

IMPUTED RENT AND INCOME DISTRIBUTION

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This paper uses unit record survey data to implement a 1977 United Nations recommendation that imputed rent from owner-occupied housing be included in household income in statistics collected for income distribution purposes. The conceptual difficulties associated with employing the recommended National Accounts approach are highlighted by a comparison of the methodologies used to impute housing income for National Accounts purposes, for use in income distribution analyses and for income taxation purposes. The empirical difficulties associated with implementing the preferred approach are also discussed. The results reinforce the significant impact owner-occupation has on the well-being of many households and point to the importance of a disaggregate analysis of its distributional impact.

1. INTRODUCTION

In 1977 the UN issued a set of Provisional Guide-lines on Statistics of Distribution of Income, Consumption and Accumulation of Households (UN, 1977). These Guide-lines recommended that imputed income from owner-occupied housing be included in the property income component of household income along with interest, dividends and rent receipts and that this, along with transfer and benefit income, be added to primary income to give the preferred measure of total household income. In a like manner, rental expenditure should also be imputed as an item of household consumption.

Questions surrounding the use of income as a measure of well-being and the choice of an appropriate measure of income are perhaps the most well established of all of the issues associated with income distribution analysis. However, as internationally comparable microdata sets have become more readily available, researchers have been able to experiment with the data collected. This has resulted in a shift in the focus of attention away from conceptual issues underlying the source data and towards methodological issues such as the appropriate choice of income unit, methods for adjusting for family size, or the choice of equivalence scale and the appropriate basis for ranking. All of these can be dealt with from within the confines set by existing unit record data. Cowell (1984) provides an overview of the earlier work. Buhmann *et al.* (1988) and O'Higgins *et al.* (1989) are illustrative of the more recent work.

The work currently being done on the appropriateness of income as a measure of well-being (Travers and Richardson, 1991), on the treatment of non-cash

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income in the Luxembourg Income Study (Saunders, 1992), and on static (Burkhauser and Wilkinson, 1985) and dynamic (Harding, 1992) life-cycle approaches to lifetime distribution of income, is indicative of a return of interest to the issues which were at the focus of earlier income distribution work.

This paper similarly returns to a focus on the implications of the underlying definitions of income in income distribution studies. It examines both the ways in which the UN recommendation to incorporate imputed rental income into income distribution statistics can be implemented and the impact of expanding the definition of household income in this way. It represents the first attempt to implement the fifteen year-old UN recommendation in Australia.

The following section provides an overview of three approaches which have been used to impute rental income for various purposes; these are the National Accounts approach, the income distribution approach and the income taxation approach. The approach in the Australian National Accounts is used to highlight the difficulties involved in implementing the UN recommended approach. Section three indicates how the preferred National Accounts approach can be integrated with household survey data to provide household estimates of imputed rent. Section four provides an empirical assessment of the extent and distribution of net imputed rental income in Australia based on unit record data from the 1988/89 Household Expenditure Survey. Section five concludes.

2. APPROACHES TO MEASURING IMPUTED RENT

The most widespread inclusion of imputed rent into income statistics occurs in the National Accounts. The United Nations System of National Accounts (UN, 1968), first published in 1953 with the intent of providing a uniform of basis for reporting national income statistics, defines a preferred approach:

“The total of owner-occupied dwellings which is to be included in gross output should, in principle, be valued at the rent on the market of the same facilities. It may be necessary to approximate the market rent by an estimate which should cover items such as operating, maintenance and repair outlays, water charges, insurance service charges, taxes, depreciation and mortgage interest in addition to interest on the owner’s investment in the dwelling and other elements of net return.” (UN, 1968:6.22)

When the issue of an equivalent system of distribution statistics was first placed on the agenda of the Statistical Commission in 1966 it was recommended that imputed income be included in a manner which was consistent with its inclusion in the national accounts (UN, 1977). This recommendation has been adopted subsequently by the World Bank/ILO Income Distribution Statistics Project (van Ginneken, 1982).

In the first report of what was to be a series published every 3 or 4 years, the UN Compendium of Income Distribution Statistics (UN, 1985) provided income distribution data from 57 countries. Of these 57 countries, only 18 failed to incorporate some measure of imputed income for housing in the published data. Those countries that did not incorporate imputed income in this particular

source of official income distribution statistics include most of the English speaking western world (Australia, Canada, Ireland, New Zealand, U.K. and U.S.) and some other OECD countries (Japan and France).¹

Despite an expressed desire to develop a system of income distribution statistics equivalent to the standardised approach employed for the development of National Accounts, attempts to incorporate imputed income in a manner consistent with its inclusion in the National Accounts have been constrained by difficulties arising from both conceptual and empirical issues. Some of the potential difficulties are signalled in the UN definition given above in which two distinct approaches can be identified: the first can be described as a *market value approach*; the second as an *opportunity cost approach*.² The possibility that the two suggested approaches could yield quite different results is slurred over in recognition of the difficulties in implementing either. Some of the more significant of these difficulties are discussed below; first in relation to the approach used in the National Accounts, second in relation to attempts to apply this approach in income distribution analyses and third in relation to the statutory definitions of imputed income for income tax purposes.

2.1. *National Accounts Approach*

The first of the conceptual issues to be considered arises from the extent of aggregation employed in the National Accounts. Aggregate National Accounts net out intersectoral transactions to avoid double counting. At the disaggregate or sectoral level, however, such intersectoral transactions are separately recorded with the result that measures of production or income at the sectoral (household) level do not necessarily coincide with the measures employed at the aggregate (national) level. This difficulty is illustrated by reference to the Australian National Accounts, but the issue is a global one which applies to all countries.

Aggregate Measure of Imputed Rent

In the Australian National Accounts, gross operating surplus (GOS) from owner-occupied dwellings is defined as gross rent (GR) less operating costs (C) associated with rates, insurance, maintenance etc. That is

$$(1) \quad GOS = GR - C.$$

The definition of gross operating surplus given in equation (1) is that which is attributed as income from owner-occupied housing in the income based measure of gross domestic production; operating costs are excluded as intermediate transactions recorded in the incomes of the respective recipients. Gross rent (including

¹The former set of exclusions, combined with the cultural dominance of sources of information, may explain why there has not been much focus on this issue in the English language literature on income distribution. When combined with the OECD exclusions, it could also explain how this lack of focus has been extended to such cross-cultural attempts as that being undertaken by the Luxembourg Income Study, which has begun to recognise the potential importance of imputed income only in its most recent papers.

