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ABSTRACT

Housing, Income Inequality and Progressivity of Taxes and Transfers*

We examine the role of owner-occupied housing for income inequality. Departing from related work, we incorporate accrued capital gains, focus on long-run measures of income, and consider implications for tax progressivity. Using Australia as a case study, we show that housing income can have major implications for the apparent level and trends over time of inequality, progressivity of taxes and transfers, as well as the demographic profile of the rich and the poor. When imputed rent and accrued capital gains—neither of which are taxed—are included in the income base, the redistributive impact of income tax is reduced by 40%.

JEL Classification: D63, R21, H24

Keywords: inequality, housing, tax progressivity

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1 Introduction

The relationship between housing and inequality is deep, broad, and seemingly timeless. Contemporary archaeologists measure the physical size of housing remains to infer levels of inequality in ancient societies (Simelius, 2023). They debate whether characteristics of dwellings were primarily an outcome of wealth, or a means of generating status and wealth (Westgate, 2021). Reviewing contemporary economics literature on housing and inequality, Ioannides and Ngai (2025) start with essentially the same distinction. But the importance of housing in inequality has increased considerably over recent decades. Most advanced economies have experienced large increases in real housing prices over the last 80 years. This increase has been particularly pronounced in some countries, such as Australia (Knoll et al., 2017).

As also emphasised by Ioannides and Ngai (2025), housing intersects with economic inequality in many ways. Housing is a major component of consumption and of wealth. It is intertwined with the inequalities associated with location. It is also a key source of collateral, opening access to credit. In many countries, owner-occupied housing is treated preferentially for (wealth and income) tax purposes (Kholodilin et al., 2023). This can reduce, or potentially reverse, the progressivity of the tax system. Housing has also been positioned as an important mechanism for intergenerational transmission of income, especially through neighbourhood sorting (Durlauf and Seshadri, 2018).

Our aim in this paper is to provide a deep treatment of the role of housing in contemporary income inequality and income tax/transfer progressivity. Earlier work on this link is limited, despite the large and growing importance of housing for economic wellbeing. Many studies have focussed on imputed rental income, whilst ignoring capital gains.[1] In contrast, we adopt a Haig-Simons income benchmark, which implies treating both imputed rent and accrued capital gains as income. We are not the first to incorporate accrued capital gains from housing as income.[2] However, all previous studies we are aware of have a very different focus. They all do so as part of a broader assessment of 'full income', without focussing on the role of housing. Most have also focussed on the implications for the apparent trends in the top-1% share of income. All are focussed on the United States. And none considered tax progressivity.

[1] Examples include Yates (1994); Ceriani et al. (2023); Smeeding et al. (1993); Frick et al. (2010).

[2] Previous studies include Smeeding and Thompson (2011); Armour et al. (2013); Larrimore et al. (2021); Armour et al. (2014). Many other studies instead treat realised capital gains as income (for example Piketty and Saez, 2003). See especially Larrimore et al. (2021) for a detailed treatment of realised versus accrued capital gains for inequality analysis.

Our focus on housing leads to important departures from such earlier work. We favour long-run measures of income, rather than the usual annual accounting period.[3] Lifetime income is arguably a better measure of economic wellbeing than annual income. Further, housing income is subject to major short-run volatility, as well as considerable life-course variation, neither of which are of first-order interest. Such volatility is a major focus in international guidelines for inequality measurement (Expert Group on Household Income Statistics, 2001; World Inequality Lab, 2024). Focusing on longer-run income largely eliminates such volatility, leading to more stable estimates. Using long-run measures also reverses the effect of imputed rent on inequality; imputed rent is typically found to reduce inequality within most countries (see for example Smeeding et al., 1993; Frick et al., 2010). But this seems to be explained by life-course variation (older people have high imputed rent, offsetting their low disposable income). We also propose new approaches for dealing with such instability and life course variation for analysing shorter-run income measures.

We demonstrate the importance of these issues using Australia as a case study. Australia has a similar home ownership rate to many other developed countries. Like many other countries, it's housing prices have increased greatly over the last 30 years and home ownership rates have consequently declined, especially for young and low-income households. This price growth has also led to higher mortgage debt for first home buyers. Further, neither imputed rent or capital gains on owner-occupied housing are subject to income tax, and housing is treated concessionally in determining eligibility for transfer payments. This implies the progressivity of the income tax and transfer system can be substantially impacted by levels of, and changes in, home ownership (and mortgage debt). Importantly, there is high quality panel data available for Australia that allow us to investigate the role of housing income in a long-run perspective which we argue is important.

We show that housing income can have major implications for assessments of inequality and progressivity of taxes and transfers. We begin by constructing new measures of imputed rent and accrued capital gains for the Household, Income and Labour Dynamics Australia (HILDA) Survey, covering 2001 to 2023.[4] Compared to earlier studies, we find a much lower average net imputed rental return, and substantial variation across households. Our measure of accrued capital gains uses inflation-adjusted, hedonic price indices from CoreLogic—disaggregated by dwelling type, state, and capital city versus balance of state. These

[3] As argued by Clarke and Kopczuk (2025), there is no conceptual basis to prefer an annual accounting period, which is likely treated as a default primarily due to the tax system, and the resulting availability of data.

[4] These imputed rent estimates draw on external aggregates from the National Accounts, the Reserve Bank, the ABS Survey of Income and Housing, and self-reported home values and mortgages in HILDA.

gains fluctuate greatly from year to year. Remarkably, total income from owner-occupied housing exceeded total disposable (cash) income in 2021; in some other years, it was negative. Our preferred capital gains measures smooth these fluctuations while still capturing heterogeneity in the timing and location of home purchases and sales, by leveraging HILDA's panel dimension.

Including housing income moves people in the income distribution by an average of 8-9 percentiles. Average income of outright home owners is 34% higher than for renters, but it is 86% higher when housing income is included. The impact on inequality is large, equivalent to a shift from 16th to 10th highest, amongst OECD countries (OECD, 2025).[5] It also strengthens the apparent increase in inequality over time and the demographic profile of the rich and the poor.

The inclusion of housing income greatly changes the apparent progressivity and redistributive impact of Australia's income tax and transfer system. When imputed rent and accrued capital gains—neither of which are taxed—are included in the income base, the redistributive impact is reduced by around 40%. The redistributive effect of the transfer system is also reduced, by 19%. This reflects the exclusion of housing wealth from the means testing of Australian government transfers, which are otherwise highly targeted.

The remainder of the paper is structured as follows. Section 2 reviews the arguments for and against inclusion of housing income for inequality analysis. Section 3 discusses data and methods. Section 4 shows implications of housing for inequality levels and trends. Section 5 shows implications for the demographic profile of the rich and the poor. Section 6 considers implications for income tax and transfer progressivity and Section 7 concludes.

2 Should non-cash housing income be treated as income?

We argue in this section that it is at least defensible to include both imputed rent and accrued capital gains in the income construct. We discuss the income construct itself, then review the treatment of housing income in two influential publications providing guidelines on income inequality measurement. The section concludes with a discussion of the income accounting period.

[5]This comparison is based on the latest available OECD data on annual equivalised disposable income. It is purely to aid in interpreting the magnitude of this change, as we do not perform this exercise for other countries.

The income construct may seem obvious. However, income is a surprisingly recent construct, which poses many conceptual challenges, and even more practical challenges (Clarke and Kopczuk, 2025). The most commonly accepted benchmark in public finance is 'Haig-Simons income', often equated with 'economic income'. Haig-Simons income in a given period is most commonly defined as the sum of consumption and the real change in wealth (net worth). The income concept seemingly emerged in the early twentieth century when the United States implemented comprehensive personal income taxation, stimulating discussion as to what should be included in this tax base (Haig, 1921; Simons, 1938). By this definition, both imputed rent and accrued capital gains should be considered income. Imputed rental income is simultaneously consumption, while accrued capital gains represents a change in real net worth, so long as this represents changes in housing prices (as opposed to improvements to the property, which would be offset by equivalent dissaving).[6].

How then is housing income treated in inequality work, and why? We search for clues in two (quite different) sets of international guidelines of relevance to the study of income inequality. Such guidelines do not dictate or encompass all decisions that inequality researchers make. But they do represent the culmination of considerable thought by significant research teams, and provide rationale for their recommendations. The first is the United Nations' 'Canberra Group Handbook' (Expert Group on Household Income Statistics, 2001), which is used broadly by national statistical bodies and researchers who use household income survey data. The second is the Distributional National Accounts (DINA) Guidelines (World Inequality Lab, 2024).[7]

Both sets of guidelines recommend the inclusion of imputed rental income, but neither recommends inclusion of capital gains from owner-occupied housing. The rationale provided for the exclusion of capital gains is brief, but enlightening. The DINA Guidelines provide purely pragmatic reasons: "... we do not include all capital gains because they are not part of national income (and their inclusion would introduce a lot of volatility...)". To elaborate, the DINA approach seeks to match distributional income concepts to national accounts aggregates. This is motivated by the desire to harness national accounts data, which are available for many countries and years. The national accounts income construct, in turn, was not designed for distributional analysis, but to quantify national economic activity. It thus includes some capital gains (retained company earnings), but excludes others, for reasons

[6]Many income inequality studies refer to the Haig-Simons concept, especially when exploring 'full-income' and related concepts. Other categories of income often included are employee fringe benefits and retained company earnings (see for example Larrimore et al., 2021). It can also be extended further to include the value of household production (Clarke and Kopczuk, 2025).

[7]See National Academies of Sciences and Medicine (2024) for another recent discussion of these concepts.

that have nothing to do with distributional concerns.

The UN Canberra Group also cites volatility as a key consideration, noting that the "pattern of change in income inequality may become very uneven and pro-cyclical." On the same page it states: "One could in principle impute an income stream for those assets that do not pay interest or dividends. Such a general approach may be considered the more theoretically correct as it measures unrealised but available command over resources. But if one is mainly interested in whether a household can meet its everyday needs the relevant approach is to count only realised capital gains and losses." This raises two further points. One is that household income distribution constructs are often motivated by considerations of poverty and adequacy of social assistance (rather than inequality *per se*). The other issue relates to the appropriate accounting period.

In almost all studies of income inequality, the accounting period is one year, or less. There is no theoretical basis for this, except perhaps the concern with subsistence-level income discussed above. It is likely that the main driver for this is instead data availability (Clarke and Kopczuk, 2025). In particular, income tax is generally assessed on an annual basis, which in turn also impacts on the accounting period of firms and individuals (that is, the period over which they can meaningfully report their incomes). The alternative is to use a longer accounting period to reduce the effects of short-term fluctuations and life course variations. This is particularly attractive when dealing with unrealised capital gains, whose short-term fluctuations are unlikely to generate similar fluctuations in consumption or living standards.

To summarise the key points from this section: Both imputed rent and accrued capital gains are clearly within the 'Haig-Simons' definition of income. The inclusion of imputed rent as income is commonly accepted in income inequality analysis, but this is not the case for accrued capital gains. The reasons provided for the latter are not conceptual but pragmatic. These include data availability and relevance to poverty alleviation (rather than inequality measurement). Perhaps the main concern is the potentially large year-on-year volatility caused by capital gains fluctuations. One solution to this is to favour longer income accounting periods, by drawing on long-run panel data. This is not always practical, but other smoothing approaches are also be available. We discuss this further in the following section.

3 Data and methods

We draw primarily on the Household, Income and Labour Dynamics in Australia (HILDA) dataset. HILDA is a leading household panel data set, with annual observations, commencing in 2001 with 13,969 respondents aged 15 and over residing in 7,682 households. We use the latest release available at the time of writing (23.0) which contains 23 annual waves of data. See Summerfield et al. (2024) for a full description of the study. We apply sampling weights provided with the HILDA data throughout the analysis.[8]

We treat the individual as the unit of analysis, and we begin with equivalised disposable (after tax) household income, which is the default measure used in most analysis of income inequality, internationally.[9] To this, we add imputed rental income and/or accrued capital gains income, both of which are equivalised consistent with the baseline income construct. We then examine the implications of including such income for income inequality and tax/transfer progressivity. When examining income over multiple periods, we sum these income measures (in constant AUD) across years at the individual level.

Apart from housing income, we depart from the default income constructs in one additional way. This is the inclusion of irregular income throughout the analysis.[10] This is justified by the positioning of lifetime Haig-Simons income as our benchmark construct. Appendix A shows the key results if irregular income is excluded.[11]

We also show results where we abstract from differences in mean incomes between age cohorts, applying a simple adjustment: $\tilde{Y}_{ia} = Y_{ia} \times \frac{\overline{Y}}{\overline{Y}_a}$, where Y_{ia} is some measure of income for person i in age group a, $\overline{Y}_a$ is the mean income in that age group, and $\overline{Y}$ is the overall mean income[12].

[8] Specifically, we use the cross-sectional enumerated person population weights (˙hhwte) for analysis of annual income; the (waves 1-23) enumerated person longitudinal weights (wlnwte) for analysis of 23-year income; and the appropriate 5-year enumerated person longitudinal weights (balanced) for analysis of 5-year income (e.g. wlea˙e for income measured across waves 1-5, wleb˙f for income measured across waves 2-6, and so on.)

[9] Recent examples include Eurostat (2024) and OECD (2024). Equivalisation adjusts household income according to household size and/or composition. The equivalence scale we adopt is the square root of the number of people in the household.

