



HOME OWNERSHIP AND INEQUALITY: IMPUTED RENT AND INCOME DISTRIBUTION IN AUSTRALIA

By Peter Saunders and Peter Siminski

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Bruce Bradbury, Peter Saunders and Lyn Craig
Editors

About the Authors:

Peter Saunders is the Director of the Social Policy Research Centre. Peter Siminski is a Research Officer of the Centre. The research reported in this paper was supported by the Australian Research Council Strategic Partnerships – Industry, Research and Training (SPIRT) grant C00106830 for the project 'Household Income, Living Standards and Economic Inequality in Australia and Its Regions' conducted by the Social Policy Research Centre in collaboration with the Australian Bureau of Statistics (ABS) as Industry Partner. The authors acknowledge the many helpful comments and suggestions provided by Bruce Bradbury (SPRC), Leon Pietsch, Bob McColl, Jan Gatenby and Jenny Harber (ABS). The usual caveats apply.

Correspondence to:

Email: p.saunders@unsw.edu.au

Abstract

This paper examines the impact of home ownership on income distribution and the incidence of low-income using data from the Household Expenditure Surveys conducted in 1993-94 and 1998-99. The market value approach is used to derive an estimate of imputed rental income, which is added to disposable income. The results indicate that in 1998-99, imputed rent had an equalising distributional impact, except at the very top of the distribution. This finding is robust with respect to changes in some of the assumptions that underlie it. Comparisons of low-income rates by housing tenure and age are very sensitive to the inclusion of imputed rent as part of income, and to the deduction of housing costs from income. Analysis of the changing distributional impact of imputed rent between 1993-94 and 1998-99 indicates that while the effect was equalising in both years, it is not possible to determine whether the impact became more or less equalising over the period. Simulation results indicate that the disequalising impact of changes in gross housing equity (which incorporates the effect of increased house prices) explain much of the observed change in the distribution of income plus imputed rent, and accounted for much of the changed distributional impact of imputed rent itself. Overall, the results highlight the importance of taking account of imputed rent when analysing the structure and distribution of Australian living standards.

1 Introduction

Home ownership is a central goal of the ‘Australian dream’ that most Australians aspire to. With the size of home mortgages following house prices in an upward spiral, the Reserve Bank Board’s monthly interest rate decision is the most eagerly awaited economic statistic, far outstripping the unemployment rate as a barometer of the nation’s economic fortunes. While most home purchasers seem more concerned about the wealth effects of home ownership, economists have also focused on the impact of the purchase and ownership of owner-occupied dwellings on household incomes and living standards. They have addressed this issue either by deducting housing costs from income in order to explore issues of after-housing poverty (Bradbury, Rossiter and Vipond, 1986) or housing affordability (Australian Institute of Health and Welfare, AIHW, 1997; Chapter 5), or by examining the distributional consequences of the imputed rental value of home ownership (Yates, 1991; 1994; Travers and Richardson, 1993).¹

This paper fits mainly within this latter stream of research, focusing on the consequences of home ownership for the shape and change in the distribution of income in the 1990s,² although some consideration is also given to how housing costs affect the profile of low-income households.³ We build on recent developments in the measurement of income distribution undertaken by Yates (1991; 1994) by adjusting gross household income to reflect income tax liabilities, variations in household need, and the weighting of the data by persons rather than households.⁴ These adjustments locate the study of imputed rent within the conventional income distribution framework, and have implications for its size and distributional impact.

The paper is organised as follows: Section 2 reviews recent Australian research on imputed rent and discusses the two main approaches used to derive and analyse its effects. This is followed by a discussion of our methodology and a description of the data used (Section 3) and by four sections that discuss our results at an aggregate level (Section 4), in terms of their overall distributional impact (including the sensitivity of results to the use of an alternative equivalence scale) (Section 5), the impact on the profile of low-income households (Section 6) and on the factors behind the observed

¹ The benefits of home ownership are not the only form of non-cash income that can be included in income distribution studies. Ironmonger (1996) has suggested that income should be adjusted to reflect the imputed value of unpaid household domestic production, while Travers and Richardson (1993) also include the estimated value of the ownership of consumer durables, and the ABS has conducted a series of studies of the impact of government non-cash health, education, welfare and housing benefits (e.g. ABS, 2001).

² Our results thus fit within the conventional (extended) income distribution paradigm associated with work by Travers and Richardson (1993), Whiteford and Kennedy (1995) and Yates (1994). An alternative framework would have been based on the use of expenditure rather than (cash) income as the starting point from which to assess an extended measure of living standards and inequality (see Barrett, Crossley and Worswick, 2000), but we have not pursued this approach.

³ Low-income households have been defined as those falling in the lowest quintile of the (equivalised) income distribution, in order to avoid the controversy surrounding where to set a poverty line: see Saunders (2002: Chapter 6).

⁴ These methods are acknowledged to be the best approach for use in distributional studies (Atkinson, Rainwater and Smeeding, 1995; Saunders, 2004) and have recently been adopted by ABS in its presentation of income distribution statistics (ABS, 2003a).

changes between 1993-94 and 1998-99 (Section 7). The main results and implications are briefly summarised in Section 8.

2 Recent Research and Conceptual Issues

While there are many forms of non-cash income, the imputed rental income of owner-occupied housing holds a privileged position in many realms. It is treated as a component of household income in the National Accounts, and most guidelines for the compilation of income distribution statistics recommend the inclusion of imputed rent as a way of providing the desired consistency with National Accounting frameworks.⁵ The Australian Bureau of Statistics (ABS) has accepted this view, arguing that in conceptual terms, income should include ‘the value of services provided from within the household via the use of an owner-occupied dwelling’ (ABS, 1995; p.33). The Expert Group on Household Income Statistics (the ‘Canberra Group’) has also suggested (2001; p. 62) that a measure of income that includes imputed rent will produce a ‘fairer and more accurate picture of income distribution’, particularly when making international comparisons.⁶

There is much to be gained by including imputed rent as a component of household income when examining living standards and inequality. First, it allows those in different housing tenures to be more directly compared, since the rental income attributed to homeowners is made as visible as the rents paid by renters. Secondly, it provides a basis for improved comparisons between social groups because both home ownership rates and private rent levels vary systematically with observable characteristics such as age or household type (see Table 2 below). Third, comparisons over time can be distorted if the rate of home ownership changes, since the previously invisible imputed rental income is replaced by (or replaces) the observed income received from other forms of investment. Finally, international comparisons will be distorted because home ownership varies between countries (see Ritakallio, 2003).