²Katz (1983) provides an overview of six possible approaches for valuing the services of consumer durables which includes the two outlined here and raises some of the issues associated with implementing each.

operating costs) is included in the expenditure based measure. This measure of imputed rent is equivalent to the first (market value) approach proposed by the UN. Some of the empirical difficulties associated with the measurement of gross rent based on this approach are discussed in Section 3 below.

Sectoral Measure of Imputed Rent

If depreciation (D) is allowed for, the net operating surplus from dwellings is given by

$$(2) \quad NOS = GOS - D = GR - C - D$$

and if interests costs (I) as well as depreciation are taken into account, the net income (NR) from dwellings is given by

$$(3) \quad NR = NOS - I = GR - C - D - I.$$

The measure of net rental income given in equation (3) is that which is incorporated in household income in the household account. All deductions are excluded as intermediate transactions representing intra- or inter-sectoral transfers of income from the household sector to other households or to other sectors (government, corporate etc.). Again gross rent is included in outlays.³ Equation (3) can be given in terms of gross rent with

$$(4) \quad GR = NR + C + D + I.$$

Given NR represents the “interest on the owner’s investment in the dwelling and other elements of net return,” equation (4) outlines the second (opportunity cost) approach to measuring imputed rent proposed by the UN.

Reconciliation

Equations (1), (3) and (4) indicate that measures of housing income in the National Accounts differ depending on the level of aggregation employed. This signals the difficulties which arise in translating measures designed for National Accounts statistics and macroeconomic analysis into measures suitable for income distribution statistics and microeconomic analysis.

At the aggregate level only operating costs are excluded from income; at the sectoral level, all housing related costs are excluded on the income side although gross rent (which embodies these) is included on the expenditure side.⁴ Thus, the question of how imputed rent is to be included in income distribution statistics in a manner which is consistent with its inclusion in National Accounts statistics is not clear cut. Both gross and net measures of housing income are employed in the National Accounts and both market value and opportunity cost approaches to measuring this income have been proposed.

³The definitions embodied in equations (1) and (2) can be derived by reconciling the data presented in Table 1, Table 9, Table 17, Table 27, Table 45 and Table 47, Australian National Accounts 1988-89, ABS Cat. No. 5204.0.

⁴The measure of housing income embodied in the National Accounts at the aggregate level does not have an intuitively obvious counterpart in micro level data; the measure neither includes all housing income nor excludes all housing costs. The measure of housing income embodied in the National Accounts at the household level, however, does have an intuitively obvious counterpart at the micro level; it is effectively an after-costs or net measure of income.

2.2. Income Distribution Approach

The second conceptual difficulty to be considered arises from attempts to incorporate these National Accounts measures into income distribution measures.

Information on the treatment of imputed rent in income distribution studies can be obtained from the various cross country comparisons of income distribution which have been undertaken. This tradition can be regarded as having been started by Sawyer (1976); it has been carried on ably in the work arising out of the Luxembourg Income Study (LIS) which began in 1983 (Buhmann *et al.* 1988; O'Higgins *et al.* 1989; Saunders *et al.* 1989). No attempt was made to include housing income in the operational definitions of income in either the Sawyer study, or in the initial analyses undertaken by the LIS. Sawyer, in fact, excluded some countries from his analysis expressly because they included imputed rent in their statistics and so were not comparable with the countries covered. With the extension of the LIS analysis to include consideration of non-cash incomes, this short-coming is in the process of being rectified. One of the first attempts to publish cross-country comparisons of the effects of including non-cash income (including imputed housing rent) into measures of well-being is the LIS study by Saunders *et al.* (1992).

In line with the National Accounts approach to measuring rental income at the household level, the basic gross cash income concept used in income distribution analyses would incorporate net rental income defined as gross rental income less all associated housing costs as given by equation (3). This measure can be compared with those proposed by Saunders *et al.* (1992) which, in turn, follow measures proposed by the U.S. Bureau of the Census (1991). These income distribution studies suggest two methods could be employed. The first estimates net rental income from market rent less the various costs of home ownership including mortgage interest, depreciation, maintenance costs and property taxes.⁵ The second method (employed by the Bureau of the Census) applies a rate of return to home equity to obtain an estimate of the income which would have been received if this equity was held in an interest bearing account.

Reinterpreted Sectoral Measure of Imputed Rent

The first of these measures is equivalent to net rental income from dwellings as defined by equation (3). This measure of imputed rent can be rewritten as

$$(3) \quad NR = GR - C - D - I = (r - c - d)V - iM,$$

where r stands for a gross rental rate of return, c for operating costs, d for depreciation and i is the mortgage interest rate. Non-interest costs are expressed as a percentage of dwelling value, V ; interest costs are a percentage of outstanding mortgage, M . If the gross rental rate is assumed to represent the user cost of housing, with $r = i + c + d - p$ where p is (expected) inflation, the latter part of this

⁵In the Saunders *et al.* proposal it is not clear whether this first measure includes mortgage interest payments as these were not explicitly listed with depreciation, property taxes and maintenance as a cost of owning.

expression can be rearranged to give

$$(3') \quad NR = (i - p)V - iM = i(V - M) - pV,$$

where $V - M$ represents housing equity.⁶

In other words, in the National Accounts, the net income from dwellings is given by a nominal risk adjusted rate of return applied to housing equity less expected capital gains. With zero debt, this is equivalent to a risk adjusted net real rate of return applied to dwelling value. With positive debt, this risk adjusted real rate of return must be reduced by the cost of the interest payments made on the mortgage outstanding. The gross rental return on housing consistent with this is equal to a risk adjusted real rate of return plus non-interest costs. The expression given in equation (3') clearly indicates that the net rental return on housing is a real return.

Measures of Imputed Rent Incompatible with National Accounts

The alternative measure proposed by Saunders *et al.* and used by the U.S. Bureau of the Census, however, is equivalent to

$$(5) \quad NR = i(V - M) = (r - c - d + p)(V - M).$$

A comparison of equations (3') and (5) indicates the LIS proposed measures are internally inconsistent. The measure given in equation (5) differs from equation (3') by the inclusion of expected capital gains ($= pV$). In other words, use of a nominal rate of interest applied to equity in housing to impute rental income is equivalent to including (unrealised) nominal capital gains into the measure employed.