[10] This includes inheritances, bequests, redundancy and severance payments, irregular transfers from non-resident parents, irregular payments from other non-household members, lump sum workers compensation and other irregular payments. Mean irregular income is equal to 5.5% of mean regular income in our main estimation sample.

[11] In that version, housing income has a larger effect on inequality than in our preferred version. Excluding irregular income also reduces the level of inequality, as well as the magnitude of it's increase over time.

[12] We do this separately for each accounting period we consider (annual income, 5-year income, 23-year income). We use 10-year age groupings (0-9; 10-19; 20-29...). For 5-year and 23-year income, these are the ages at the time of the first relevant observation.

3.1 Imputed rental income

We have created a new measure of imputed rental income for the HILDA survey, drawing on numerous sources. Our approach is similar to (but simpler than) that used by the Australian Bureau of Statistics for the Survey of Income and Housing (SIH) (Australian Bureau of Statistics, 2018).[13] Our resulting measure differs markedly from HILDA's existing imputed rent variable (which is set to 5% of net housing equity), as we will show.[14].

3.1.1 Gross imputed rent

For each HILDA year, gross imputed rent (GIR) is set to the (self-reported) value of each owner-occupied dwelling, multiplied by the estimated national gross rate of return on owner-occupied housing (GRR). The GRR is set to total gross imputed rental income in the Australian National Accounts, divided by the estimated total value of the owner-occupied housing stock in Australia based on the HILDA Survey data.[15] Figure 1 shows the GRR for each HILDA year. In each year, the GRR is much lower than was found for earlier periods in studies that used a similar approach (e.g. Yates (1994); Saunders and Siminski (2005)). It also varies considerably, exceeding 4% in some years, and falling below 3% in the most recent years.

3.1.2 Net imputed rent

Net imputed rent is set to gross imputed rent minus the expenses that are usually paid by landlords. These expenses are discussed in turn below.

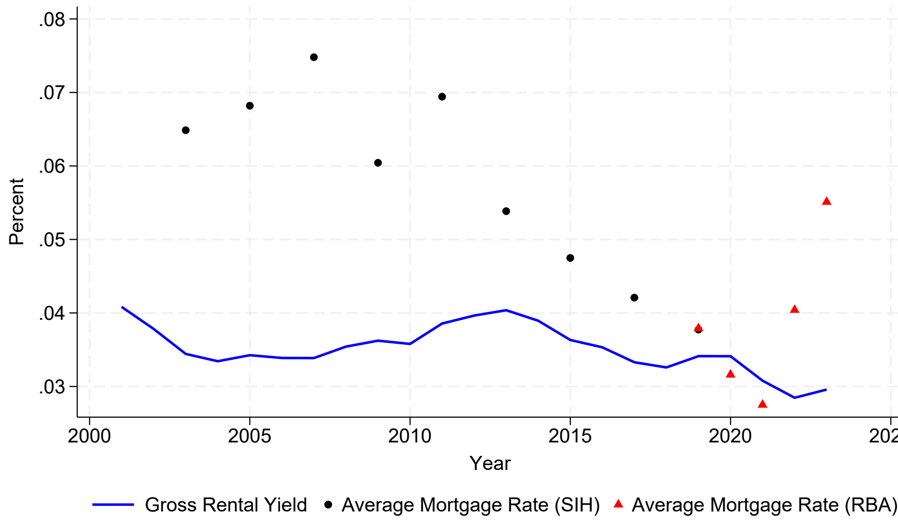
The first expense is the interest component of mortgage repayments. Whilst HILDA does collect data on mortgage repayments, it does not distinguish between interest and principal components, so we do not use this variable. Instead, we estimate the interest component by

[13] We are grateful to Michael Bassett from the Australian Bureau of Statistics for providing feedback on our approach.

[14] The CNEF version of HILDA currently (at least up to Release 23.0) contains an imputed rent variable, which is set to 5% of the net equity of owner-occupied housing. This has been used in various studies with a focus on imputed rent such as Alexeev (2020). Kaplan et al. (2018) used a similar approach by which imputed rent was set to 5% of total home value, less usual mortgage repayments (which includes principal and interest components).

[15] In the National Accounts, gross imputed rent of owner-occupied dwellings is calculated in two main steps. First, average rent is calculated for rented dwellings using Census data, stratified by each combination of Section of State (major urban, other urban, rural), structure of the dwelling (separate house, semi-detached, flat) and number of bedrooms. The average rent in each strata is then multiplied by the number of owner-occupied dwellings in the same strata, and aggregated Australian Bureau of Statistics (2021).

Figure 1: Gross rental yield and average mortgage interest rates by year



Notes: The first series is the estimated national average annual gross rental yield on owner occupied housing, calculated as the ratio of gross imputed rent for owner occupied housing (from the Australian National Accounts) to the total value of owner occupied housing (from HILDA). The other series are estimates of the average interest rate on existing mortgages for owner-occupied housing. The SIH series draws on mortgage interest repayments and outstanding mortgage amounts collected in the Survey of Income and Housing Costs. The RBA series is from Reserve Bank of Australia Reserve Bank of Australia (2025).

multiplying the value of any outstanding loans on owner-occupied housing (which HILDA does collect explicitly) by the average mortgage interest rate in that year.[16] The interest rate we use is not the rate offered for new mortgages, but the average rate for existing mortgages. The RBA publishes this for 2019 onwards.[17] For earlier years, we use the median mortgage interest rate implied by the ABS SIH (which does identify the interest component of mortgage repayment, as well as outstanding mortgage amounts).[18] The two approaches yield a very similar estimate in 2019, which is the only year where both methods are currently feasible.

These mortgage interest rates are shown in Figure 1. Unsurprisingly, these vary greatly over time, from a peak of 7.48% in 2007, to 2.75% in 2021. It is worth noting that the interest rate exceeds the GRR in every year apart from 2020 and 2021, sometimes greatly. This highlights

[16] In Australia, the majority of owner-occupied mortgages are subject to variable interest rates. Whilst the use of fixed rate mortgages has fluctuated over time, their rates are typically fixed for only three years or less Reserve Bank of Australia (2023); Lovicu et al. (2023). Due to these factors, the age of mortgage is not a major factor for the accuracy of this imputation.

[17] We use the value at September of each year of the field "Lending rates; Housing credit; Outstanding; Owner-occupied; All loans; All institutions" in Reserve Bank of Australia (2025). Most interviews for each HILDA Survey year (when respondents report home debt) are conducted in August and September.

[18] SIH was held every second year between 2003-04 and 2019-20, as shown in Figure 1. We linearly interpolate the interest rate for intervening years. SIH did not collect the interest component prior to 2003. To navigate this, we assume that the mortgage interest rate in 2001 and 2002 was the same as in 2003. This seems reasonable as the Reserve Bank's official cash rate did not vary greatly over this period.

that assuming a constant net rate of return on housing equity is problematic (even within a given year).

We also draw on SIH to estimate other expense types that are not fully collected by HILDA.[19] For these, we use median imputations, stratified by variables which capture significant heterogeneity:

- Rates (general and water), stratified by number of bedrooms (1-6+)
- The combined expenditure on building insurance, repairs and maintenance, stratified by number of bedrooms (1-6+)
- Body corporate fees, stratified by dwelling structure (4 categories) and bedrooms (1-3+)

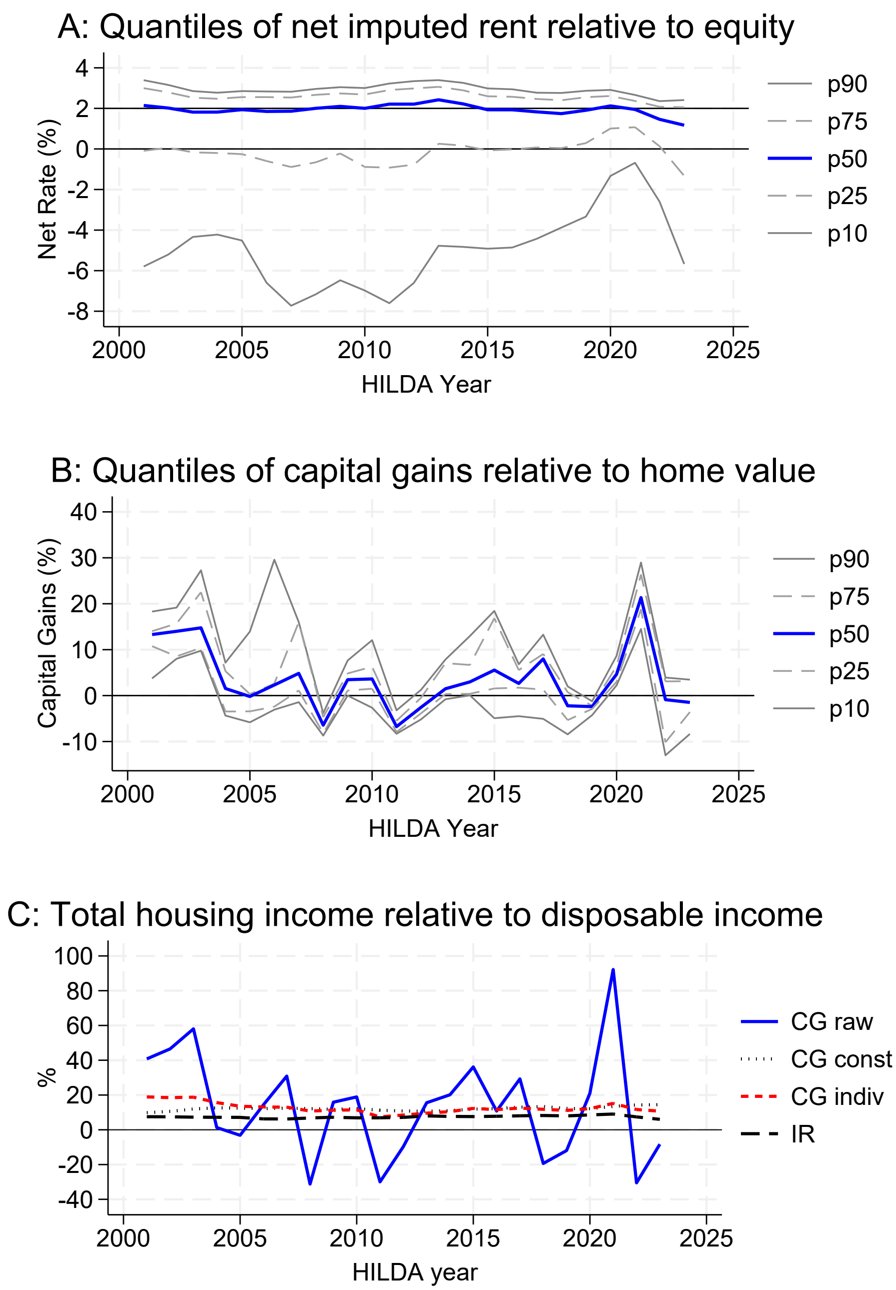
For rental properties in Australia, the property owner is liable to pay all of the above expenses. The exception is the variable component of water rates (which covers water usage), which is sometimes paid by the renter.[20] We would prefer to exclude the variable component of water rates, but the SIH data do not separately identify the fixed and variable components.

As discussed above, numerous studies assign imputed rent under an assumption of a constant net rate of return on housing equity. It is useful to consider the actual distribution of this net rate of return under our, more detailed, procedure. This is summarised for owner-occupiers in Figure 2 (Panel A), which shows key percentiles for each year. The median net rate of return is around 2% in most years, which is much lower than assumed in the current HILDA variable (5%) and by numerous studies. This median has been steady over time, except for a dip in the last two HILDA years. However, this Panel shows a wide distribution. In most years, around 25% of owner occupiers have negative imputed rent, and for many, this loss seems to be large. The Covid period (characterised by very low interest rates) is the exception, where negative imputed rents were much less common, and much smaller. Variation in the top half of the distribution is much smaller. This is because it is dominated by outright home owners with no mortgage, for whom imputed rent is much more stable.

[19] HILDA collects data on repairs and maintenance since Wave 5, but that item includes renovations. It also includes council rates and body corporate fees, but only since Wave 22.

[20] Water rates consist of a fixed component and a variable component. The property owner is liable for the fixed component (which covers the water supply service and sewerage supply service). The renter is liable for the variable component, but only if water usage is separately metered at the premises. Water usage is not metered separately in many apartment buildings. In these cases, water usage is paid by the owner, often through body corporate fees.

Figure 2: Summary of housing income estimates by HILDA year



Notes: This Figure summarises the housing income estimates, by HILDA year. Panels A and B show quantiles of rates of return, for owner-occupiers. Panel C shows totals across all people, regardless of home ownership.

3.2 Accrued Capital Gains from Owner-Occupied Housing

We construct three versions of accrued capital gains. Each draws on self-reported housing values in HILDA, combined with hedonic price indices. These are real (CPI adjusted) hedonic price indices, disaggregated by dwelling type (house or apartment), state/territory, and capital city versus balance of state (15 geographical areas). [21]

We see this as conservative approach, compared to alternatives. The hedonic model is described in CoreLogic (2023). It controls for numerous quality-related variables, capturing the size, composition, and the locations of the stock of dwellings (which change considerably over time). It also abstracts from changes in urban density, which we would prefer not to do (conditional on the area effects which are also included). It is unclear if this is a major factor, but it likely biases our capital gains estimates downwards, since urban density generally increases within each area over time. Abelson and Joyeux (2023) compare this hedonic series to alternative price indices which do not control for quality changes. They find large differences, suggesting that quality improvements are substantial, perhaps equal to one percent of property values on average in each year, slightly less in recent years. To ignore this would greatly overestimate the extent of capital gains. A comparison of the CoreLogic hedonic series with the repeated sales index yields similar conclusions. Between September 2001 and September 2023, the annual increase in the national repeated sales index was almost 1 percentage point higher than the hedonic series. Mainly for this reason, we do not rely on changes in the self-reported housing values, which are available in each year of the HILDA panel.[22] To repeat, drawing on the hedonic indices is the more conservative approach.