Conceptually, the inclusion of imputed rent as part of income treats owner-occupiers as if they were renting their home from themselves, thus simultaneously incurring rental expenditure and earning rental income (net of the expenses incurred). This approach has been employed in Australian studies by Yates (1991; 1994), Travers and Richardson (1993), Flatau and Wood (2000) and Chotikapanich et al. (2003). An alternative to treating imputed rent as part of income involves deducting actual housing costs from income to obtain an after-housing costs measure of economic well-being. This approach has been most often used in poverty studies to control for differences between the disposable incomes available to support the non-housing consumption needs of owners, purchasers and renters (Commission of Inquiry into Poverty, 1975; Bradbury, Rossiter and Vipond, 1986; Harding and Szukalska, 2000; Harding, Lloyd and Greenwell, 2001). In a recent contribution, Siminski and Saunders (2004) have argued that income after housing costs also has advantages when analysing the regional dimension of income distribution because it adjusts for the

⁵ The United Nations Statistical Commission has recommended that national income distribution statistics include imputed rent in the incomes of owner-occupiers (United Nations, 1977).

⁶ There is broad agreement that the inclusion of imputed rent (and other forms of non-cash income) will improve the reliability of international comparisons of income distribution (see Smeeding et al., 1993; Whiteford and Kennedy, 1995; and Smeeding and Weinberg, 2001).

higher rents that exist in attractive areas that pay a wage premium because of proximity to a strong labour market.

The two methods used to calculate the imputed rental income of owner-occupiers are the market value (MV) approach and the opportunity cost (OC) approach. The *market value approach* treats an owner-occupier unit as if it was renting its dwelling to itself, and thus includes the rent attributable to ownership of the dwelling as part of the income of the owner. An estimate is made of the property's gross market rent and the expenses associated with earning such income are then subtracted to derive the imputed (net) rental income, which can then be added to disposable (net) cash income. In applying the MV approach, Yates (1991) estimated market rent as a fixed annual percentage of the value of the property, where the percentage was calculated as the value of gross imputed owner-occupier rent derived from the National Accounts (which is based on the market rents received for dwellings that have similar characteristics to those that are owner-occupied), divided by an estimate of the gross value of the owner-occupied housing stock derived from estimates reported in the Household Expenditure Survey (HES). From this measure of gross imputed rent, the costs of mortgage interest repayments, repairs, maintenance, insurance and rates (but not depreciation) were deducted to derive net imputed rent.

One of the difficulties involved in implementing the MV approach is that the imputed rental income of owner-occupiers is likely to be under-estimated in the National Accounts, for reasons discussed in detail by Yates (1991; pp. 23-4). Another point of contention relates to the fact that the National Accounts deduct an allowance for the depreciation of the building when estimating imputed rental income, but no such allowance is made for the appreciation of land values (although we follow Yates in excluding both depreciation and capital gains from our estimates of imputed rent).⁷ Another potential issue relates to the reliability of the self-reported values of owner-occupied properties in the HES, although Yates (1991) shows that the value of owner-occupied housing reported by owners is generally close to market values as determined by independent valuers, suggesting that the approach will not be compromised by its reliance on self-assessed property values.⁸ Importantly, there was no relationship between socio-economic characteristics (such as race, income, age, marital or employment status) and the accuracy of the valuation estimates.

The *opportunity cost approach* calculates the cash income foregone by homeowners investing in housing equity rather than financial assets by estimating the financial benefit of converting the equity in one's home into an annuity. Although the OC approach requires less information on household expenditure and market rental information than the MV approach, it faces some formidable practical problems in implementation. Since most studies of living standards focus on the use of post-

⁷ Under a stricter application of the economic income framework, it could be argued that there is a case for including depreciation as a component of income. However, our decision not to include depreciation is consistent with the approach taken in other income distribution studies.

⁸ Yates (1991; Appendix B) describes two Australian studies of self-reported dwelling values, in which approximately half of respondents estimated their property value within 10 per cent of the actual market value, while over 90 per cent of the estimates were within 30 per cent of the market value. Such apparent inaccuracy might intensify during periods of rapid house price inflation (bearing in mind that the survey we are using is conducted over the course of the financial year), and this might affect how the income deciles are defined and hence affect the distributional results.

transfer, post-tax (disposable) income, it is necessary for consistency to estimate the tax and benefit implications that arise if housing equity were to be converted into an investment portfolio that yields a monetary return. This involves complex calculations based on tax and social security legislation which in turn raises issues about who in the household owns the equity in the home (since this will affect after-tax income because of the individual basis of the Australian income tax system). These difficulties have not prevented some valuable recent applications of the opportunity cost approach by Flatau and Wood (2000) and Chotikapanich et al. (2003) that reveal some interesting insights.⁹

Despite these advances, the advantage of the MV approach is that it treats owners in a conceptually similar way to renters, having to pay the market price for the housing that they occupy. This similar treatment of those in different housing tenures also makes the MV approach a more appropriate way of valuing non-cash income, particularly when examining how housing tenure affects the distribution of income. For these reasons, combined with the uncertainties and complexities associated with estimating tax liabilities and benefit entitlements under the OC approach, the MV approach forms the basis of the following analysis.¹⁰

3 Data and Methods

The main source of data we have used is taken from the confidentialised unit record file based on the *1998-99 Household Expenditure Survey* (hereafter HES 98-99) (ABS, 2000), although we also make comparisons with results from HES 93-94 in Section 7. It is difficult to make reliable comparisons over a longer period because of changes in the weighting of the HES data prior to the 1993-94 survey, when the data were benchmarked against external aggregates for the first time (see Siminski et al., 2003), although this will not prevent forward looking comparisons from being made as new HES data are released.¹¹

Our primary indicator is equivalent (weekly) disposable household income (calculated both before and after the inclusion of imputed rent), expressed on a person-weighted (individual) basis (unless otherwise indicated).¹² Income from government cash benefits is as reported in the survey, whereas the payment of income tax has been

⁹ See Chotikapanich et al. (2003) for an example in relation to equity partnerships and reverse equity mortgages. This study also includes the role of the transactions costs incurred when changing between assets.

¹⁰ We recognise that there are limitations in using imputed rent as an indicator of the material well-being associated with home ownership. Amongst other benefits of home-ownership is the option to draw down on housing assets to finance expenditure that exceeds income (including imputed rent). However, this along with the non-pecuniary benefits of home-ownership fall beyond the scope of the income distribution paradigm we are using. Such limitations are a feature of imputed rent analysis regardless of whether the market value or opportunity cost approach is used, even where the latter accounts for transaction costs in converting housing equity to financial assets.

¹¹ Most of these problems can be corrected for the two earlier HES surveys, in 1984 and 1988-89, and the ABS is endeavouring to make these corrections and is expected to re-release these data in due course (ABS, 2002). There are some comparability problems between the 1993-94 and 1998-99 HES data, but these are of far less significance.