Several earlier income distribution studies have attempted to impute housing income. The equation (5) approach based on nominal interest rates has been employed in an Australian study of income, housing and gender inequality by Smith (1990) following the example set much earlier by Aaron (1970) and more recently by Lerman and Lerman (1986).⁷ By contrast, Hurd and Shoven (1985), following an approach employed earlier by Weisbrod and Hansen (1968), converted net housing wealth to income at a fixed real rate of interest. This variation on equation (5) overstates net imputed rent as measured by equation (3) because it does not allow for deduction of the inflation component of mortgage interest payments.

In a U.S. study of interracial transfers and income redistribution, Cox and Raines (1985) defined total income to include gross imputed income as measured by a gross rental rate of return on housing. A similar approach has been applied by the U.K. Central Statistical Office (1990) in its publication of Family Expenditure Survey data and by Statistics Canada in 1990. Each of these studies measures gross housing income using a market value approach. They are consistent with

⁶This expression ignores any complications which arise from the tax treatment of housing and assumes dwelling prices increase in line with inflation so that there are no real capital gains on housing. These issues are addressed in section 2.3.

⁷The potential incompatibility between this approach and that employed in the National Accounts is indicated by Smith's estimate of imputed rent which exceeds that recorded in the National Accounts by a factor of almost 10.

the expenditure based measures incorporated in National Accounts but not with the income measures employed at the aggregate national level.

The differences in the approaches employed to impute housing income in income distribution studies provide an indication of the conceptual issues which arise when the underlying framework employed is not clearly articulated.⁸

2.3. Income Taxation Approach

This lack of an internally consistent framework can also be found in early studies of the distributional impact of the taxation benefits which arise from the income tax treatment of owner-occupied housing. In these early theoretical discussions of imputed rent taxation, the predominant approach was based on use of an opportunity cost of capital (often presumed equal to the nominal mortgage rate) applied to equity in housing to measure net imputed rent. Rosen (1985) provides a good overview of this type of approach. These approaches are equivalent to that proposed in equation (5) above and, as such, are incompatible with the National Accounts approach. Studies which have focussed on the costs of owner-occupation, however, are more likely to have applied a user cost of capital approach. This makes an allowance for expected capital gains and is consistent with that implied by equation (3') above. Atkinson and King (1980) provide a good example of this approach. They point to the need to use a plausible long run value for the underlying net real rate of return and suggest 4 percent for illustrative purposes. More recently Hills (1989), using a similar approach, suggests a net rental rate of 5 percent for the U.K.

Empirical Measures of Imputed Rent

These theoretical discussions have originated in countries where imputed rent is not taxed or is no longer taxed. Greater internal consistency in approaches is observed in countries where imputed rent is currently taxed. Merz (1977) claims imputed rent tax was incorporated in over one-third of the income tax systems in existence in the mid 1970s. In these countries, the estimated rental value of owner-occupied housing less operating and interest costs formed the basis of taxation; some, but not all, countries allowed deductions for depreciation.

Two recent OECD reports (OECD, 1990, 1988) give specific illustrations of the way in which rental income and deductions are assessed in those countries which include imputed rent in the income tax base. Gross imputed rental income is generally calculated by an administrative valuation procedure as a flat percentage of the capital value of housing. This percentage generally ranges from

⁸Some of the incompatibilities between the income distribution approaches employed and the National Accounts approaches arise from the treatment of capital gains. The question of non-realised capital gains has not been an issue in income distribution studies based on cash income concepts. It becomes an issue once non-cash income is considered. Ruggles and Ruggles (1986) have argued that national accounts data may provide an unsuitable framework for microdata because of the different concepts employed in each. They argue for a system of National Accounts which distinguish market transactions from imputations and attributions on the grounds that it is only the former which supply financing for capital formation in other sectors. Eisner (1988), on the other hand, has recommended extending the National Accounts to include capital gains as a component of income in the National Accounts.

1 percent to 4 percent.⁹ In such countries operating costs are taken into account either directly or via an allowance fixed in terms of the capital value. Most countries which allow interest deductions set limits on the extent of these.

In Australia, imputed rent was included in the Federal income tax base from 1915 to 1923 (Reece, 1985). At that time rental value was assessed as 5 percent of capital value and operating costs and interest expenses were deductible. Depreciation expenses were explicitly excluded on the grounds that the 5 percent return was presumed net of depreciation.¹⁰ Currently, no form of housing income is assessable for owner-occupied housing in Australia, nor is any housing related expenditure (including interest expense) deductible. The income derived from non owner-occupied housing, however, is defined as net rental income plus any real capital gains when realised. All operating and (nominal) interest costs are allowable deductions. This statutory definition is broader than the definition of imputed income employed at the sectoral level in the National Accounts by the inclusion of real capital gains.

In summary, in those cases where the tax is actually applied, the conventional approach to imputing net rent for income tax purposes is to assess gross rent on the basis of a fixed percentage of the capital value of housing and to allow operating and interest costs as deductions. As long as depreciation allowances and real capital gains are incorporated into the gross rate of return chosen this approach is compatible with the National Accounts approach expressed in equation (3).

3. IMPUTING HOUSING INCOME

The discussion above suggests that the disaggregated definition of net imputed rent incorporated in the household accounts provides the best starting point for imputing rental income for inclusion in income distribution analyses. This is consistent with the UN recommendation and with the statutory definitions of imputed rent in those countries where it is incorporated into the income tax system. This section first briefly describes the estimation of imputed rent in the Australian National Accounts and then indicates how the information embodied in these aggregate accounts can be combined with survey data to provide consistent estimates of imputed rent at the individual household level.

⁹In Sweden, however, imputed rent is assessed at 2 percent of capital value for low valued properties and 8 percent for high valued properties and in Denmark a similar progressive rate scale from 2.5 percent to 7.5 percent applies. More detailed information is provided in the national position papers upon which the 1988 report was based and, in particular, Talon (1985). The Scandinavian countries, Belgium, Greece, Italy, Luxembourg, the Netherlands, Spain, and Switzerland all assess imputed income for tax purposes. Unless property valuations are kept upto date, the approach used tends to underestimate the rental value of the property. This has been one of the reasons why the policy of taxing imputed rent has been abandoned in some countries (e.g. UK abandoned its Schedule A taxation in 1963 because valuations were based on 1939 figures; France abandoned it in 1965 and (West) Germany in 1987).