The first version of accrued capital gains is:

$$CG1_{idrt} = \frac{HV_{idrt} \times \Delta P_{drt}}{1 + \Delta P_{drt}} \tag{1}$$

Where CG1 is accrued capital gains for owner-occupier household i, dwelling type d, area r, in year t. HV_{idrt} is the self-reported home value (at the time of interview, which for most households ranges from August to December of each year); $\Delta P_{drt} = (P_{drt} - P_{drt-1})/P_{drt-1}$

[21] The data were supplied by Securities Industry Research Centre of Asia-Pacific (SIRCA) on behalf of CoreLogic.

[22] There are two further reasons not to use changes in self-reported housing values. They are only available for a subset of person-year observations (persons who were enumerated in consecutive waves, and did not move dwellings between those waves). And the first-difference of two such self-reported values is likely subject to considerable measurement error.

is the real rate of return. It is the annual change to September in the relevant (inflation adjusted) hedonic price index, expressed relative to September in the previous year. The denominator is an adjustment factor, necessary to avoid 'double counting' of house price changes[23].

Figure 2 (Panel B) shows quantiles of the ΔP_{drt} across HILDA owner-occupiers, by year. It shows great volatility. The median rate of return was over 20% in 2021, but it was negative in a number of other years. Since price changes can be very different between regions, there is also considerable variation in this rate within most years.

CG1 is the best measure we have of the accrued capital gains in a given year. However, it fluctuates greatly between years, and it is not necessarily the best measure for all purposes. Recall that we have positioned lifetime Haig-Simons income as our conceptual benchmark. With this in mind, our preferred measure of accrued capital gains (CG2) smooths such variation over time '*within* persons'. Such smoothing does not remove the important variation (*between* persons) stemming from differences in timing and location of dwelling purchases and sales. Equation 2 is an expression for CG2:

$$CG2_{idrt} = \frac{HV_{idrt} \times \Delta P_i}{1 + \Delta P_i} \tag{2}$$

The right side of this equation is the same as equation 1 above, except that ΔP_{drt} is replaced by an individual-specific time-invariant rate of return ΔP_i which is set at whatever rate ensures that the total observed capital gains for each person is the same as in the original version. That is, $\sum_t CG2_{idrt} = \sum_t CG1_{idrt}$[24].

A third version (CG3) is used only for comparative purposes. It applies an extreme version of smoothing, using a single rate of return across all people and years:

$$CG3_{idrt} = \frac{HV_{idrt} \times \Delta P}{1 + \Delta P} \tag{3}$$

ΔP is set to 2.7%, which is the rate which ensures that the total observed capital gains across all persons is the same as in the original version. That is, $\sum_t CG3_{idrt} = \sum_t CG1_{idrt}$.

[23]For example, consider a house price which increased by 50% in real terms from \$1m to \$1.5m. The accrued capital gain (\$500k) is 50% of last year's value, not this year's value. The denominator ensures the calculation accounts for this. An alternate approach would be to instead use last year's reported value HV_{idrt-1}, but this is only available for a subset of household-year observations.

[24]A simpler alternative is to distribute these capital gains equally across the years in which the person is a homeowner. But such an approach ignores that people's (real) home values tend to increase with age, and thus allocates too much of the capital gains in early years, and too little in later years.

Figure 2 (Panel C) shows the aggregate value of housing income in each year, relative to total disposable (post-tax and transfer) income. CG1 fluctuates greatly over time, reaching +92.5% of disposable income in 2021, and as low as -31.3% in 2008. In fact, with the inclusion of imputed rent, housing income exceeds total disposable income in 2021. The two other versions of capital gains (CG2 and CG3) are much more stable, and reasonably similar to each other. CG2 ranges from 7.5% to 19.1%, while CG3 ranges from 10.0% to 14.6%. Net imputed rental income is considerably smaller, and does not fluctuate greatly, ranging from 6.1% to 9.1%.

The joint distribution of imputed rent and accrued capital gains can be examined in various ways. The simplest way is to compare the raw annual measures within each year for owner-occupiers. The rank correlation between these annual measures varies greatly between years, ranging from 0.82 (in 2021, when housing prices rose strongly and mortgage rates were low, ensuring that imputed rent was positive for most owner-occupiers) to -0.59 (in 2019, when housing prices fell and mortgage rates were also low). Unsurprisingly, the rank correlation is low (0.14) when all years are pooled. The joint distribution (with years pooled) is shown in Panel A of Figure 3. It confirms the weak relationship, except at the right side, where people in the top percentiles of imputed rent are either at the top of the capital gains distribution as well (in years where housing prices rise) or at the bottom (when housing prices fall).

The relationship is much stronger when using the individually-smoothed version of capital gains, which ensures that accrued capital gains are positive for most of the sample. The rank correlation varies little between years (ranging from 0.36 to 0.56), and is 0.49 when the years are pooled. Panel B of Figure 3 shows the full distribution.

Panel C shows the corresponding distribution for the long-run (23-year) income measures. Here the relationship is stronger again, with a rank correlation of 0.71.

3.3 Descriptive Statistics

Table 1 shows descriptive statistics for the key variables. The observation unit here is the person-year, and the sample is consistent with the analysis of annual income to follow. All income variables are equivalised and expressed in constant (2023) prices.

Figure 4 summarises the impact of including housing income for various demographic groups. Appendix Table B1 presents the same data in tabular form. Panel A shows mean annual incomes, across HILDA waves. By construction, annual income is unchanged for renters when housing income is included. But the impact is large for owner-occupiers. The comparison

Figure 3: Joint distribution of imputed rent and capital gains amongst homeowners

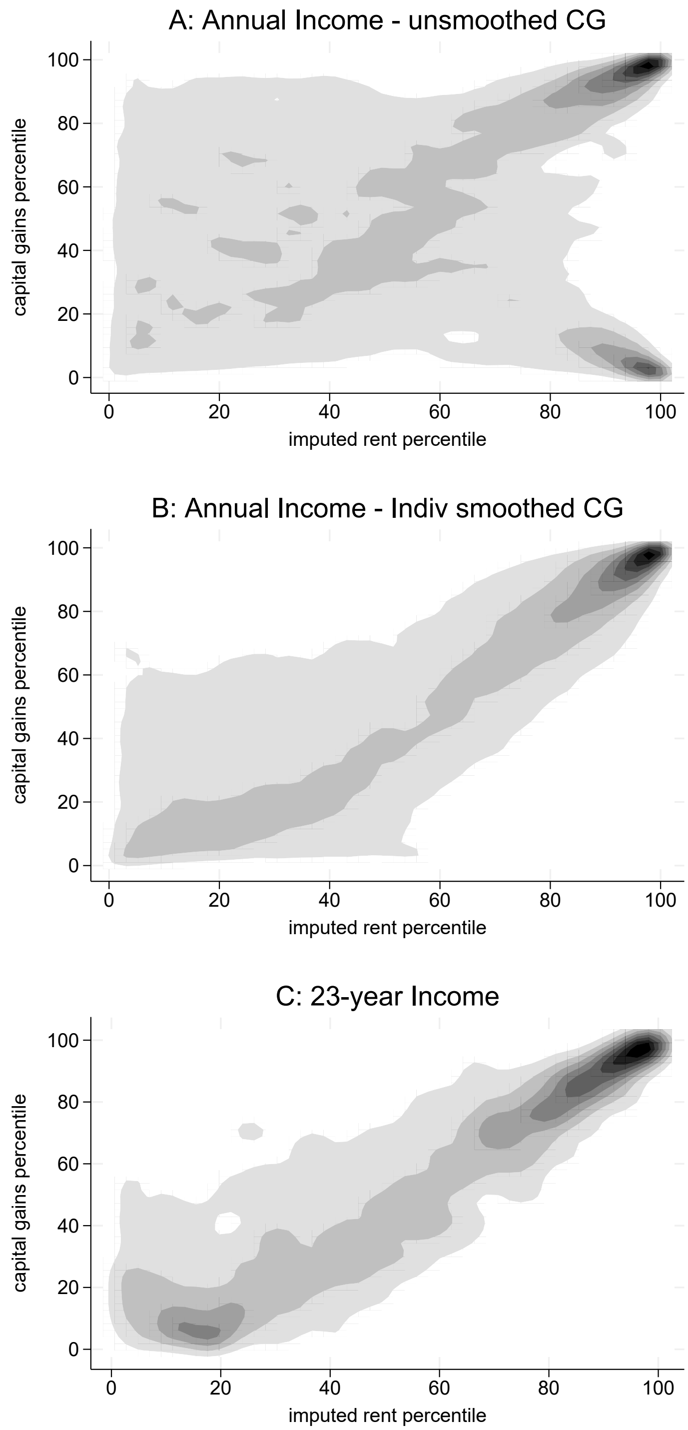


Table 1: Descriptive Statistics

	mean	sd
Age	37.11	22.37
Female	0.50	0.50
Owner-occupier	0.69	0.46
Outright owner	0.29	0.45
Disposable income	73,623	60,585
Gross imputed rent	11,869	13,531
Expenses	6,363	7,449
Net imputed rent	5,506	12,079
Capital gains v1	9,032	46,338
Capital gains v2	9,027	15,481
Capital gains v3	9,034	10,471
Observations	47,1667	

Notes: constant AUD (September 2023 prices). The baseline income concept is equivalised disposable income. Equivalisation is based on household size in each year. The equivalence scale is the square root of household size.

between renters and outright owners is particularly striking. Mean disposable income of outright home owners is 34% higher than for renters, but it is 86% higher when housing income is also counted as income. This increase is almost equally split between capital gains and imputed rent. Compared to outright owners, owners with a mortgage have a similar mean capital gain, but a much smaller imputed rental income. Mean income is slightly lower for females than males, but there is little gender difference in the impact of housing income.[25]

The comparisons by age are also revealing. Mean housing income is high for each age group aged 50 and above, reflecting high ownership rates, and high equity. Mean housing income is lowest for children aged 0-9. This exacerbates their already low mean disposable income. Amongst adults, the lowest housing income is for those in their 30s. It is slightly higher for those in their 20s, as some of them are living in homes owned by their parents.

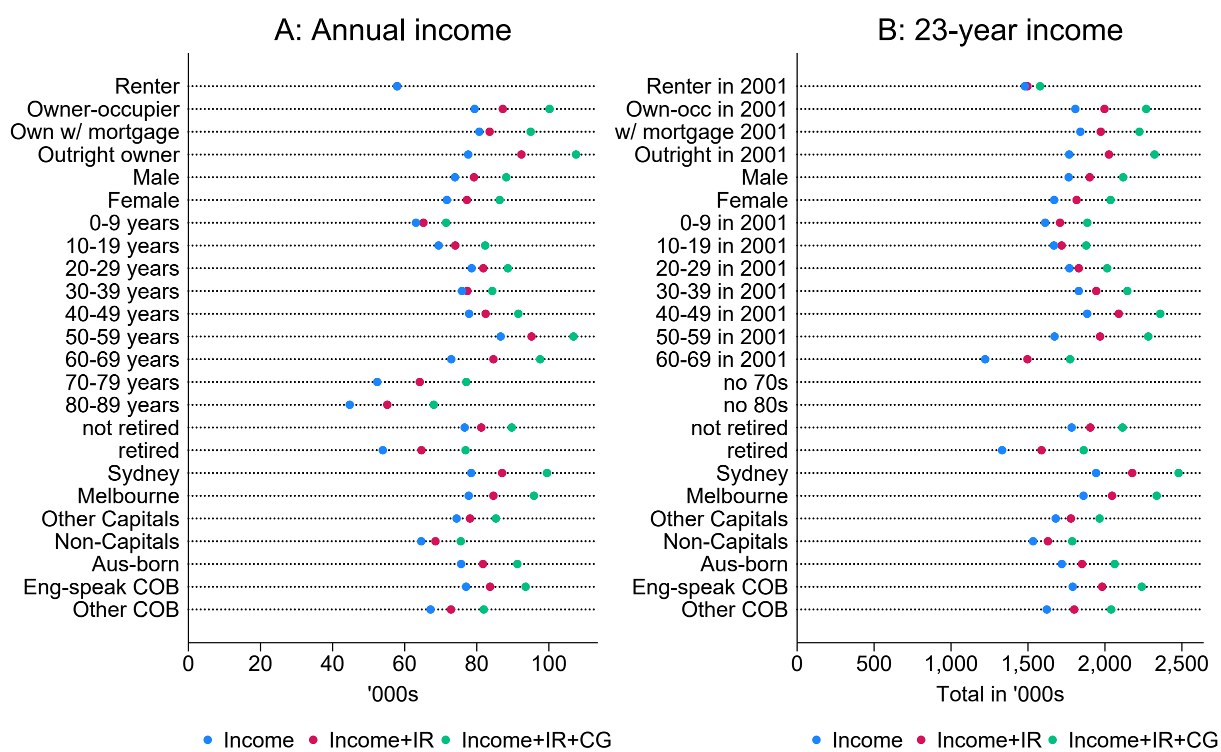
Unsurprisingly, housing income is highest in Sydney and Melbourne, Australia's two largest cities. Average incomes are higher in these cities than the rest of Australia even without including housing, but the difference is much larger after housing income is included.