¹² It should be noted that this measure assumes that resources are equitably shared within the household, an assumption that has been criticised by feminists and others who see a role for gender power relations in the determination of intra-household decision-making.

estimated by ABS from the tax schedules operating in each year, as has the implicit rental income subsidy received by public tenants on account of their below-market rents.¹³ Equivalent income has been derived using the detailed Henderson equivalence scales (Johnson, 1996), although we also assess the sensitivity of our results to the use of an alternative scale – the modified scale proposed by the OECD that is used widely in income distribution studies, including in official ABS publications (ABS, 2003a).¹⁴ An important advantage of the Henderson scale is that it differentiates between housing and other needs, thus allowing separate equivalence adjustments to be made for income before and after housing costs, making it possible to compare the distributions of (equivalent) income plus imputed rent and income after housing costs by applying the appropriate equivalence adjustments in each case. When discussing the distributional results, we present the decile income shares, as well as two summary measures, the Gini coefficient and the P90/P10 percentile ratio.¹⁵

The methods used to estimate imputed rent are now described, accompanied by illustrations from the 1998-99 HES data: the methods used in 1993-94 were the same and are not separately discussed. For *owner-occupiers*, the estimation of imputed rent is based on the MV approach, which is dependent on the HES estimate of reported gross housing worth of owner-occupiers of \$953.66 billion.¹⁶ Gross imputed rent in 1998-99 was estimated at \$47,628m in the National Accounts (ABS, 2003b, Table 60), so that the implied average rate of gross imputed rental return was 4.994 per cent per annum. The corresponding figures for 1993-94 are \$743.1bn and \$36,401m, implying that the gross rate of return in that year was 4.899 per cent. We use these rates of return as the benchmarks throughout this study, and assume that they apply equally to all owner-occupied dwellings in each year.

Yates (1991) used a rate of return of 5.0 per cent in her study using HES 88-89 data, although Siminski et al. (2003) have pointed out that the data in all HES surveys conducted prior to the 1990s have been systematically under-weighted, leading to a

¹³ The version of the data used here incorporates corrections to the errors in receipts of veterans' benefits identified by ABS (2002).

¹⁴ It is difficult to provide a precise comparison between these two scales because they differ in complexity. The modified OECD scale assigns a score of 1.0 to the first adult, 0.5 for each subsequent adult and 0.3 for each child, whereas on an average basis, the Henderson scale assigns a slightly higher score (around 0.6) for the second adult and a slightly lower score (around 0.27) for each child, although these weightings vary according to the employment status of adult household members and with the age and gender of children.

¹⁵ The Gini coefficient is sensitive to observations close to the mode of the distribution, whereas the P90/P10 percentile ratio is obviously more sensitive to the upper and lower tails of the distribution.

¹⁶ Owner-occupiers are by far the largest tenure group in HES 98-99, when 71.9 per cent of enumerated persons were part of owner-occupier households (with 35.9 per cent owned outright and 36.0 being purchased, respectively). Just over one-fifth (21.3 per cent) of persons were in private renter households, while 4.9 per cent of people were part of public renter households, and the remaining 2.0 per cent of persons were classified as 'other tenures' (which includes those living in rent-free accommodation and those participating in the 'life tenure scheme' and the 'rent/buy (or shared equity) scheme'.

gross rate of return closer to 4.5 per cent.¹⁷ Following Yates (1991), we have assessed the sensitivity of our results by using an alternative gross rate of return of 7.5 per cent rate.

Net imputed rent was derived from gross imputed rent by subtracting expenditure on rates (general and sewerage), house insurance, repairs, maintenance, body corporate payments, and the interest component of mortgage repayments and loans for alternations and additions. Expenditure on all of these items is identified in the HES, although some modifications had to be made to the insurance, repairs and maintenance items. In particular, HES 98-99 was the first to separate house building insurance from home contents insurance, and the ratio applying in this year was used to estimate a breakdown of the aggregate insurance item reported in 1993-94. In relation to expenditure on maintenance items, the recall period used in HES 98-99 was three months for payments to contractors and two weeks for expenditure on materials. In order to adjust for any 'lumpiness' in these items, a regression model was used to model expenditure on maintenance as a function of dwelling type (separate house; semi-detached; flat; other), dwelling value and number of bedrooms, with the estimated model used to even out the reported expenditures.¹⁸

The scope of the MV approach was extended to include the imputation of rental income not only for homeowners, but also for public housing tenants and the occupants of rent-free dwellings.¹⁹ The rent paid by *public housing tenants* pay is usually below market rent, implying that public renters receive an implicit government subsidy, equal to the difference between the market rent and the rent actually paid. The amounts estimated by ABS as part of its fiscal incidence calculations (ABS, 2001) have been included in the estimates reported below.²⁰ A small number of households living in *Other tenures* occupy dwellings either on a rent-free basis, or participate in life tenure schemes and rent/buy (shared equity) schemes. For these households, we have applied the same methods for imputing rent as described above for owner-occupiers. The only difference is that for the small number of households (presumably confined to those in a shared equity tenure) who report

17 The ratio of the adult (age 15 and over) population as estimated in HES 93-94 to official population estimates was 97.6 per cent. The corresponding percentage for HES 88-89 was 87.7. These figures give an indication of the extent of under-weighting of households in HES 88-89. They suggest that the household weights in HES 88-89 would have been 11.3 per cent higher if the new weighting regime had been adopted, and hence that the estimated value of the owner-occupier housing stock would also have been 11.3 per cent higher.

18 The model regressed weekly maintenance expenditure on the following explanatory variables: dwelling value, dwelling value squared, number of bedrooms, number of bedrooms squared, and dummy variables for each dwelling type other than a separate house. The values predicted by the model were then used instead of the actual reported expenditures in all subsequent calculations.

19 The imputation of rent to public housing tenants is consistent with the National Accounts, since this is a part of income as measured in the Household Adjusted Disposable Income Account. The imputation to some of the occupants of rent-free premises is also loosely consistent with the approach used in the National Accounts, since the value of housing provided by employers is a component of the compensation of employees, while the imputed rental value of rent-free properties which are privately owned is included in the item for 'other dwellings' (ABS, 2003b, Table 58).

20 Although this is technically an imputed transfer income rather than imputed rent, its inclusion can be justified on the grounds that it produces a measure of income including imputed rent that is more comparable across housing tenures.

positive rental expenses, these have been subtracted from the imputed rental income amount to give a net figure.

4 Aggregate Effects

Table 1 provides a breakdown of the components of the aggregate benchmark estimate of imputed rental income, broken down by tenure type, before and after the equivalence adjustment.²¹ In unadjusted terms, purchasers have the highest mean disposable incomes by a considerable margin, followed by non-public (principally private) renters and outright owners. The low mean disposable income of owners reflects the fact that this group contains many who have retired on relatively low (cash) incomes. Not surprisingly, public renters have the lowest disposable cash incomes, well below those of any other tenure group – a consequence of the eligibility criteria used to allocate public housing. Based on the benchmark interest rate of 4.994 per cent, imputed rent contributes an additional 11.2 per cent to total household disposable income in 1998-99, while the 7.5 per cent gross rate of return suggests that this contribution increase to 20.7 per cent. These results demonstrate the importance of imputed rent as a component of household income, but they also indicate how sensitive the results are to the assumed gross rate of return.

