Australian National University

Crawford School of Public Policy

# TTPI

## Tax and Transfer Policy Institute

# Measuring the changing size of intergenerational transfers in the Australian tax and transfer system

## TTPI - Working Paper 7/2025
## May 2025

**Peter Varela**
Crawford School of Public Policy, ANU

**Robert Breunig**
Crawford School of Public Policy, ANU

**Matthew Smith**
PhD Candidate
Crawford School of Public Policy, ANU

## Abstract

This paper estimates the extent to which the Australian tax and transfer system redistributes income between Australians of different ages and how this has changed in the past three decades. These estimates combine individual level survey data such as the Household Income and Labour Dynamics in Australia survey (HILDA) and the Survey of Income and Housing (SIH) with aggregate values from the Australian National Accounts. This paper shows that Government expenditure targeting older Australians has increased significantly in real, per-person terms in recent decades. At the same time, older Australians have also earned significantly more private income, primarily as a result of higher capital income from real estate and superannuation. The combination of these two trends has significantly changed the nature of the Australian tax and transfer system and the age profile of the final (after taxes and transfers) income distribution. We discuss the implications of these trends for intergenerational equity, tax policy, housing policy and budget sustainability.

Keywords: Intergenerational equity, ageing population, fiscal, sustainability, taxes, transfers, housing affordability, intergenerational contract

* *We acknowledge financial support from the Business Council of Australia in producing this research. Kristen Sobeck produced an early iteration of this paper and was influential in shaping the direction of the project. The authors have benefited substantially from comments from the Bob Gregory, John Piggott, Roger Wilkins, Kate Griffiths, Matt Taylor and Ashley Craig and seminar participants at the Australian Public Economics Exchange workshop and the Australian Treasury. Ric Curnow assisted with editing. Corresponding authors*: peter.varela@anu.edu.au; robert.breunig@anu.edu.au; matthew.smith1@anu.edu.au

Tax and Transfer Policy Institute

Crawford School of Public Policy

College of Law, Governance and Policy

+61 2 6125 9318

tax.policy@anu.edu.au

The Australian National University

Canberra ACT 0200 Australia

**www.anu.edu.au**

**The Tax and Transfer Policy Institute** (TTPI) is an independent policy institute that was established in 2013 with seed funding from the federal government. It is supported by the Crawford School of Public Policy of the Australian National University.

TTPI contributes to public policy by improving understanding, building the evidence base, and promoting the study, discussion and debate of the economic and social impacts of the tax and transfer system.

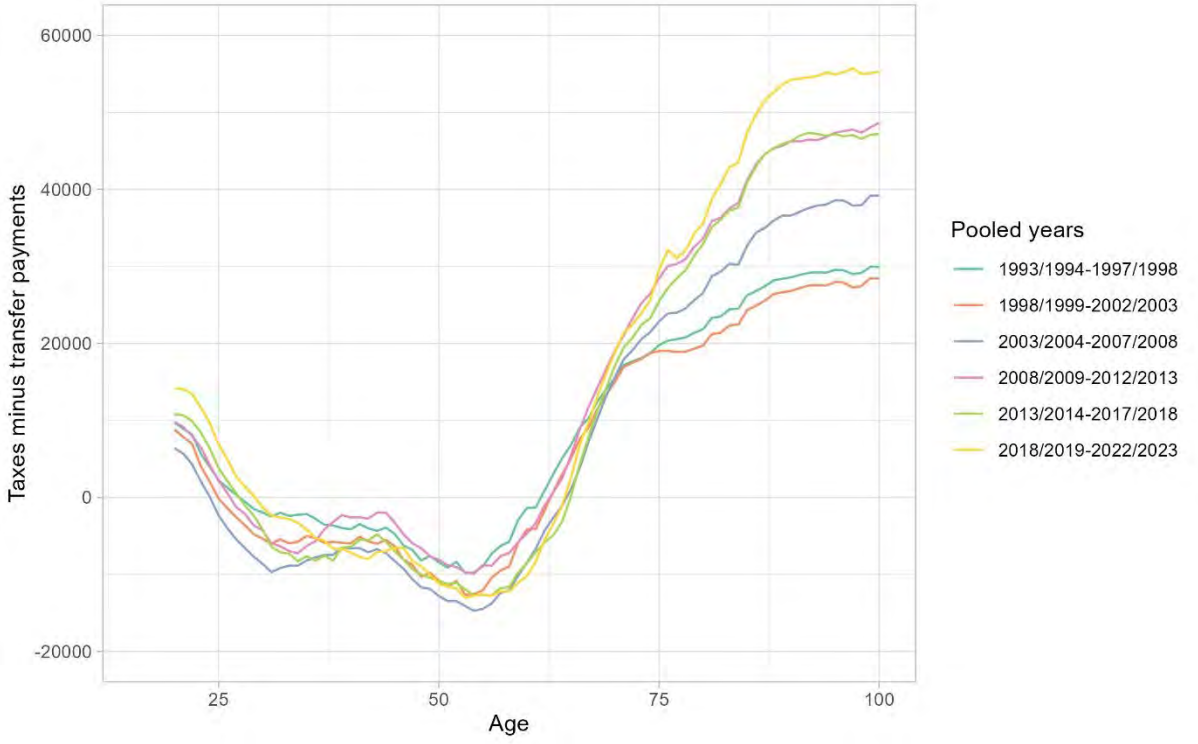
**The Crawford School of Public Policy** is the Australian National University's public policy school, serving and influencing Australia, Asia and the Pacific through advanced policy research, graduate and executive education, and policy impact.

## Executive summary

This paper estimates the extent to which the Australian tax and transfer system redistributes income between Australians of different ages and how this has changed in the past three decades. These estimates combine individual level survey data such as the Household Income and Labour Dynamics in Australia survey (HILDA) and the Survey of Income and Housing (SIH) with aggregate values from the Australian National Accounts.

This paper shows that the tax and transfer system has become more generous to older Australians in recent decades. Government expenditure targeting older Australians – such as the age pension, aged care and health care – has increased significantly in real, per-person terms over this period. In contrast, net expenditure targeting younger households remains relatively constant. This is not a function of an ageing population, as we are measuring expenses per capita. The net mean impact of the Australian tax and transfer system on individuals of different ages is shown in Figure 1.

***Figure 1 The intergenerational contract – average transfers net of taxes across the lifecycle***



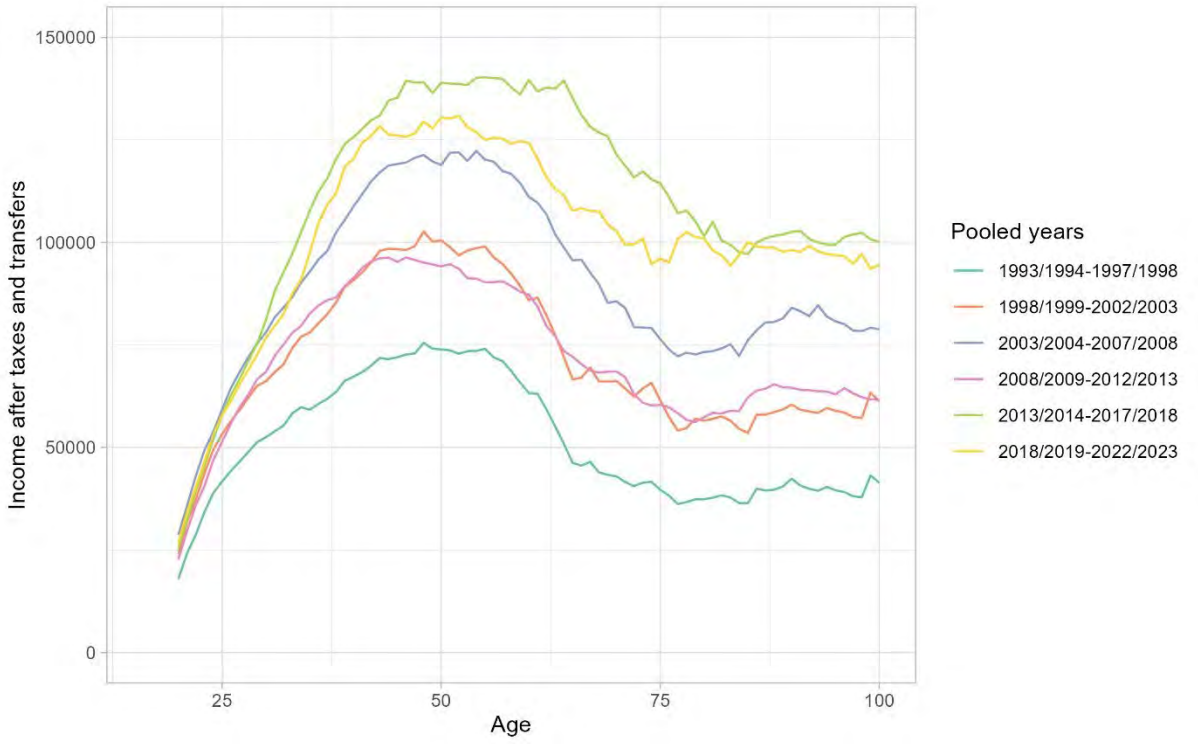

This increase in transfers to older Australians has occurred in a period in which older Australians have also earned significantly more private income, primarily as a result of higher capital income from real estate and superannuation.

The combination of these two trends has significantly changed the nature of the Australian tax and transfer system and the age profile of the final (after taxes and transfers) income distribution. In the first 10 years of our study (1993/94 to 2002/03), Australians aged over 60 had private income equal to 41% of the income of Australians aged 18-60 and average final income equal to 61% of the income of Australians aged 18-60. In the final ten years of our study, the pre-tax income of Australians aged over 60 was 65% of the population aged 18-60, and post-tax income is equal to 95% of their income.

This trend is even more notable when Australians over the age of 60 are compared to those aged 18-30. In the past ten years, the older cohort has earned an income around 11 percent higher ($72,000

compared to $64,000 in 2022 dollars). However, the tax and transfer system means that the older group has an average after-tax income 60% higher than the younger group.

***Figure 2 Average real income per person after taxes and transfers***




These findings have important implications for intergenerational equity, tax policy, housing policy and budget sustainability. The key insights are that:

- The tax and transfer system has not adjusted to the changing age profile of income in Australia. Current settings increasingly favour older Australians at the expense of younger Australians. Unless Australian society wants to explicitly favour older Australians, policies should be considered that reduce payments to older Australians and that shift the tax burden away from younger Australian and towards older Australians. Policy rules around means testing could be an important part of such a shift.
- The Australian personal income tax system is levied on a base which captures only around two-thirds of household income, leaving income generated from owner-occupied housing and superannuation lightly taxed. This has important implications for efficiency and equity.
- Growth in Australian land prices has created large transfers of wealth between generations of Australians. This price growth is driven to some extent by government policies, such as restrictive zoning and planning practices. Removing these barriers will deliver both equity and efficiency gains.
- To achieve a fiscally sustainable budget over the coming decades, Australia must choose between increasing taxes and reducing government expenses. The consequences of this adjustment should be borne, at least in part, by older Australians. Achieving budget sustainability solely by increasing taxes on Australians of working age (mostly by growing personal income tax revenue through bracket creep) will worsen generational imbalance in the tax and transfer system.

# 1 Introduction

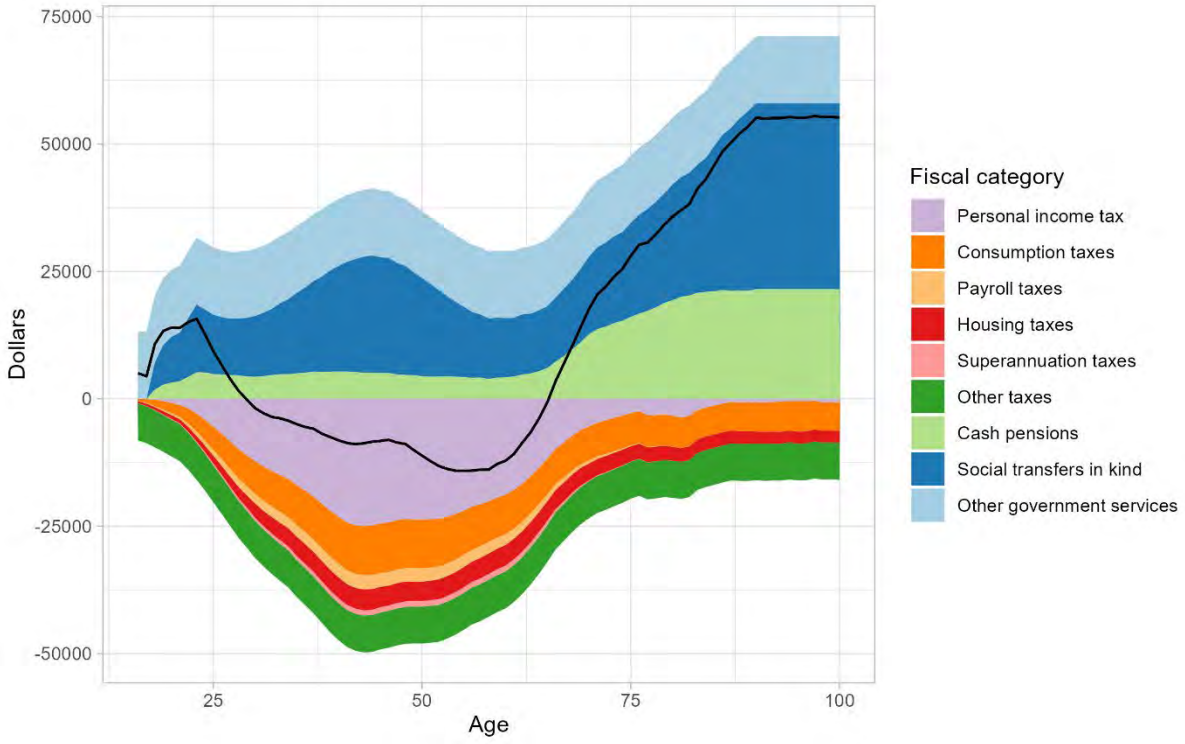
As Australians age, they interact with the tax and transfer system in different ways:

- When people are young, they are, on average, net recipients of services (such as education) and pay relatively little in taxes.
- During working age, people typically pay more in taxes than they receive in services.
- After retirement, people typically receive more in government benefits and services (age pension, aged care and health care) than they pay in taxes.

This generational structure of the tax and transfer system is sometimes referred to as an intergenerational contract. It is a well-known feature of tax and transfer systems and has been studied in detail, including by Barr (2001), Auerbach, Gokhale and Kotlikoff (1994) and Creedy and Van de Ven (2001). It is also a key component of long-term fiscal models produced by the Australian Government, including those in the Intergenerational Report (Commonwealth of Australia 2023).

The structure of the intergenerational contract (as modelled in this paper) is shown in Figure 1.1 (the black line is the net value of transfers less taxes).

***Figure 1.1. Components of the intergenerational contract***




This figure shows the net fiscal impact conditional on being alive at a particular age, which overstates actual expenses at older ages. Similar figures can also be found in Varela et al. (2019), Productivity Commission (2013), and Wood et al. (2019). Differences in these figures occur due to a) whether revenues and expenses for older age groups are discounted to account for the time value of money, b) whether mortality rates are used to adjust for the probability of survival (this significantly reduces the costs for very old ages) and c) whether child-related transfers are attributed to parents or children (this paper attributes these transfers to parents).

This structure does not, on its own, create concerns around intergenerational equity. Provided that each working generation supports the old and young to a similar extent, the net impact of the system is balanced across the lifecycle. Indeed, an intergenerational contract maintained through the tax and transfer system is a common feature of most advanced economies and has many favourable attributes (see section 1.3 below).

However, these transfers involve trade-offs. Net transfers to one generation must come at the expense of taxes paid by another generation. These taxes and transfers also distort the incentives of Australians to work and save.

