Vanguard

Level 13
130 Lonsdale Street
Melbourne VIC 3000
Australia

vanguard.com.au

Estimating Retirement Replacement Rates in Australia: Evidence from HILDA

By Osei Wiafe, PhD, Investment Strategy Analyst at Vanguard

Research overview

A central question in retirement policy is how much income retirees need to maintain their standard of living.

One common approach is to use pre-retirement income as a guide. A widely used benchmark is that retirees require around 70% of their pre-retirement income to maintain a similar standard of living.[1]

In this research, we analysed 10 years of data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey to test this assumption against observed household behaviour by examining changes in income and spending before and after retirement.

While replacement rates are a simplified measure and retirement experiences vary considerably between individuals, evidence based on observed behaviour can provide a useful reference point for understanding retirement income needs.

Key findings

1. **Median income replacement rates are typically 70–80%**

   Analysis of 10 years of HILDA data suggests that median income replacement rates are approximately 70–80%, placing observed outcomes at or above the commonly cited benchmark of replacing 70% of pre-retirement income.

2. **Retirement replacement rates vary significantly across household types**

   Retirement needs vary meaningfully across household characteristics. The analysis identifies substantial differences by:
   - Household structure (single versus couple)

[1] OECD (2012), *OECD Pensions Outlook 2012*, pg. 161. https://doi.org/10.1787/9789264169401-en

- Pre-retirement income level
- Retirement age

Couples generally maintain higher replacement rates than singles, while lower-income households benefit from interaction between superannuation and the means-tested Age Pension. Higher-income households experience larger income declines but often sustain spending through accumulated wealth.

3. **Retirees generally reduce expenditure less than income**

   Our analysis shows that expenditure declines less than income in retirement, with median expenditure replacement rates of approximately 83–87%. This suggests retirees are often able to maintain a higher proportion of their pre-retirement spending than income-based measures alone would imply, smoothing consumption through a combination of superannuation drawdowns, accumulated savings and Age Pension support.

Practical implications for industry

- While headline replacement rates provide a useful starting point, a single replacement rate does not capture the diversity of retirement experiences.
- This research suggests there may be value in using differentiated replacement rate benchmarks based on factors such as household structure, income and retirement age, rather than relying on a single rule of thumb.
- Income replacement rates can be influenced by pre-retirement saving behaviour, mortgage repayments, taxation and the use of accumulated assets. Observed expenditure may therefore provide an important complementary measure of whether living standards are being maintained in retirement.

What Vanguard is doing

This research forms part of Vanguard's broader effort to better understand how Australians transition into retirement and, ultimately, what drives retirement success. By combining longitudinal household data with observed retirement outcomes, we aim to build a more evidence-based understanding of the income and spending patterns associated with maintaining living standards throughout retirement.

The findings highlight an opportunity to move beyond a one-size-fits-all replacement rate benchmark. By combining replacement rate benchmarks with characteristics such as household structure, age and pre-retirement income, retirement planning tools could provide more relevant retirement targets at scale without requiring a transition into personal financial advice. This has the potential to support more tailored retirement guidance while remaining accessible to a broad range of Australians.

1. Executive Summary

Understanding how much income Australians need in retirement is central to improving retirement outcomes. Using ten waves of the Household, Income and Labour Dynamics in Australia (HILDA) panel data, this paper estimates empirical replacement rates based on both income and expenditure. The results show that income falls sharply at retirement, while expenditure declines more gradually, indicating that households smooth consumption (more gradually reduce consumption) rather than adjust spending directly in line with income. The effect is stronger for singles than for couples, and higher-income households generally maintain better replacement rates. Overall, the findings suggest that observed retirement spending offers a more accurate measure of retirement adequacy than income alone, as it reflects the role of savings, superannuation, and other assets in maintaining living standards.