In terms of the value of net imputed rent, the (unadjusted) figures vary greatly, from \$49 a week for purchasers to \$146 a week for homeowner households (ignoring private renters, who receive zero imputed rent by definition). Net imputed rent represents almost one-quarter (23.0 per cent) of the mean disposable income of homeowners, but only one-twentieth (5.4 per cent) of the mean disposable income of purchasers. The imputed rent received by public renters averages one-sixth (16.6 per cent) of their disposable income on average, although the amount involved is much lower in absolute terms, as noted earlier.

The equivalence adjustment causes a large increase in the (relative) disposable incomes of public renters, reflecting the fact that many households in this situation are below average in size (e.g. single aged people and lone parents with one or two children). . The most striking aspect of the estimates in Table 1 is the fact that the inclusion of imputed rent reduces the tenure-type disposable income disparities that would otherwise exist: for example, the ratio of the mean incomes of purchaser to public renter households declines from $903/386 = 2.34$ to $952/450 = 2.12$ when imputed rent is included as part of income,

²¹ The results presented throughout this paper include a number of reported negative incomes. All of the results have been re-calculated after setting all negative incomes to zero to check what difference this makes. Aside from making the overall contribution of imputed rent to income smaller (by definition) and reducing the equalising impact, the detailed patterns are unaffected.

Table 1: Income and Components of The Benchmark Imputed Rental Income of Persons by Tenure, 1998-99

Housing Tenure	Income Variable	Overall mean (\$)	
		Unadjusted	After equivalence adjustment
Owned outright			
	Disposable income	636	799
	Gross imputed rental income	188	234
	Operating expenses	41	51
	Interest ^(a)	1	1
	Net imputed rental income	146	182
	Disposable income plus imputed rent	782	981
Purchaser			
	Disposable income	903	861
	Gross imputed rental income	181	174
	Operating expenses	44	42
	Interest ^(a)	89	84
	Net imputed rental income	49	48
	Disposable income plus imputed rent	952	909
Public renter			
	Disposable income	386	533
	Rent paid	70	95
	Estimated market rent	134	181
	Gross imputed rental income	64	86
	Net imputed rental income	64	86
	Disposable income plus imputed rent	450	619
Renting - other			
	Disposable income	669	760
	Rent paid	149	161
	Gross imputed rental income	0	0
	Net imputed rental income	0	0
	Disposable income plus imputed rent	669	760
Other tenures			
	Disposable income	509	653
	Rent paid	1	1
	Gross imputed rental income	142	174
	Operating expenses	18	23
	Interest ^(a)	8	14
	Net imputed rental income	116	138
	Disposable income plus imputed rent	625	791

Note: (a) Includes mortgage interest and interest for loans on dwelling alterations and additions.

Source: *Household Expenditure Survey, 1998-99*, confidentialised unit record file.

and to $909/619 = 1.47$ after the equivalence adjustment. Imputed rent thus exerts an equalising effect on income inequality between tenure types, although this effect is based on highly aggregated figures that require a more detailed examination.

Table 2 provides some background to the results presented later by showing how housing tenure (home-ownership in particular) varies by household type and across the income distribution. Home ownership is highest among the aged (over 90 per cent for couples and 75 per cent for singles, with most owning outright), followed by

couples (with or without children) where ownership also exceeds 70 per cent. Home ownership among single-adult households (single non-aged people and lone parents) are much lower at around 48 per cent, similar to the rate for mixed households. Renting public housing is most common among the single aged and lone parents, while single non-aged people, lone parents and mixed households are most likely to be in private rental accommodation.

Table 2: Housing Tenure by Household Type and Income Decile, 1998-99 (percentages)

	Housing tenure status:					All households
	Outright owner	Purchaser	Renting - public	Renting - private	Other tenures	
<i>Household type:</i>						
Single aged	74.6	1.8	11.5	8.8	3.3	100.0
Single, non-aged	25.7	22.6	8.3	38.6	4.8	100.0
Aged couple	90.0	3.5	2.8	2.4	1.3	100.0
Non-aged couple	39.2	34.8	2.6	20.9	2.6	100.0
Couple with children	32.1	48.4	2.9	15.1	1.5	100.0
Lone parent	25.3	23.0	14.7	36.3	0.8	100.0
Mixed households	25.6	22.1	3.6	45.8	3.0	100.0
<i>Income decile:</i>						
1	38.5	17.5	12.0	26.7	5.3	100.0
2	43.0	13.9	18.1	21.0	3.9	100.0
3	47.1	20.8	6.5	23.2	2.5	100.0
4	42.0	25.8	6.6	23.4	2.2	100.0
5	49.5	24.0	5.3	19.0	2.3	100.0
6	35.2	34.5	1.8	26.1	2.3	100.0
7	38.1	36.6	2.1	21.6	1.6	100.0
8	35.8	42.4	1.4	19.4	1.0	100.0
9	32.8	40.6	0.4	24.4	1.8	100.0
10	34.0	41.5	0.5	22.7	1.3	100.0
All households	39.6	29.8	5.5	22.8	2.4	100.0

Note: Income deciles are based on (Henderson) equivalent income and have been weighted by households.

Source: See Table 1.

In terms of the distributional profile of housing tenure both outright ownership and renting privately display no clear pattern across the income deciles, whereas the incidence of home purchase tends to rise with income, and public renters are heavily concentrated in the lowest two income deciles. These latter results provide the first clue as to the distributional impact of imputed rent, although it is necessary to conduct a formal analysis to identify the effects (which depend on more than just housing tenure status), and it is to this analysis that we now turn.

5 The Overall Distributional Impact

Table 3 shows how net imputed rent is distributed across the deciles of the distribution of equivalent disposable income, in absolute terms and as a percentage of disposable income. Results are presented using both the benchmark rate of return (4.994 per cent) and the alternative of 7.5 per cent, to provide an insight into the sensitivity of the estimates. Regardless of which interest rate is used, the top decile receives the highest income from imputed rent, with a mean that exceeds the overall average by around 60 per cent. In terms of the absolute level of imputed rental income, there is not a large difference between the amounts received by the bottom nine deciles on either measure.

The importance of imputed rent to the bottom deciles (as well as its distributional impact) becomes more apparent when imputed rent is considered not in absolute terms, but as a percentage of disposable income. Using either rate of return, imputed rental income represents a declining percentage of equivalent disposable income across all income deciles except for the highest, where the value is similar to that for the eighth decile. The results in Table 3 thus suggest that imputed rent has an equalising effect on the income distribution, except at the very top of the distribution.