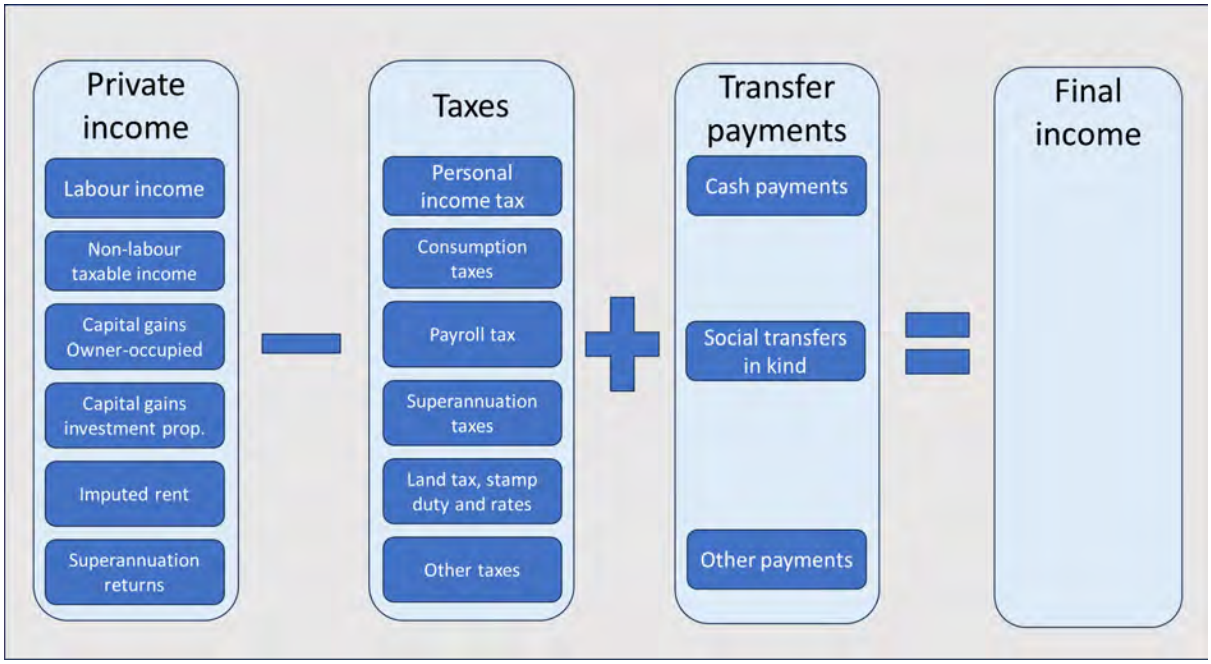
Given the size of the programs involved, the appropriate level of transfers between generations is one of the key design elements of the Australian tax and transfer system. However, these net intergenerational redistributions from the totality of Government policy are largely hidden from the Australian policy debate. While it is common to discuss how a particular tax instrument or policy change impacts different Australians at different stages of life, it is much harder to see (and thus much less commonly discussed) how the different components of the tax and transfer system fit together and how the aggregate impact of these policies has changed over time.

Therefore, the primary goal of this paper is to measure the size of intergenerational transfers made through the tax and transfer system, how this has changed over time, and how this has impacted the age profile of final income (after taxes and transfers) in Australia. By making these transfers more transparent, we hope to improve the policy discussion around intergenerational equity in Australia.

## 1.1 A framework for measuring income and intergenerational transfers

This paper calculates the total income, the total taxes paid, and the total amount of government transfers received at different ages over time. We refer to private income as income before taxes and transfers and final income as income after taxes and both cash and in-kind transfers. Income, taxes and government payments are decomposed into the categories in figure 1.2.

***Figure 1.2 Components of income, taxes and government services.***




Additional discussion of this income framework appears in Appendix A.

## 1.2 Measuring income, taxes and expenses by combining survey data and the Australian National Accounts

The calculations in this paper use survey data to estimate the age profile of income, tax and government services to individuals in different years. We then scale these values to equal aggregate

values from the Australian National Accounts. Combining survey data and National Accounts in this manner is a common modelling approach and has been used by Piketty, Saez and Zucman (2018), Fisher-Post, Herault and Wilkins (2022), Auten and Splinter (2023) and others. A similar approach is used by the Australian Treasury in the Intergenerational Report (IGR) (Commonwealth of Australia 2023) and the Fiscal Impact of New Australians (FIONA) model (Varela et al. 2019).

Three main rationales support mapping survey data to national accounting data. First, the National Accounts represent the best estimate for key aggregate economic values. Second, survey data are known to under-represent some values – a commonly cited example is that people typically understate their alcohol and tobacco consumption in household surveys. Mapping household values to National Accounts ensures that the aggregate level of taxation is attributed across individuals of different ages in each year even if individual responses are biased. Last, the National Accounts are available for every year, whereas the survey data are not (HILDA is not available before 2001, while the Survey of Income and Housing has gaps between collection years). This means that in years where survey data are not available, we only need to impute the relative shares across age groups and then scale this to the National Accounting aggregates.

Further detail of how these variables are mapped to the National Accounting aggregates are provided in Appendix A.

## 1.3 Why do changes to intergenerational transfers matter?

The government facilitates the transfers between generations via the tax and transfer system as part of the intergenerational contract. The literature identifies five main rationales for an intergenerational contract:[1]

- **To smooth lifetime consumption or invest in human capital** in the absence of perfect capital markets. (This relates primarily to government spending on younger people). Empirical evidence suggests that spending on younger groups has a higher return, on average, than spending on other groups (Hendren and Sprung-Keyser, 2020).
- **To insure against longevity risk.** Individuals don't know how long they are going to live and in the absence of a government pension, would be force to 'over save' to cover expenses in case they live to a very old age. Government funded services targeting older groups (age pension, aged care and health care) is a form of insurance against this longevity risk (Whitehouse (2007), Productivity Commission (2013)).
- **To target Government payments to those that are less likely to be able to earn a market income**. In the language of tax policy design, age is used as a 'tag' for ability to pay in the design of the welfare system (Akerlof 1978).
- **To reduce intergenerational inequality**. Different generations face different economic circumstances. Those entering the labour market in recent years have higher levels of productivity and as a result will earn higher lifetime wages than previous generations. Similarly, earlier generations have benefitted significantly from large increases in housing and stock market prices. The tax and transfer system can transfer resources from lucky to unlucky generations.
- **To expand consumption possibilities for all generations.** Where population and productivity in an economy grow over time, an intergenerational contract in which each generation pays for the retirement costs of the previous generation increases the consumption possibilities of all

[1] This discussion is based on literature reviews conducted by Barr (2001), Productivity Commission (2013) and Wood (2023).

generations. This is a standard result from an over-lapping generations modelling framework – see for instance, Campante, Sturzenegger and Velasco (2021, p.122)

The relative importance of these factors is debated. Indeed, the appropriate size of the welfare state is one of the defining debates of modern history. However, most (but not all) justifications for redistribution towards older age groups are based on the idea that the spending will finance consumption in retirement rather than fund intergenerational bequests.

As the distribution of private income changes over time, so will the most appropriate policy to facilitate the goals of the intergenerational contract change with it. For instance, the main value from providing insurance against longevity risk is that people at younger ages do not need to reduce current consumption in order to self-insure. This justification is no longer relevant if people accumulate large assets that they do not intend to consume before death.

## 1.4 Cross sectional versus cohort analysis

The analysis in the main body of this paper is cross-sectional, in that it compares how the Australian tax and transfer system treats people of different ages within a given year. The empirical framework in this paper can also be used to track generations of Australians across time to calculate the cumulative impact of the tax and transfer system on generational cohorts. In this paper, we present the cross-sectional analysis as the main empirical results in Sections 2 and 3, while we present a limited set of results from cohort analysis in Appendix B.

There are two main reasons that we prioritise the cross-sectional results. The first is that cohort analysis requires input data over a much larger number of years. For instance, cross-sectional analysis covers 30 years in this paper, while data required for the cohort analysis covers 140 years 1960-2100. This requires very strong assumptions about how to extend the data into the past and future.[2]

The second is that while policymakers endeavour to maintain some level of consistency in the tax and transfer system across time, policy is ultimately determined on a cross-sectional basis. That is, each year Australia determines the relative size of different government programs taking into account changes in economic conditions and social preferences. In contrast, we are unable to go back in time 30 years and levy a tax on housing capital gains. Nor are we able to bind the decisions of future governments 30 years in the future.

[2] This argument is similar to the reason that researchers typically use period rather than cohort life expectancy to understand changes in life expectancy.

# 2 The impact of taxes and transfers on Australians of different ages over the past three decades

The impact of the Australian tax and transfer system on Australians of different ages has shifted over the past three decades. This change is the result of both deliberate policy decisions and changing economic circumstances. This section calculates the net impact of the tax and transfer system on Australians of different ages.

## 2.1 Trends in taxes paid by people of different ages

This paper calculates the age profile of six tax categories:

- Personal income tax
- Consumption taxes (GST, wholesale sales taxes, and fuel, alcohol and tobacco excises)
- Payroll tax
- Housing taxes (including stamp duty, land taxes and council rates)
- Superannuation taxes (including taxes on contributions and earnings)
- Other taxes

When combined, these six categories are constructed to equal total Australian tax revenue as reported in the Australian National Accounts. Figure 2.1 shows how these different revenue bases have impacted Australians of different ages in the past three decades. All values are adjusted for inflation and reported in 2022 dollars.

***Figure 2.1 Trends in the Taxes paid across the age distribution (in 2022 dollars)***

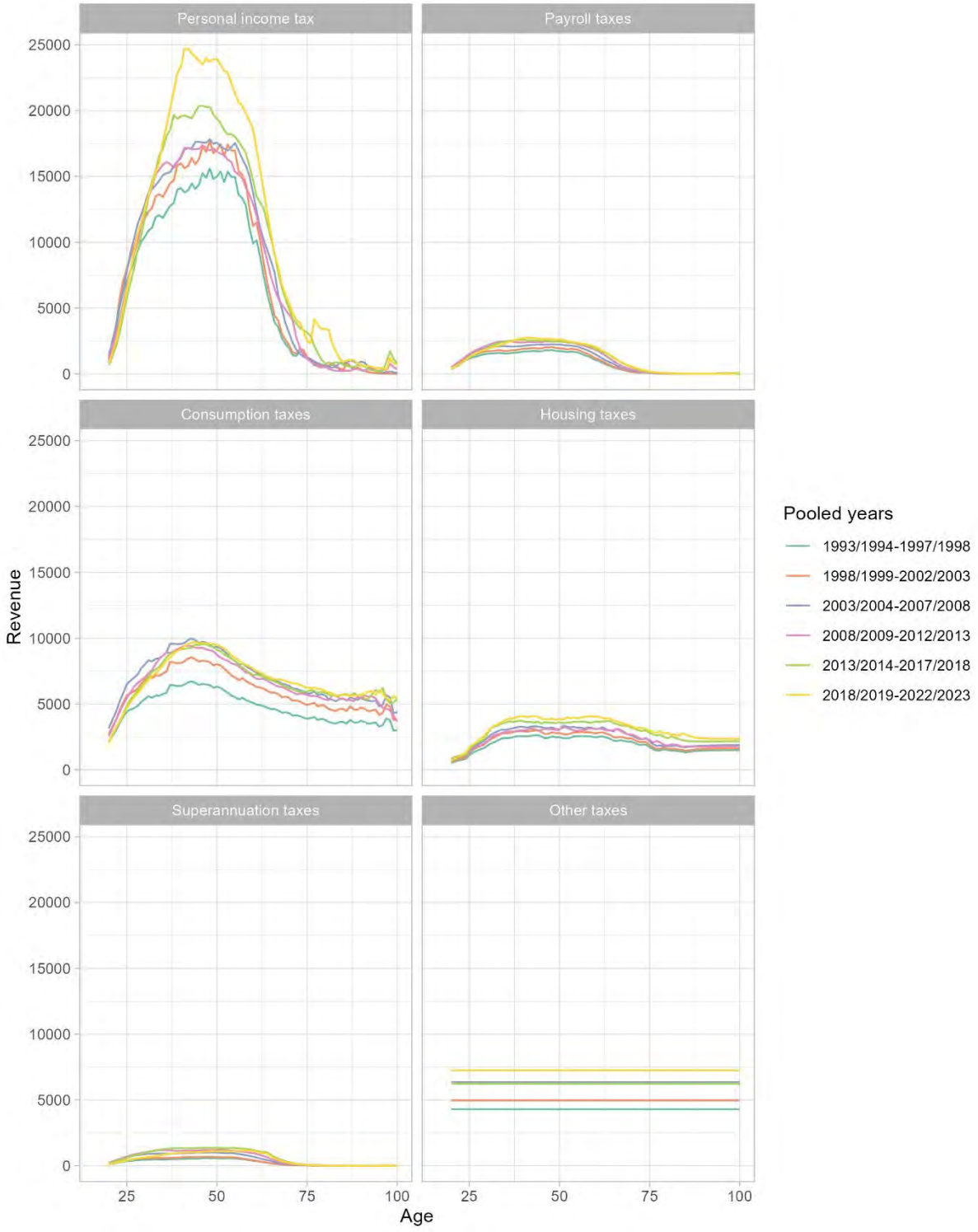



Figure 2.1 shows that Australian taxes fall most heavily on those of working age. This is most pronounced with personal income tax, payroll tax and superannuation taxes but is also seen with consumption and housing taxes.

The age profile of "Other taxes" is flat by assumption. This decision is made primarily to mirror the assumption used for 'other government expenses' in the following section. Other reasonable assumptions, such as allocating all taxes in proportion to income, would only strengthen the key

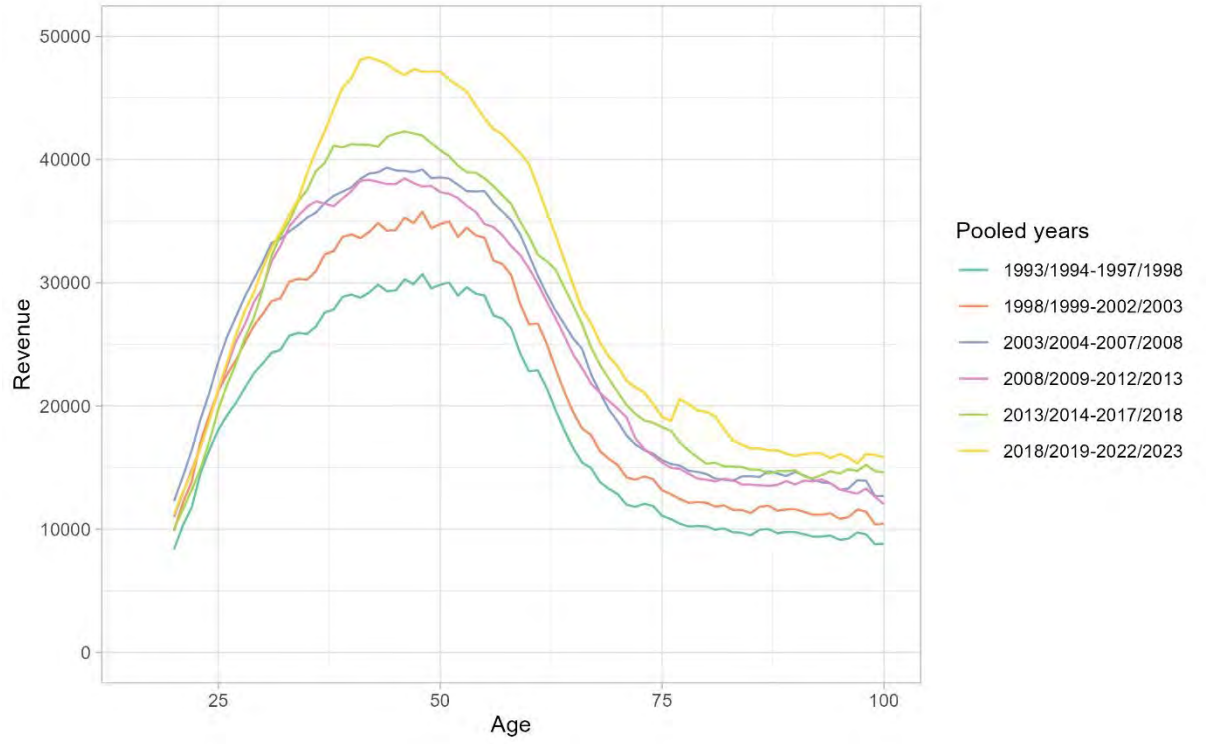
qualitative findings of this paper. We also conduct sensitivity tests around who pays the corporate income tax in Appendix C.

The most pronounced growth over this period occurs in personal income tax. This is due to an increase in real income, with the average tax rate on labour income relatively stable during this period. The other tax bases show comparatively little change. Consumption taxes are particularly notable for their lack of growth in the last twenty years.[3] The growth in "Other" taxes reflects growth in corporate income taxes.

Aggregate taxes (the sum of the six categories above) is presented in Figure 2.2. This shows that total taxes paid have increased significantly for those in the highest earning years.

- Taxes have also increased at older ages. This increase is similar in proportional terms to the increase in the highest earning years, but still relatively low in absolute terms.
- Taxes paid have not increased at younger ages (reflecting the lower growth rate in earnings for this group, discussed below).

***Figure 2.2 Trends in the total taxes paid across the age distribution***




## 2.2 Trends in government spending on people of different ages

Next, we estimate the age profile of government expenses received by Australians and how this has changed over time. This calculation attributes expenses to adults in each household. For instance, expenses related to childcare are assumed to fall on parents rather than children.