¹⁰More recently, the Priorities Review Staff (1975) proposed the reintroduction of imputed rent into the income tax base. For practical purposes, they proposed a simple method for imputing income based on 7.5 percent of assessed capital value less deductions for operating costs, depreciation and interest payments.

3.1. National Accounts Estimates of Imputed Rent

In the Australian National Accounts census data on rents paid in the private sector for unfurnished dwellings are used as a benchmark for imputing gross rents for owner-occupied dwellings. The data employed are disaggregated in terms of the physical characteristics of dwellings but are aggregated in terms of their spatial characteristics. Thus, estimates of market rent vary by the size and type of dwellings but are averaged over all locations.

This reduces the importance of the location premium embodied in market rents and leads to distorted estimates of imputed rents. In the most recent data for the major urban areas in New South Wales, for example, rent for a four bedroom medium density dwelling exceeds that for a four bedroom separate house. Location specific data, however, clearly indicates houses have a higher rental value than medium density dwellings of the same size. This distortion arises because the highest proportions of rented medium density dwellings are in the higher priced inner and middle ring suburbs in the metropolitan areas. Conversely, separate houses for rent are located disproportionately in the cheaper outer ring suburbs. This means that imputed rental values for medium density dwellings are dominated by rental values in the more expensive suburbs and those for separate houses are dominated by rents in the cheaper suburbs. Thus, the procedure employed suggests that the estimates embodied in the National Accounts are conservative, as rents for the predominant dwelling type (separate houses) are understated.

Given the estimates of gross housing wealth for owner-occupied housing from the 1988/89 Household Expenditure Survey (HES), the gross annual imputed rent recorded in the 1988/89 National Accounts represented a gross rental rate of return for housing of approximately 5 percent pa. Rules of thumb employed by real estate agents suggest this represents a lower bound for net, not gross, returns which supports the claim that the National Accounts estimates are biased downwards.¹¹

3.2. Income Distribution Estimates

Once an average gross rental rate is derived, the gross rental value of owner-occupied housing can be determined at the individual household level by applying this average rate to the individual estimates of dwelling value provided in the HES data. Likewise, because operating costs for maintenance, repairs, rates and insurance as well as interest payments are also collected in the quinquennial HES, equation (1) estimates of gross operating surplus at the individual household level can be readily determined as can the step from net operating surplus to net imputed rent embodied in equation (3).

¹¹Evidence collected for the NSW Department of Housing suggests that gross rental rates of return on houses have averaged about 8 percent over a 20 year period to 1990 (Dwonczyk, 1990). These calculations were seen as robust enough to form the basis of the funding of a partial privatisation of NSW public housing. Estimates undertaken by the Victorian Ministry of Housing and Construction (1990) suggest that net rental yields in Melbourne averaged 5.9 percent on houses and 5 percent on units. Both State based figures are consistent with attempts undertaken elsewhere to assess a rate of return on housing. EPAC (1988), for example, suggests that housing has exhibited an average after tax (real) *net* rate of return of between 5–6 percent at the end of the 1980s.

Data limitations, however, mean that estimates of depreciation are difficult at the individual household level and hence the equation (2) step from gross to net operating surplus is incomplete. Imputation of housing income at the household level in line with the National Accounts with depreciation based on the capital component of housing can cause concern in the absence of inclusion of any appreciation arising from the land component of housing.¹² In this paper, the impact of depreciation is assumed to be absorbed into the estimate of the gross rental rate and, for consistency with the National Accounts, capital gains are ignored.

Thus, using the preferred National Accounts approach outlined, gross imputed rent is assessed in this paper as a fixed (real) rate of return on estimated dwelling value and net rent is determined by subtracting the actual costs associated with earning that gross rent. This approach allows for both positive and negative net imputed rents. In line with the estimates of gross imputed rent which are incorporated into the 1988/89 Australian National Accounts and the estimate of gross owner-occupied housing wealth obtained from the 1988/89 HES, a benchmark gross rate of return is taken as 5 percent of dwelling value. Alternative estimates of net imputed rent based on a gross rental rate of 7.5 percent are also considered. This represents a conservative industry estimate of gross rental returns for investment in private rental housing. In determining net rates of return, operating costs covering rates, repairs, maintenance and insurance and interest costs are based on the actual costs incurred by owner-occupiers as reported in the Household Expenditure Survey.

As indicated, a 5 percent rate of return represents a conservative estimate of gross market rates of return on rental property. It also represents a conservative estimate if an alternative opportunity cost approach is used to estimate rental rates of return. The average annual dividend yield on Australian share markets over the year to June 1989 was 5.5 percent and the return on Treasury indexed bonds issued during 1988 was 4.55 percent for 15 year bonds and 4.65 percent for 10 year bonds. These returns provide an indication of the net return which might be earned on alternative investment options which yield a real return.

For purposes of comparison, the effect of estimating imputed rent using an opportunity cost approach based on the return on net equity rather than a market rent approach based on gross rent less costs is also examined. Net worth or equity in owner-occupied housing was derived from the dwelling value and outstanding debt data provided in the Household Expenditure survey and a net real rate of return of 5 percent is applied to this.

4. THE IMPACT OF HOUSING INCOME ON INCOME DISTRIBUTION

The impact of imputed income on household income distribution in Australia as estimated by the benchmark approach outlined in the previous section will depend on the distribution of gross housing wealth and on the distribution of the

¹²This problem has been compounded in the Australian accounts by a switch in 1985-86 from a historic cost estimate of depreciation to a current replacement cost estimate. This change had the effect of more than trebling the deduction for depreciation. Edey and Britten-Jones (1990) express concern at the use of any measure which is so sensitive to estimates of depreciation.

costs associated with owning and acquiring that wealth. The impact of the alternative measure, on the other hand, depends only on the distribution of net housing wealth.