Figure 4 also shows that housing income is similar on average for people born in Australia, compared to migrants, whether from major English speaking countries, or elsewhere.

Panel B shows similar data for long-run (23 year) income, for the balanced sample of people

[25] It is important to note, however, that by using (equivalised) household income, we invoke an assumption of income pooling within households, which may not capture true gender differences. The same point is relevant to comparisons between age groups, especially comparisons involving children.

Figure 4: Average income, with and without housing income



Notes: Capital gains is the individually-smoothed version. See also Table 1 notes.

who have participated in every wave of the HILDA survey. Since characteristics, such as home ownership status can change over time, the comparisons are with reference to 2001 characteristics. Most of the patterns are similar to Panel A, though most demographic differences are smaller. The most striking results are for people renting in 2001. Their mean housing income over the 23 year period was very small, highlighting that few people transition from renting to owning, and those who do are unlikely to yield high housing incomes for an extended period.

Figure 5 Panel A shows the distribution of movements between annual income percentiles when housing income is included. The mean (median) absolute movement is 11.7 (8) percentiles when including IR and raw CG, or 8.8 (7) percentiles when using the individually-smoothed CG version instead. The main difference between versions is at the lower end. The raw CG version leads to many more large movements down the distribution, presumably in years where house prices fell. Panel B shows the corresponding distribution of movements using 23-year income. Here the mean absolute movement is 7.8 percentiles and the median is 6.

4 Implications for inequality levels and trends

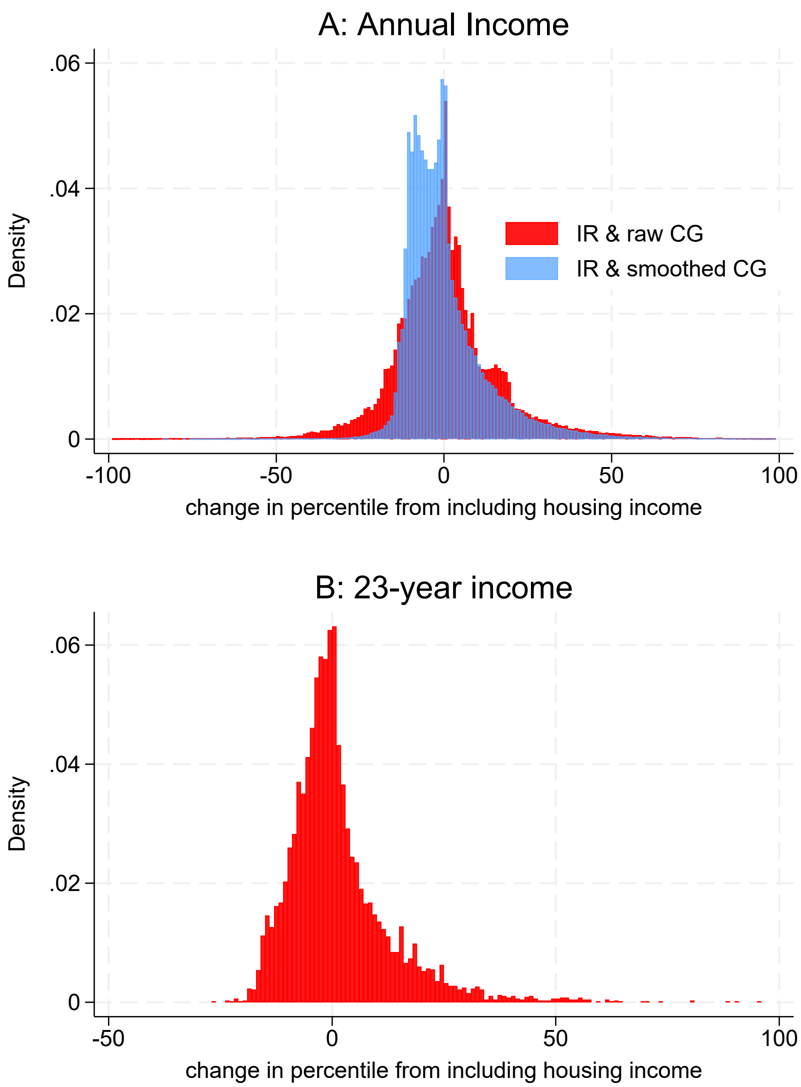
4.1 Long-run income

We have positioned lifetime Haig-Simons income as the benchmark income construct. Without resorting to modelling, the closest we can get to this is 23-year income, using the full available length of the HILDA panel. For this analysis, we use a balanced panel of people aged less than 70 at Wave 1 (less than 92 at Wave 23).

Table 2 shows the implications of housing income for apparent levels of (long-run) income inequality. This Table uses the original (unadjusted) version of capital gains. By construction the individually-smoothed version of capital gains produces exactly the same results.

The key finding is that most income inequality summary statistics are substantially higher with the inclusion of housing income. For example, including housing income increases the Gini coefficient by 0.02 (or 7.9%). Is this a large impact? An increase of this size would shift Australia's inequality from 16th to 10th highest, amongst OECD countries (OECD, 2025). As another point of comparison, Australia's (progressive) income taxation system decreases the Gini by 0.04, or about 0.025 if housing income is included, as we show in Section 6. The p90p10 ratio increases slightly more (by 9.9%) with the inclusion of housing income,

Figure 5: Distribution of percentile movements from including housing income



while the share of total income captured by the top decile is 6.5% higher. The increase in inequality is greater at the top (p9050), than the bottom (p50p10) of the distribution.

Table 2: Long-run (23-year) income inequality with and without housing income

Income construct	**Gini**	**p90p10**	**p10p50**	**p90p50**	**Top-10% share**
			A: Inequality		
Disposable income (DY)	0.246	3.035	0.551	1.673	0.206
DY plus IR	0.257	3.185	0.553	1.763	0.215
difference	0.010	0.150	0.002	0.090	0.009
% difference	4.3%	4.9%	0.4%	5.4%	4.3%
DY plus CG	0.251	3.148	0.545	1.717	0.209
difference	0.005	0.113	−0.006	0.044	0.003
% difference	1.9%	3.7%	−1.0%	2.6%	1.5%
DY plus IR & CG	0.266	3.336	0.535	1.784	0.220
difference	0.020	0.301	−0.016	0.111	0.013
% difference	7.9%	9.9%	−3.0%	6.7%	6.5%
			B: Within-cohort Inequality		
Disposable income (DY)	0.241	2.892	0.575	1.664	0.206
DY plus IR	0.252	3.038	0.569	1.730	0.212
difference	0.011	0.146	−0.006	0.066	0.007
% difference	4.5%	5.0%	−1.0%	4.0%	3.4%
DY plus CG	0.246	2.996	0.564	1.690	0.208
difference	0.006	0.105	−0.011	0.026	0.002
% difference	2.3%	3.6%	−2.0%	1.6%	1.0%
DY plus IR & CG	0.260	3.211	0.549	1.763	0.216
difference	0.020	0.319	−0.026	0.099	0.011
% difference	8.1%	11.0%	−4.6%	6.0%	5.2%
			C: Inequality within Sydney		
Disposable income (DY)	0.244	3.006	0.553	1.661	0.205
DY plus IR	0.257	3.187	0.565	1.801	0.213
difference	0.014	0.181	0.012	0.139	0.008
% difference	5.6%	6.0%	2.3%	8.4%	3.9%
DY plus CG	0.251	3.087	0.564	1.742	0.208
difference	0.008	0.080	0.012	0.081	0.003
% difference	3.1%	2.7%	2.1%	4.9%	1.6%
DY plus IR & CG	0.270	3.302	0.555	1.832	0.219
difference	0.026	0.296	0.002	0.171	0.014
% difference	10.8%	9.8%	0.4%	10.3%	6.8%

Despite total imputed rental income being much smaller than capital gains, its impact on long-run inequality is at least as large on most statistics. To emphasise, imputed rent increases income inequality substantially. This result is a sharp contrast to most or all previous analyses of imputed rent, which focus on annual income, and find that imputed rent decreases inequality (for example Smeeding et al. (1993) and Frick et al. (2010)). Those results are driven by life-course variation; older people tend to have low cash income and high imputed rent, and hence imputed rent may 'equalise' short-run income. By instead using a longer-run measure of income, we remove much of the life-course variation which drives this.

Notably, total housing income affects most indicators of inequality by more than the sum of its components. For example, imputed rent increases the Gini by 4.3%, and capital gains increases it by 1.9%, but the Gini increases by 7.9% when both are included.

As shown in Panel B, the within-cohort adjustment does not make a major difference to most of these results. The exception is the p50p10, which increases more in this version. This implies that the increase in inequality is more similar at the bottom of the distribution as to the top when we focus on within-cohort variation.

Panel C shows further results, for people who lived in Sydney (in 2001). As expected, housing income has a greater impact on inequality within Sydney, than for Australia overall. It increases the Gini coefficient by 0.026, or 10.8%. This increase is 0.006 larger (i.e. 30% larger) than for Australia overall. Most (apparently all) of this effect is in the top-half of the distribution – the p90p50 ratio is 10.3% higher with the inclusion of housing income, while the p10p50 ratio is almost unchanged.

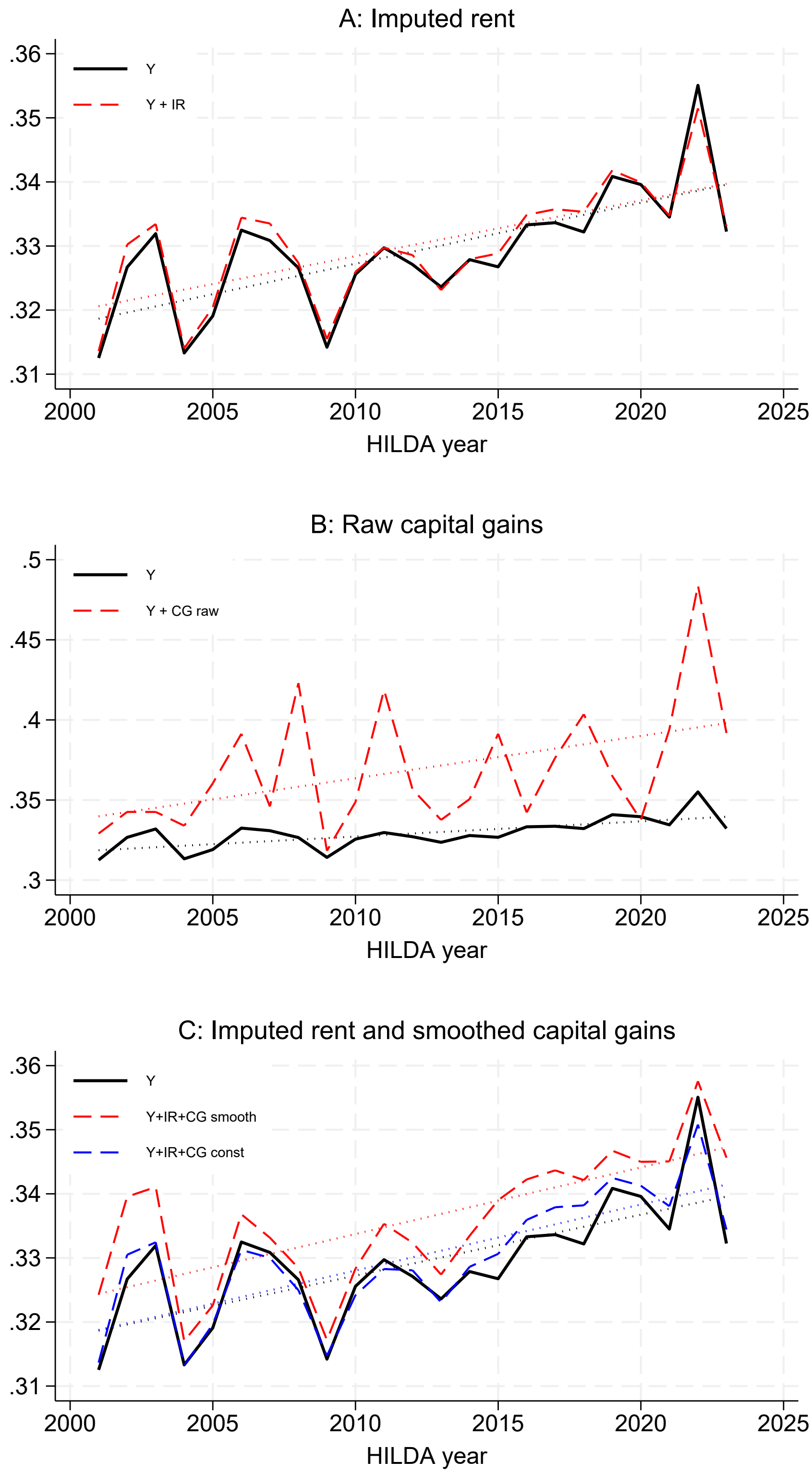
4.2 Annual income

Whilst we prefer the long-run measure of income, it does not facilitate an analysis of trends over time. Primarily for this reason, we now consider annual income, followed by 5-year income. For the analysis of annual income, we use an unbalanced panel of persons from HILDA.