[3] The decline of revenue through consumption taxes is largely driven by a fall in GST. The factors behind this fall include a shift towards consumption that is GST-exempt and faster price growth of GST-exempt goods and services. These trends are discussed in Parliamentary Budget Office (2020). As this paper models consumption taxes as a single tax paid in proportion to total consumption, some factors discussed in Parliamentary Budget Office (2020) will not be fully reflected in Figure 2.4.

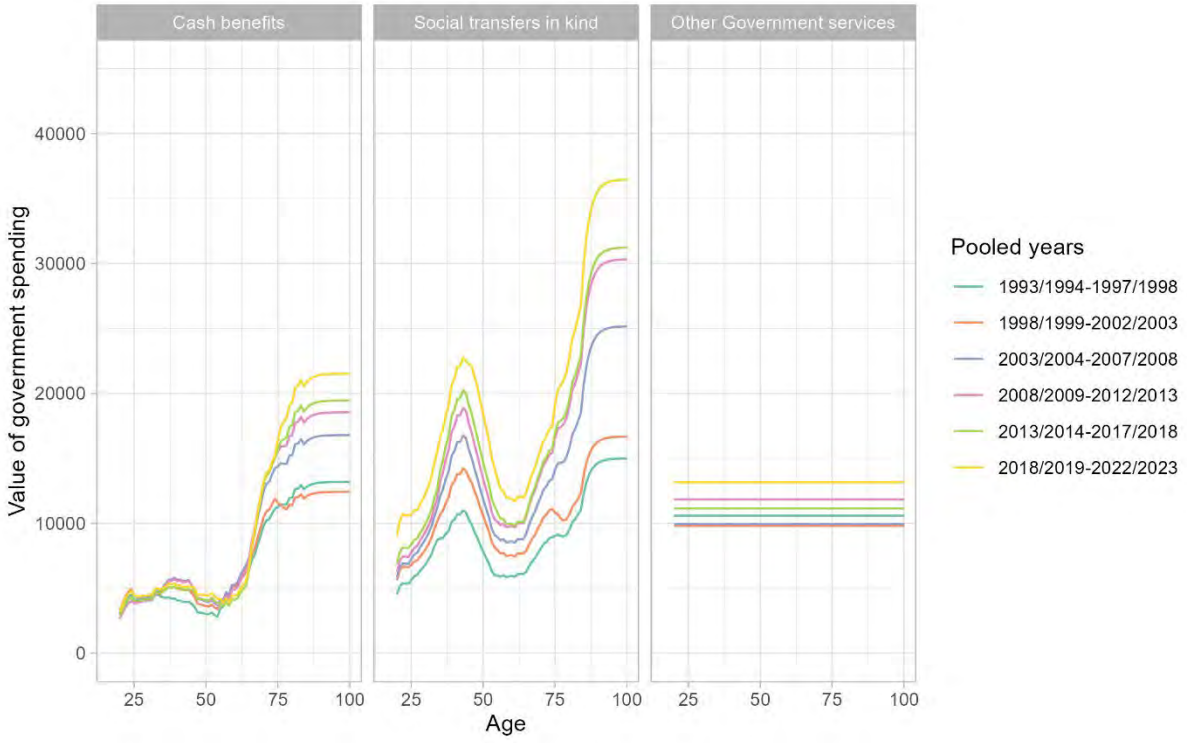
We decompose government expenses into three categories:

- Pensions and other cash benefits.
- Social transfers in kind (such as health and education where the spending has a clear recipient).[4]
- All other government spending (such as infrastructure costs or defence) is assumed to be spread equally across all people above the age of 15.

The analysis is based on ABS data collected in the HES and released in the ABS publication "Government Benefits, Taxes and Household Income". Aggregate values are scaled to equal the corresponding figures from the National Accounts. A notable shortcoming is that the most recent version of the ABS survey records social transfers in kind is from 2017-18. Therefore, we are not able to capture any changes to the age profile of government spending and social transfers in kind after this time – including policy responses to COVID and growth in the NDIS.[5]

The distribution of government expenses by age are shown in Figure 2.3. Cash payments are heavily targeted towards older age groups (the Age Pension) while social transfers in kind have a bi-modal distribution with a peak at older ages (aged care, health care) and a peak around 30-40 that reflects services provided to families with children.

***Figure 2.3 Trends in government services received across the age distribution***



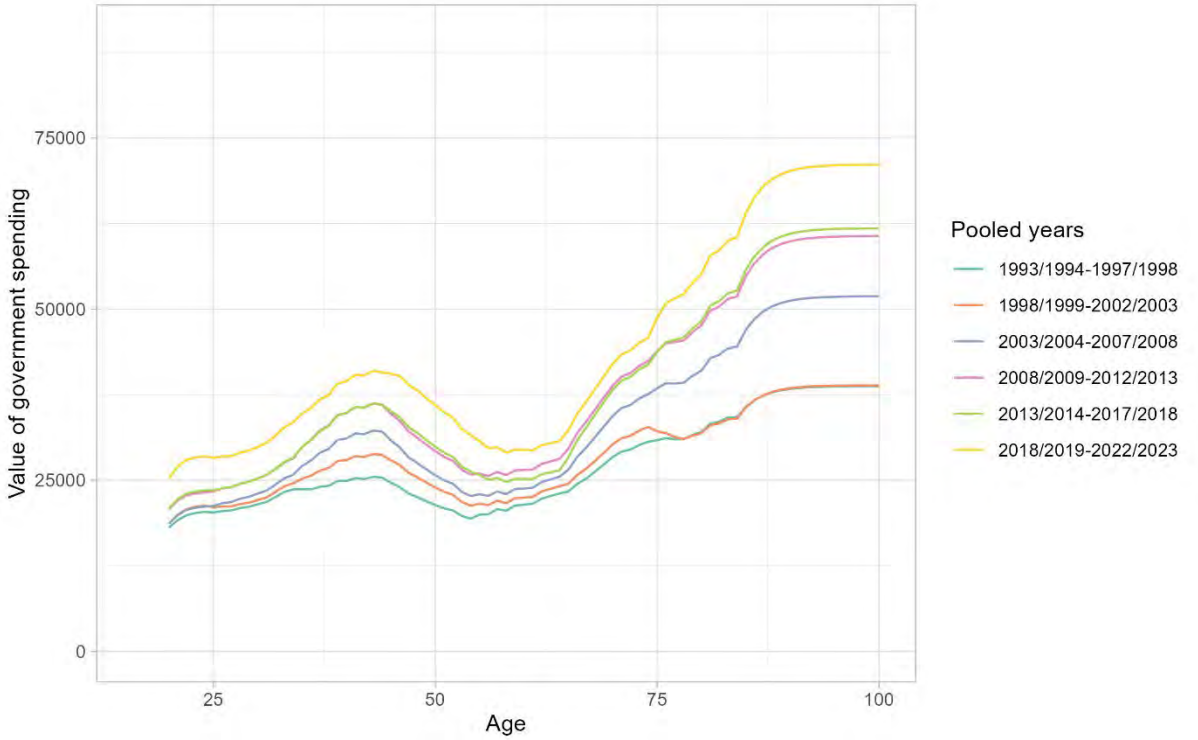

Data are 'top-coded' above the age of 85.

The sum of these three transfers categories is shown in Figure 2.4.

[4] In the most recent data, Health (52%) and Education (31%) are the largest categories of social transfers in kind.

[5] The NDIS is designed to primarily support Australians below the age of 65 and therefore this growth would partially offset the trend towards spending on older Australians.

***Figure 2.4 Trends in total government spending received across the age distribution***

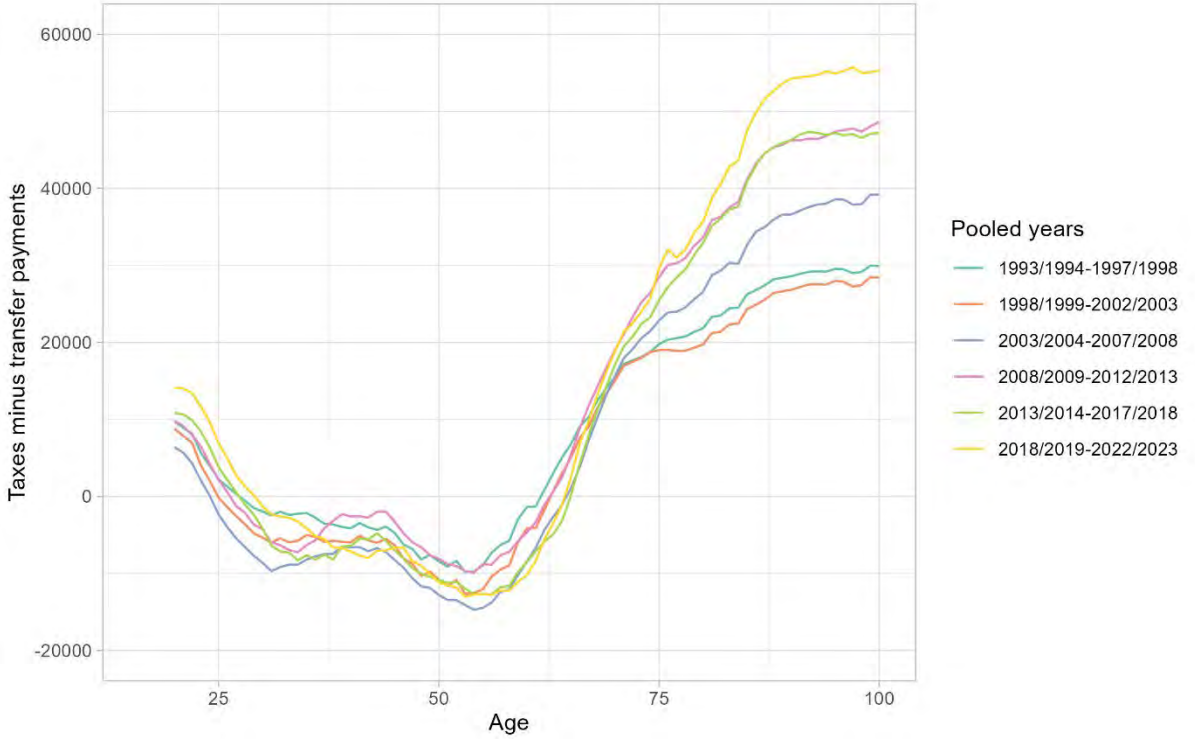



## 2.3 Net transfer through the tax and transfer system over time.

By combining the net impact of taxes (Figure 2.2) less transfers (Figure 2.4) received we can measure how the intergenerational contract has changed over time. A negative number means people of this age pay more in taxes than they receive in government expenses while a positive number implies that people of this age are net recipients of government transfers.

Figure 2.5 shows that the Australian tax and transfer system has transferred money from working age to those of older ages in every period. However, the net transfer to older Australians has increased significantly in real terms in recent years. Notably, transfers to younger cohorts have not increased in a similar manner.

***Figure 2.5 Trends in the Australian intergenerational contract***



# 3. The age profile of Australian income, before and after taxes and transfers

This section of the paper shows trends in private income over the past three decades, and how these interacted with the changes to the tax and transfer system described in Section 2.

We first calculate the pre-tax distribution of income by age in Australia over the period. This calculation is similar to the tax and transfer calculation in that it uses survey microdata to estimate the relative income levels by age groups and scales these values to equal aggregate values from the Australian National Accounts. We then add the aggregate impact of the Australian tax and transfer system to derive an estimate of final income by age.

## 3.1 Trends in private income earned by people of different ages

This paper groups income into six categories:

- Wages and salaries
- Other 'regular' taxable income
- Owner-occupied capital gains
- Investment property capital gains
- Returns to superannuation
- Net imputed rent

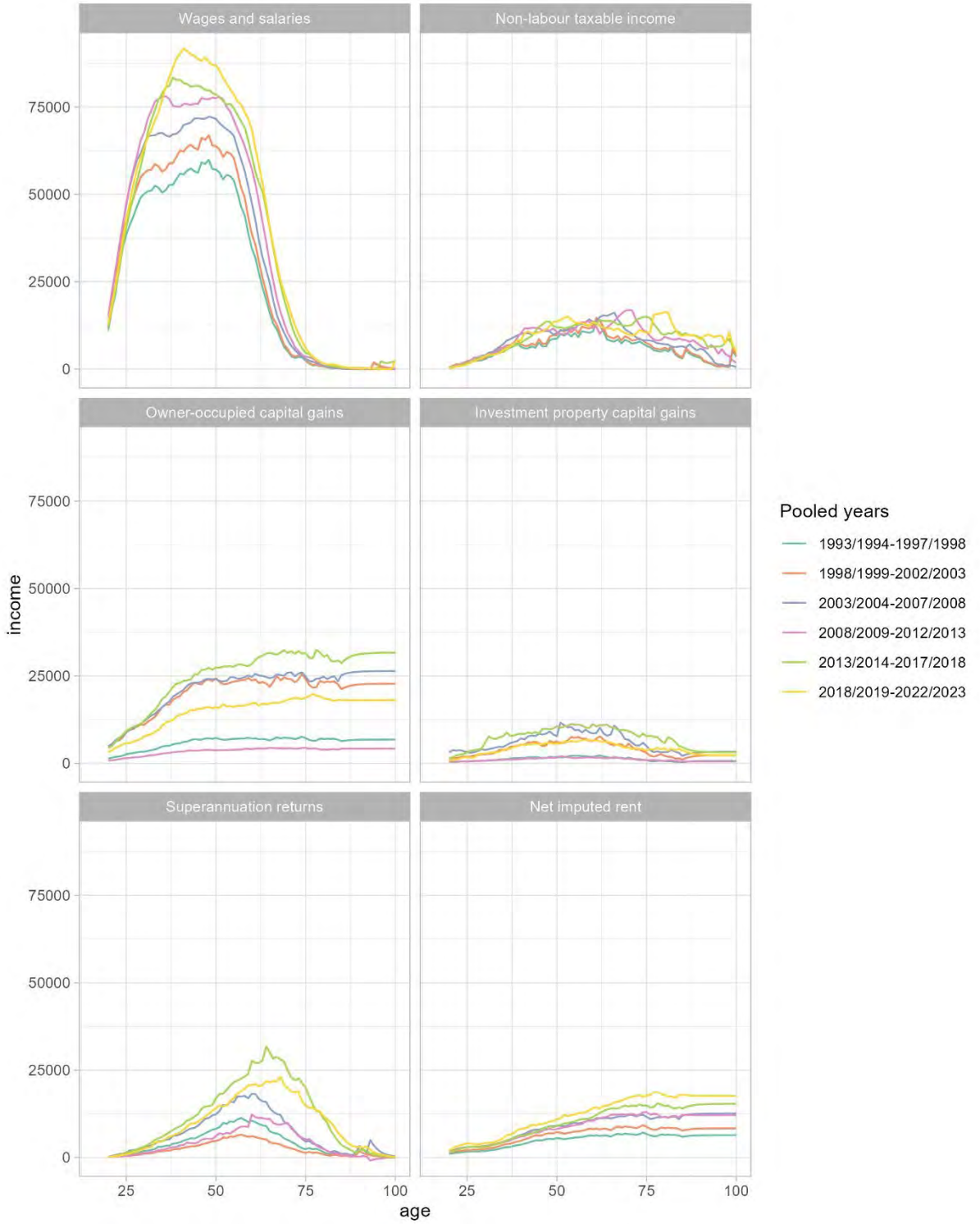
In each case, income is the change in net wealth from each source, rather than the realised cash income stream. For instance, if an individual's superannuation balance increased by $10,000 due to interest and dividends paid on investments held within the superannuation account, this is counted as income. On the other hand, if that individual withdrew $10,000 from their superannuation balance as a pension, this does not count as income (as it is converting one asset into another asset).

Figure 3.1 shows how Australians at different ages have generated income, and how this has changed. The largest increase in earnings (in dollar terms) has occurred through salary and wages, (although this effect is not seen for younger workers).[6] Older age groups have seen substantial growth in income from real estate over the period.

In interpreting figure 3.1, it is important to note that capital income varies significantly between years. For instance, when the housing market reduces in value this income is negative. Presenting average results across five-year periods removes some volatility but significant volatility remains. For instance, the 2008/09 – 2012/13 has the lowest level of capital gains due to the fall in asset prices during the Global Financial Crisis.

[6] More detailed analysis of youth labour market outcomes and potential reasons for the slower wage growth for this group is found in Australian Treasury (2017), Dhillon and Cassidy (2018), Hambur (2023) and Productivity Commission (2020).