2. Introduction

Australia's superannuation objective is to preserve savings to provide income for a dignified retirement, supported by government in an equitable and sustainable way. A dignified retirement is commonly understood as one that maintains pre retirement living standards. Treasury's final report on Retirement Income Review calls out replacement rates, frequently defined as a percentage of the last pre-retirement income, as the most appropriate measure for assessing whether the retirement income system maintains living standards in retirement, yet how this should be measured, while central to policy design, remains a topic not fully explored.

The conventional approach to computing replacement rates reduces retirement adequacy to a single summary statistic. This, however, fails to adequately address substantial heterogeneity across household structure, the income distribution and the age at which retirement occurs.

When it comes to determining replacement rates, a growing literature argues that consumption expenditure provides a more direct and theoretically grounded measure of living standards than income alone. Income-based replacement rates are distorted by pre-retirement working and saving behavior, debt repayment such as mortgage payments and the tax treatment of income on the working side and superannuation drawdowns on the retirement side. Consumption based replacement rates, on the other hand, capture the resources households devote to living standards, hence, more clearly indicate whether those standards are maintained in retirement. Despite this, Australian studies that jointly track income and consumption around the retirement transition remain uncommon.

The commonly cited "70 per cent of final salary" rule may be an adequate proxy for some but may understate what other retirees truly require. For the latter group, knowing about replacement rates relevant to their characteristics will allow them to take adequate action such as delaying retirement, reducing expenses, or leveraging home equity, which may significantly improve retirement readiness.

This research fills that gap by estimating empirical retirement replacement rates using both disposable income and household expenditure, drawing on HILDA survey data. By combining income and consumption measures and distinguishing household types and retirement age cohorts, we provide empirically robust estimate of replacement rates in Australia. We

provide a framework that will support decision making on retirees based on observed pre- and post-retirement income and spending patterns. This way, our estimate for retirement will be helpful in maintaining pre-retirement lifestyle in a useful way.

3. Data and Methodology

Data and Variable Construction

This study uses HILDA Survey data (waves 14–23), covering individuals and households retiring between the ages of 60 and 70 years.

All monetary variables used in this study, equivalized household disposable income and equivalised household expenditure, are expressed in real terms by deflating to constant 2019 dollars using the Australian Bureau of Statistics Consumer Price Index (All Groups, Australia). Values are winsorised at the 1st and 99th percentiles within each wave to limit the influence of outliers. The choice of 2019 as the base year reflects two considerations. First, it is the last full calendar year prior to the disruptions associated with the COVID-19 pandemic, thereby avoiding distortions from the temporary CPI decline in 2020 and the elevated inflation observed in 2022–23. Second, selecting a base year within the sample period ensures that real values remain close to observed nominal magnitudes, helping with interpretability.

Household Definition and Equivalisation

Households are classified as either single or couples. Individuals without a valid partner identifier in each wave are classified as single, while those with a partner identifier matched to another individual in the same wave are classified as part of a couple.

Income is measured at the individual level and equivalised to the household level for couples. Expenditure is observed at the household level and equivalised using the modified OECD scale (Hagenaars et al., 1994). This adjustment enables comparability of economic resources across household types.

Retirement Definition

Retirement status is defined at the individual level for singles and derived from the joint states of both partners, in the case of couples. Our definitions are consistent with labour force and retirement indicators in the HILDA data. The analysis focuses on clearly defined pre-retirement (both working) and post-retirement (both retired) household states.

Event-Study Design

Replacement rates are estimated using an event-study framework centred on the timing of retirement. The event-study design tracks individuals five years before and after retirement. The sample is restricted to individuals retiring between ages 60 and 70. To preserve sample size, individuals observed near the panel boundaries (wave-14 retirees with no pre-window observations and wave-23 retirees with no post-window observations) are retained, even if they do not have a complete event window.

Replacement Rate Measures

We construct replacement rates using two complementary approaches.