Table 3: Mean Weekly Equivalent Household Income and Imputed Rent of Persons by Decile (\$)

	Income decile:										All
	1	2	3	4	5	6	7	8	9	10	
Equivalent disposable income E(DY)	227	447	523	597	679	770	877	1003	1169	1678	797
Equivalent net imputed rent (4.994%)											
- \$	96	90	78	75	85	80	82	82	86	141	90
- as a % of E(DY)	42.2	20.0	14.9	12.6	12.5	10.4	9.4	8.2	7.4	8.4	11.2
Equivalent net imputed rent (7.5%)											
- \$	161	147	141	139	153	152	160	161	171	264	165
- as a % of E(DY)	70.6	32.8	26.9	23.3	22.6	19.8	18.3	16.1	14.6	15.8	20.7

Source: See Table 1.

The importance of imputed rent to persons in low-income households is re-affirmed in Table 4, which shows the distribution of income before and after the inclusion of imputed rent, using the two alternative gross rates of return and with each income measure adjusted using the Henderson and modified OECD equivalence scales. The results in the upper panel indicate that when the lower gross rate of return is used along with the Henderson scale, the inclusion of imputed rent has an unambiguously equalising impact on the income distribution: the Lorenz curve for income plus imputed rent lies wholly inside that for income alone.²² This reflects the fact that the bottom decile's share of total income is considerably higher after the inclusion of imputed rent, while under the benchmark measure, the shares of deciles 2 through 5 also increase marginally, and the income share of each of the top five deciles declines by a similar amount. The Gini coefficients decreases slightly (by 3.3 per cent in the benchmark case and by 2.5 per cent in the alternative), and the P90/P10 percentile

²² The two Lorenz curves intersect in the top decile when the higher (7.5 per cent) return is used, implying that the impact on inequality is uncertain.

ratios also decline, providing further evidence that the inclusion of imputed rent results in a more equal income distribution.

Table 4: Decile Shares of Equivalent Disposable Income With and Without the Inclusion of Imputed Rent

	Decile shares (%):										Gini Coeffi	P90/P10 ratio
	1	2	3	4	5	6	7	8	9	10		
<i>Detailed Henderson equivalence scale:</i>												
Equivalent disposable income E(DY)	2.85	5.60	6.56	7.49	8.53	9.66	11.00	12.58	14.67	21.06	0.275	3.24
E (DY plus net imputed rent)												
- 4.994% gross rate of return	3.23	5.67	6.68	7.59	8.55	9.59	10.92	12.39	14.43	20.96	0.266	3.17
- 7.5% gross rate of return	3.31	5.54	6.59	7.57	8.55	9.63	10.90	12.35	14.42	21.15	0.268	3.25
<i>Modified OECD equivalence scale:</i>												
Equivalent disposable income E(DY)	2.63	5.01	6.02	6.97	8.15	9.52	11.06	12.95	15.49	22.21	0.304	3.78
E (DY plus net imputed rent)												
- 4.994% gross rate of return	3.08	5.29	6.20	7.10	8.21	9.45	10.94	12.71	15.16	21.88	0.289	3.56
- 7.5% gross rate of return	3.15	5.24	6.19	7.17	8.25	9.48	10.95	12.65	15.05	21.88	0.288	3.62

The distributional picture changes somewhat when the modified OECD scale is used, although the conclusions reached above are robust to this change, and once again the inclusion of imputed rent has an unambiguously equalising impact, the Gini coefficient in this case declining by 4.9 per cent in the benchmark case. Further examination of the distributions shown in Table 4 indicates that (using the Henderson equivalence scale) the decile rankings of more than one-half (53 per cent) of all individuals change when imputed rent is included in the income measure and ranking is undertaken on this extended basis. Of these, the vast majority (83 per cent) move by only one decile, implying that around 9 per cent of the population $(0.47 + (0.53) \cdot (0.83) = 0.91)$ move by more than one decile. More than a quarter of a million people move up the income distribution by at least four deciles, while the number whose ranking changes downwards by more than two deciles is close to zero. The inclusion of imputed rent thus leads to substantial re-ranking within the income distribution, even though the aggregate inequality effect is modest.

6 Low-Income Rates

Ever since the early study of poverty in Melbourne (Henderson, Harcourt and Harper, 1970) and the national study undertaken for the Poverty Commission (Commission of Inquiry into Poverty, 1975), poverty researchers have recognised that some account should be taken of the relatively high housing wealth (and hence low housing costs) of home-owning (predominantly older) Australians with low-incomes. Measuring poverty both before and after housing costs has been regarded as one way of examining this issue, and this approach is widely used in Australia (King, 1998) and in other countries (Ritakallio, 2003). There are many controversial issues surrounding the measurement of poverty that we wish to avoid (Saunders, 2002), so we have

focused on low-income rather than poverty, where low-income is defined as being in the bottom quintile of the (equivalised) income distribution.²³

Figure 1 presents low-income rates by housing tenure using three alternative income measures: equivalent disposable income $E(DY)$, $E(DY)$ plus the benchmark estimate of imputed rent described earlier $E(DY+IR)$, and $E(DY)$ minus *actual* housing costs $E(DY-HC)$. The low-income rates show the percentage of each tenure-type that fall within the lowest quintile of the overall income distribution, where income is defined using each of the three measures. Thus, for example, the inclusion of imputed rent in income causes the low-income rate of outright owners to decline from 19 per cent to 11 per cent, while that for home-purchasers increases from 13 per cent to 17 per cent. These results indicate that while the conventional disposable income measure suggests that outright owners are *more* susceptible to low-income than home purchasers, they become *less* susceptible to low-income after imputed rent is included in income. And whereas public renters have a low-income rate (51 per cent) that is more than twice that for private renters (24 per cent), the difference narrows after the addition of imputed rent to just four percentage points (38 per cent compared with 34 per cent) and the gap is similar when account is taken of housing costs incurred. Despite these changes, the low-income rates for rental households remain above those for both owner-occupiers and home purchasers.

Tenure-specific low-income rates based on income after housing costs produce similar low-income rates to those based on the income plus imputed rent measure, with the greatest discrepancies occurring for private renters (a low-income rate of 34 per cent compared with 30 per cent) and home purchasers (21 per cent compared with 17 per cent). Thus, aside from those who own their homes outright, either of the two adjustments results in a narrowing of the low-income rates across tenure types. Whether the impact of housing is measured as providing a supplement to cash income, or as a cost that must be financed out of cash income, the results show that the circumstances of homeowners improve relative to all other tenure types.

²³ We have replicated the estimates used to construct Figures 1 and 2 using the modified OECD scale but this has no marked impact on the pattern or results or on any of the conclusions reached below. For reasons of space, we have not presented the alternative results, but they are available on request from the authors.