***Figure 3.1 Trends in the components of income across the age distribution***

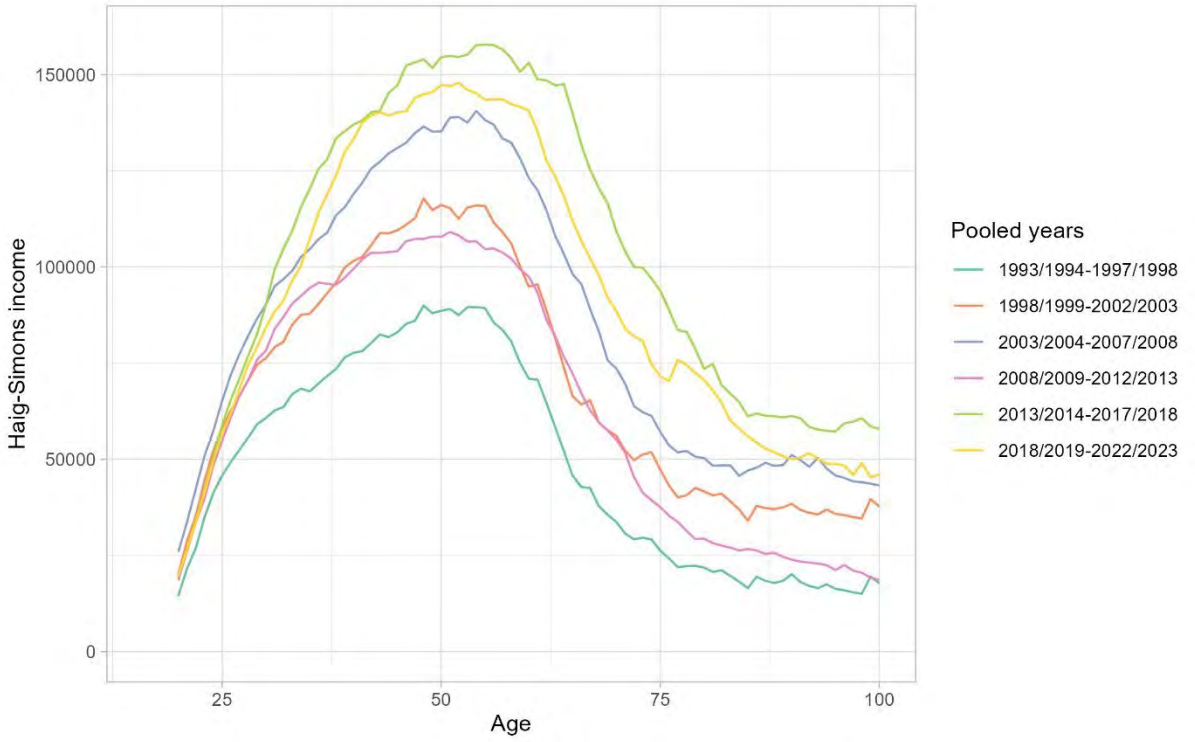



A moving average is applied across the age dimension. This is pertinent for older age groups with small underlying sample sizes in HILDA. Housing spikes at older ages are partially due to asset consolidation when one partner dies and partially due to variance from small sample sizes.

Together, these six categories of income sum to equal Haig-Simons income, a broad measure that captures private income from all sources. The total pre-tax income from all sources is shown in Figure 3.2. Private income in aggregate increased in real terms for all ages over the 20 years between the mid-1990s and the mid-2010s, before generally falling slightly over the five-year period to

2022/23. On average, private income from all sources is highest in the years around age 50, after which private earnings decline consistent with reduced labour market participation. The effect of consistently higher income from passive sources (capital gains, imputed rent and superannuation returns) is seen both in private incomes remaining high at older ages as we move forward in time and remaining at higher levels than private incomes of younger individuals.

***Figure 3.2 Trends in the private income across the age distribution***




## 3.2 Trends in final income distribution

The age profile of final (after tax/transfer) income can be calculated by adding the previous chart with the total impact of taxes and transfers in Figure 2.5. This is presented as Figure 3.3.

***Figure 3.3 Trends in final income across the age distribution***

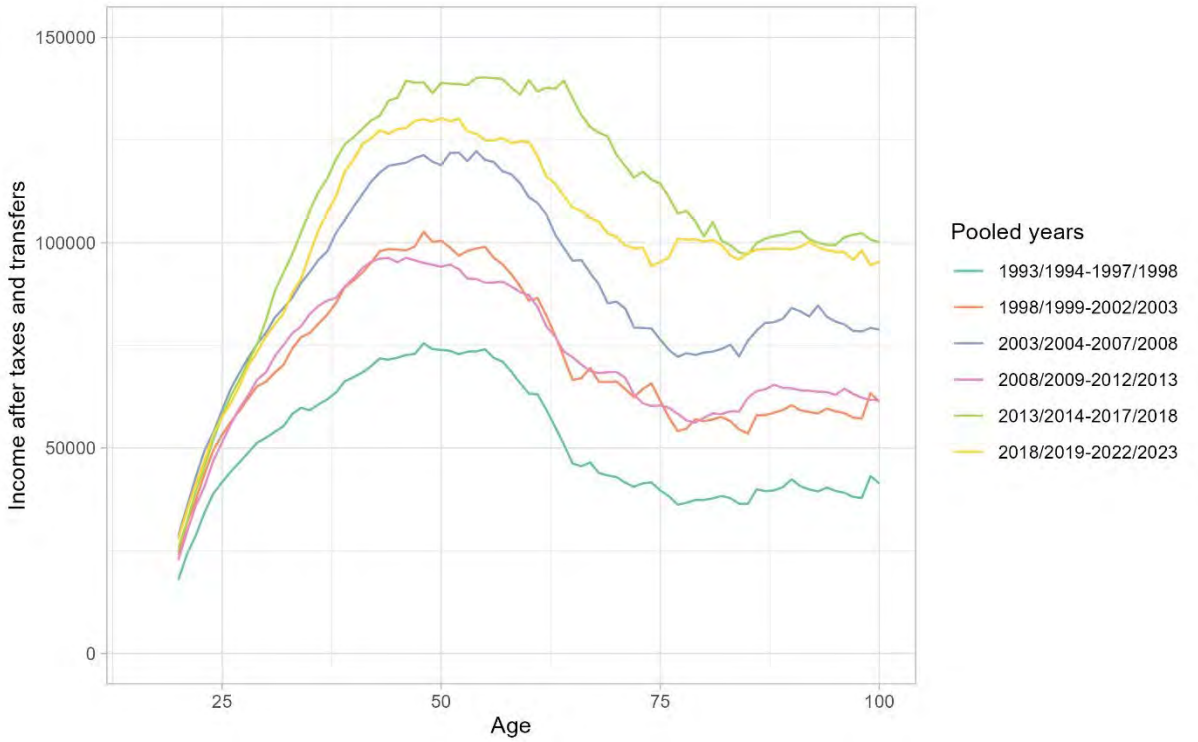



Figure 3.3 shows that the age profile of final income has changed dramatically in recent decades. In the past, the tax system narrowed the distribution of income. It now increases, on average, the incomes of older Australians well above the incomes of younger Australians. As seen across the two preceding sections this is a combined effect of increases in private income for older Australians and a greater real value of cash payments and transfers in kind for older Australians.

# 4- Implications for Australian policy

The results in section 2 of this paper show that the redistributive properties of the tax and transfer system have changed in the past 30 years. This, combined with the change in the age profile of private income in section 3, has flowed through to substantial changes in the age profile of final income. Below, we discuss the implications of this finding for the design of the Australian tax and transfer system, housing policy and budget sustainability. However, given the complexities of these topics, this paper does not provide specific policy recommendations. Instead, this section briefly discusses how the analysis fits into broader policy debate and suggests future research to extend the framework developed here.

## 4.1 Implications for inter-generational equity

This paper shows that the nature of Government redistribution towards older Australians has changed significantly in recent decades. In earlier periods, older Australians earned relatively little income while the tax and transfer system provided income and in-kind support. However, as Australian retirees have accumulated significant wealth and associated capital income, the Australian tax and transfer system has not adjusted. It has instead increased support to this cohort. As a result, Australians over the age of 60 have enjoyed a post-tax income similar to that of mid-career working age Australians and much higher than Australians aged 18-30.

The authors of this paper interpret this finding to mean that the Australian tax and transfer system is 'out of balance' and that policy changes should be considered that partially reverse the changes that have occurred over the past 30 years.

The jump from the positive analysis in Sections 2 and 3 to this normative statement is based on the idea that the primary goal of redistribution through the tax and transfer system is to reduce the variation in access to economic resources across the population (in simple terms, "taking from the well off and giving to the needy"). The current system violates this principle as redistribution to older Australians results in higher average income amongst this group than for younger cohorts.

Two additional factors suggest that the gap between the economic resources of older Australians and younger Australians is even higher than that measured in this paper.

- A standard life-cycle economic model would predict that individuals save and build up assets at the start of life and then (at least partially) draw down those assets towards the end of life. As a result, older individuals need lower annual income than younger Australians to achieve the same level of consumption.[7]
- The calculations in this paper are done on a per adult, rather than per person basis. We therefore do not adjust for the expenses associated with household size such as the costs of raising children. Taking this into account by calculating income levels per person within a household, or by using a 'household equivalisation factor' to account for the non-linear growth in costs, would strengthen the conclusion that older Australians are treated more favourably by the tax and transfer system.

It is possible that the Australian population has a preference for older Australians to live a higher material standard of living than younger Australians and that this has only been adopted in policy in

[7] For instance, a 90-year-old with a million dollars in assets that expects to live another 10 years could increase their consumption by $100,000 per year by spending these retirement savings.

recent years. However, a simpler explanation is that the tax and transfer system has simply not adjusted to changing economic circumstances in Australia.

While this paper makes the case that the intergenerational contract has become imbalanced, the calculations in this paper do not, on their own, suggest a recommended path to correct this imbalance. Four considerations not captured by the methodology in this paper but still critical considerations for policy reforms are:

- The distinction between high and low wealth individuals within each age group. If high final incomes amongst older Australians is the result of a relatively small number of high-wealth individuals drawing large capital incomes, then the appropriate policy response may relate to the taxation of capital income, including superannuation and housing. On the other hand, if the growth in final income is spread across this cohort, then an appropriate policy response would impact people across the income distribution (e.g. increasing user fees on aged care and health care or including all household assets in the age pension means test (as suggested by Productivity Commission (2013)).[8]
- The role of policy in changing private incomes as well as final incomes. A significant share of the results in this paper can be attributed to increasing housing prices. Improved housing policy (Section 4.3) may mitigate the need for other more sweeping changes.
- The role of policy and capital markets in facilitating the realisation of income streams at different points in time. Our comprehensive income framework considers gains in asset prices as income in the year the gain occurs, whether or not that gain is realised. However, liquid assets convertible to cash are needed to pay taxes or fund consumption in a specific period. For instance, proposed changes to full means testing of owner occupied housing often raises concerns over pensioners forced to sell their home. However, such concerns are easily addressed through a government-run reverse mortgage scheme that allows such pensioners to postpone payment of any debt until disposal of the house. Furthermore, as the superannuation system reaches maturity, the size of this hypothetical population with high private income but low liquid assets may end up being quite small.
- Government transfers are only one mechanism for transfers between generations. Informal care (such as children looking after their parents in retirement), financial transfers within households and bequests are also key components of the intergenerational contract.[9] These mechanisms are captured in the National Transfer Accounts literature (for instance, Kendig (2017) building off the work of Temple, Rice and McDonald (2017)).

## 4.2 Implications for broader tax and transfer design

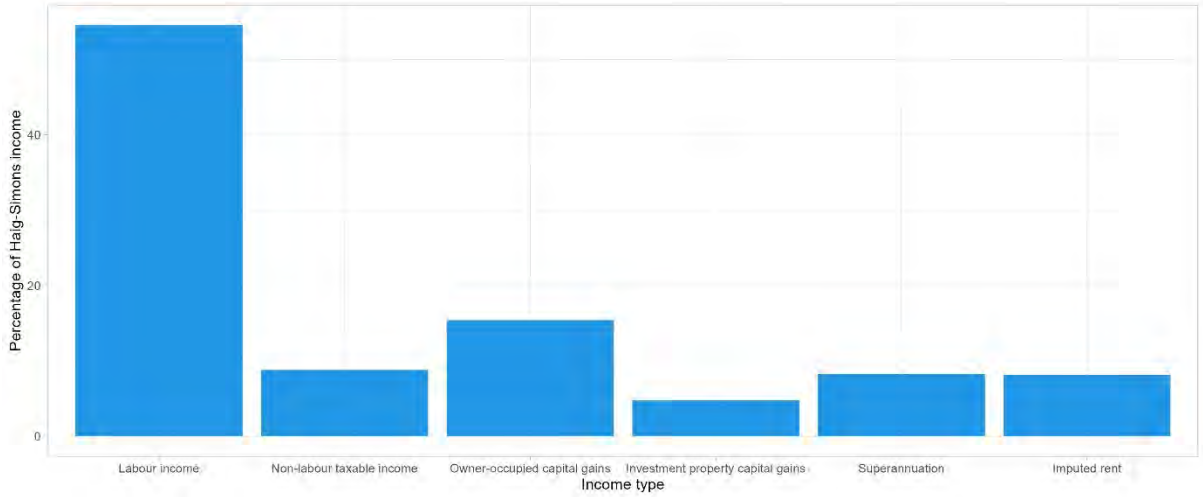
*Excluding capital income from the tax base has both efficiency and equity implications*

Another key finding of this paper is that over the past 30 years, only around two thirds of household income is taxed through the personal income tax — see Figure 4.1. The first, second and fourth columns represent those types of income which are taxed through the personal income tax system.

[8] Extending the methodology from this paper to capture income distributions within each age cohort, beyond the scope of this paper, is a promising path for future research.

[9] A key empirical question for future Australian research is the extent to which transfers to older Australians documented in this paper are transmitted to the next generation in the form of a bequest. While this will partially reduce concerns about intergenerational equity, it presents an additional issue of intra-generational equity between Australians that receive an inheritance and those that do not.

***Figure 4.1. Average shares of income over the past thirty years (1992/3 – 2022/3)***




Excluding a large share of income from the personal income tax base has two important consequences.

- Efficiency: By excluding certain types of income from tax, we must increase the tax rate on other types of income to fund government expenses. While good reasons support not taxing all personal income at the same rate, a recent TTPI paper on the Taxation of Savings (Varela et al. 2020) suggested superannuation and owner-occupied housing are under-taxed.
- Equity: As different people receive income from different sources, people with similar levels of income are taxed at very different rates.[10]

### *Conventional calculations of bracket creep do not fully capture rising housing costs*

The Australian personal income tax system is based on a set of progressive tax brackets. Over time, inflation pushes greater shares of overall income into higher tax brackets which increases the average tax rate (even if real income doesn't rise). This phenomenon is known as "bracket creep". To avoid tax rates growing over time, tax 'cuts' are periodically applied to the income tax system.

However, measuring inflation over decades is very challenging. While the Consumer Price Index produced by the ABS is a useful benchmark, many of the goods and services available today did not exist 40 years ago, limiting application of CPI as the change in consumer purchasing power. In addition, the Australian method for calculating inflation excludes housing costs relating to land (which is the element of housing costs that has increased most significantly). If housing costs were included (as is the case in the United States CPI, Ripp (2014)) Australian inflation would be higher in the past three decades.

Thus, different community groups experience different rates of inflation. For instance, the ABS "Selected Living Cost Indexes" show that in the year to December 2023, the cost of living rose by 6.9 per cent for employee households compared to the CPI estimate of 4.1 per cent. The main factor was the increase in mortgage costs.

While beyond the scope of this paper, the extent to which increasing housing prices over the past 30 years has created more bracket creep than implied by a CPI-based calculation and how this bracket

[10] An example of this occurred in 2021/22 when Australian housing values rose by 24%. This resulted in an average capital gain on owner-occupied and investment properties of $138,500 per person, which was largely untaxed. People who didn't own a property during this period wanting to "catch up" on wealth through increased labour income must increase taxable income by significantly more than $138,500.

creep varies between groups of Australians due to differences in consumption bundles is an important area for future research.[11]

## 4.3 Implications for housing policy

A key finding of this paper is that increasing house prices over the past decades have increased the wealth of older Australians, generating substantial growth in private income in the form of both capital gains and imputed rent. This income has come at the expense of younger Australians and migrants buying into the housing market.

Increased housing prices are partially caused by increasing scarcity of land in Australian cities. However, they are also partially the result of policies at all levels of Australian Government. Policies that have increased Australian housing prices include:

- Preferential tax treatment of housing increases demand for this asset class and pushes up the price.
- Zoning and planning regulations that limit the supply of new housing increase the price of housing. For instance, Kendall and Tulip (2018) estimate the impact of zoning on housing prices and find that "as of 2016, zoning raised detached house prices 73 per cent above marginal costs in Sydney, 69 per cent in Melbourne, 42 per cent in Brisbane and 54 per cent in Perth".
- The NSW Productivity Commission (2023) found that around a quarter of land within 10 kilometres of the Sydney CBD is subject to heritage protections.
- A variety of existing policies combine to disincentivise older Australians downsizing in retirement. These policies include: capital gains exemption for owner-occupied housing, means test exemptions for owner-occupied housing, rates and utilities subsidies for older Australians, ageing in place programs, the lack of a broad-based property tax and stamp duty.
- Policies enacted in response to COVID-19 strongly supported housing and share prices.