(i) Descriptive (Raw) Replacement Rates

Raw replacement rates are defined as the ratio of post-retirement to pre-retirement outcomes:

$$RR_{it} = Y_{it}^{post} / \tilde{Y}_{i}^{pre}$$

Where RR_{it} is the replacement rate for person *i* retiring at time *t*, Y_{it}^{post} and $\tilde{Y}_{i}^{pre}$ denote median income (or expenditure) over the pre- and post-retirement windows, respectively.

Medians are used to reduce sensitivity to transitory fluctuations. Individual-level replacement rates are then aggregated to produce estimates by retirement age (60–70), household type (single vs couple), and pre-retirement income quintile.

(ii) Regression-Implied Replacement Rates

We complement the descriptive approach with a regression-based event-study using a two-way fixed-effects (TWFE) specification:

$$ln(Y_{it}) = \beta_0 + \beta_1 post_ret_{it} + f(age_{it}) + \sum_t \gamma_t \delta_t + \alpha_i + \varepsilon_{it}$$

where:

- $ln(Y_{it})$ = log (Income or expenditure) for individual *i* at time *t*
- $f(\text{age}) = \theta_1 \text{age} + \theta_2 \text{age}^2$ (age of individual *i* at time *t* and square of age to capture non-linear age effects)
- α_i = individual fixed effects
- δ_t = wave effects
- $post_ret_{it}$ = discrete retirement status change

Standard errors are clustered at the individual level to account for serial correlation.

The coefficient β_1 captures the average within-individual change in log income (or expenditure) associated with retirement. Exponentiating this coefficient yields the implied replacement rate:

$$RR_{it} = \exp(\beta_1)$$

which can be interpreted as the proportional change in outcomes following retirement relative to the pre-retirement period.

Taken together, the raw and regression-based measures provide complementary perspectives: the former offers transparent, distributional summaries across our sample, while the latter isolates within-person changes and adjusts for other factors like age and time trends.

4. Key Findings

Sample Characteristics

The initial sample comprises approximately 25,426 individuals aged between 60 and 70. To minimise noise around the transition into retirement, the retirement year itself is excluded, and the sample is restricted to individuals with at least one valid income and expenditure observation within a 1–5-year window before and after retirement. This leaves 15,038 observations of which 4,496 belong to single households and the remainder belonging to couple households; couples account for approximately 70% of the sample. Our final analytical sample comprises 9,971 household units, of whom approximately 55 per cent are couple households. The average retirement age in the sample is approximately 66 years, with a modal retirement age of 69, indicating a concentration of retirements in the late 60s.

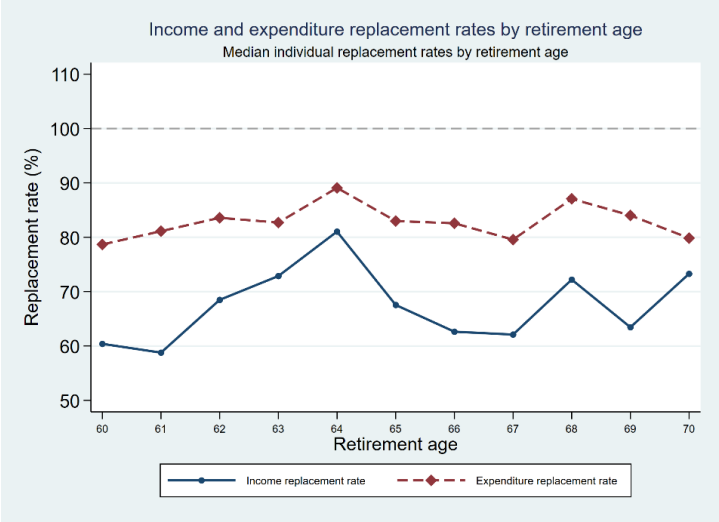
Results

Descriptive (Raw) Replacement rates

We find replacement rates to vary modestly by retirement age, with income typically replacing around 60–75% of pre-retirement levels and expenditure around 80–90%. Across all ages, expenditure replacement exceeds income replacement, indicating that households partially smooth consumption in retirement. The relatively stable expenditure profile suggests that retirees adjust spending less than income, supported by drawdowns of wealth or other buffers.