4.1. Aggregate Results

The data from the 1988/89 HES provide an estimate of \$537b for Australia's gross owner-occupied housing wealth. Outstanding debt on this housing is estimated to be a mere \$51b. Table 1 indicates how this owner-occupied housing wealth and debt is distributed over the 5.42m households in Australia. Averaged over the 2.93 m or 72.7 percent of households who are owners, it represents an average value of \$136,367 for owner-occupied dwellings. Averaged over all households, this represents the average value of \$99,118 indicated in Table 1. Average outstanding debt amounts to \$13,525 per owner-occupied household or \$9,418 averaged over all households.

Table 1 indicates the extent of differences in dwelling values and debt amongst owner-occupiers and differences in ownership rates amongst households in different income deciles. In general, average dwelling values increase with income. In part, this arises from the increasing proportion of households who are owner-occupiers as income decreases. Outright ownership, however, declines with income. Low average debt in the lower income deciles arises primarily from high rates of outright ownership.

The interaction of dwelling values, debt and the proportions of households who are owners or purchasers influences the aggregate net imputed income estimated for each decile group. Renting households with no housing wealth derive no income advantages from the ownership of housing. Outright owners with no housing debt derive only positive income. For the preferred measure, purchasers with positive net housing wealth benefit from the rental services provided by their housing, but can suffer income losses if costs exceed gross rental income. When this occurs, the measure of income given by equation (3) is negative. For the measure of imputed rent based on net equity, as in equation (5), imputed rent is negative only when net equity is negative.

The net imputed rent estimates in Table 1 summarise these effects for all households. Three estimates are provided. Two are based on the National Accounts preferred approach (that is a market rent approach based on gross rent less housing costs): the first assumes a benchmark gross rental rate of 5 percent consistent with the estimates of gross rent in the National Accounts; the second employs a 7.5 percent rate more consistent with market evaluations of gross rental returns. The third estimate applies a net real return of 5 percent to equity in housing.

The sensitivity of the estimates of imputed rental income to the assumptions made about the gross rental rate of return can be seen by comparing the first and second of these estimates of net imputed rent. A 50 percent increase in the assumed rental return more than doubles the estimate of average net imputed rent from \$46 per week to \$94 per week. This disproportionate increase arises because costs are invariant to the assumptions made about gross rental rates. The information

TABLE 1
OWNER-OCCUPIED HOUSING WEALTH, DEBT AND ALTERNATIVE ESTIMATES OF NET IMPUTED INCOME: ALL HOUSEHOLDS, 1988-89

	Gross Income Decile										
	1	2	3	4	5	6	7	8	9	10	Total
Wealth:	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Value of owner-occupied dwellings	63,893	69,218	82,193	73,468	78,293	103,339	96,302	102,262	126,188	195,315	99,118
Outstanding debt	1,612	1,625	2,854	5,857	8,673	12,047	13,525	14,697	15,552	17,577	9,418
Tenure:	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Outright owners	59.0	56.7	56.9	40.3	35.5	37.7	35.5	30.8	33.7	41.8	42.8
Owner-purchasers	6.7	10.0	13.5	24.1	31.1	39.9	42.8	46.1	45.4	39.2	29.9
Owner-occupiers	65.7	66.7	70.4	64.4	66.6	79.6	78.3	76.9	78.1	81.0	72.7
Income:	(\$ pw)	(\$ pw)	(\$ pw)	(\$ pw)	(\$ pw)	(\$ pw)	(\$ pw)	(\$ pw)	(\$ pw)	(\$ pw)	(\$ pw)
Gross household income	92	195	271	378	484	595	720	870	1,064	1,680	636
Net imputed rent:											
0.050 value-costs	44	45	56	36	32	43	31	26	41	108	46
0.075 value-costs	74	78	96	72	70	93	77	76	102	202	94
0.050 equity	60	64	76	64	65	88	78	82	107	167	82

Source: 1988/89 Household Expenditure Survey, unit records.

Note: These values have been averaged over all households. Results for owner-occupiers only are given in Yates (1991).

provided in Table 2 can be used to determine the effects of alternative assumptions about gross rental rates.

The effect of applying a net real return to equity in housing can be seen from the third of the estimates of imputed rent. Compared with the benchmark preferred approach, this estimate based on the alternative approach overestimates net imputed rent. In relative terms, this is most discernible for those households with above average loan to valuation ratios for whom the true (nominal) cost of interest payments have not been taken in account fully. For this alternative approach, a 50 percent increase in the assumed rate of return would increase estimate imputed rent by 50 percent on a pro rata basis over all households.

On the basis of the preferred approach with the benchmark assumptions, imputed rent contributes on average of \$46 per week to household income. This amounts to 7 percent of average weekly gross household income.

Table 2 provides a breakdown of the components of this benchmark net imputed rent averaged across all owner-occupiers. The impact of the relatively high incidence of (aged) outright owners in the lower three deciles of the income distribution can be seen in the lower interest costs faced by these groups and the resultant disproportionately high net imputed rent.

4.2. Distributional Outcomes

Both Tables 1 and 2 show that net imputed income is not distributed evenly across all households. The specific outcomes, however, are sensitive to the assumptions made about rental returns and to the rental measures employed. On the preferred measure, households in the fourth to ninth income deciles receive below average net imputed incomes whereas those in the top income decile have a net imputed income of more than double the average value. For households in deciles 4 and 5, this can be explained by below average housing wealth (arising in part from a below average proportion of households with any housing wealth). For households above the sixth decile, above average housing debt contributes to disproportionately high interest costs. For these households, the average value of owner-occupied housing wealth does not provide sufficient level of housing services to compensate for the costs incurred in accumulating that wealth.

The above average incidence of the aged in the lower three income deciles contributes to an above average incidence of outright ownership. This, in turn, offsets the impact of below average dwelling values. A more detailed analysis of the characteristics of households in each decile is given below.