Therefore, to the extent that housing prices are driven by government policies that restrict land supply, these policies should be reversed as a matter of urgency. This would generate large equity and efficiency gains.

## 4.4 Implications for budget sustainability

The latest Intergenerational report estimates that the Australian Budget is in a structural deficit. It projects that the cash balance will be negative in every year going forward and will grow to almost 3 per cent of GDP by 2062-63 (Commonwealth of Australia 2023, Chart 2). Therefore, over the coming years, Australians will have to decide whether to increase taxes or reduce Government spending.

The findings in this paper suggest that budget repair should not solely be focused on those of working age (as would happen if policy makers relied on "automatic" tax increases from bracket creep). Doing so would increase the 'imbalance'. Instead, budget repair should include both a mix of tax increases and spending reductions on older Australians.

The alternative to long-term Budget repair is an increase in long-term Government debt, with higher spending on current generations repaid with interest later. Decisions to delay budget repair pass

[11] This is a separate issue to bracket creep that occurs in the stamp duty system because stamp duty thresholds have not been increased at the same rate as house prices have grown (Varela et al. 2020).

these costs on to younger generations. Increasing government debt is a transfer from future generations to current ones, exacerbating the intergenerational imbalance documented in this paper.

# Appendix A – Detailed methodology and data

Calculations in this paper combine a variety of different datasets and use a number of simplifying assumptions. This Appendix contains the details of those calculations and technical explanations behind modelling decisions. It is aimed at a more technical audience than the rest of the paper including those that wish to replicate the calculations.

## Income framework

The income framework used in this paper is based on "Haig-Simons" income, which includes income from all sources (Haig (1921) and Simons (1938)). As described in Hicks (1946), Haig-Simons income is what an individual "can consume during the week and still expect to be as well off at the end of the week as he was at the beginning".

While Haig-Simons income is typically regarded as an ideal income benchmark, there is significant variation in the definition of income used in studies of income distribution. This is driven both by the availability of data and the purpose of the study. The advantages and disadvantages of different approaches are discussed in Robbins (2018), Armour, Burkhauser and Larrimore (2013) and Smeeding and Weinberg (2001).

The most important practical question relating to the definition of income in this study relates to the treatment of income from owner-occupied housing (both unrealised capital gains and imputed rents, which is the technical term for the value people gain from living in housing which they own). This paper includes both of these values while some other studies of income inequality do not. The argument for including these values is that it better represents the true level of income received by different generations. The two main downsides are that a) these values can't be measured directly and must be inferred by multiplying asset holdings from survey data with general housing price trends and b) including them creates a more volatile measure of income – for instance, aggregate income measured using the definition in this paper was negative in 2008/09 as falls in housing and stock market prices were larger than increases in income from all other sources.

Including capital gains and imputed rents aligns with an everyday definition of income and economic wellbeing. For instance, most people would consider themselves better off if their investment portfolio rose in value rather than fell in value, even if they don't realise these gains in the current period. Similarly, if two families are compared, one that rents and one living in its own house without a mortgage, the family with a house is able to enjoy a higher level of material consumption because they don't need to allocate any of their income on rent.

## Overview of data sources

Calculations in this paper use survey data (from HILDA and the SIH) to estimate the average amount of private income earned, taxes paid, and government payments received by single year of age and year. We then scale these values up or down to equal aggregate values from the National Accounts. For instance, to model the total amount of labour income earned by people of different ages, we multiply the average labour income by year of age (from the HILDA survey) with the Australian population of that age.[12] If that number were 5 per cent below the National Accounts estimate of national labour income, we would adjust the microdata estimates up by 5 per cent. Another way to describe this approach is that we use the microdata sources to estimate the relative shares of income

[12] We use estimates of population by age from two ABS publications – National, state and territory population (Catalogue number 3101.0) and "Historical Population" (Catalogue Number 3105.0.65.001).

taxes and payments by people of different ages and National Accounts data for the absolute size of these variables.

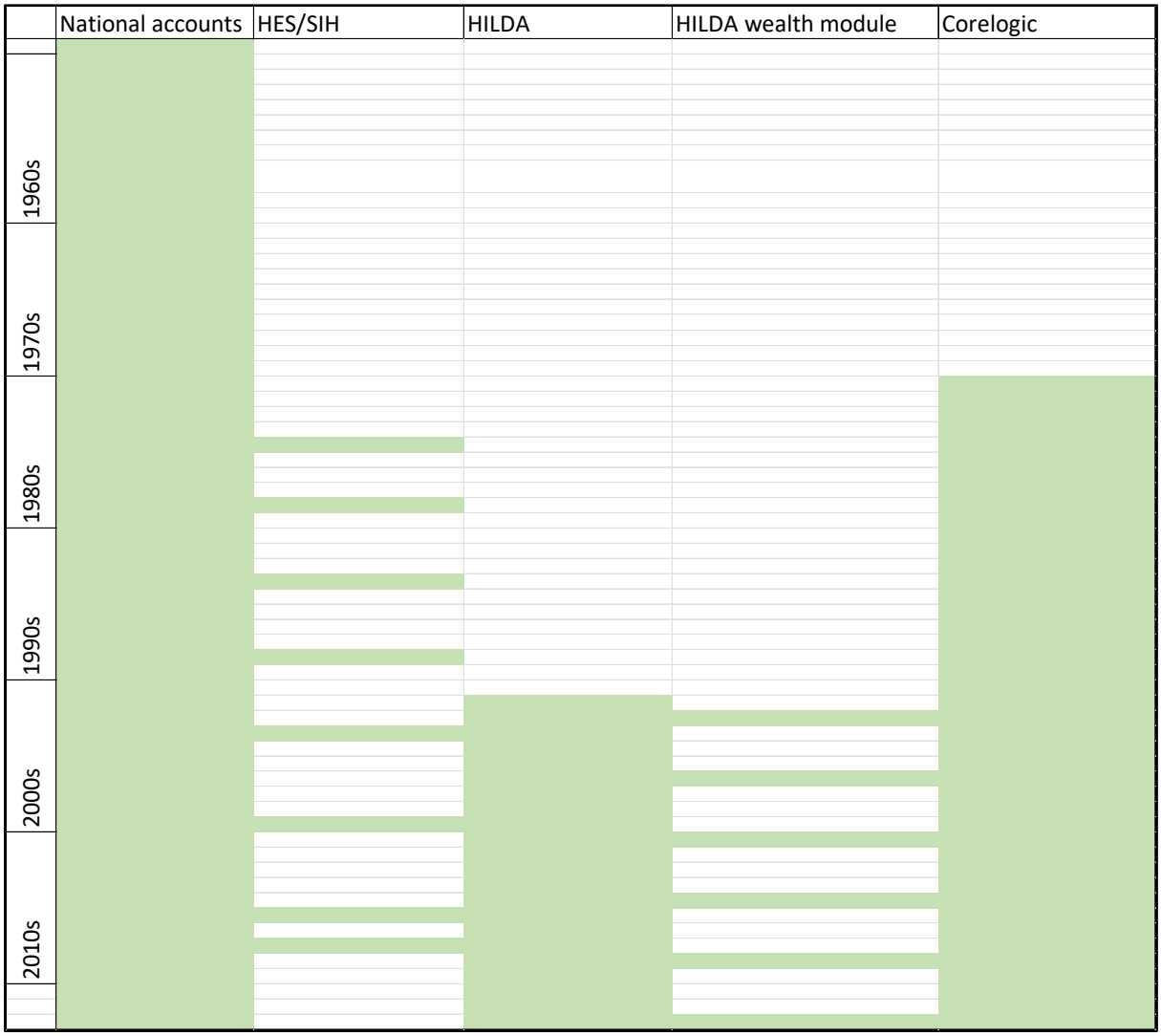
Survey data are scaled to National Accounts aggregates in four categories:

- Labour income (from the HILDA survey) is scaled to equal Compensation of Employees in the National Accounts. Non-labour income is scaled by the same factor, preserving the ratio of labour and non-labour income in taxable income.
- Taxes from the National Accounts are aggregated into the six categories in Figure 1.2. Personal income tax is apportioned relative to the personal income tax variable in HILDA, while other taxes are spread equally across the tax base. Taxes that are difficult to allocate directly to an individual (such as corporate income taxes and mining royalties) are included in an 'Other taxes category' and are attributed equally to all individuals above the age of 15.
- Aggregate government spending from the National Accounts is broken into three categories, cash payments, social transfers in kind (such as government subsidies for health and education) and all other government spending. These categories are allocated across age groups based on the relative shares of spending in the HES. As is the case with taxes, "Other government spending" is attributed equally to all individuals above the age of 15.
- Household wealth is based on the HILDA wealth survey and maps to the values from the Household Balance Sheet in the National Accounts. Note that these values are then 're-scaled' to tax bases. This means that this mapping is relevant for income results, but does not impact the estimates of the intergenerational contract.[13]

A key advantage of incorporating estimates from the National Accounts is that these data are available in every year. In contrast, the microdata used in the model are only available in selected years. (Figure A.1 below). This means that we are, in effect, imputing the relative shares of age, income and taxes between years, rather than the absolute values.

[13] Intuitively, any scaling factor that is applied to the level of wealth will be fully incorporated in the second scaling factor mapping to revenue levels.

**Figure A.1: Availability of key datasets, by year**




The cross-sectional analysis in Section 2 of this paper is based on the years 1992/93 to 2022/23, while the cohort analysis in Appendix B starts in 1960/61 and projects results to 2100/01.

## Mapping household level data to individuals

While personal income data are available at an individual level, data on asset ownership,[14] consumption and social transfers in kind are reported (and conceptually defined) at a household level. In this paper, these values are divided equally between non-dependant adults in the household.

There are two implications of this assumption that are worth noting:

- First, this allocates government services provided to children to their parents. We believe that this is an appropriate assumption as this project is focused on equity and such subsidies ultimately benefit this cohort. However, this assumption differs from models designed to project Government expenditure (such as the Inter-Generational Report or the Treasury FIONA model) in which the number of children is the best predictor of child-related services.

[14] With the exception of superannuation balances and HECS/HELP debt which we use at the individual level.

- Second, where a household includes children or, equally, elderly relatives, who are classed by survey respondents as independent from the primary income earners in the household, this calculation will include the relatives as owners of certain household assets in equal shares and potentially understate the level of wealth inequality between generations. Correcting such effects would only strengthen the main results from this paper.

## Estimating wealth holdings

This paper uses estimates of owner-occupied housing, investment properties and superannuation based on the wealth module of the HILDA survey. Key results from this survey, as well as how the estimates compare to other estimates of Australian wealth can be found in Adams et al. (2020). Our estimates of wealth are then scaled to estimates of wealth from the National Accounts.

### Value of owner-occupied housing

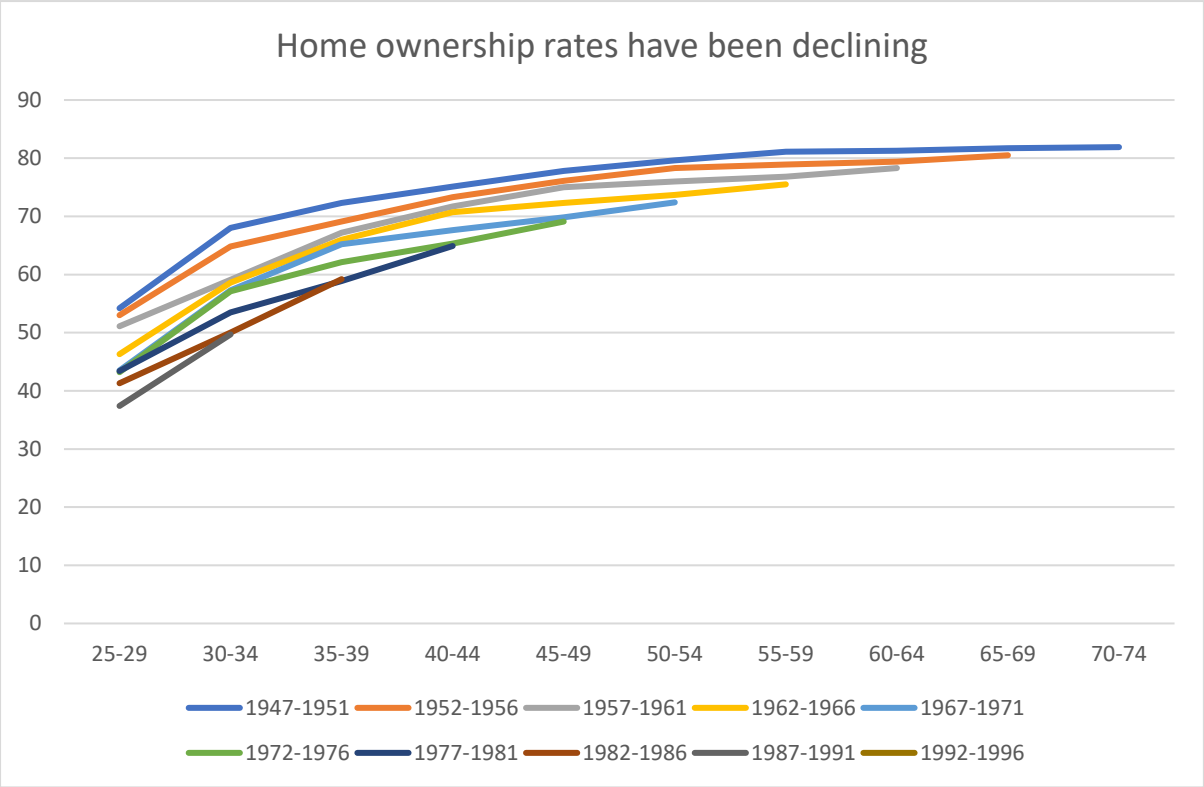
Estimates of the value of owner-occupied housing are taken from the wealth module of the HILDA survey. The wealth module of the HILDA survey has been run every four years in 2002, 2006, 2010, 2014, 2018 and 2022. In the years between the HILDA wealth survey, values for wealth are imputed by linear interpolation using the na.approx function in R.

For years before 2002, the value of housing stock is estimated by combining:

- Historic Australian home ownership rates by age
- Growth rates in Australian house prices

The decreasing rate of home ownership by age is a long-term trend in Australia. This analysis uses the aggregate rates of home ownership by age from the AIHW Housing dashboard (which is based on census data) AIHW (2023). These home-ownership rates are reproduced in Figure A.2. A key policy question is the extent to which Figure A.2 is shifting downwards (people are less likely to buy a home) or to the right (people are buying houses later in life).

***Figure A.2: Home ownership rates have been declining by generation***

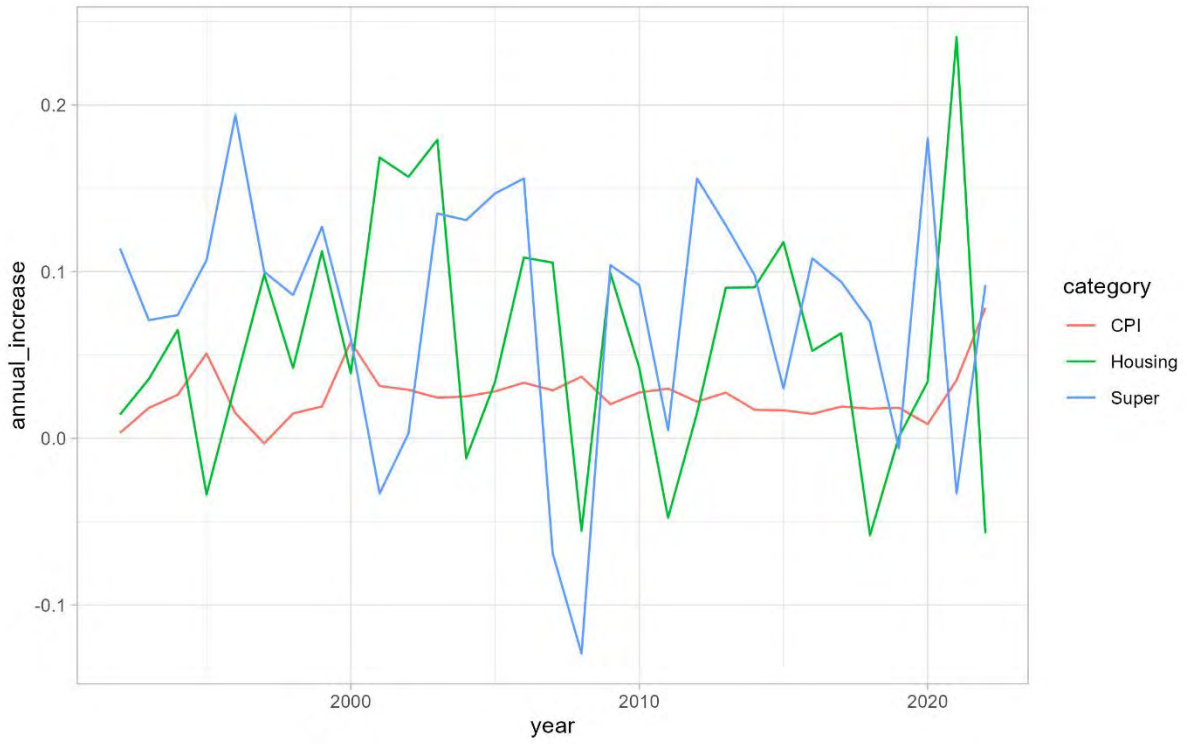



The value of owner-occupied housing prior to 2002 also needs to be deflated to account for changes in housing prices. This paper uses the Corelogic Hedonic price index. As discussed in Corelogic (2023), the Corelogic Index is designed to adjust for improvements in property quality (such as having more bedrooms etc.) and shows a lower growth rate than is achieved by comparing the average prices of residential property over time. A summary of the housing price growth rates used in the body of the paper, compared to the growth in superannuation and the consumer price index is included in Figure A.3.