We find overall median replacement rates are around 71% for income and 83% for expenditure. These results indicate a substantial decline in income at retirement, accompanied by a smaller reduction in expenditure.

Figure 1. Income and Expenditure Replacement Rates (Descriptive Measure)



Replacement rates vary notably by household type. Singles experience income replacement of around 64% but maintain expenditure at roughly 86% of pre-retirement levels, while

couples exhibit higher income replacement rates of around 86% and expenditure replacement close to 90%, consistent with stronger consumption smoothing among couple households.

Regression-based event-study estimates

Figure 2 presents the event-study estimates of income and expenditure around retirement, using (retirement year minus 1) as the reference year. The specification includes individual fixed effects, wave fixed effects, and standard errors clustered at the individual level. The coefficients indicate a small increase in income and a stabilization of expenditure immediately before retirement, followed by a clear decline in both outcomes after retirement. Income declines sharply, while expenditure falls more gradually.

Figure 2. Event Study – All Households (Full Sample)

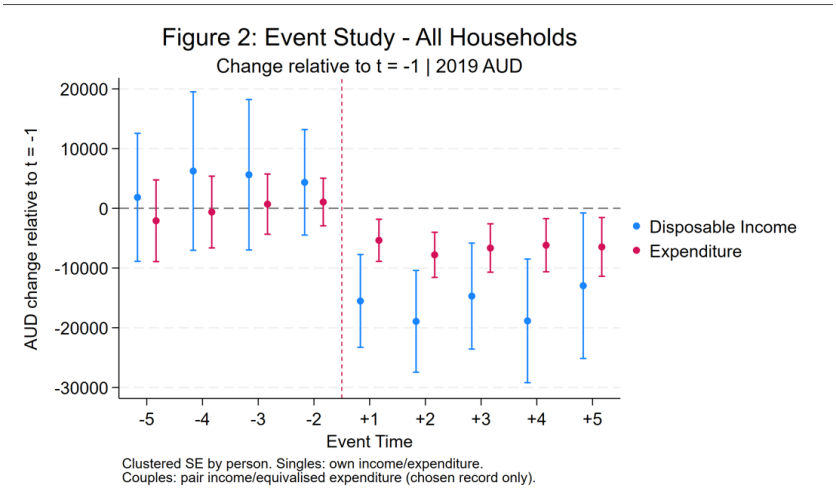


Figure 2 shows that across both regressions, the pre retirement coefficients are generally small and centred around zero and jointly insignificant (F=0.44, p=0.78 and F=0.25, p=0.90 for income and expenditure respectively). This suggests there is no evidence of differential pre-trends prior to retirement. After retirement, income falls sharply and persistently, with post-event coefficients implying reductions of approximately $10,000 to $30,000 (F=4.41, p < 0.001), relative to the reference period. Expenditure also declines, but by a smaller amount, approximately $2,000 to $10,000 (F=3.34, p < 0.004). Overall, the results reveal a distinct structural break at retirement, indicating that the observed changes in income and expenditure are attributable to the retirement event itself rather than to individual heterogeneity or macroeconomic factors.

Regression Implied Replacement Rates

Estimating permanent income - smoothed pre-retirement income

Income around retirement is subject to substantial volatility due to changes in labour supply and retirement-related payments. To approximate permanent income, we construct a smoothed pre-retirement measure to provide a more stable benchmark for evaluating retirement replacement rates. This smoothed income variable is calculated as a three-wave

directional median of income prior to the retirement year and is used as a proxy for permanent pre-retirement income.

Replacement rates

Replacement rates estimated using the fixed-effects specification are broadly consistent with the descriptive results. On average, income replacement rates are around 80% and expenditure replacement rates around 87% across all ages. There is clear heterogeneity by household type, with singles averaging roughly 75% (income) and 89% (expenditure), compared with higher rates for couples of around 91% and 95%, respectively. Additional variation is observed across income quintiles.