The impact of including imputed rent on the distribution of income can be seen in Table 3 which compares income distributions when households are ranked on the basis of gross household income with the outcomes when they are ranked on the basis of gross household income plus various assessments of net imputed income. From these results, net imputed income, however measured, appears to have little impact on income distribution at an aggregate level. For households ranked on the basis of gross household income the Gini coefficient is 0.39; that for households ranked on the basis of gross household income plus the preferred measure of net imputed rent is reduced only to 0.38. The insensitivity of these Gini coefficients, however, partly arises because redistribution has taken place

TABLE 2
RENT AND COMPONENTS OF BENCHMARK NET IMPUTED RENT BY TENURE: OWNERS, 1988-89

	Gross Income Decile										
	1 (\$ pw)	2 (\$ pw)	3 (\$ pw)	4 (\$ pw)	5 (\$ pw)	6 (\$ pw)	7 (\$ pw)	8 (\$ pw)	9 (\$ pw)	10 (\$ pw)	Total (\$ pw)
Owners:											
Gross imputed rent	93	100	112	110	113	125	118	128	155	232	131
Operating costs	21	26	22	28	28	33	32	37	46	45	32
Interest costs	7	7	11	26	37	40	47	56	55	55	35
Net imputed rent	66	67	79	56	48	55	39	35	52	132	63

Source: 1988/89 Household Expenditure Survey, unit records.

Note: Rents and costs have been averaged over households in each tenure and not over the whole population; for income distribution purposes these have been weighted by the proportion of households in each tenure.

from households in the middle income deciles to those at the lower and the highest deciles. The implications of this will be discussed below. Measures based on the conceptually inconsistent opportunity cost approach suggests inequality increases with inclusion of housing income.

As can be seen from the results in Table 3, the impact of the preferred measure of net imputed income is greatest on households in the lowest income groups. From Table 1, the benchmark estimate increases gross household income by almost 50 percent for households in the bottom income decile; it increases gross household income by less than 1 percent for households in the top income decile. From Table 3, households in the bottom quintile receive 4.6 percent of original gross income compared with 5.0 percent of total income when income is expanded by the inclusion of net imputed rent. Although such a change does not appear large in aggregate terms, the impact of net imputed income on the relative share of those in the lowest quintile is relatively large compared with the changes in inequality which have been observed in Australia in the 1980s (Saunders *et al.* 1989).

4.3. Disaggregate Outcomes

These aggregate effects disguise an uneven impact of the inclusion of imputed income within each income group. The average weekly net imputed income of \$46 recorded in Table 1, for example, is the weighted average of a net imputed income of \$63 for the 72.7 percent of households who are owners and an imputed income of zero for the remainder. In turn, the \$63 is shared unevenly amongst owners. The 42.8 percent of households who own outright derive a positive weekly income of \$137 and the 29.9 percent of households who are still purchasing derive a negative weekly income of \$41. Similar disparities arise when households are examined by any other characteristics such as State of residence, age and household type.

In order to facilitate a disaggregate analysis, Table 4 indicates the incidence of households by each of these characteristics (that is State, tenure, age and household type) when households are ranked by gross household income. Table 5 illustrates the impact on this incidence when households are ranked on the basis of this gross income plus the benchmark estimate of net imputed income.

In the absence of any assessment of net imputed rent, Table 4 records the disproportionate share of households in the lowest and highest income deciles in NSW; the disproportionate share of households in the lower income deciles in Queensland and South Australia and the disproportionate share of households in the upper income deciles in Victoria. It points to the high incidence of outright owners amongst those in the lower income groups and the age and household data confirms that this arises from life-cycle factors.

Comparison of the results in this table with those presented in Table 5 shows the impact of net imputed rent. The significantly higher dwelling values in NSW combined with only marginally higher levels of outstanding debt result in a reduction in the proportion of households in NSW in the lowest income decile and a small increase in the proportion of those in the highest income decile. The tendency for households in both Queensland and South Australia to be concentrated at the

TABLE 3
DISTRIBUTIONAL IMPACT OF INCLUSION OF NET IMPUTED INCOME

	Decile Share of Total Income (%)										Gini coefft
	1	2	3	4	5	6	7	8	9	10	
Gross income	1.5	3.1	4.3	6.0	7.6	9.4	11.5	13.7	16.7	26.4	0.39
+ net imputed income											
0.050 value-costs	1.6	3.4	4.7	6.1	7.5	9.2	11.1	13.3	16.3	26.7	0.38
0.075 value-costs	1.7	3.6	4.9	6.2	7.6	9.2	11.0	13.1	16.1	26.7	0.38
0.050 equity	1.7	3.3	4.4	5.6	7.0	8.6	10.7	13.3	16.8	28.6	0.41

Source: 1988/89 Household Expenditure Survey, unit records.

Note: Households have been re-ranked with each different measure of income.

lower end of the income distribution is exacerbated by the below average dwelling values in those States.

More significant changes, however, occur amongst the life-cycle variables of age and household type which, in turn, influence household tenure. As expected, outright owners have moved to higher income groups while the proportion of owner-purchasers in the lower income group has increased. When imputed income is ignored, as in Table 4, 59 percent of households in the lowest income decile are outright owners and 51.2 percent have a reference person aged 65 or over. When imputed income is taken into account, only 39.2 percent of households in the lowest income decile are outright owners and the reference person is aged 65 or over in only 40.4 percent of those in the lowest income decile. Similarly, single parents represent only 1.6 percent of households in the lowest income decile on a cash income basis but 10.5 percent of households on an expanded income measure.

The results presented in Tables 4 and 5 clearly suggest positive income from housing protects outright owners from the relative disadvantage caused by low cash incomes; conversely, negative income from housing can create significant difficulties for lower income owner-purchasers.

4.4. Impact on Ranking

Table 6 indicates the extent to which the income ranking of individual households has shifted as a result of redefining income to include this rental income. If the inclusion of net imputed income had no impact on decile rankings, each of the elements on the main diagonal in Table 6 would be 10.0 percent and all off-diagonal elements would be zero. However, as can be seen, there is a significant number of observations in the off-diagonal elements. In total, some 2.07 m households or 38 percent of the 5.42m households in the population move to a different income ranking when imputed income is added to gross household income. Of these households, 1,110,000 are pushed down the income scale and 960,000 move to higher income deciles. In total, almost 90 percent of the re-ranking implies a move up or down of only one income decile but the income ranking of almost 60,000 households is changed up or down by at least 3 income deciles.

Within each decile group, the ranking of between 13 percent and 49 percent of households, is changed depending on whether household income excludes or includes the rental income from housing. Table 6 shows that the extent of this re-ranking is greatest for households in the lower middle income deciles. Of those ranked in the lowest income decile on the basis of gross household income, 74 percent remain in the lowest income decile when ranked on the basis of gross household income plus net imputed rent and 87 percent of those in the highest income decile remain there on re-ranking. However, the ranking of only 51 percent to 56 percent of households in deciles 2 to 7 remains unchanged.