The Corelogic price index is only calculated from 1980. For the cohort analysis in Appendix B, additional assumptions are required for the period from 1960. In the years 1970-1980, the paper uses the growth rates from the BIS housing index (Bank of International Settlements, 2023). Prior to 1970, this calculation assumes that house prices grew by 1 per cent per quarter.

Ownership of housing assets is calculated by multiplying these factors together. For instance, the average (gross) value of owner-occupied housing for a 35-year-old in 2002 is around $100,000. 10 years earlier, a 35-year-old was 3% more likely to own a house but nominal house prices were around half as large. Therefore, the estimated asset ownership of a 35-year-old in 1992 is calculated as $100,000*1.03*0.5.

***Figure A.3: Housing and super growth rates used in this paper***

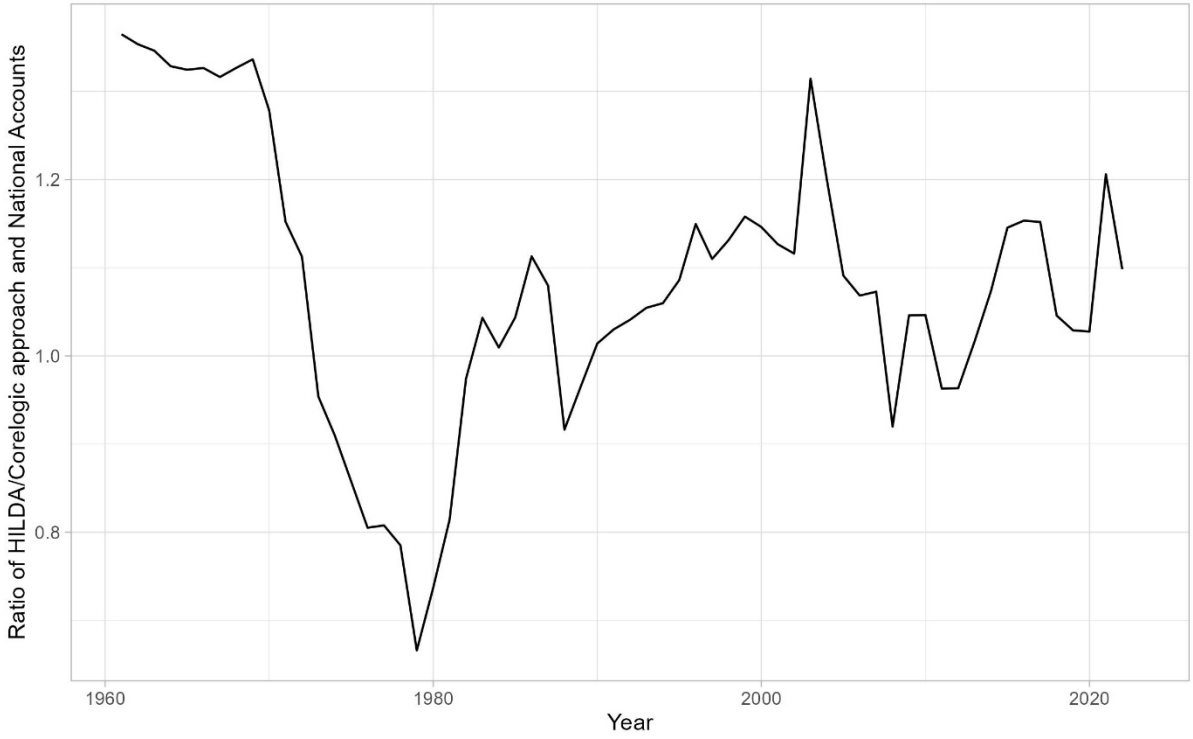



Finally, the total value of housing (including owner-occupied and investment properties) is scaled to equal the aggregate value of housing in the National Accounts. For years after 1988, we use the total value of residential land and dwellings from the Household Balance Sheet.[15] The Household Balance Sheet is not available before this time, so we base the calculation on the growth rate of dwellings in Australia,[16] which imposes an additional assumption that the ratio of land and dwellings remain constant in the years 1960-1988.

The ratio of the bottoms-up approach (using HILDA data and Corelogic growth rates) and the National Accounting aggregate is shown in Figure A.4. This shows that on average, HILDA produces a slightly higher estimate of housing wealth compared to the National Accounts. This is consistent with Adams et al. (2020).

[15] ABS Catlogue Number 5232.0, Table 35.
[16] ABS Catalogue Number 5204.0, Table 56.

***Figure A.4 Housing Adjustment factor to match national accounting aggregates***




When adjusting housing values to equal National Accounts, the share of equity held by homeowners is held constant. In other words, the adjustment factor from Figure A.4 is applied to both the gross housing value (used to calculate capital gains) and the net housing value (used to calculate imputed rents).

### Value of residential investment properties

The method for calculating the value of investment properties is similar to that applied to owner-occupied housing, but does not include the adjustment for changes in ownership rates in Figure A.2.

- Investment property rates are based on the HILDA wealth survey
- Years between HILDA wealth surveys are imputed using the na.approx function
- Years before and after the HILDA wealth surveys are inflated following the Corelogic Hedonic House price index and BIS Housing Index.
- The value of investment properties are adjusted to National Accounting aggregates using the values from Figure A.4.

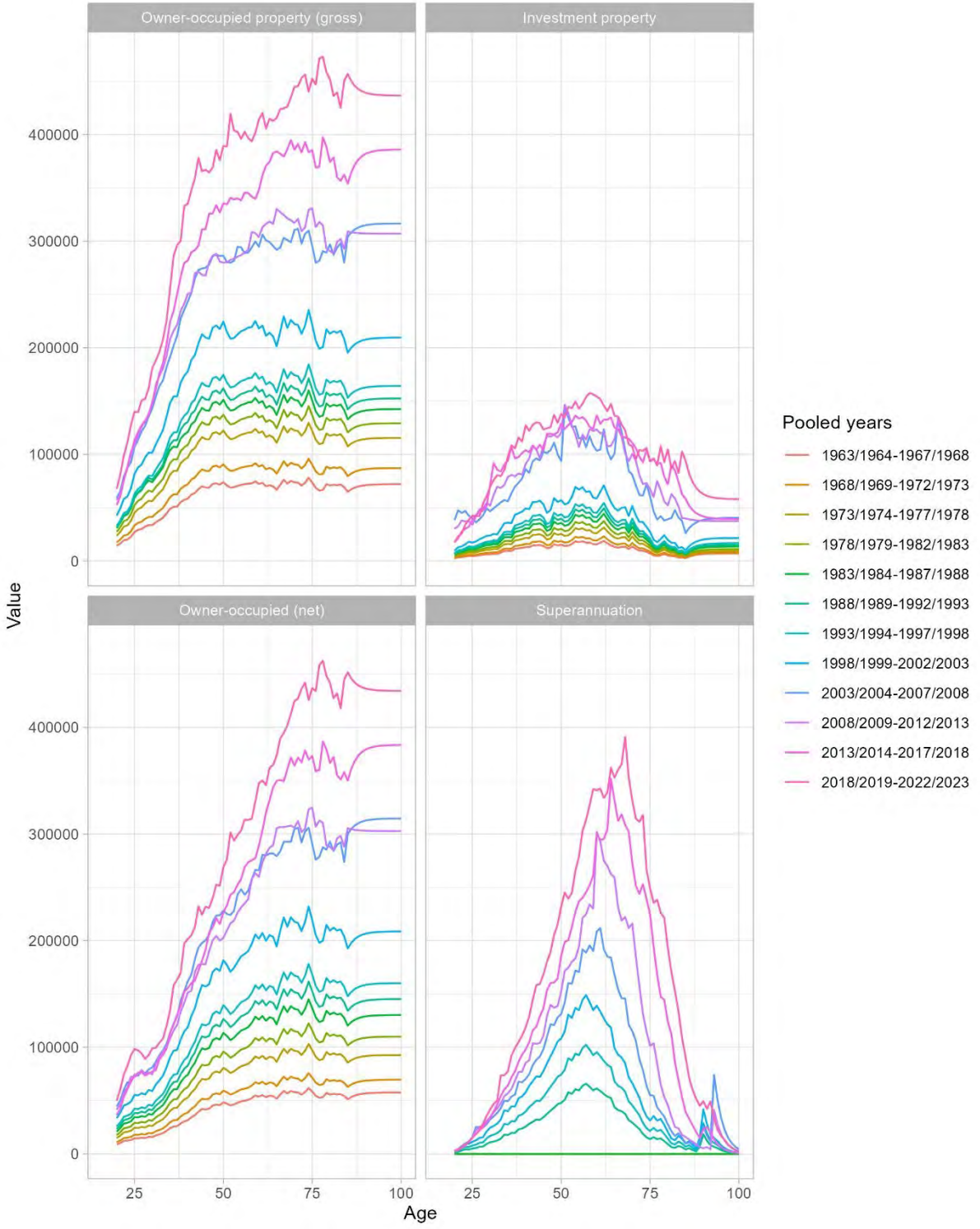
### Value of superannuation assets held by people at different ages

Superannuation assets are based on the HILDA wealth survey, and are scaled up/down to equal the estimate of total superannuation assets under management from the Household Balance Sheet in the National Accounts[17] . For years before 2002, this assumption holds the relative profile of superannuation assets between ages constant, which is a limitation to the approach, but one that is expected to have only a small impact on results given the relatively small stock of superannuation assets held prior to 2002.

The values of assets used in this paper are presented in Figure A.5.

[17] ABS Catalogue number 5232.0, Table 7

***Figure A.5 Modelled asset stocks, by asset type***




## Private income

Private income (income before taxes and transfers) in this paper is broken down into 6 components.

- Labour income
- Non-labour taxable income
- Capital gains on owner-occupied housing
- Capital gains on investment properties

- Returns to superannuation
- Net imputed rent

### Value of labour income

The income of individuals is based on the HILDA survey and scaled to equal total labour income from the National Accounts[18] . This value includes business income.

The age profile of earnings is assumed to be constant for all years before the HILDA survey. In other words, the ratio of labour income shares across age groups in the first year of the HILDA survey is used for all years prior to the HILDA survey.

### Value of non-labour taxable income

For years in which HILDA data are available, non-labour taxable income is calculated as the difference between market income and labour income.

- The HILDA survey does not capture irregular sources of income (such as the sale of a residential property). Therefore, the calculation in this paper estimates capital gains on investment properties separately (see below).
- This value excludes business income, which is captured above.

For years before HILDA data are available, this calculation projects non-labour income using the same adjustment rate as labour income. In effect, this assumption assumes both that:

- The age profile of non-labour taxable income is constant over time.
- Labour income as a share of taxable income has been constant over time.

Figure 2.1 shows that across the past 20 years non-labour taxable income has been a relatively small share of total income and thus this assumption will not have significant impacts on results.

### Value of capital gains on owner occupied properties

Capital gains for owner-occupied properties are calculated as the estimated value of owner-occupied properties (described above) multiplied by the annual change in (quality adjusted) housing prices measured by the Corelogic housing price index.

### Value of capital gains on investment properties

Capital gains for investment properties are calculated as the estimated value of investment properties (described above) multiplied by the annual change in (quality-adjusted) housing prices from the Corelogic Hedonic price index.

### Value of imputed rent

Imputed rent is the value of the housing services that homeowners receive from living in their home. It can also be interpreted as the avoided cost of not having to pay rent (which one would have to do if one did not own a house).

In this paper, imputed rent is calculated as 4 per cent (nominal) of the net value of home ownership (asset value less the outstanding mortgage) following the approach used in Lillard et al. (2020).

The value of 4 per cent (nominal) is lower than the gross market rate of return to account for the maintenance costs that homeowners face (and which are not faced by renters).

[18] ABS Catalogue number 5206.0, Table 7

### Value of superannuation earnings

Earnings on superannuation are calculated as the estimated value of superannuation assets multiplied by the median historical return of Australian superannuation funds following a "growth strategy". Values were taken from Drury (2023).

## Estimating taxes paid

Taxes are modelled based on the distribution of the tax base in each year and are scaled to equal aggregate tax revenue from the National Accounts (which are calculated on an accrual, rather than cash framework). Taxes are calculated in 8 components:

- Personal income taxes are paid in proportion to the level of personal income tax observed in HILDA.
- Consumption taxes are treated as a single tax and allocated in proportion to household consumption from HILDA (excluding imputed rent).
- Payroll taxes are allocated in proportion to labour income.
- Council rates are allocated in proportion to the value of residential property (owner occupied and investment property) owned by an individual.
- Land taxes are allocated in proportion to the value of investment property owned by an individual.
- Stamp duties are allocated based on the age profile used in the FIONA model produced by the Australian Treasury (which is in turn based on a regression using HILDA data). (Varela et al. 2021)
- Super contributions taxes are allocated in proportion to labour income while super earnings taxes are allocated in proportion to super assets held by those under the age of 65.[19]
- Other taxes are allocated equally between people above the age of 15.

The three housing taxes are aggregated before presentation in this paper due to the relatively small size of these tax bases.

## Estimating transfers received

Estimates of the government transfers received by each group are based on the SIH, using estimates for the years 1984-85, 1988-89, 1993-94, 2003-04, 2009-10 2015-16 and 2017-18. The values used in this paper are aggregate estimates released in the ABS publication Government Benefits, Taxes and Household Income (Catalogue number 6537.0) and Household Income and Wealth (Catalogue Number 6523.0).

These values are reported as averages within age bins. The relative values of payments received by single year of age **within age bin** is then calculated based on the age profile from the 2017-18 SIH Confidentialised Unit Record File (CURF). As the CURF is top-coded at age 85, the age profile of expenses is assumed to be equal beyond that age. This method is a simplification and is used due to challenges comparing the CURF variables from earlier ABS surveys.

Aggregate payment values are then scaled to values from the National Accounts.

[19] This abstracts from various policy changes, most particular the decision to remove taxation on benefits paid over preservation age in 2006 and to implement a balance cap for tax-free earnings in 2017, both of which would increase slightly the share of tax paid by those over 65.

An important limitation of the calculations in this paper is that the latest year for which data on social transfers in kind are available is 2017-18[20] and so this calculation is unable to capture any changes to the age distribution of government expenses since this time.

For the purposes of this calculation, government expenses are split into three components:

- Cash benefits, such as pensions
- Social transfers in kind (such as education and health care).
- All other government spending.

Cash benefits and other spending follow the definitions used in the underlying ABS survey. Other government spending is calculated as a residual of all government spending from the National Accounts and is split equally across all individuals above the age of 15. (This mirrors the treatment of 'other taxes'). This spending includes various things that may not be directly valuable to individuals (such as defence spending or funding government departments). However, it is important to include this spending in a model of intergenerational equity as these expenses must be funded somewhere.

For each year of the ABS survey, the share of aggregate government spending is calculated. For instance, in 2015-16:

- 19 per cent of government spending was on cash payments
- 44 per cent of government spending was on social transfers in kind
- 37 per cent of government spending was on other payments.

These ratios are interpolated between survey years, and held constant in the years before the first survey and after the final survey.

## Calculating survival rates

The cohort analysis in Appendix B of this paper tracks the income, taxes paid, and services received by Australians born in different birth cohorts. This calculation is weighted by the probability of living to each age.

- Historical mortality rates are sourced from the Human Life-Table Database, which aggregates various lifetable publications from the Australian Bureau of Statistics and the Australian Government Actuary.[21]
- Mortality rates for future years are based on the ABS "B series" released in ABS (2018). This series assumes that age-specific mortality rates will continue to decline into the future.

The mortality rate at age 100 is assumed to be 100%.