Figure 3. Path of Income replacement rates by pre-retirement income quintiles

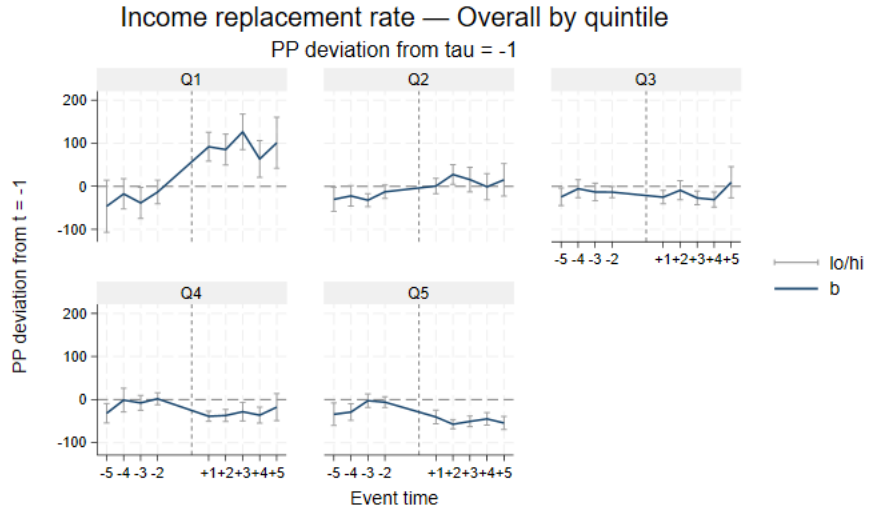


Figure 3 shows clear heterogeneity in income replacement across pre retirement income quintiles, with significantly different patterns before and after retirement. Prior to retirement, replacement rates are broadly stable and close to the reference level across all quintiles, indicating no meaningful pre trend differences. However, post retirement paths diverge substantially. Lower income households (Q1) exhibit an increase in replacement rates relative to the pre retirement benchmark, suggesting that income falls less sharply or is supported by structures such as the Age Pension. In contrast, middle income groups (Q2–Q3) show relatively flat or modest adjustments, indicating more balanced changes in income around retirement. Higher income households (Q4–Q5) experience persistent declines in replacement rates, reflecting larger proportional income drops and potential greater reliance on accumulated assets to sustain consumption. These patterns are consistent with consumption smoothing behaviour being more prominent among higher income groups. Importantly, these replacement rate paths differ by household types. We find couples generally exhibit higher and more stable replacement rates than singles, indicating greater capacity to buffer income shocks, while singles tend to experience larger declines, particularly in the higher quintiles.

Ratio Regression (Post-retirement expenditure relative to pre-retirement income)

Finally, we define replacement rates as post-retirement expenditure relative to a fixed pre-retirement income benchmark (smoothed pre-retirement income). This measure captures the share of prior income that households continue to spend after retirement, providing a direct and intuitive indicator of how well living standards are maintained.

Figure 4. Expenditure/ Pre-Retirement Income (Replacement Rates)