Figure 6 shows the impact of housing income on the Gini coefficient for annual income inequality. Panel A shows that including imputed rental income does very little, either to the level of inequality, or its trend. This contrasts with its large role in long-run income inequality, as analysed in the section above. It also contrasts somewhat with earlier analyses of Australian annual income, which typically finds it decreasing annual income inequality. The likely explanations are that our measure of imputed rent is lower on average that earlier work, and includes many negatives.

Panel B shows the impact of including the raw measure of capital gains. It shows that it increases inequality in most years, sometimes quite dramatically, making the trend quite unstable. Perhaps surprisingly, this measure of CG increases inequality most in the years

Figure 6: Annual income Gini with and without housing income



where average capital gains were negative (2022, 2008, 2011, 2018 and 2023), presumably reducing some income to very low levels for many people. The line of best fit in this panel is influenced greatly by the 2022 outlier.

Panel C shows the inclusion of the other two measures of CG. Our preferred measure is the 'individually-smoothed' CG. Its inclusion increases inequality by a similar magnitude to the long-run income measure. But its inclusion has little impact on the inequality trend. IR is also included in this Panel so that is captures the full impact of housing income, though panel A suggests IR has a small role.

Figures B1 and B2 in Appendix B show further results for annual income inequality. Those results vary somewhat across inequality statistics. However, including housing income seems to strengthen the apparent increase in inequality over time, especially at the top end, as measured by the p90p50 ratio. The within-cohort adjustment also has a larger impact. The inclusion of housing income increases within-cohort inequality considerably, especially at the bottom of the distribution. Housing income has little effect on the Top-10% share of total income.

Including housing income also has a large effect on income mobility. Following Kopczuk et al. (2010), mobility can be summarized using a Shorrocks (1978) mobility index defined as:

$$1 - M = \frac{G(\bar{z})}{\frac{1}{K}\sum_{t=1}^{K} G(z_t)} ,$$

where z_t is income in period $t \in \{1, \ldots, K\}$, $\bar{z}$ is the average income over K periods, and $G(\cdot)$ is a summary index of inequality such as the Gini. The Shorrocks index in our data is 0.265 before the inclusion of housing income. It is much higher (0.315) if housing income is included (without smoothing capital gains). This reflects the large volatility in accrued capital gains that we have shown previously. There is however a clear conceptual difference between volatility in cash flow and volatility in a typically-unrealised capital gain. If the individually smoothed version of capital gains is included instead, the Shorrocks falls to 0.214. All of this shows that housing income has a major role in the apparent level of income mobility.

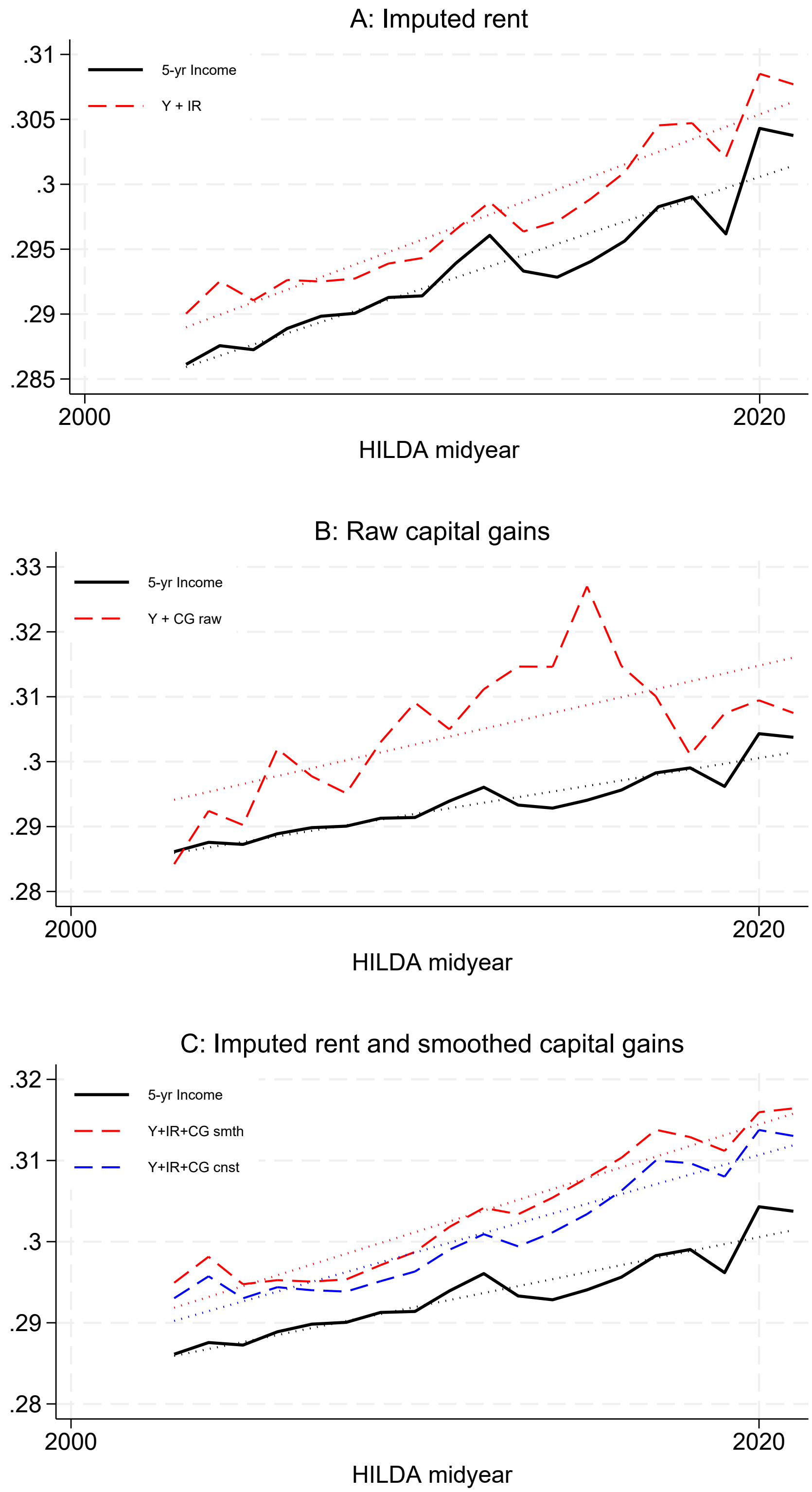
4.3 Medium-run (5-year) income

We now-turn to analysis of 5-year income inequality. For this analysis, we draw on a series of balanced 5-year panels, commencing in each year from 2001 to 2019, respectively. In most respects – these findings are a fusion of the insights from the 23-year income and the annual income analysis. The main new insight here is that including housing seems to magnify the increase in inequality over time more so than the on the annual income measure.

Figure 7 shows the main results for the Gini coefficient. Panel A shows that including imputed rent clearly increases inequality in each period, but does not have much impact on the trend. Panel B shows that including raw capital gains increases inequality in all but one year. It makes the series unstable, but less so than shown for annual income, as to be expected. Panel C shows that the other versions of capital gains also increase inequality. They also suggest that including housing income magnifies the increase in income inequality over time.

Figures B3 and B4 in Appendix B present further results for 5-year income inequality. The key results are as follows. For each summary statistic, inequality is higher when housing is included, similarly to the long-run inequality results. On most measures (the top-10% share being the exception), including housing income also strengthens the increase in inequality over time.

Figure 7: Medium-run (5-year) income Gini with and without housing income



5 Demographics of the Poor and the Rich

The inclusion of housing income has a major impact on the characteristics of who is relatively poor or relatively rich. We show this graphically in this section. The same results are also shown in Appendix Table B1.

5.1 Poverty Profile

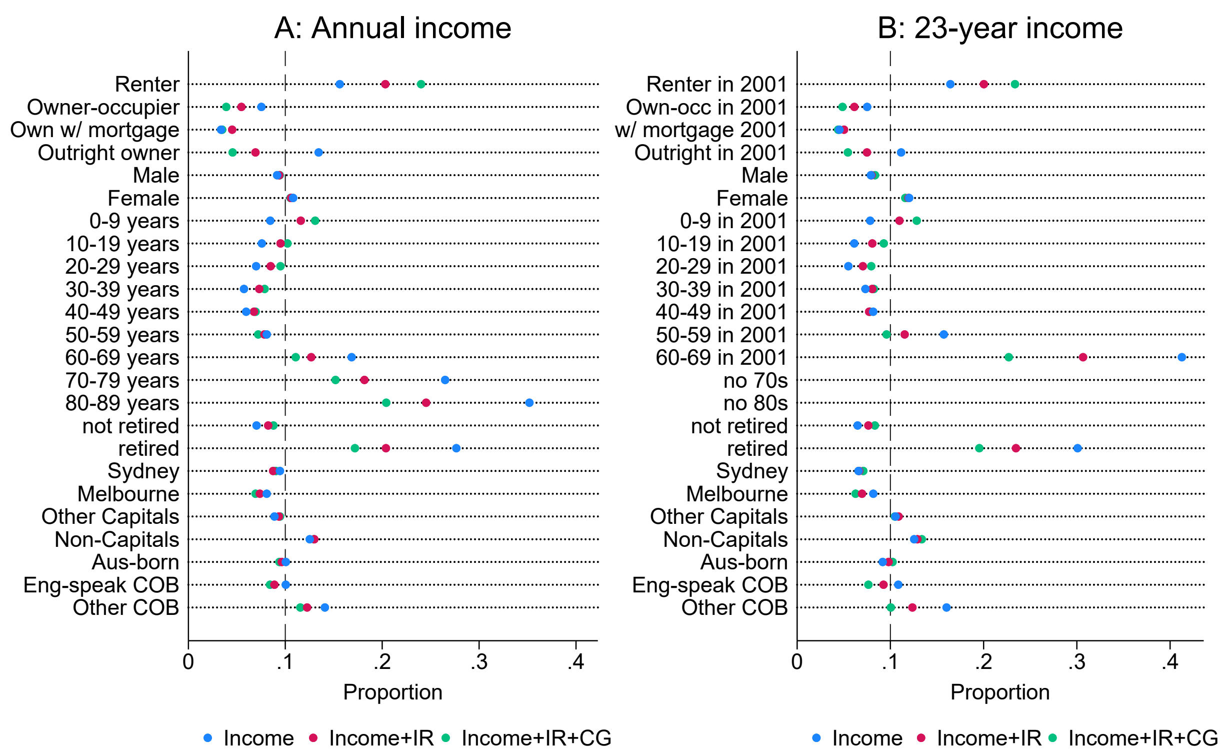
Figure 8 shows the proportion of people in various groups that are 'relatively poor', that is, their income is in the lowest decile of the distribution of annual income (Panel A) or 23-year income (Panel B), before and after the inclusion of housing income. For obvious reasons, the most striking results are by housing tenure. Around 15.6% of renters are poor by annual disposable income, compared to 7.5% of owner-occupiers. This gap increases dramatically with the inclusion of housing income, by which renters are 6 times more likely to be poor than owner-occupiers (24.0% compared to 3.9%). This pattern is similar (though slightly less stark) if 23-year income is used instead, highlighting that the elevated risk of poverty that is associated with renting is highly persistent.

There is an interesting contrast between outright owners and owners with a mortgage. For owners with a mortgage the poverty risk is low and does not change markedly with the inclusion of housing income. This highlights that most home purchasers have relatively high disposable income, and relatively low housing income. In contrast, the poverty risk for outright owners falls by a factor of almost three once housing income is included (from 13.4% to 4.6%). In contrast to purchasers, many outright owners are older people with low disposable income, offset by high housing income.

The inclusion of housing income does little to affect the gender comparison of poverty risk. But it has a major effect on its age profile. It increases the risk of poverty for each group aged under 50, and decreases it for each group aged 50 and over. The largest increase is for children aged under 10, whose poverty risk increases from 8.4 to 13.1 percent. However, even with the inclusion of housing income, older people are at greatest risk of poverty (20.4 percent of 80-89 year olds, and 15.2% of 70-79 year olds). This highlights the particular case of older renters, who tend to have both low cash income and low housing income. Overall, the inclusion of housing income greatly reduces differences between age groups in the propensity of poverty. This is also the case with the 23-year income definition.

The inclusion of housing income does not substantially change the geographical distribution of poverty. However, it substantially decreases the proportion of migrants in the bottom income decile, especially for migrants from non-English speaking countries.