## Main limitations of the approach to allocating taxes and transfers

This paper uses a variety of simplifying assumptions to allocate all taxes and transfer to different age cohorts. These assumptions are necessary to implement this type of model and are similar to assumptions used in similar economic models. However, these assumptions cannot possibly capture the complexity of the tax and transfer system.

[20] Social transfers in kind (STIK) data are no longer collected in cyclical housing years. https://www.abs.gov.au/methodologies/household-income-and-wealth-australia-methodology/2019-20

[21] A full list of Australian lifetable sources used in the Human Life-Table Database can be found at https://www.lifetable.de/Codes/ReferencesByCode?cntr=AUS

While we believe that these assumptions are unlikely to impact the qualitative interpretation of the main results, it is nevertheless important to understand and be clear about the limitations of our study. The five main factors we identify that could influence our results are:

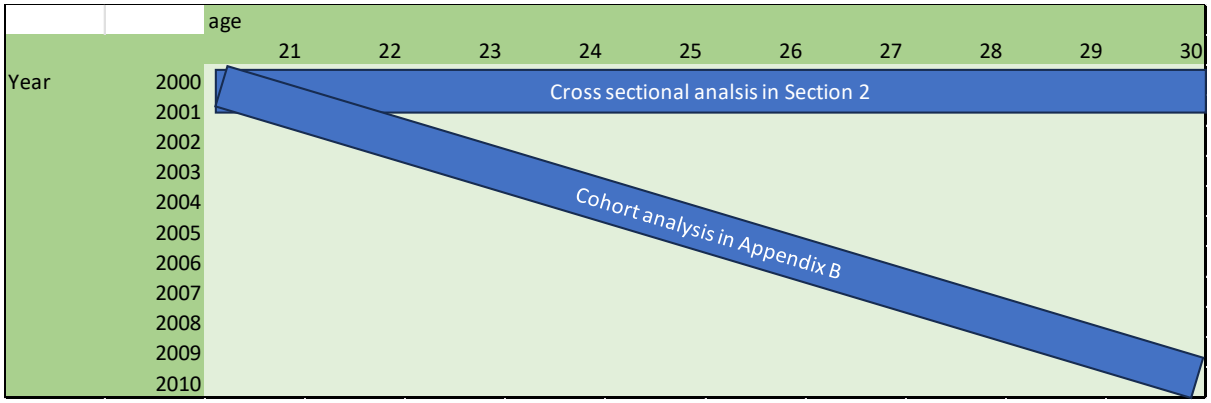
- **Situations where the economic incidence of taxation is different to the legal incidence (legal incidence is generally used to allocate taxes in the model).** For instance, this paper assumes that land taxes are paid by those investing in property, but some share of this tax is likely to be passed to renters (England 2016). Similarly, this paper assumes that stamp duty is paid by those buying property. However, stamp duty reduces the amount that a property can be sold for and is therefore 'paid' primarily by the seller of a property (Davidoff and Leigh 2013).
- **By allocating taxes evenly across a tax base, this paper does not capture various tax concessions where a group is given preferential tax treatment**. Many of these tax concessions are targeted at younger or older Australians, such as stamp duty exemptions for first home buyers and pensioners. These concessions therefore form an important part of the intergenerational contract. However, to the authors' knowledge, there is no data source that captures the combined impact of these concessions and we are therefore unable to include this effect in this paper.
- **By allocating taxes evenly across a tax base, this paper also excludes the impact of progressive tax scales (other than the personal income tax and stamp duty calculation).** For instance, land tax is levied with a progressive schedule in each Australian state and Territory (excluding the Northern Territory which does not levy a land tax). As older Australians have a greater level of wealth, a uniform tax rate assumed in this paper will likely overstate the taxes paid by young investors and understate the taxes paid by older investors.
- **The assumption to allocate 'other taxes' and 'other services' evenly between all adults is subjective.** A more complicated exercise would attempt to allocate "other taxes" and "other services" according to their economic incidence. For instance, the impact of the corporate income tax could be allocated between stockholders, workers and consumers. Such an exercise is likely to allocate more taxes to working age Australians than the uniform assumption used in this report. This would strengthen our main qualitative findings.
- **The paper does not capture changes to the age structure of income, taxes, and transfers that occurred before or after the age-based microdata (HILDA and HES) used to calibrate this model were available.**
    - Prior to the HILDA survey, the age profile of the Australian workforce was slightly younger, meaning that income and taxes modelled in this paper will be slightly low for this group.
    - This paper will not capture changes in government payments made in response to COVID. It will also exclude recent increases in spending through the NDIS.

These limitations provide important context when interpreting the results of this paper. They also represent important priorities for future research and data collection.

# Appendix B Cohort analysis

The majority of the analysis in this paper is done by comparing individuals within a given year. This appendix presents results from tracking cohorts of Australians by year of birth across time. Conceptually, the cohort analysis in this Appendix is simply grouping the results from the previous section in a different manner (Figure B.1).

***Figure B.1: Stylised comparison of cohort and cross-sectional analysis***




However, conducting cohort analysis introduces several additional technical difficulties.

- Cohort analysis requires a calculation covering a large number of years. The analysis conducted examines the years from 1959-60 to 2100-01.
    - Data for the tax and transfer system become less detailed further back in time and require stronger assumptions to calibrate the model.
    - Future year results are entirely driven by assumptions about how the intergenerational contract will evolve and are best described as illustrative.
- Taxes paid in different periods need to be discounted to account for the time value of money. Results are sensitive to this assumption and there is no consensus on the appropriate discount rate to use in such calculations.
- Cohort analysis ideally needs to take into account changes to the composition of the population due to migration and mortality rates.

Given these technical challenges, the results in this section are subject to much stronger caveats than those in the main body of the paper.

We use the cohort analysis to show two key ideas:

- The generation of Australians that has been most favoured by the intergenerational contract is highly sensitive to the choice of discount rate. Given the debate around the appropriate use of discount rates to use in long-term calculations, it is very difficult, if not impossible, to reach defensible, normative conclusions about whether any given generation has been treated better than another by intergenerational transfers in the tax system. It is similarly difficult to make statements about whether any generation has paid enough in taxes to fund their use of government services in retirement.
- As generations live longer, the tax and transfer system becomes implicitly more generous towards older Australians (even on a per person basis) as each Australian receives age related payments for a larger number of years. We illustrate the size of this effect through a sensitivity analysis to show the effect of different mortality rates on the overall net transfer.

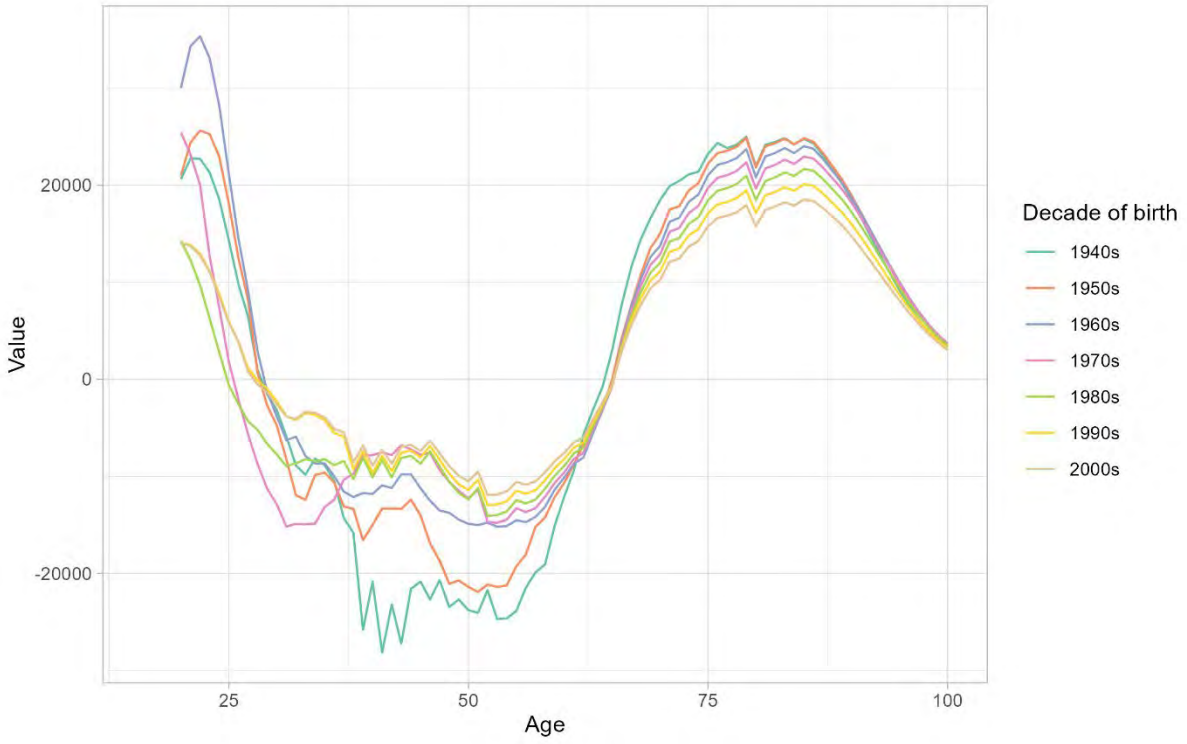
## How has the lifetime intergenerational contract changed for different generations?

The baseline calculation in this section estimates the effect of the lifetime intergenerational contract for generations born from 1940 to 2000, using distributional estimates of incomes, taxes and transfers between 1960 and 2100. In addition to the methodology used in Sections 2 and 3, this calculation is based on the following assumptions:

- National Accounts data on tax revenue and government expenses are available from 1959-60. The model allocates these revenues and expenses based on the age profile of the most recent available microdata.
    - The HILDA survey is used for income, which is available from 2001 onwards
    - HES data are available from 1984.
- CPI is projected forward at 3 per cent per year.
- Net revenues and expenses at each age group are grown forward at a rate of 2 per cent real per year.
- Cohort mortality rates are calculated for each generation. These are projected into future years following the ABS 'B series' assumptions (ABS 2018).
- The fiscal impact is discounted at a nominal rate of 6 per cent.

Based on these assumptions, the lifetime intergenerational contract experienced by each generation of Australians is presented in Figure B.2.

***Figure B.2: Stylised lifetime Intergenerational contract by birth-year***




We then test how the sensitivity of this calculation to the discount rate using six alternative assumptions:

- 6 per cent nominal (as in Figure 3.2 above)
- The mortgage rate available to households
- CPI
- CPI plus 2 per cent

- CPI plus 5 per cent
- CPI plus 7 per cent.

***Figure B.3: The impact of discount rate on the lifetime intergenerational contract (2023 dollars)***

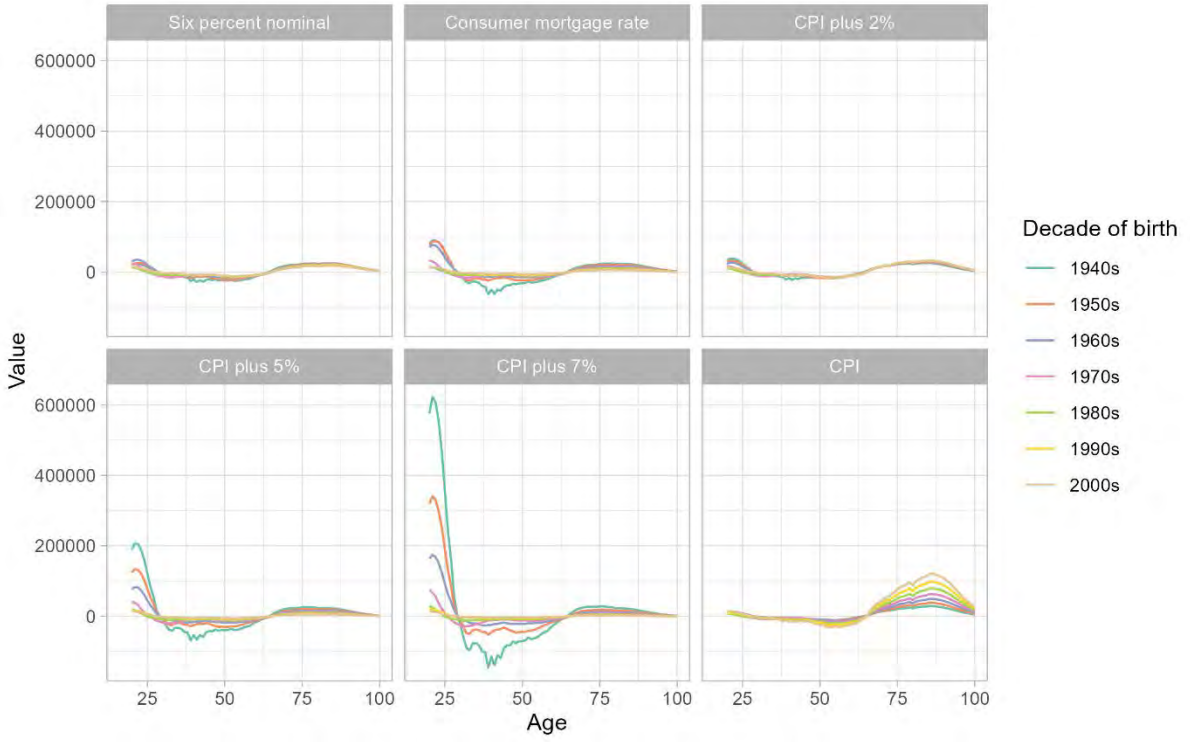



Figure B.3 shows that the impact of the intergenerational contract on different cohorts is highly sensitive to the discount rate used in the calculation. If the assumed growth rate of taxes and expenses is larger (smaller) than the discount rate, then the discounted impact of these taxes and expenses will grow (shrink) in future years. The choice of discount rate is particularly important for comparing the value of transfers received at young ages from earlier generations (such as free university education provided in the 1970s and 1980s) and at old ages from later generations (such as aged care and the age pension), as can be seen by comparing the last two panels of Figure B.3.

Figure B.3 highlights the inherent limitation in determining whether a particular generation has paid its fair share of taxes compared to other generations. There is significant disagreement about the appropriate discount rate to use in long-term economic models[22] and the uncertainty around this parameter can easily overturn any normative findings. For instance, Table B.2 converts the values from Figure B.3 into a lifetime net present value (NPV). It shows that if we use a high discount rate then older generations have gotten a better deal from the lifetime intergenerational contract than younger generations, while if we use a low discount rate, this result is reversed.

***Table B.2 Lifetime NPV by birth decade and discount rate assumption***

| Birth decade | 6 percent nominal | Mortgage rate | CPI plus 2% | CPI plus 5% | CPI plus 7% | CPI |
|---|---|---|---|---|---|---|
| 1950s | 246,166 | -124,303 | 72,933 | -352,514 | -1,483,032 | -714,982 |
| 1960s | 83,202 | -228,254 | 91,515 | -190,332 | -734,737 | -943,351 |
| 1970s | 96,500 | 56,551 | 109,031 | 61,192 | -37,720 | -1,123,477 |
| 1980s | 28,588 | 20,519 | 37,549 | 10,813 | -24,451 | -1,398,078 |

[22] Harrison (2010) surveys this literature and finds that the suggested real discount rate used by government agencies in different countries varied between 2 and 15 per cent.

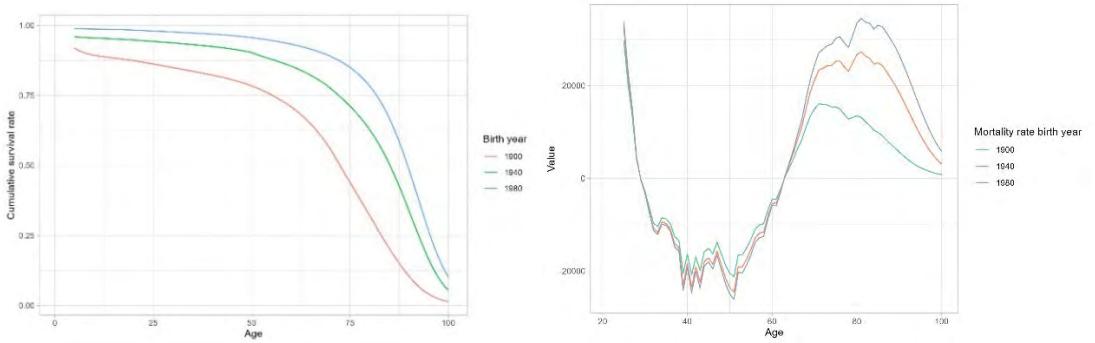
| | | | | | | |
|---|---|---|---|---|---|---|
| 1990s | -105,049 | -103,155 | -93,991 | -122,626 | -146,545 | -1,799,482 |
| 2000s | -41,449 | -42,053 | -41,234 | -44,845 | -47,421 | -2,066,472 |

## The impact of improving mortality rates

The main results in Sections 2 and 3 of this report are presented as an average value per living Australian at each age. Therefore, the main results don't capture the lifetime, per-person impact of additional Australians living to older ages. To illustrate the importance of population ageing, we now re-calculate the lifetime impact of taxes and transfers for those born in the 1940s, but with varying assumptions about mortality rates. Specifically, we use the observed mortality rates for those born in 1900, 1940 and 1980.