Figure 1: Low-income Rates Before and After the Inclusion of Imputed Rent and the Exclusion of Housing Costs, by Housing Tenure

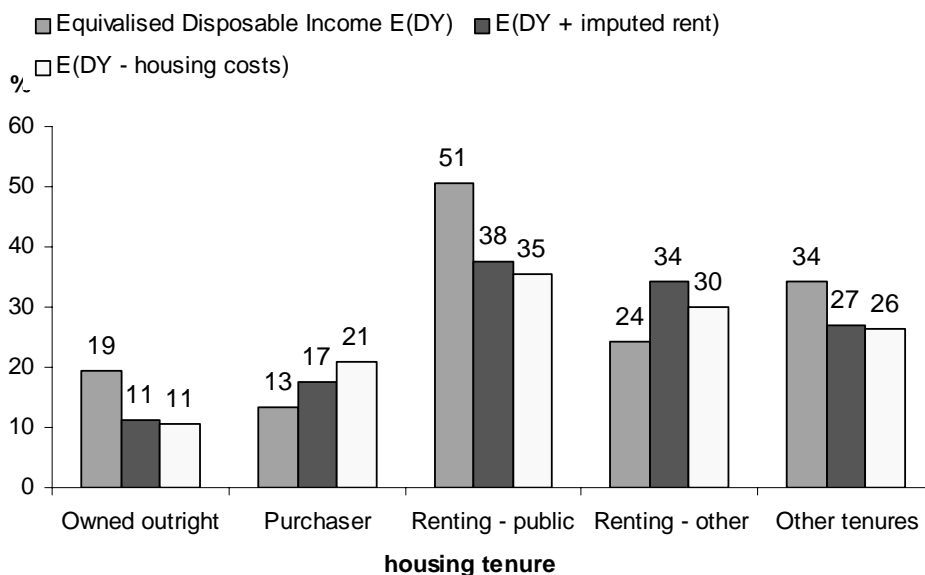
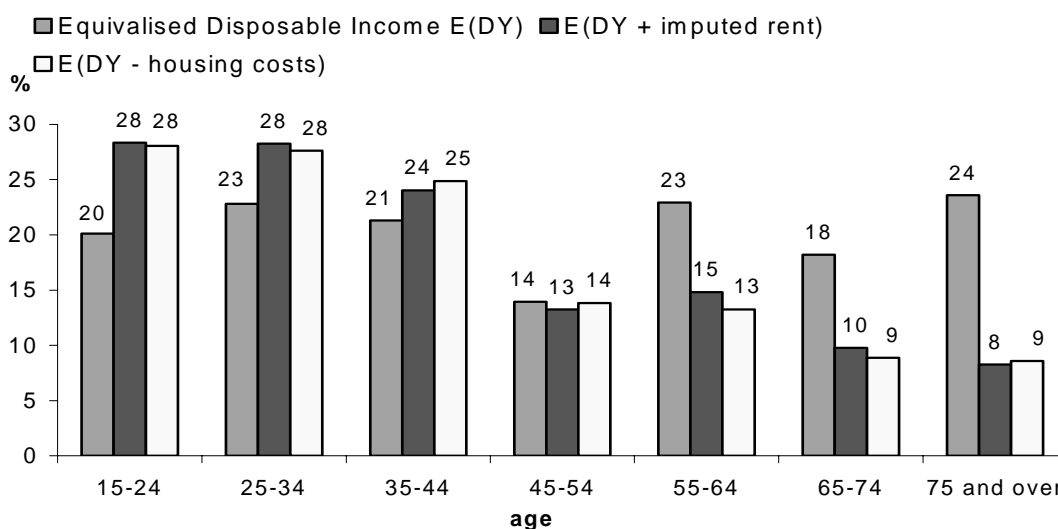


Figure 2 presents low-income rates, calculated on the same basis as in Figure 1, classified by the age of the reference person in the household. Before the inclusion of imputed rent, the differences in low-income rates by age are small, varying between 14 per cent (for the 45-54 year age group) and 24 per cent (for those aged 75 and over). However, the inclusion of imputed rent increases the incidence of low-income among all age categories up to the 35-44 year age group, leaving it unaffected for the 45-54 year age group, and decreasing it considerably among households aged 55 and over. As a result, the low-income rate amongst the youngest households (28 per cent) is more than three-times higher than that amongst the oldest households (8 per cent), a dramatic change from the original rankings. Figure 2 also shows that the low-income rates derived from the disposable income after housing costs measure are very similar to the corresponding rates after imputed rent is included.

Figure 2: Low-income Rates Before and After the Inclusion of Imputed Rent and the Exclusion of Housing Costs, by Age of Reference Person



7 Changes Over Time: 1993-94 to 1998-99

At any point in time, the magnitude of gross imputed rental income is aligned with private rental prices, while net imputed rent is strongly influenced by the size of mortgage interest payments by home-purchasers. Interest payments in turn are a function of the mortgage interest rate and the level of house prices, as well as other factors such as average mortgage size and time to maturity. Changes over time in the magnitude of imputed rental income thus incorporate the impact of many factors. Here, we examine the extent and breakdown of changes between 1993-94 and 1998-99. Unfortunately, as noted earlier, problems with data comparability currently preclude such an investigation extending beyond this period.²⁴

The total value of net imputed rental income increased as a proportion of (unadjusted) household disposable income between 1993-94 and 1998-99. Excluding imputed rental income in the ‘Other tenure’ category (because of data comparability problems), the total value of net imputed rent in 1993-94 was equal to 10.1 per cent of disposable cash income, whereas by 1998-99 it had increased slightly to 10.8 per cent. This increase was driven by a (relative) decline in interest payments between the two periods, from 4.4 per cent to 3.8 per cent of total disposable income, and this in turn reflects a fall in home loan interest rates from an average of 8.88 per cent to 6.58 per cent (moderated by an increase in housing debt).²⁵

²⁴ The annual (CPI) inflation rate in the two years was similar, at 1.8 per cent in 1993-94 and 1.2 per cent in 1998-99, respectively. Had they been very different, it would have been necessary to consider whether and how this could have affected the results by influencing nominal interest rates and house prices in each year. It should be possible to extend the period covered by this analysis when the ABS releases the foreshadowed revised versions of the earlier HES surveys, and when future expenditure surveys are conducted – the latest HES took place in 2003-04 but the unit record data have not yet been released.

²⁵ These latter figures were calculated as the average of interest rates offered to owner-occupiers by banks for standard variable home loans for the twelve months over each of the two years. The rate for each month was the ‘predominant or average rate of large’ banks on the last working day of each month. (Reserve Bank of Australia, 2003)

Table 5 summarises the aggregate percentage contribution of imputed rental income to household disposable income for those in each housing tenure category in each year.²⁶ There was a slight increase in the contribution of gross imputed rent to the incomes of people in owner-occupied housing over the period, but the fall in interest payments increased the net imputed rental income of people in purchaser households. The net effect has been to make the contribution of net imputed rent to the incomes of people in purchaser households more than twice as high in 1998-99 (5.4 per cent) as it was in 1993-94 (2.3 per cent).