Almost 450,0000 renters have their relative income status decreased by one income decile when the benchmark assessment of net imputed income is added to the definition of household income; this represents 30 percent of all renting households. No renters have their relative status decreased by more than one decile and none have it improved. Outright owners are almost unambiguously

TABLE 4
INCIDENCE OF HOUSEHOLDS RANKED BY GROSS HOUSEHOLD INCOME; 1988-89

	Gross Income Decile										
	1	2	3	4	5	6	7	8	9	10	Total
Percentage of households (%)											
Location:											
New South Wales	36.5	32.9	33.7	35.1	34.6	30.8	31.3	33.2	32.9	38.1	33.9
Victoria	19.7	25.0	23.8	24.5	23.2	27.5	28.7	27.0	27.4	30.1	25.7
Queensland	20.0	19.2	17.3	18.9	20.2	18.1	16.2	14.8	14.9	11.8	17.1
South Australia	12.2	10.4	10.3	8.9	8.3	8.9	9.0	9.8	8.0	5.9	9.2
Western Australia	7.3	7.9	10.0	7.6	9.3	9.9	9.8	8.8	11.0	9.1	9.1
Tasmania	2.8	3.3	3.5	3.4	3.0	3.2	2.8	3.2	2.5	0.9	2.9
NT	0.7	0.2	0.5	0.8	0.4	0.3	0.9	1.0	0.9	1.0	0.7
ACT	0.8	1.3	0.9	0.9	1.0	1.2	1.5	2.2	2.4	3.1	1.5
Tenure:											
Outright owners	59.0	56.7	56.9	40.3	35.5	37.7	35.5	30.8	33.7	41.8	42.8
Owner-purchasers	6.7	10.0	13.5	24.1	31.1	39.9	42.8	46.1	45.4	39.2	29.9
Renters	34.3	33.3	29.6	35.6	33.1	20.4	21.7	23.1	21.9	19.0	27.3
Age:											
Under 25	3.7	6.8	5.6	7.2	6.0	4.7	7.0	6.5	5.7	3.0	5.6
25-44	16.1	19.6	26.4	48.5	55.3	59.1	60.8	58.6	57.8	49.4	45.2
45-64	29.1	26.6	26.5	30.9	29.8	29.5	27.1	30.1	32.3	43.6	30.6
65 and over	51.2	47.0	41.4	13.4	8.9	6.7	5.0	4.8	4.3	3.9	18.6
Household type:											
MC only	8.4	40.3	42.2	23.2	16.8	15.7	21.5	21.7	25.9	15.9	23.2
MC with dependents	7.0	6.5	18.3	27.6	37.0	42.5	40.7	39.3	34.0	30.5	28.4
Other MC	0.4	1.1	2.4	7.0	7.9	10.3	14.7	21.1	22.9	37.6	12.6
Single parent	1.6	17.4	9.2	7.5	4.6	2.9	1.7	0.3	0.4	0.0	4.5
Single person	80.1	30.9	14.7	25.4	21.0	14.8	7.7	5.3	2.0	1.9	20.3
Other	2.5	3.9	13.2	9.2	12.7	13.9	13.8	12.4	14.9	14.0	11.1

Source: 1988/89 Household Expenditure Survey, unit records.

Note: Other MC and other household types cover households with multiple income units.

TABLE 5

INCIDENCE OF HOUSEHOLDS RANKED BY GROSS HOUSEHOLD INCOME PLUS BENCHMARK NET IMPUTED INCOME; 1988-89

	Gross Income Decile										
	1	2	3	4	5	6	7	8	9	10	Total
Percentage of Households (%)											
Location:											
New South Wales	32.1	32.3	30.7	36.7	33.6	33.9	32.7	32.7	34.6	39.8	33.9
Victoria	20.4	21.6	25.7	25.7	25.9	23.3	27.6	27.5	27.9	31.2	25.7
Queensland	21.2	20.1	20.0	17.6	17.4	19.3	16.6	14.2	13.9	11.0	17.1
South Australia	12.8	11.0	10.4	7.6	9.5	8.1	8.9	9.4	8.4	5.4	9.2
Western Australia	8.2	9.5	8.5	8.0	9.1	10.3	9.3	9.7	9.7	8.4	9.1
Tasmania	3.6	3.7	3.2	3.1	3.1	3.2	2.5	3.0	2.3	0.9	2.9
NT	0.7	0.4	0.6	0.6	0.3	0.5	0.9	1.2	0.8	0.8	0.7
ACT	1.0	1.4	1.0	0.7	1.1	1.5	1.5	2.4	2.4	2.5	1.5
Tenure:											
Outright owners	39.2	53.6	56.3	41.2	38.4	36.2	38.5	35.2	38.2	50.7	42.8
Owner-purchasers	11.3	11.6	17.8	26.8	32.1	39.8	40.9	42.5	42.3	34.0	29.9
Renters	49.5	34.8	25.9	32.0	29.4	23.9	20.6	22.3	19.5	15.3	27.3
Age:											
Under 25	8.1	5.2	5.9	6.2	5.3	6.9	6.5	4.4	4.9	2.8	5.6
25-44	25.8	22.7	29.0	45.5	54.2	57.6	58.6	59.1	56.3	43.2	45.2
45-64	25.8	26.2	27.4	27.8	29.1	26.8	28.0	31.8	34.3	48.2	30.6
65 and over	40.4	45.8	37.8	20.5	11.3	8.7	6.9	4.7	4.5	5.8	18.6
Household type:											
MC only	9.5	30.5	37.3	28.0	22.0	19.0	21.7	23.0	23.7	16.8	23.2
MC with dependents	9.6	11.4	17.9	26.0	34.7	40.1	41.1	37.9	34.9	29.9	28.4
Other MC	0.4	1.0	3.5	6.2	6.6	10.3	14.7	19.4	25.5	37.9	12.6
Single parent	10.5	12.4	7.6	5.2	4.0	3.6	0.9	0.4	0.7	0.1	4.5
Single person	66.5	38.3	24.5	24.1	20.8	12.1	7.7	6.0	0.7	2.5	20.3
Other	3.4	6.5	9.0	10.4	11.9	14.9	13.9	13.2	14.5	12.8	11.1

Source: 1988/89 Household Expenditure Survey, unit records.