The left panel of Figure B.4 shows the mortality rates for those born in the three different generations while the right panel shows the impact of using these mortality assumptions on the lifetime intergenerational contract applied to the 1940 cohort (all other elements of this calculation are based on the cohort born in 1940 and use a common discount rate).

***Figure B.4: How improving mortality rates impact the lifetime intergenerational contract***




The key interpretation of Figure B.4 is that as life expectancy has increased, the tax and transfer system becomes more generous on a per person basis for successive generations who spend a greater number of years at higher ages as net transfer recipients. This effect is shown in Figure B.4 by the larger negative values after age 50 when 1980 mortality is assumed. It should be interpreted in addition to the trends in Section 2 that show that the tax and transfer system is becoming more generous to older Australians on a per capita basis.

# Appendix C – Corporate income tax sensitivity tests

The economic impact of the corporate income tax falls to some degree on capital owners, workers (through lower wages) and consumers (through higher prices). However, the literature is yet to reach a conclusion as to the share of the corporate income tax that falls on each group (Freebairn (2015) and Sobeck, Breunig and Evans (2022)). In the main calculations in this report, the corporate income tax is included in 'other taxes', which are allocated equally between adult Australians. This Appendix tests the importance of this assumption to the main findings in this report.

The different assumptions for allocating the corporate income tax tested in this appendix are:

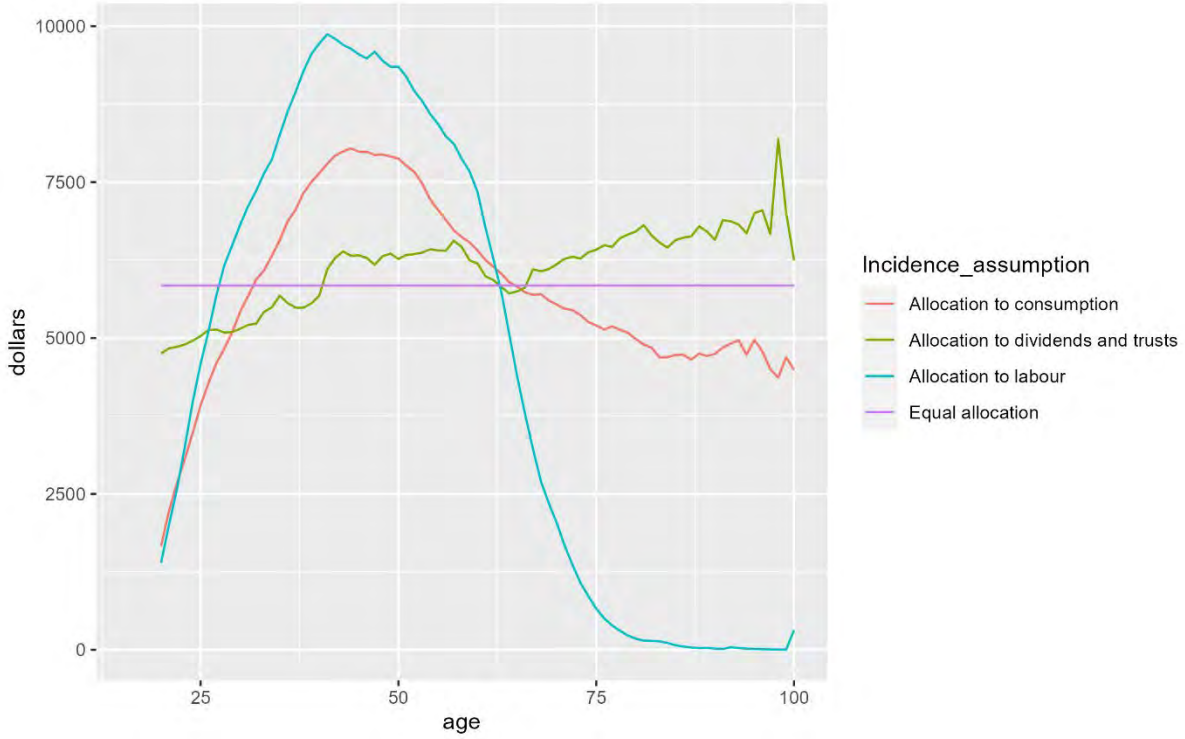
- Allocating corporate income taxes claimed as franking credits in personal tax returns (20% of total corporate income tax[23]) in proportion to dividend and trust income in HILDA, with the remaining 80% (including retained earnings, taxes paid by foreign owners, taxes where imputation credits were claimed by Australian businesses and taxes where imputation credits were claimed by Australian superannuation funds and charities) assigned equally across the population. This scenario follows the approach taken by the Commonwealth Treasury (2024).
- Allocating all corporate tax income in proportion to observed labour income. This approach is equivalent to the Chamley (1986) and Judd (1985) prediction that capital taxes fall entirely on labour income.
- Allocating all corporate income tax in proportion to consumption.[24]
- Allocating all corporate income equally across the population of adult Australians (the approach used for the main results in the paper).

The implied age distribution of the corporate income tax for these scenarios is presented in Figure C.1. As expected, an assumption where corporate income taxes fall on labour has a larger impact on working age Australians, while the assumption that corporate income falls on capital owners falls more heavily on older Australians.

[23] For the most recent year for which data are available, in 2020-21 company tax revenue was $100 billion (ABS 2018). In the same year Australian Treasury (2024) notes that three-quarters of that amount were actually distributed as franking credits, with the remainder of tax presumably kept as retained earnings. Individuals claimed $17.2 billion in franking credits on tax returns for 2020-21 (just under one-fifth of the overall annual take for that year) either directly from company dividend distributions, or via a partnership or trust distribution. For the remainder, around one-quarter ($25.7 billion) of the annual company tax take was claimed by Australian companies, roughly one tenth ($8.1 billion) by other concessionally taxed entities, including superannuation funds and charities, and the remaining one fifth ($20 billion) elsewhere, including to foreign shareholders who could not claim the franking credit.

[24] Baker, Sun and Yannelis (2020) find that around one-third of US corporate income taxes fall on consumers.

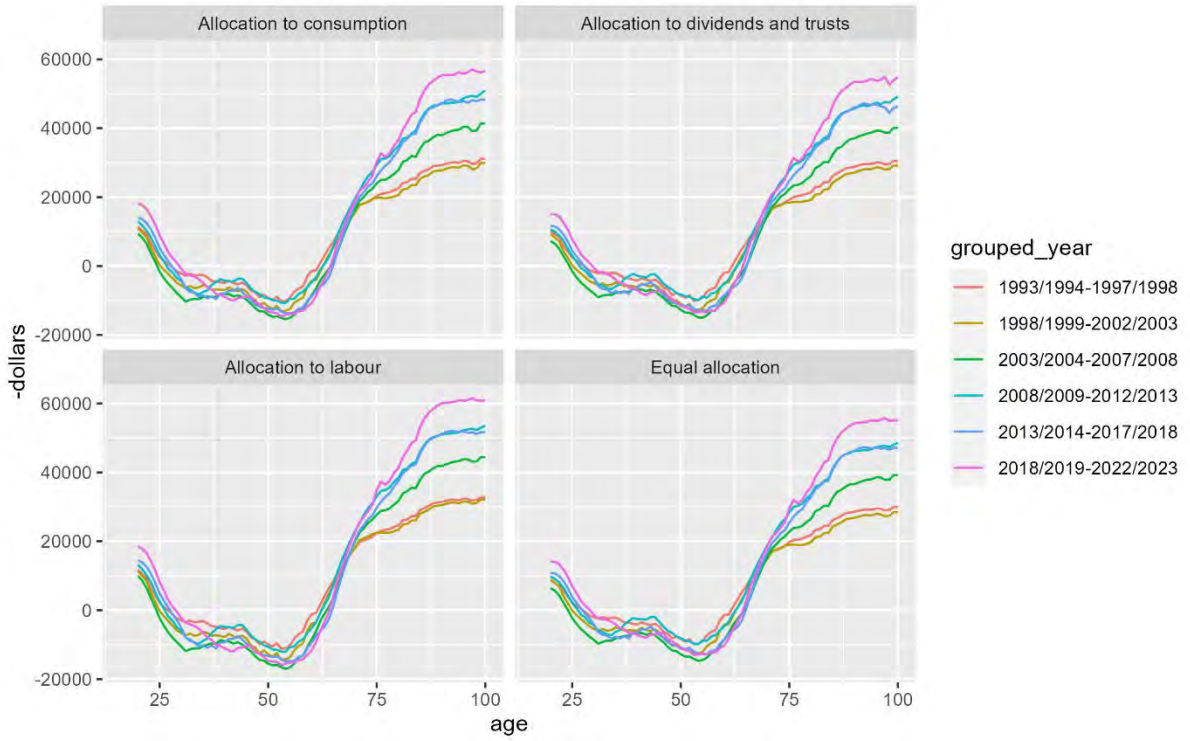
**Figure C.1: Age profile of Corporate taxes paid in sensitivity test scenarios**




When interpreting Figure C.1, it should be noted that distribution of personal income taxes in Figure 2.1 of this report are calculated net of any imputation credits. Therefore, to the extent that older Australians pay a low tax rate on corporate income as they have a low personal tax rate, this effect will be captured in Figure 2.1 rather than in Figure C.1. (For instance, an Australian with $1000 of franked dividends and no other income would pay $300 in corporate income tax and -$300 in personal income taxes using this framework).

The choice of assumption for allocating corporate income tax has a relatively small impact on the generational contract calculated in this report (Figure C.2).

**Figure C.2: Generational contract in sensitivity test scenarios**



# References


ABS (2018), “Population Projections, Australia”, Catalogue Number 3222.0.

ABS (2024), “Taxation Revenue, Australia”, Catalogue Number 5506.0.

Adams, N., Holland, C., Penrose, G. and Schofer, L. (2020), “Household Wealth prior to COVID-19: Evidence from the 2018 HILDA Survey” RBA Bulletin.

AIHW (Australian Institute of Health and Welfare) (2023), “Home Ownership and Housing Tenure”, available at https://www.aihw.gov.au/reports/australias-welfare/home-ownership-and-housing-tenure

Akerlof, G. A. (1978). “The Economics of “Tagging” as Applied to the Optimal Income Tax”, Welfare Programs, and Manpower Planning. The American Economic Review, 68(1), 8–19.

Armour, P., Burkhauser, R. V., and Larrimore, J. (2013). “Deconstructing Income and Income Inequality Measures: A Crosswalk from Market Income to Comprehensive Income”, The American Economic Review, 103(3), 173–177. http://www.jstor.org/stable/23469724.

Auerbach, A., Gokhale, J. and Kotlikoff., L. (1994). "Generational Accounting: A Meaningful Way to Evaluate Fiscal Policy." Journal of Economic Perspectives, 8 (1): 73–94.

Australian Treasury (2017), “Analysis of wage growth”, November 2017, downloaded from “https://treasury.gov.au/sites/default/files/2019-03/p2017-t237966.pdf”.

Auerbach, Gokhale and Kotlikoff (1994) and Creedy and Van de Ven (2001).

Australian Treasury (2024), “Tax Expenditure and Insights Statement”, January 2024, downloaded from “https://treasury.gov.au/sites/default/files/2024-01/p2024-489823-teis.pdf”.

Baker, S., Sun, S. and Yannelis, C. (2020), “Corporate Taxes and Retail Prices Scott” NBER Working Paper No. 27058.

Bank of International Settlements (2023), “Residential property prices: selected series (nominal and real)”, accessed at https://www.bis.org/statistics/pp_selected.htm

Barr, N. (2001), “The Welfare State as Piggy Bank”: Information, Risk, Uncertainty, and the Role of the State”, Oxford University Press.

Campante, Sturzenegger and Velasco (2021), Advanced Macro-economics: An easy guide. London: LSE Press.

Chamley, C. (1986). “Optimal taxation of capital income in general equilibrium with infinite lives.” Econometrica 54(3): 607–622.

Commonwealth of Australia (2023), “Intergenerational Report 2023: Australia’s future to 2063”.

Creedy, J. and Van De Ven, J. 2001, ‘Decomposing redistributive effects of taxes and transfers in Australia: Annual and lifetime measures’, Australian Economic Papers, vol. 40, no. 2, pp. 185–198.

Davidoff, R and Leigh, A, (2013), “How Do Stamp Duties Affect the Housing Market?”, Economic Record, VOL. 89, NO. 286, September 2013, 396–410.

Dhillon, Z. and Cassidy, N. (2018), “Labour Market Outcomes for Younger People”, Reserve Bank of Australia, Bulletin, June.

Drury, B. (2023), “Super fund performance over 31 financial years (to June 2023)”, Article for Superguide, accessed at https://www.superguide.com.au/comparing-super-funds/super-funds-returns-financial-year.

England, R. (2016). “Tax Incidence and Rental Housing: A Survey and Critique of Research”. National tax journal. 69:435-460.

Fisher-Post, M. Herault, N,. and Wilkins, R. (2022), “Distributional National Accounts for Australia, 1991-2018”, Melbourne Institute Working Paper No. 17/22.

Freebairn, J. (2015) *Who pays the Australian Corporate Income Tax?*, The Australian Economic Review, Vol. 48, No. 4, pp. 357-68.

Haig, R. (1921), "The Concept of Income—Economic and Legal Aspects". The Federal Income Tax. New York: Columbia University Press. pp. 1–28.

Hambur, J. (2023), “Did Labour Market Concentration Lower Wages Growth Pre-COVID?”, jointly released as Treasury Working Paper 2023-01 and RBA Research Discussion Paper 2023-02.

Hendren, N. and Sprung-Keyser, B. (2020). “A Unified Welfare Analysis of Government Policies.” Quarterly Journal of Economics 135 (3):1209-1318.

Hicks, J.R. (1946) Value and Capital: An Inquiry into Some Fundamental Principles of Economic Theory. 2nd Edition, Oxford University Press, Oxford.

Judd, K. L. (1985), “Redistributive taxation in a simple perfect foresight model”, Journal of Public Economics, 28/1, pp. 59–83.

Kendall, R. and P. Tulip (2018), “The Effect of Zoning on Housing Prices”, RBA Research Discussion Paper No 2018-03.

Kendig, H. (2017), “Australian developments in ageing: Issues and history.” Ageing in Australia: Challenges and opportunities, 13-27.

Lillard, R., R. Christopolou, J. Goebel, S. Freidin, O. Lipps, K. Snider and KLIPS team (2020), “Codebook for the Cross-National Equivalent File 1980-2020: BHPS – SOEP – HILDA - KLIPS - PSID – SHP - SLID”

NSW Productivity Commission (2023), “What we gain by building more home in the right places”, Research report.

Parliamentary Budget Office (2020), Structural Trends in GST, Report No. 02/2020.

Piketty, T., E. Saez, and G. Zucman. (2018), “Distributional National Accounts: Methods and Estimates 35 for the United States.” Quarterly Journal of Economics 133(2):553–609.

Productivity Commission (2013), “An Ageing Australia: Preparing for the Future”, Commission Research Paper, Canberra.

Productivity Commission (2020), “Why did young people’s incomes decline?”, Commission Research Paper, Canberra.

Simons, H. (1938). “Personal Income Taxation: the Definition of Income as a Problem of Fiscal Policy”, Chicago: University of Chicago Press. p. 49.

Sobeck, K., Breunig, R., and Evans, A. (2022), Corporate income taxation in Australia: Theory, current practice and future policy directions, Tax and Transfer Policy Institute (TTPI) Policy Report No. 01-2022, Canberra, Australia

Temple, J., J. Rice and P. McDonald (2017), “Ageing and the economic lifecyle: The National Transfer Accounts approach” Australasian Journal on Ageing 36(4):271-278.

Varela, P., N. Husek, T. Willliams, R. Maher and D. Kennedy (2021), “The lifetime fiscal impact of the Australian permanent migration program”, Treasury Working Paper.

Varela, P., R. Breunig and K. Sobeck (2020), “The taxation of savings in Australia: Theory, current practice and future policy directions”, TTPI policy Report.

Whitehouse, E. (2007), “Life-Expectancy Risk and Pensions: Who Bears the Burden?”, OECD Social, Employment and Migration Working Papers, 5 October, OECD, Paris

Wood, D., K. Griffiths and O. Emslie (2019) “Generation Gap: ensuring a fair go for younger Australians”, Melbourne: Grattan Institute.

Wood, D. (2023), "Creating a better Australia for Generation Next”, Giblin Lecture, Hobart, 30 August.