Table 5: Components of the Benchmark Imputed Rental Income as a Percentage of Household Disposable Income by Housing Tenure, 1993-94 and 1998-99

Housing Tenure	Variable	1993-94	1998-99
Owned outright	Gross imputed rental income	28.8	29.5
	Operating expenses	6.5	6.4
	Interest ^(a)	0.0	0.1
	Net imputed rental income	22.4	23.0
Purchaser	Gross imputed rental income	19.8	20.1
	Operating expenses	4.8	4.8
	Interest ^(a)	12.6	9.8
	Net imputed rental income	2.3	5.4
Public renter	Rent paid	17.3	18.2
	Estimated market rent	32.1	34.8
	Gross imputed rental income	14.8	16.7
	Net imputed rental income	14.8	16.7

Note: (a) Includes mortgage interest and interest for loans on dwelling alterations and additions.

Source: See Table 1 and main text.

As a share of disposable income, the average rents paid by public housing tenants increased slightly, but the estimated value of their rental income supplements increased by a greater amount. Paradoxically, therefore, the proportional contribution of imputed rent to the income of public renter households increased in magnitude, even though their rental expenditure accounted for a higher proportion of their disposable income. This reflects the fact that the average disposable incomes of public renters decreased in real terms over this period, as did their income if imputed rent is included.

Changes in the distributional impact of imputed rental income are summarised in Table 6, which compares decile mean incomes and income shares before and after imputed rent has been added to disposable income. In both years, the inclusion of imputed rent adds substantially to mean household income, by an amount equal to \$89 (12.1 per cent of disposable income) in 1993-94 and by \$104 (12.8 per cent) in 1998-99 (both measured in 1998-99 prices). Imputed rent also had an equalising effect on the income distribution in both years, the Gini coefficient declining by 5.9 per cent

²⁶ Private renters have been excluded from Table 5 because they have zero imputed rent in each year, by definition.

and 5.2 per cent in 1993-94 and 1998-99, respectively, and the P90/P10 percentile ratio declining by 1.9 per cent and 4.4 per cent, respectively.²⁷

It is not possible to identify the factors that are driving the results shown in Table 6 because so much changed over the period and some of these changes have offsetting effects. The factors that are of specific importance in this context include changes in interest rates, changes in mean housing debt and mean gross housing equity, and changes in the home ownership profile across the income distribution. How these latter two factors changed between 1993-94 and 1998-99 is shown in Table 7. It is clear from these results that changes in both the ownership profile and in gross housing equity will have a complex effect on the distributional impact of imputed rent. Over the period, there was a slight decline in outright ownership, but a more than offsetting increase in the percentage of households who were purchasing their homes. Even so, by 1998-99, the outright ownership rate of just below 40 per cent was still 10 percentage points above the home purchase rate.

Table 6: Distribution of Disposable Income Before and After Adding Imputed Rental Income, 1993-94 and 1998-99 (\$1998-99)

Income decile	1993-94				1998-99			
	Equivalised disposable income E(DY)		E(DY + IR)		Equivalised disposable income E(DY)		E(DY + IR)	
	Mean (\$)	Share (%)	Mean (\$)	Share (%)	Mean (\$)	Share (%)	Mean (\$)	Share (%)
1	177	2.38	231	2.77	205	2.55	271	2.99
2	420	5.66	478	5.73	435	5.42	504	5.56
3	484	6.53	569	6.84	508	6.32	599	6.61
4	549	7.40	647	7.76	585	7.28	682	7.53
5	626	8.43	723	8.68	671	8.36	770	8.49
6	711	9.56	805	9.68	769	9.57	867	9.56
7	810	10.90	900	10.81	888	11.05	986	10.88
8	937	12.61	1019	12.25	1025	12.76	1127	12.43
9	1107	14.90	1188	14.27	1206	15.01	1317	14.52
10	1606	21.63	1765	21.21	1742	21.69	1942	21.42
All	742		833		803		907	
Gini		0.286		0.269		0.290		0.275
P90/P10		3.20		3.14		3.41		3.26

Notes: Incomes are expressed in constant 1998-99 prices and have been adjusted using the detailed Henderson scale and the data have been weighted on a household basis. Differences in the weighting procedure accounts for the differences between these results and those reported in Table 3.

²⁷ In both years, the Lorenz curve for the distribution of income plus imputed rent lies wholly inside that for income only, thus indicating that the inclusion of imputed rent has an unambiguously equalising effect. The smaller declines in the percentile ratio indicate that most of the impact of imputed rent occurs around the middle of the income distribution, as opposed to its extremes.

Table 7: Changes in Gross Housing Equity and Tenure Profile, 1993-94 to 1998-99

Equivalent Disposable Income Decile	Owners				Purchasers			
	% of decile		Mean gross equity (\$'000)		% of decile		Mean gross equity (\$'000)	
	1993-94	1998-99	1993-94	1998-99	1993-94	1998-99	1993-94	1998-99
1	43.9	38.5	191.5	187.7	15.9	17.5	154.3	196.7
2	44.9	43.0	135.5	150.3	13.6	13.9	149.2	135.2
3	46.9	47.1	157.0	148.4	15.9	20.8	138.0	164.2
4	49.5	42.0	155.2	166.3	19.4	25.8	144.9	158.6
5	46.0	49.5	168.5	172.3	23.4	24.0	167.7	161.5
6	41.5	35.2	173.6	191.7	28.4	34.5	175.6	182.6
7	37.9	38.1	180.4	210.8	34.9	36.6	160.9	178.4
8	35.5	35.8	193.4	218.2	34.9	42.4	179.0	183.6
9	34.2	32.8	211.9	237.1	38.9	40.6	179.4	190.2
10	38.6	34.0	296.4	325.1	41.4	41.5	236.6	271.0
All	41.9	39.6	183.5	196.0	26.7	29.8	176.4	189.2

Notes: Data has been weighted on a household basis and is expressed in constant 1998-99 prices.

Whereas outright ownership is highest at the bottom and middle of the distribution, the incidence of home purchase rises steadily with the level of equivalent household income. And while the distributional pattern of ownership became slightly more pronounced between 1993-94 and 1998-99, the purchaser pattern became somewhat less pronounced across the income deciles. Not surprisingly, in both years the gross housing equity of owners exceeded that of purchasers, but whereas gross housing equity rises steadily across deciles three to ten for both owners and purchasers, this pattern is not observed in deciles one and two – particularly for owners. Purchasers in the lowest decile experienced a particularly rapid increase in gross equity over the period examined.