Figure 8: Share in bottom income decile

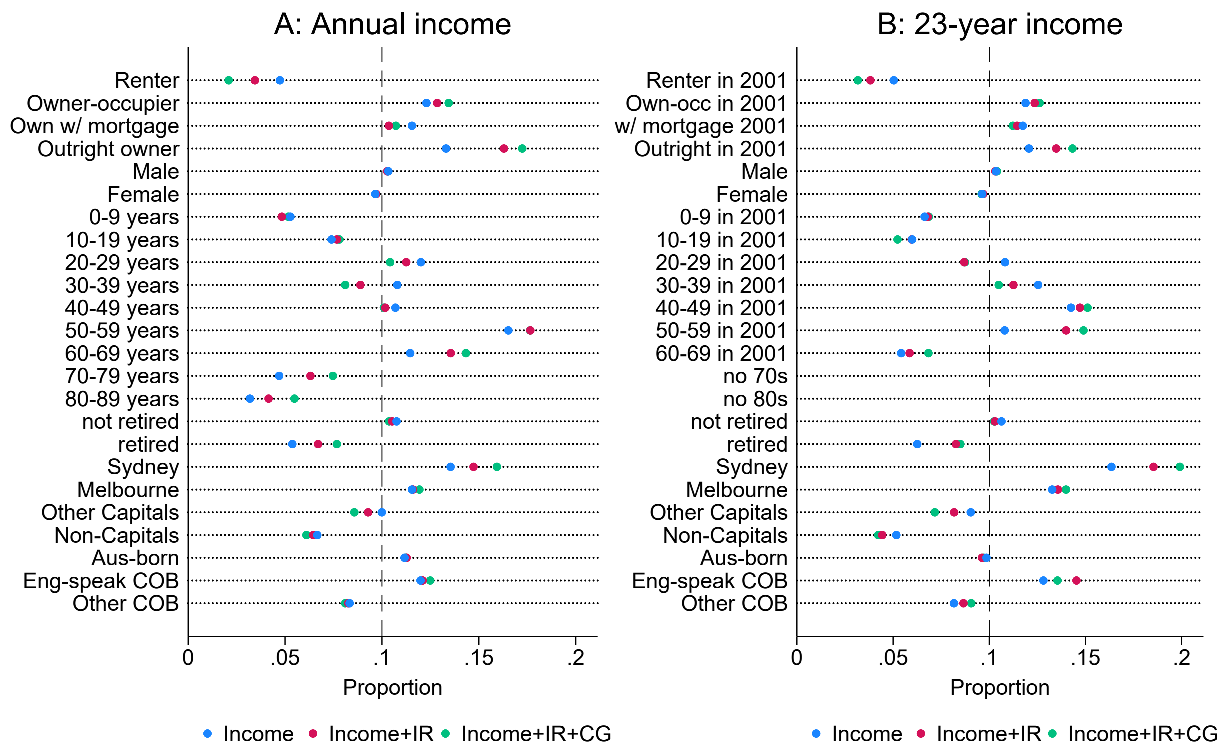


5.2 Profile of the Rich

Housing income has a smaller, but still substantial, effect on the demographic profile of the rich – who we define here as the top decile of the income distribution. As shown in Figure 9, owner-occupiers are 2.6 times more likely than renters to be 'rich' on disposable income (12.3% compared to 4.7%), but over 6 times more likely after including housing income (13.4% compared to just 2.1%). As for the 'poverty profile' above, the effect of housing income is much larger for outright owners than for home purchasers.

Housing income has little effect on the gender gap in being rich, or on the propensity of children in rich households. It does, however, decrease the proportion of young adults (20-39) being classified as rich, and increase it for older people (50+). Nevertheless, the age

Figure 9: Share in top income decile



groups least represented in the top decile are people aged 70+. The 23-year income version yields similar results, although most of the differences between demographic groups are considerably smaller.

Including housing income substantially changes the geographic profile of the rich. In particular, the share of people who are in the top decile increases considerably for Sydney, especially for long-run income. This is offset by declines in other areas, with the exception of Melbourne, where there is little change. Differences between Australian-born and migrants are not affected greatly by housing income.

6 Tax/transfer progressivity and redistributive impact

In this section, we consider the implications of housing income for the apparent progressivity and redistributive impact of income tax and government transfers in Australia. We show that both the income tax and transfer systems are much less redistributive and much less progressive when housing income is included.

The results in this section should be interpreted with caution. The measures we use ignore behavioural responses to taxes and transfers, so they should not be interpreted to represent the *effects* of taxes and transfers *per se*. The term 'redistributive impact' is hence problematic, though it is standard terminology. It should be treated as a (commonly used) indicator, or proxy, of the redistributive impact. Further, we do not consider the entire tax and transfer system, limiting the exercise only to income taxes (with one exception, detailed below), and cash transfers.

Redistributive impact and progressivity are closely related, but distinct, concepts. We focus here on the redistributive impact, but show some progressivity results as well. We use the Reynolds-Smolensky index (Reynolds and Smolensky, 1977) as the measure of redistributive impact, which is a standard, and simple measure. The redistributive impact of income tax is measured therein as the difference in Gini coefficients for pre-tax (gross) income and post-tax (disposable) income. The redistributive impact of transfers is measured as the difference in the Gini coefficients between private (pre-transfer) income and gross (post-transfer, pre-tax) income. The redistributive impact of taxes-and-transfers combined is measured as the difference in Gini coefficients for private income and post-tax disposable income. Progressivity, in turn, is a distinct concept. We adopt the Kakwani index (Kakwani, 1977), which is the most common measure.[26]

Income from owner-occupied housing (imputed rent and accrued capital gains) attracts no income tax, or capital gains tax in Australia. But home-owners are subject to some taxes that renters do not pay. They pay local taxes (council and water rates). For this exercise, we have included these taxes. We do not include stamp duty for the main estimates, but we show that the results are not sensitive to its inclusion.

Figure 10 shows the Reynolds-Smolensky index for the income tax system (at the bottom of the graph), with and without housing income. The tax system reduces the Gini by around 0.04 in most years, though it was more progressive in the earlier years. More importantly, the figure shows a much lower redistributive impact when housing income is included, with a Reynolds-Smolensky index ranging from .03 in early years to around .024 in the later years. The inclusion of housing income reduces the redistributive impact of the income tax system

[26] A distinguishing feature of the Kakwani index is its independence of the average tax rate. However, we are primarily interested in the relative change from including housing. The main disadvantage of the Kakwani index, for our purposes, is that it is undefined for summarising the progressivity of taxes and transfers combined (Lambert, 1985;Hérault and Jenkins, 2022).

by an average of 36% across years, ranging from 30%, to 45% in 2023.

Figure 10 also shows the corresponding exercise for transfers (towards the middle of the Figure). The redistributive impact of transfers has diminished considerably over time. The inclusion of housing income reduces the Reynolds-Smolensky index by an average of .016 or 19%, though this gap has reduced over the HILDA years. This relative effect of housing income is hence smaller for transfers than for taxes. But the absolute effect is actually similar, since the redistributive effect of transfers is much larger than that of taxes.

Finally, the two series at the top of the figure repeat the exercise for taxes-and-transfers combined. The inclusion of housing income reduces the (annual) redistributive impact of the income tax and transfer system by an average of 0.031, or 24%.

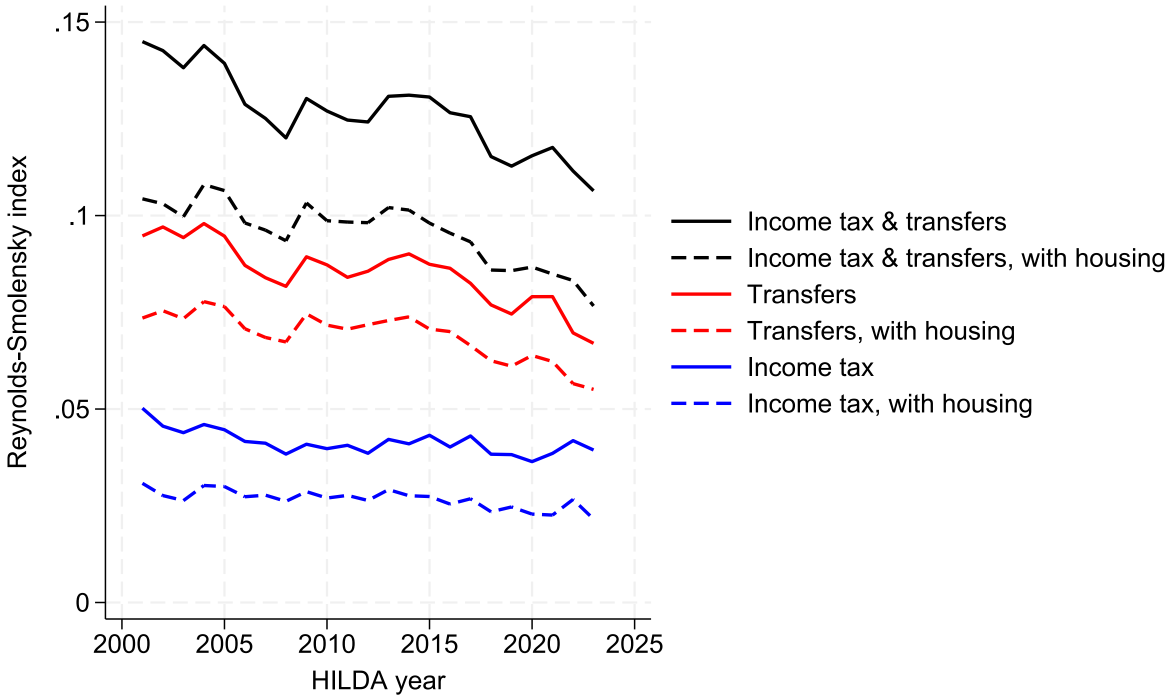
These results are similar with the exclusion of the older population (65+). Amongst younger people, the inclusion of housing income reduces the redistributive impacts of income tax (for annual income) by 33.5%, of transfers by 14.3%, and of income taxes-and-transfers combined by 21.5%.

The results are also similar using long-run (23-year) income. Here, the inclusion of housing income reduces the redistributive impacts of income tax by 40.5%, of transfers by 18.9%, and of income taxes-and-transfers combined by 26.7%. The inclusion of housing income also reduces the Kakwani index of progressivity, by 28.5% for income tax, and by 3.6% for transfers.

These estimates do not include stamp duty. But we believe that its inclusion would have a negligible effect on the results. In particular, we estimate that it would increase the Reynolds-Smolensky index for long-run income by just 0.0013[27].

[27] Stamp duty is a state tax imposed on home purchasers, according to the value of the purchase price. Stamp duty is not observed in HILDA, and would be difficult to estimate accurately, especially for those who bought their home before the data window. Stamp duty is applied on a progressive scale. Whilst this scale differs between states and years, for most (non-exempt) purchases, it equates to a rate of between 3.5% and 5.5% on the purchase price, and around 4% at the median selling price (National Housing Finance and Investment Corporation, 2021). According to the analysis in the previous sections, this is similar to the average housing income (expressed relative to home value) in a single year. However, the value of most homes at a point in time is considerably greater than their value at the time of purchase. There are also stamp duty exemptions and discounts for first-home buyers, which have also changed over time, and sometimes differ between new and established homes, and according to the value of the property. In addition to this, first-home buyers have been eligible for various grants, which again vary by state, time, new vs established, and value of the home. Taking these factors into account, average stamp duty on a home purchase is likely considerably smaller than the average housing income in a single year. When we do include stamp duty, we set it to 0.4% of the value of the home in each year. This is crude, but it is the right order of magnitude.

Figure 10: Redistributive impact of income tax and transfers with and without housing income



7 Conclusion

Housing is an increasingly important driver of economic wellbeing in most developed countries. But previous work has not fully examined its role in inequality. Whilst no income measure is perfect, it is useful to position lifetime Haig-Simons income as a benchmark for analysing inequality. In the realm of owner-occupied housing, this implies including both imputed rent and accrued capital gains as components of income. We have demonstrated several approaches to account for the instability this can create. Our analysis shows that housing income has important consequences for the apparent level of inequality, its trend over time, and the demographic profiles of the rich and the poor.

Most significantly, owner-occupied housing income has very large implications for the apparent redistributive impact of the income tax and transfer system. This highlights that favourable tax treatment of owner-occupied housing is a major driver of inequality, undermining the redistributive role of government. Such favourable tax treatment of owner-occupied housing is prevalent internationally, with little economic rationale to this 'hidden homeownership welfare state' (Kholodilin et al., 2023). It is worth reconsidering such tax concessions in light of their apparent effects on the vertical equity of tax systems.

We hope that comparable work will be done for other countries. Differences across countries in levels and trends in home ownership, housing prices, rents, mortgage debt and the tax and transfer treatment of housing income create considerable potential for challenging established perspectives on relative levels and trends of inequality and the progressivity of tax/transfer systems internationally.