TABLE 6
CROSS CLASSIFICATION OF DECILE RANKING GROSS INCOME/GROSS INCOME PLUS BENCHMARK IMPUTED RENT

		Percentage of households (%)										
		Gross Income Decile										
												Total
Gross Income Plus Benchmark	Imputed Income Decile	1	2	3	4	5	6	7	8	9	10	
	1	7.4	2.3	0.2								10.0
	2	2.1	5.2	2.5								9.9
	3	0.3	2.0	5.2	2.4	0.2						10.0
	4		0.5	1.6	5.5	2.3						10.0
	5			0.5	1.5	5.7	2.1	0.2				10.0
	6				0.3	1.5	5.6	2.3	0.2			10.0
	7					0.2	1.9	5.4	2.2			10.1
	8						0.2	1.7	6.2	1.7		10.0
	9							0.2	1.4	7.1	1.3	9.9
	10									1.1	8.7	10.0
Total		9.9	10.0	10.0	10.0	10.0	10.0	9.9	10.0	10.1	10.0	100.0

Source: 1988/89 Household Expenditure Survey, unit records.

advantaged by their positive imputed rental income. Almost 900,000 outright owners have their relative income position improved by one or more income deciles and only 100,000 are pushed into a lower income decile by those owner-purchasers whose net rent makes a greater positive contribution to income despite offsetting housing costs. In general, when a conservative gross rental rate of 5 percent is employed, owner-purchasers are relatively disadvantaged by the inclusion of imputed income. Over 500,000 owner-purchasing households have their relative income position decreased by one or more income deciles whilst less than one quarter of this number has gross imputed income sufficiently great to offset their negative costs to an extent sufficient to improve their relative income position.

With the benchmark assessment of imputed rent, this re-ranking is greatest in NSW and Victoria; the proportion of households whose ranking is changed ranges from 43 percent in NSW to 28 percent in Tasmania. It is greatest for owners; 41 percent of outright owners and 48 percent of owner-purchasers are re-ranked compared with only 28 percent of renters. It is greatest in the downward direction for the young with almost 35 percent of those under 44 moving down the income distribution; in contrast, 40 percent of those 65 and over move up the income distribution. Finally, it is greatest for single parent households with 53 percent of these households being re-ranked compared with just over 40 percent of married couple households.

The extent of this re-ranking increases as the estimates of net imputed income increase. The proportion of households whose ranking is changed increases from the 38 percent reported in Table 6 where the benchmark measure of net imputed income based on a 5 percent gross rental return is used to 49 percent if one of 7.5 percent is used. With an opportunity cost approach to estimating net imputed rent which yields only positive additions to income, a return of 5 percent results in 50 percent of households being re-ranked. Under this approach, owner-purchasers do not face the same degree of relative disadvantage as they do with the preferred benchmark as there are few if any assessments of negative income.

5. CONCLUSIONS

This paper has implemented the 1977 UN recommendation that imputed rent be incorporated into income distribution statistics in a manner consistent with National Accounts estimates. It has argued this recommendation requires direct estimation of the value of rental services provided by housing and deduction of all associated costs of ownership including interest costs. Approximation of this by applying an appropriate rate of return to housing equity overstates rental income if a nominal rate of return is employed and understates it if a real rate of return is applied. In either case, the approximation does not allow for the possibility that low net wealth purchasers can face (temporary) cash flow shortfalls and hence reduced income after switching from rental to ownership.

The empirical results presented reinforce the conventional wisdom that owner-occupation has a significant impact on the well-being of many households. Averaged over all households, the (National Accounts consistent) benchmark estimate of net imputed rent increases gross household income by 7 percent. At an aggregate level, this increase has little impact on the extent of income inequality

amongst households. The Gini coefficient for gross household income before imputed rent is taken into account was 0.39; inclusion of the benchmark estimate of imputed rent reduced this to 0.38.

This aggregate measure of inequality, however, disguises much of the redistribution which has taken place. Net imputed rent is not distributed equally over all households; it increases the gross household income of owners by 10 percent but, by definition, has no impact on the income of renters. Amongst owners, the impact is also not equally distributed; outright owners, on average, benefit from positive net income and purchasers, on average, face reductions in household income.

A disaggregate analysis which explicitly takes into account the strong impact of life-cycle effects on housing costs is needed to highlight the distributional implications of extending the measure of household income to include net imputed rent. The possibility that purchase of housing can temporarily reduce cash flow by more than the imputed gross income derived from rental highlights the importance of incorporating a measure of housing income which takes this into account.

Outright ownership unequivocally enhances the command that households have over resources and contributes positively to their capacity to enjoy housing and non-housing commodities alike. Outright owners are amongst those who benefit from a positive re-ranking; their improved relative income status can be inferred from the reduction in the incidence of such households in the lowest income deciles once imputed income is taken into account. This eventual benefit may be obtained only as a result of initial significant costs by households forced to face high housing outlays as owner-purchasers. This is seen in the increased incidence of owner-purchasers in the lowest income deciles when imputed income is taken into account. That renters derive no increase in their command over resources as a result of their housing decisions is seen in the increased incidence of renters in the lowest income deciles when imputed income is taken into account.

The question of whether or not increases in the value of owner-occupied dwellings contribute to the well being of owners in any absolute sense may be controversial. In a physical sense, owners consume no more housing services when the value of their housing wealth increases and when the imputed rental value of the services provided increases. However, the question of whether or not these increases contribute to the relative well-being of owners is incontrovertible. Owners of dwellings which have maintained or increased their relative value experience no constraints on their housing choices. Any increase in housing cost arising from house price inflation is automatically covered by the additional imputed income generated by the increase in housing wealth. Owner occupier households can maintain the level of their housing consumption without reducing their non-housing consumption standards. However, those who have no housing wealth do not have these options open to them. For them, increases in the rental value of housing can mean facing a reduction in their standard of living in relation to both housing and non-housing consumption. To the extent that well-being is measured by the command that households have over resources, such households are relatively disadvantaged. They do not have the same resources nor the same opportunities available to them.

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