We have simulated how different factors affect inequality in the distribution of income plus imputed rent using two methods. The first estimates the *separate marginal impact* of each factor (the level of interest rates, the value of housing debt, the distributional profile of home ownership and the value of gross housing equity) by estimating the impact of changing each factor in isolation holding all the others constant at their initial (1993-94) value. The second approach estimates the *cumulative marginal impact* of each factor by changing each in sequence and calculating the cumulative impact as each is adjusted to their final (1998-99) value.²⁸ Both methods produced very similar estimates of the marginal effects and we therefore only present (in Table 8) those based on the latter method.²⁹ To be clear, these simulations estimate what the distribution of income plus imputed rent would have been in 1998-99 as each factor is progressively set at its 1998-99 value: thus the results in column three of Table 8 estimate what the distribution would have been had the rate of interest been equal to its value in 1998-99, with other factors held at 1993-94 values, the next column sets both the interest rate and housing debt at their 1998-

²⁸ Note that the order in which the factors are changed matters in the second method but not in the first. However, this does not appear to exert a major impact on the results, since both methods produce very similar estimates of the marginal impacts.

²⁹ Imputed rent has been set to zero for public renters in the following analysis in order to focus on the impact of changes in the home-ownership profile.

99 value, holding other factors at 1993-94 values, and so on.³⁰ The second last column shows the impact of changing all four factors, while the final column shows the actual distribution in 1998-99 presented in Table 6.

The second and third columns of Table 8 suggest that the decline in interest rates between 1993-94 and 1998-99 had a small but equalising effect on the distribution of income plus imputed rent, with the effect concentrated at the bottom of the distribution. In contrast, changes in the housing debt profile had an offsetting (disequalising) effect, although the change was also small (and not large enough to offset the interest rate effect). Changes in the home ownership tenure profile (between outright owners, home purchasers and all other tenures combined) had no clear distributional impact, but by far the largest distributional effect is associated with the simulated change in real gross housing equity. This resulted in a marginal impact that caused the Gini coefficient to increase by 1.87 per cent, and a 1.91 per cent marginal impact on the P90/P10 percentile ratio.

Table 8: Simulated Effects of Changes in Interest Rates, Gross Housing Equity and the Owner/Purchaser Profile on the Distribution of Imputed Rent, 1993-94 to 1998-99 (percentages)

Income decile	Income share (%):						E(DY+IR) in 1998-99
	E(DY+IR) in 1993-94	E(DY+IR) in 1993-94 assuming Interest rates	E(DY+IR) in 1993-94 assuming Housing Debt	E(DY+IR) in 1993-94 assuming Ownership profile	E(DY+IR) in 1993-94 assuming Gross housing equity	E(DY+IR) in 1993-94 assuming All four changes together	
1	2.77	2.83	2.82	2.81	2.75	2.75	2.99
2	5.73	5.73	5.74	5.73	5.67	5.67	5.56
3	6.84	6.84	6.84	6.84	6.77	6.77	6.61
4	7.76	7.77	7.77	7.78	7.72	7.72	7.53
5	8.68	8.66	8.66	8.67	8.61	8.61	8.49
6	9.68	9.67	9.64	9.65	9.60	9.60	9.56
7	10.81	10.80	10.77	10.81	10.79	10.79	10.88
8	12.25	12.25	12.23	12.31	12.34	12.34	12.43
9	14.27	14.28	14.29	14.35	14.43	14.43	14.52
10	21.21	21.17	21.23	21.07	21.32	21.32	21.42
Gini	0.269	0.268	0.269	0.268	0.273	0.273	0.275
P90/P10	3.14	3.13	3.13	3.14	3.20	3.20	3.26

Notes: See Notes to Table 6 and main text.

The change in gross housing equity thus accounts for a large proportion of the observed change in the distribution of disposable income plus imputed rent between 1993-94 and 1998-99 and explains virtually all of the observed change in the equalising impact of imputed rent over the period (Table 6). When all four factors are changed together, the net impact is to increase inequality (compared with the actual distribution in 1993-94), although this final simulated distribution (shown in the penultimate column of Table 8), still diverges from the actual distribution in 1998-99, implying that factors other than those accounted for in the simulations (such as

³⁰ Recalling the methods employed in the derivation of imputed rent, and given that the gross rate of return is very similar in the two years, the third column can be interpreted as a simulation of the combined effect of changes in real private rental prices and changes in the stock (or quality) of owner-occupied housing. We have not attempted to differentiate between these two effects.

changes in the distribution of cash income or in demographic structure) had important effects, particularly at the bottom of the distribution.

8 Conclusion

This paper has reviewed the methods used to estimate imputed rental income and explored its impact on the distribution of income in Australia in the 1990s. The results indicate that, in aggregate terms, imputed rent contributes significantly to the average level of household income, but also varies considerably across housing tenure types, which in turn vary with household type and position in the income distribution. In 1998-99, the dollar value of net imputed rent (calculated after deducting operating expenses and interest) ranged from \$49 for households who were purchasing their own home, to \$146 for those who owned their home outright. When expressed as a percentage of household income (adjusted for need using an equivalence scale), net imputed rent varies between 7.4 per cent (in the ninth decile) and 42.2 per cent (in the lowest decile). Although the overall effect is small (the Gini coefficient declining by 3.3 per cent and the P90/P10 percentile ratio by 2.2 per cent), imputed rental income has an unambiguously equalising effect on the income distribution. This result is robust with respect to changes in the rate of return used to calculate imputed rent, and to changes in the equivalence scale used to adjust for differences in household size and composition.

The inclusion of imputed rent also affects the relative risks of low-income faced by different households, defined according to their housing tenure and age. In relation to housing tenure, the effect reduces the risk facing those in public housing where the risk of low income had been greatest, while increasing the risk faced by home purchasers and private renters. In broad terms, the pattern of results produced by including imputed rent as a component of income is similar to that produced when income is defined after deducting housing costs.

The analysis of the changing distributional impact of imputed rent between 1993-94 and 1998-99 indicates that while the effect of imputed rent was equalising in both years, it is not possible to reach a definitive conclusion about whether or not the overall impact had changed over the period. The simulation results in Table 8 indicate that changes in gross housing equity (which incorporates the impact of house price changes) explain much of the observed change in the distribution of income plus imputed rent, and account for much of the changed distributional impact of imputed rent itself.

Overall, the results highlight the importance of taking account of imputed rent when analysing the structure and distribution of Australian living standards. The homeownership dream has become a reality for many, and account should be taken of this when examining how household living standards vary across tenure types and change over time. When this is done, a very different picture emerges from that based on standard (cash) income measures of well-being. This does not mean that the conventional approach used to analyse the distribution of cash income should be dispensed with: disposable cash income remains an important indicator of command over resources and hence of the standard of living. However, for many purposes, the focus of income distribution analysis in Australia would benefit from also adopting a measure of income that includes imputed rent as part of income.

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