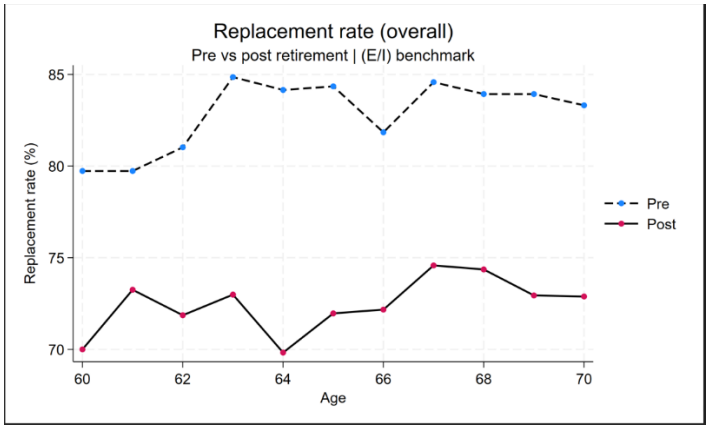


Figure 4 shows expenditure-based replacement rates by retirement age based on the regression approach using a fixed pre-retirement income benchmark, where the pre-retirement series reflects concurrent expenditure relative to prior income (exp/pre-income) and the post-retirement series compares post-retirement expenditure to that same fixed pre-retirement baseline. Prior to retirement, replacement rates are relatively stable across ages, generally below 90%, indicating that households spend less than their pre-retirement income even before exiting the workforce. Following retirement, replacement rates decline modestly across all ages, with post-retirement expenditure typically around 70–75% of pre-retirement income. The relatively small gap between pre- and post-retirement series suggests that despite a substantial drop in income at retirement, households adjust spending only gradually, partially maintaining spending levels relative to their pre-retirement benchmark. Overall, the chart highlights modest variation that the proportion of pre-retirement income needed to sustain living standards across retirement ages. This provides evidence consistent with consumption smoothing behaviour, whereby retirees sustain expenditure using accumulated assets rather than reducing spending one-for-one with income.

5. Discussion, Practical applications and Conclusion

Discussion

In Australia, the means-tested Age Pension provides a consumption floor, particularly for lower-income households, and contributes to the observed stabilisation of income and expenditure in later retirement years. Late retirement generally means a higher super balance and having access to the Age Pension. The increase in replacement rates at older ages, especially for singles and low-income households is consistent with timing of Age Pension eligibility. These factors reduce the magnitude of the income shock at retirement and support higher replacement rates for later retirees.

At the same time, the persistence of expenditure above income suggests that retirees do not rely solely on super and public support but actively manage private resources to sustain consumption. This reflects the multi-pillar structure of the Australian retirement system, combining superannuation, voluntary savings, and public support.

Practical applications

The findings support three key conclusions regarding the use of replacement rates as a measure of retirement adequacy or readiness.

Firstly, segmented replacement rates can be embedded into tools to provide more personalised retirement targets. Incorporating household structure, homeownership, and income enable scalable guidance without transitioning into personal advice.

Also, understanding expected income drops can support contribution nudges and improve retirement transition planning. Shifting focus from income targets to maintaining spending power aligns our metrics with real outcomes.

Finally, there is significant heterogeneity across income levels, household structure and retirement timing. These must be taken into account when assessing adequacy and in our estimation of income needs and targets. Aggregate replacement rate benchmarks may obscure important distributional differences, particularly for singles and lower-income groups.

Conclusion

Retirement adequacy cannot be captured by a single benchmark. Households do not adjust expenditure one-for-one with the income post-retirement, instead, they smooth consumption by drawing on savings, superannuation, or other assets. Couples are generally better positioned than singles to maintain living standards after retirement, with a similar pattern seen by income quartile. A move toward segmented, consumption-informed replacement rate frameworks will improve retirement outcomes and guidance quality.

Overall, the results provide strong empirical support for the central premise of lifecycle theory, that households adjust savings and decumulation behaviour to smooth consumption across predictable income changes such as retirement.

6. References

Australia Bureau of Statistics (2026), Consumer Price Index, Australia, Table: All groups CPI, weighted average of eight capital cities.

Australian Government Treasury. (2020). *Retirement Income Review: Final report*.

https://treasury.gov.au/publication/p2020-100554

Department of Social Services; Melbourne Institute of Applied Economic and Social Research (2024), "The Household, Income and Labour Dynamics in Australia (HILDA) Survey, GENERAL RELEASE 23 (Waves 1-23)", https://doi.org/10.26193/NBTNMV, ADA Dataverse, V2.

Hagenaars, A., De Vos, K. and Zaidi, A. (1994) Poverty Statistics in the Late 1980s, Eurostat, Luxembourg .