accounts. In any particular period investment in capital assets is added to stocks, and retirements of assets are deducted.

*RBA:* The Reserve Bank of Australia

*RIN:* The Rental Investors Survey

*Securities other shares:* Financial instruments which consist of bills, bonds, certificates of deposit, commercial papers, debentures, tradable (or offsetable) financial derivatives, and similar instruments normally traded in the financial markets.

*Shares and other equity:* A share is 'a contract between the issuing company and the owner of the share which gives the latter an interest in the management of the corporation, the right to participate in profits. While the term 'equity' can relate to the amount of an asset which is owned outright (i.e. that portion of an asset against which there is no debt), in this context equity is used as a synonym for a share.

*SIHC:* The Survey of Income and Housing Costs

*Unincorporated Enterprise:* An enterprise which is entirely owned one or more members of household sector. These enterprises are treated as a part of the household sector.

*Wealth:* Wealth is defined in this study to be the sum of an entity's assets minus the sum of its liabilities. This is equivalent to the concept of net worth.

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