8 Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

Statement: During the preparation of this work the authors used ChatGPT in order to aesthetically refine some of the figures and tables. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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Appendix A: Key results excluding irregular income

Table A1: Long-run (23-year) income inequality excluding irregular income

Income construct	Gini	p90p10	p10p50	p90p50	Top-10% share
		A: Inequality			
Disposable income (DY)	0.236	2.912	0.562	1.637	0.200
DY plus IR	0.247	2.975	0.564	1.679	0.209
difference	0.010	0.064	0.002	0.042	0.009
% difference	4.4%	2.2%	0.4%	2.6%	4.5%
DY plus CG	0.242	2.976	0.554	1.648	0.204
difference	0.005	0.065	−0.008	0.011	0.004
% difference	2.2%	2.2%	−1.5%	0.7%	1.8%
DY plus IR & CG	0.258	3.192	0.543	1.734	0.215
difference	0.021	0.280	−0.019	0.098	0.015
% difference	8.9%	9.6%	−3.3%	6.0%	7.3%
		B: Within-cohort Inequality			
Disposable income (DY)	0.231	2.754	0.584	1.609	0.200
DY plus IR	0.243	2.891	0.577	1.669	0.208
difference	0.012	0.137	−0.007	0.061	0.007
% difference	5.1%	5.0%	−1.1%	3.8%	3.7%
DY plus CG	0.238	2.867	0.570	1.635	0.203
difference	0.007	0.113	−0.014	0.027	0.003
% difference	2.9%	4.1%	−2.4%	1.7%	1.4%
DY plus IR & CG	0.253	3.074	0.556	1.709	0.212
difference	0.022	0.320	−0.028	0.101	0.012
% difference	9.6%	11.6%	−4.8%	6.3%	6.0%
		C: Inequality within Sydney			
Disposable income (DY)	0.236	2.891	0.557	1.611	0.199
DY plus IR	0.250	3.085	0.576	1.777	0.208
difference	0.014	0.194	0.019	0.167	0.009
% difference	6.1%	6.7%	3.4%	10.3%	4.6%
DY plus CG	0.244	3.070	0.565	1.734	0.204
difference	0.009	0.179	0.008	0.124	0.005
% difference	3.7%	6.2%	1.4%	7.7%	2.5%
DY plus IR & CG	0.265	3.346	0.540	1.807	0.216
difference	0.029	0.455	−0.017	0.196	0.016
% difference	12.3%	15.7%	−3.1%	12.2%	8.2%

Figure A1: Annual income Gini excluding irregular income

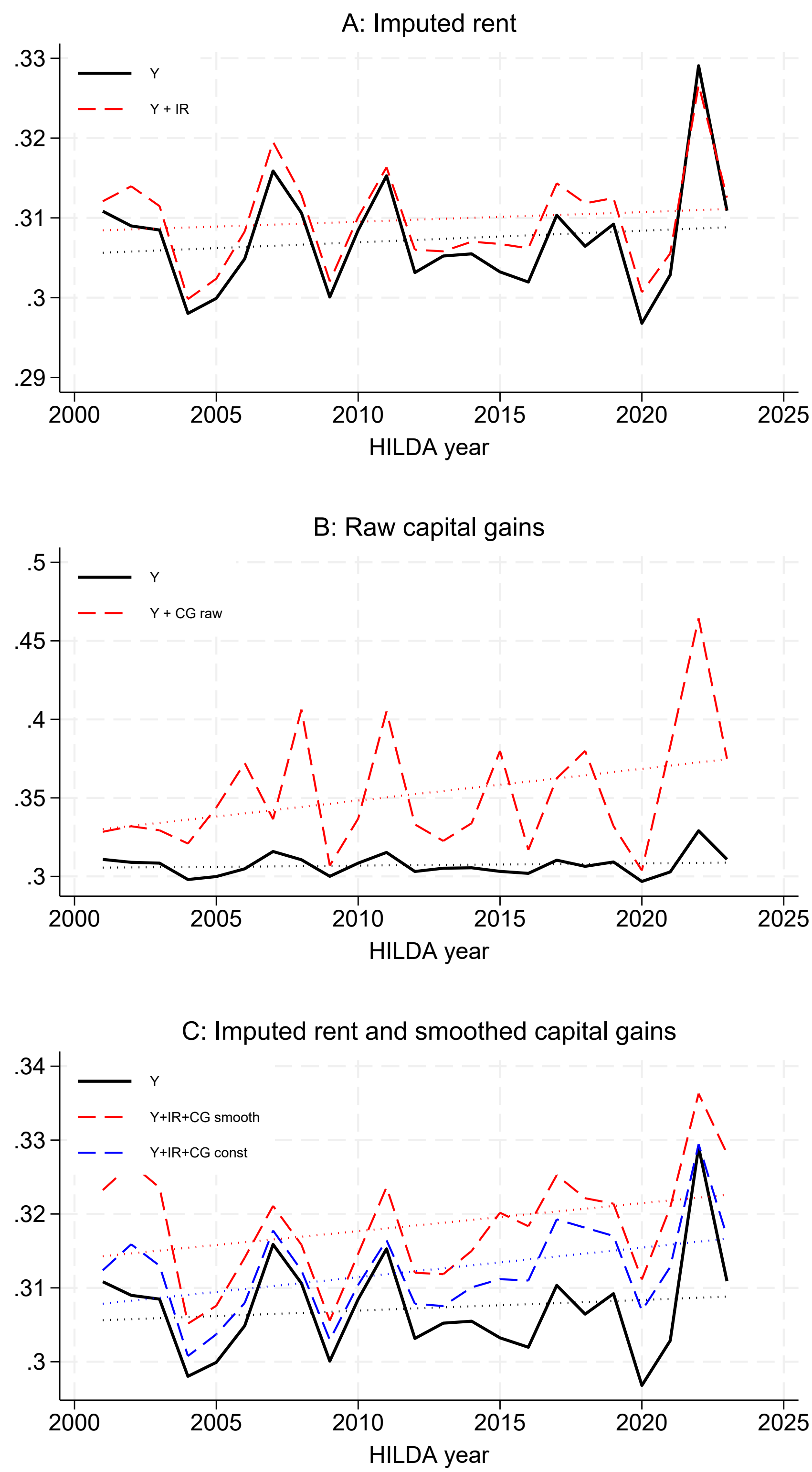
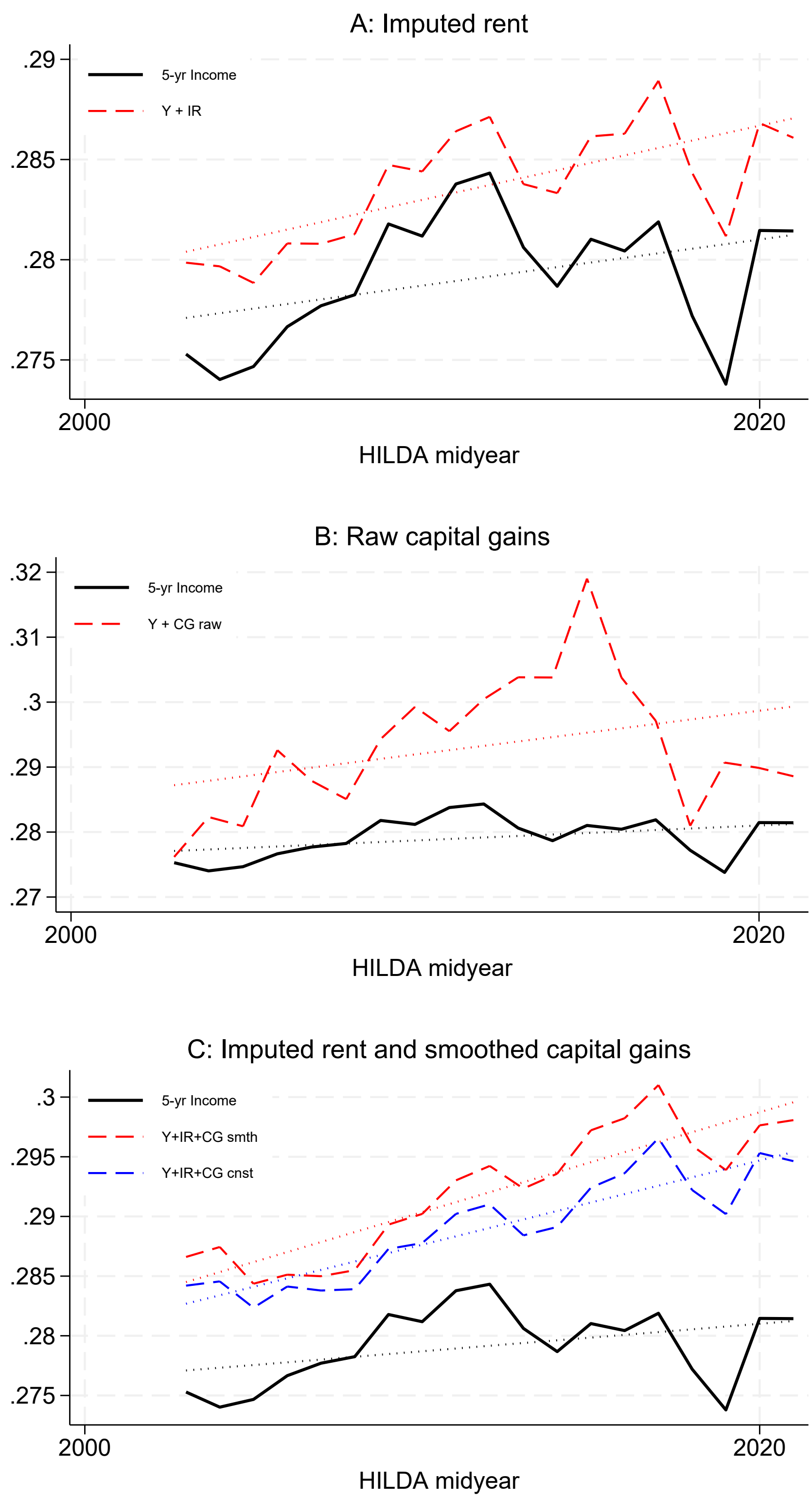


Figure A2: Medium-run (5-year) income Gini excluding irregular income



Appendix B: Additional tables and figures

Table B1 shows the same results as shown graphically in Figures 4, 8 and 9.

Table B1: Demographic profile of income with and without housing income

	Mean income ($'000s)			Share in bottom decile			Share in top decile		
	Income (Y)	Y+IR	Y+IR+CG	Income (Y)	Y+IR	Y+IR+CG	Income (Y)	Y+IR	Y+IR+CG
A: Annual income									
Renter	57.91	57.91	57.91	0.1562	0.2033	0.2401	0.0473	0.0344	0.0209
Owner-occupier	79.40	87.23	100.18	0.0753	0.0547	0.0390	0.1229	0.1285	0.1344
Own w/ mortgage	80.69	83.56	94.95	0.0337	0.0451	0.0348	0.1155	0.1036	0.1072
Outright owner	77.61	92.39	107.53	0.1344	0.0692	0.0456	0.1331	0.1629	0.1724
Male	73.94	79.23	88.18	0.0915	0.0937	0.0943	0.1033	0.1027	0.1030
Female	71.71	77.26	86.35	0.1081	0.1059	0.1054	0.0965	0.0970	0.0968
0–9 years	63.14	65.20	71.49	0.0845	0.1160	0.1308	0.0527	0.0483	0.0517
10–19 years	69.41	74.04	82.32	0.0758	0.0951	0.1023	0.0740	0.0767	0.0780
20–29 years	78.58	81.81	88.62	0.0699	0.0849	0.0950	0.1201	0.1125	0.1042
30–39 years	75.91	77.38	84.30	0.0574	0.0731	0.0787	0.1079	0.0889	0.0810
40–49 years	77.86	82.46	91.52	0.0596	0.0676	0.0694	0.1069	0.1017	0.1010
50–59 years	86.62	95.19	106.84	0.0809	0.0784	0.0720	0.1652	0.1766	0.1765
60–69 years	72.93	84.62	97.58	0.1685	0.1268	0.1107	0.1145	0.1355	0.1433
70–79 years	52.38	64.18	77.08	0.2649	0.1817	0.1519	0.0469	0.0631	0.0747
80–89 years	44.76	55.16	68.07	0.3519	0.2453	0.2042	0.0319	0.0415	0.0548
not retired	76.64	81.24	89.70	0.0703	0.0824	0.0877	0.1076	0.1053	0.1037
retired	53.93	64.65	76.89	0.2765	0.2039	0.1719	0.0537	0.0670	0.0767
Sydney	78.45	87.03	99.48	0.0944	0.0874	0.0903	0.1354	0.1472	0.1593
Melbourne	77.75	84.62	95.86	0.0808	0.0738	0.0693	0.1155	0.1160	0.1193
Other Capitals	74.40	78.12	85.31	0.0888	0.0934	0.0946	0.0999	0.0929	0.0857
Non-Capitals	64.58	68.53	75.57	0.1252	0.1299	0.1296	0.0666	0.0645	0.0610
Aus-born	75.66	81.72	91.25	0.1005	0.0964	0.0939	0.1116	0.1127	0.1124
Eng-speak COB	77.03	83.68	93.55	0.1005	0.0887	0.0843	0.1199	0.1210	0.1249
Other COB	67.18	72.85	81.94	0.1409	0.1225	0.1155	0.0833	0.0826	0.0811
B: 23-year income									
Renter in 2001	1479.58	1496.05	1578.57	0.1644	0.2003	0.2336	0.0504	0.0382	0.0316
Own-occ in 2001	1807.73	1996.90	2268.09	0.0751	0.0613	0.0487	0.1189	0.1236	0.1262
w/ mortgage 2001	1840.48	1973.05	2223.88	0.0454	0.0503	0.0440	0.1174	0.1145	0.1122
Outright in 2001	1767.62	2026.09	2322.23	0.1115	0.0749	0.0544	0.1206	0.1348	0.1433
Male	1764.68	1901.02	2118.31	0.0791	0.0798	0.0835	0.1035	0.1031	0.1040
Female	1669.94	1816.03	2036.44	0.1201	0.1195	0.1160	0.0963	0.0968	0.0961
0–9 in 2001	1611.48	1707.95	1885.44	0.0783	0.1097	0.1282	0.0664	0.0680	0.0686
10–19 in 2001	1668.42	1718.38	1878.41	0.0613	0.0806	0.0929	0.0599	0.0597	0.0523
20–29 in 2001	1769.13	1830.09	2014.21	0.0549	0.0705	0.0795	0.1082	0.0870	0.0874
30–39 in 2001	1830.01	1943.41	2145.23	0.0732	0.0805	0.0823	0.1254	0.1126	0.1049
40–49 in 2001	1884.37	2089.71	2359.34	0.0816	0.0772	0.0781	0.1425	0.1471	0.1511
50–59 in 2001	1672.50	1968.43	2281.47	0.1573	0.1153	0.0959	0.1080	0.1399	0.1490
60–69 in 2001	1221.72	1496.42	1773.38	0.4127	0.3067	0.2270	0.0542	0.0586	0.0684
not retired	1783.75	1905.03	2114.30	0.0649	0.0764	0.0833	0.1064	0.1029	0.1026
retired	1331.87	1587.93	1861.91	0.3008	0.2347	0.1954	0.0625	0.0827	0.0849
Sydney	1942.50	2177.30	2478.72	0.0658	0.0665	0.0710	0.1635	0.1854	0.1991
Melbourne	1860.62	2046.24	2336.12	0.0817	0.0696	0.0627	0.1327	0.1356	0.1399
Other Capitals	1680.39	1779.00	1965.05	0.1055	0.1088	0.1048	0.0904	0.0817	0.0717
Non-Capitals	1533.09	1629.50	1787.35	0.1255	0.1290	0.1337	0.0517	0.0443	0.0423
Aus-born	1719.66	1851.09	2063.33	0.0918	0.0981	0.1023	0.0985	0.0962	0.0971
Eng-speak COB	1790.56	1981.99	2239.22	0.1085	0.0926	0.0764	0.1281	0.1453	0.1354
Other COB	1622.24	1800.10	2040.67	0.1602	0.1236	0.1005	0.0816	0.0866	0.0906

Figure B1: Within-age annual income gini with and without housing income

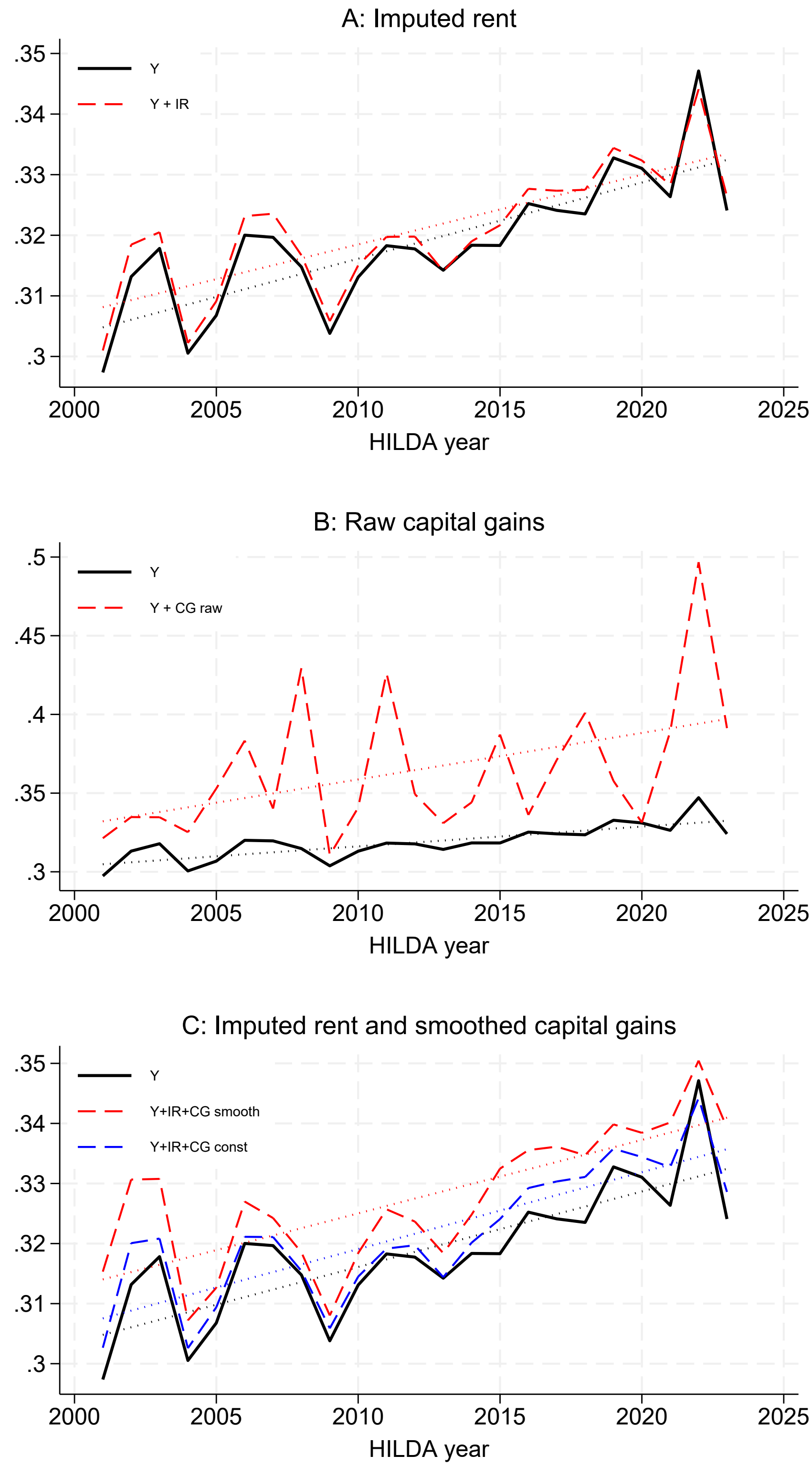


Figure B2: Annual income other inequality indicators with and without housing income

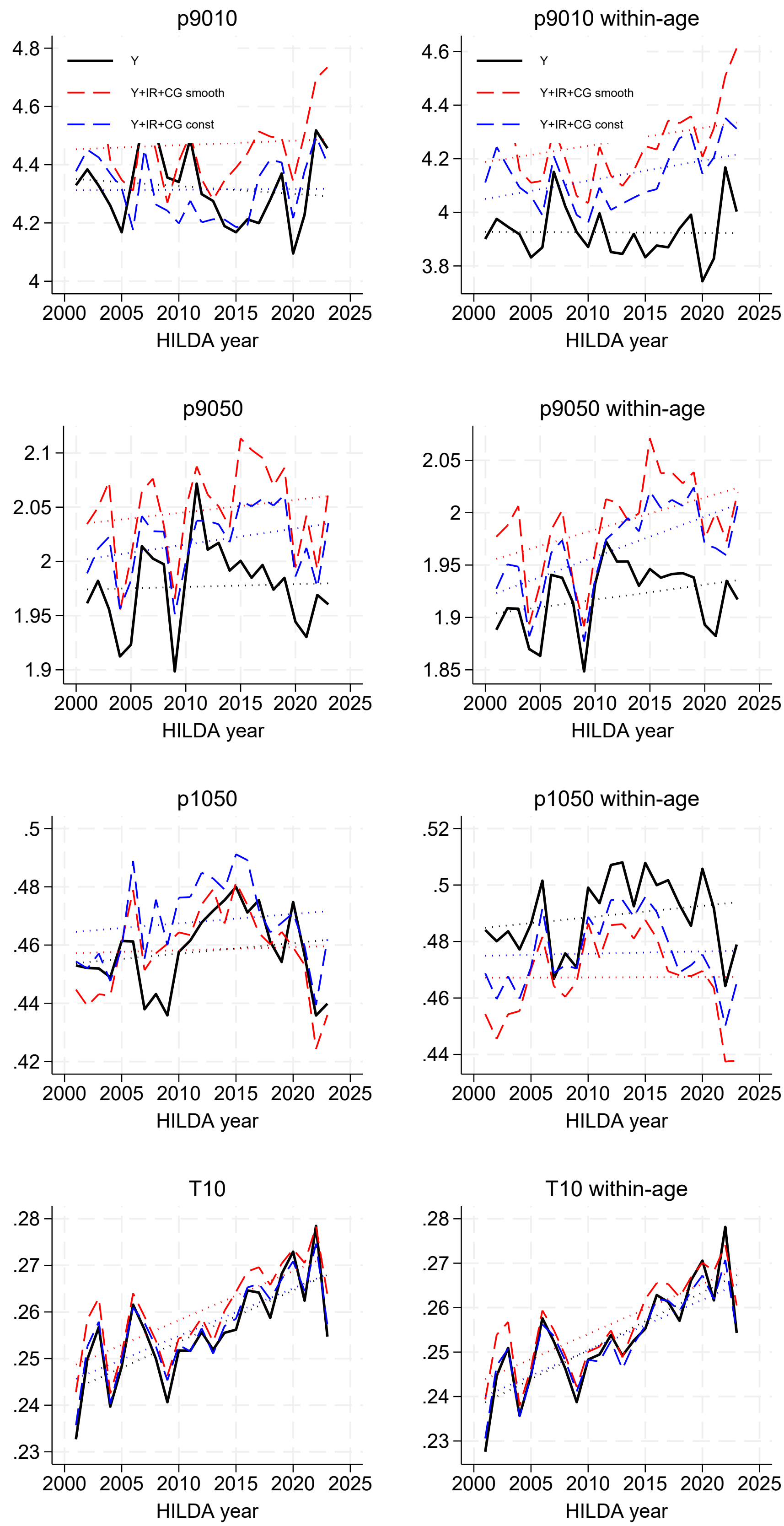


Figure B3: Within-age 5-year income gini with and without housing income

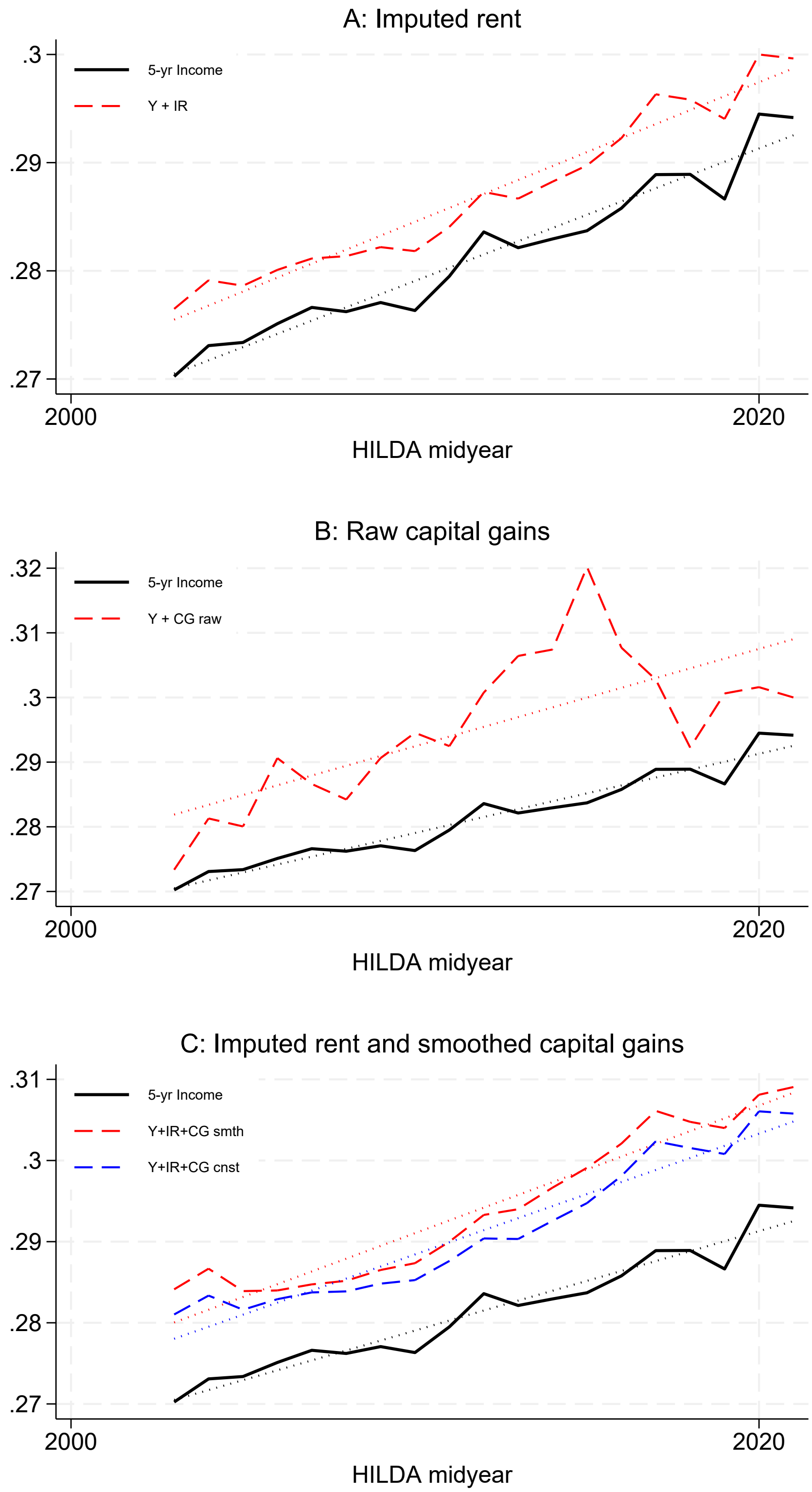


Figure B4: 5-year income other inequality indicators with and without housing income